

## Opening Credits

“A Retrospective of INFCIRCs 153 and 540”

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### Chapters:

1. Origins of INFCIRC 153
2. Origins of INFCIRC 540
3. NPT Negotiating History
4. INFCIRC 66 & 153
5. The Evolution of Safeguards
6. Timely Detection & Significant Quantities
7. North Korea's Nuclear Program
8. IAEA Use of Third Party Information
9. The Inquisitive Inspector
10. Access to Locations
11. Special Inspections
12. Decreasing the Cost of Safeguards vs. Strengthening Safeguards
13. Access to People
14. 540: A New Legal Instrument
15. Universal Adherence to 540
16. U.N. Security Council Resolution 1540
17. Restricting the Spread of ENR
18. Nuclear Weapons Free Zones
19. Linking Technical Assistance to Noncompliance?
20. Environmental Sampling
21. The Future of the IAEA
22. Concluding Remarks

### Welcome and Origins of INFCIRC 153

Tom Shea: Today we're coming to you from the Inn at Loretto in Santa Fe, NM. We have a special event today in which we're going to have a Retrospective and Prospective on the foundation documents that underlie the nonproliferation regime: these are INFCIRC 153 and 540. We have the key people that were involved in creating and we'll be going around for discussions on the various topics. On my left is Jill Cooley, and I'm going to turn the stage over to her at this moment, who is my co-moderator.

Jill Cooley: Thank you Tom. Good afternoon everyone, my name is JC and I'm currently the Director of the Division of Concepts and Planning in the Department of Safeguards at the IAEA. Before joining the Agency some 11 years, I was manager of the international safeguards program in Oak Ridge. In the 11 years that I have been in Vienna, I have been directly involved with implementation and development of many of the safeguards strengthening measures that have been progressively implemented since the discovery of Iraq's clandestine nuclear weapons program in the early 90s. Specifically I've been involved with environmental sampling program, implementation of the Additional Protocols (static), development of state evaluations, and most recently integrated safeguards. To say that my 11 years in Vienna have been interesting I think would be an understatement. I think the adjectives that more come to mind are exciting and challenging. And of course, the most recent and visible thrill has been the awarding of the 2005 Nobel Peace Prize to the IAEA and its Director General Mohamed ElBaradei for and I'd like to quote "their efforts to prevent nuclear energy from being used for military purposes and to ensure that nuclear energy for peaceful purposes is used in the safest way possible". Against a backdrop of increasing challenges to the nuclear nonproliferation regime, the Nobel Committee has stressed the importance of broad international cooperation to meet these threats. And specifically recognized the role of the IAEA and the DG in this regard. Specifically, the IAEA's work was described as "of incalculable importance" and the DG was cited as "an unafraid advocate of new measures to strengthen the nonproliferation regime". In a speech to the staff just hours after the IAEA received this distinguished award, Mr. El Baradei expressed first his gratitude for this recognition, second his pride in all the staff of the IAEA—all men and women and their support--, and third his renewed hope that the international community can develop a functional system of international security that does not derive from a nuclear weapons deterrent. I believe the international safeguards community in its entirety can take great pride in this recognition and share it with us. So with that, I would like to introduce our first distinguished panelist, Myron Kratzer, and he'll introduce himself and say a few words.

Myron Kratzer: Thanks very much Jill, I want like to start by expressing my congratulations to you and through you to the entire presence and former staff of the Agency and of course to Dr. ElBaradei himself. I don't know if you'll remember this Jill, but you invited me about 10 years ago to talk to the Vienna section of the INMM—I think you were the president then. And if I could only remember what I said then, it would save us a lot of work. But to continue in the same vein of introducing ourselves, I am or was a chemical engineer. I had what I consider to be the good fortune of being sent when I was 19 years old to Los Alamos. And I spent two and half years there from 1944-46. So you can do the arithmetic if you care to. I'm now an independent consultant, which means a consultant without clients. I left Los Alamos in '46 and did a little more schooling and ended up in the petrochemical industry and decided that wasn't nearly as much fun as the nuclear business. And I returned to that in '51 to the Atomic Energy Commission and have been involved more or less ever since that time. Let me say a few words and I'll try as I go along to work in my own involvement if that's of any interest.

Let me say a few words about safeguards in the earliest days of the Atomic Energy Commission—earliest as I know them—from '51 onward. There weren't any. The word safeguards had only one meaning and that was reactor safety. Safeguards as we know it today—a system that includes independent verification, a term that I'll come back to very often—simply didn't exist. What we did have was a system of materials accountability. The name of the organizational unit that developed and applied that system changed from time to time and I could never figure out why. These were really very remarkable people, they developed materials accountancy. I'm quite sure, although I can't prove it by the record, that they invented the term material unaccounted for (MUF). Of course there was always MUF and it was always positive and pretty often it was quite large. But safeguards as we know it didn't exist because a crucial ingredient was missing. And that ingredient was independent verification of the people who were actually responsible for—in this case the Atomic Energy Commission's contractors who were running the plant, handling the material, and so on—they applied the system developed by these people. I think some of the names Doug George, Sam McDowell, are probably familiar to many of you. Let me fast forward, because my time is limited I think, which is hard for me to do, let me fast forward to Atoms for Peace. Incidentally, I was really delighted when the Director General used that term in his acknowledgement because it's a term that has more or less been wiped out of the public record over the past few years with the tendency toward making nuclear energy and nuclear power in particular the last resort—a mistake I hope we can correct as the years go on. When Atoms for Peace came along, a different group of people—not to the exclusion of the original materials accountancy experts—but a different group of people took a look at what was needed in the way of safeguards and they realized quite quickly that when the state itself was the adversary or the potential adversary, a different system had to be developed. And they produced a couple of reports that I think are long since gone. One that looked at a plutonium production complex, modeled after Hanford no doubt. Another that looked at a U235 production complex, no doubt modeled after Oak Ridge. And they concluded that an international inspectorate applying safeguards to those two types of facilities would number in the hundreds—at each facility, at each complex. This was quickly recognized as something that we couldn't handle very easily and a very crucial decision was made. And that was to develop the international system step wise—step by step—looking first at the small facilities that were then being research reactors and going up the scale as time went onward to larger and larger facilities, including the large bulkhead lead facilities such as reprocessing plants and enrichment plants. These people or their advisors who negotiated the treaty of the international agency in New York—I think that was completed in '56 or maybe early '57--did something else which was really remarkable. And that is to develop the language of the safeguards provisions of the IAEA statute. And I think all of you are familiar with those words, but they're worth repeating. And I'm not going to do it verbatim, but they're in everyone's minds. And that is that the Agency or its inspectors, shall have access at all times to all places and data and even to persons as needed to account for material and ensure compliance with safeguards agreements. Those are remarkable words and I don't think anything like them has ever appeared in any other documents, with one exception. The exception is the bilateral agreements, negotiated by the U.S. with its many partners. The bilateral agreements for cooperation on atomic energy have very much the same language, but there was a crucial difference.

And that is in the Agency statute, those words—those very broad rights of inspection—were qualified by a little phrase that isn't mentioned often, but I think has complicated the life of everyone dealing with international safeguards. And those words were "to the extent relevant" to the project or arrangement. In the atomic energy commission's bilaterals, in the U.S. bilaterals negotiated by the Atomic Energy Commission, those words didn't appear. The result was that as cooperation got going on a bilateral basis, cooperation meaning the supply of materials, the supply of services, the supply of reactors, largely from the United States, but some other suppliers through other countries, we were not handicapped by those words "to the extent relevant" and we began to apply safeguards. We had, at one time, a small staff of I think 4 or 5, maybe as many as 6 people, conducting safeguards inspections—dozens of them—overseas, largely research reactors, in those days. No one ever said to us, no one ever said to us, no country ever said to us "what you've to do is tell us in more detail how you're going to inspect this." If they had of, we would have laughed and said "sorry that's not what the agreement says, the agreement says we have the right of access at all times to all places and that's what we're doing."

Now when the Agency started to get in the business, I think all of you know that that was handicapped was the Cold War. The Soviets were anxious to appear as a country that didn't have any ties on the cooperation or benefits that it gave to its partners and they were opposed pretty much to safeguards. Finally in 1960, a couple of years after the Agency got into business, the Agency decided with our reluctant agreement, this is a point that you should not overlook, we did not want Agency safeguards documents, we wanted the agency to be able to proceed with its rights as set forth in the agreement—the right of access at all times to all persons to all data—without having to specify to the countries involved how they were going to employ that access. That didn't happen. It was simply unacceptable to the Soviets and it was unacceptable to many member states who said "well you've got to tell us in somewhat more detail how you're going to do it". And that's what set in motion the development of the agency safeguards documents that Tom referred to a short time ago and the ones that preceded it. And you cannot look at INFCIRC 153 without a brief look at those that preceded it. And I'll do that I hope in a few very short minutes, because that's when I got heavily involved in the safeguards business. A document, and you may have had something to do with it Karl, and I suppose you did, INFCIRC 26 started the ball rolling. It came up with a formula that defined the frequency of inspections that can be applied to reactors based on their power level or their plutonium production capabilities, but it had a cutoff at 100 megawatts of thermal power which of course is small and not adequate for power purposes in most cases. It extended from zero to six inspections annually, which was probably adequate for the purposes but not very many. It did set in motion something that was very very important, in addition to the routine inspections, it created the two levels of inspections—routine and special—in addition to the routine inspections which were limited to six in numbers for reactors of 100 megawatts, it said there could be special inspections as needed. That's how, as we saw it in Washington, the right of access at all times was preserved. It wasn't cutoff by that magic number of six. A little after that, there was a necessity to extend the agreement somewhat to larger facilities, larger reactors, I have in mind in particular the Indian bilateral, where they said in effect they could not go ahead

without knowing what the safeguards would be under full scale power reactor meaning Tarapur. That was my maiden voyage into the field of international safeguards for real, because there was a meeting of the Agency safeguard committee in Vienna, at which we extended it to reactors of any size. We used the formula—the frequency formula that had already been developed—but simply said that it would be extrapolated. But in the process, we said that whenever it reached—the figure was 200 megawatts—12 annual inspections per year or more, the Agency shall have the right of access at all times. Once again, the whole story of safeguards has been—at least from the U.S. point of view—has been this attempt to preserve the right of access at all times in a system that had limitations imposed by the strong desire of practically all countries to limit inspections or at least to know something about how the inspections system would be applied to them.

I'm going to jump forward to skip a lot of things on 153 so I don't take more time than I should and kind of go to the end of the road. I would like to read, if you don't mind, a quotation/citation if you wish from the official records of the committee—the Safeguards Committee of 1970 was the official name—that put together 153. Let me just read these words, “if the Agency found any discrepancies, it could carry out more thorough inspections. If the additional inspection did not satisfy the Agency, it—the Agency in other words—could increase the number of strategic points. If in that case too, the inspection did not meet the Agency requirements, it could then exercise its right of access at any time in any place.” Now I'm sure your immediate reaction will be, “well sure that what the U.S. representative—who happened to be me at the time—would have said.” The only problem with that assumption—if that was the one that you made—is that was a comment by the delegate of Japan, Ambassador Avisu. You can find it in the official records of the Safeguards Committee, paragraph 53, official record 30. In other words it was right at the end. He had it exactly right. That is what was intended by INFCIRC 153—a graduated set—in fact the term of art that was applied to them was “action levels” that would take place as needed if problems arose. In other words, if you didn't get what you needed out of routine inspections. And I have to say that to the extent that practice has departed from that concept, I think Agency safeguards have been diminished somewhat and unnecessarily so. And I'll conclude my comments—my initial comments—I'll be back.

Cooley—Thank you, thank you Myron, fascinating. Actually I'm smiling because it would be easy to listen four hours to this historical perspective. But obviously we would like to hear the rest of the story. With that, let me turn it to Rich Hooper. Rich?

### Origins of INFCIRC 540

Rich Hooper—Rich Hooper. It's a little frightening for me to realize that I've been at this in one form or another for almost 40 years. I was hired as a brand new statistician out of the University of Wyoming by Carl Bennett back in the days of the old applied mathematics department at Hanford. I bounced around the margins of safeguards really for a number of years. I had heavy involvement in the whole development of environmental sampling for a different purpose at that time and as you know now it has all come full circle.

Beginning in 1988, I rejoined the staff of the Agency as section head of the statistical analysis section. It was a time when there were really important changes that were being made and were possible by some really amazing technical innovations primarily in the NDA measurements area. Fairly soon I got involved in the inspections in Iraq, the completeness inspections in South Africa, the ad hoc inspections in DPRK, and was selected to manage what became known as Program 93+2. Shortly thereafter, I became Director, Jill's predecessor, of the Division of Concepts and Planning and saw that process through Board Approval of the Additional Protocol.

In the formative days of Program 93+2, the formative work of the Program was carried primarily in the year 1994. There was no shortage of legal opinions on how best to proceed with better equipping the safeguards system to deal with the problem of undeclared nuclear material and activities. The Secretariat itself was well equipped with lawyers. There were two senior safeguards lawyers in the legal division: Mohamed ElBaradei, who at that time was the director of external relations; also the assistant director general; and the director general himself—all lawyers.

There were three possibilities that were identified. One was to request the Board to approve, modify, or expanded interpretation of the existing measures in INFCIRC153 and there was precedent for that. When I talk about modified, I'm talking about it in the sense of modified from practice as it evolved through the previous 20 years, not necessarily modified from intent. The second was to amend INFCIRC 153—formally amend it. The third was a new legal instrument. As time went along, all three avenues were utilized with some qualifications. There were a number of corrections that were simply made. The correction to the definition of a facility did not require any action by the Board and that was an important change and that was done in the early days of 93+2. There were a number of requests that went to the Board to expand upon the existing practice with respect to information to be provided by states under 153. These were the so-called Part I measures of Program 93+2. While most of these things had been presold—there had been extensive Board discussions of all these proposals prior to the Secretariat request for formal action in June 1995. But they went forward really without dissent at all. Then came the remaining measures. Do you amend INFCIRC 153 or do you create a new legal instrument? This was followed in 1995 in the Summer with Part I of 93+2, a year of sort of informal negotiations. This involved the production of two what were called discussion drafts for the Board of Governors. It was discussed at length by the Board and finally the conclusion was that this informal process couldn't carry the process further and what was needed was face to face negotiations with the states. The Board agreed and that was the creation of Committee 24.

The amendment of INFCIRC 153 was seen as time went along that it would be controversial in its own right and very difficult and that that was the political and legal decision that was taken to eventually proceed in a different direction—the creation of a new legal instrument. But in fact, some of the measures contained in that new legal instrument in effect amended 153, not the technical measures of 153 but the administrative measures. As time has gone along and as Myron is certainly much more acutely aware than I, and as I have remained involved as a consultant in all this, I find

myself continually fighting for the intent as practice has evolved what was really intended. I am in a closer position to influence that than maybe some of the creators of 153 were at the time. But it is a really difficult battle.

At the beginning of Program 93+2, I went to considerable effort and I was certainly in a position to find out why did things develop the way they did. Why the focus on declared vis a vis undeclared, where the basic undertaking of states clearly provided the possibility of both. Special inspection—special inspections is defined to be any inspection that's not routine and ad hoc. Why didn't special inspection develop as a routine tool?

Arrangements were made for me to spend a couple of weeks with David Fischer, who from the Agency side certainly was a very experienced and knowledgeable observer and participant in all of this. But in the end, the conclusion I came to was all these questions are largely rhetorical—that there is no answer, it just is that way.

The Small Quantities Protocol. The first time I read the Small Quantities Protocol, I was simply horrified. How could such a thing have evolved, how did it evolve? I know why it came about. But the instrument itself, believe me you cannot find anybody, there are some sort of references to dead people. The Board recently, and Jill had heavy involvement in this, has taken action now to start correct some of these problems. The first time the Small Quantities Protocol was ever surfaced was when the Secretariat was simply reporting model language to the Board for safeguards agreements. It was a one page attachment to an INFCIRC—not an INFCIRC--a GOVINC document in about 1972 or 73. It was never discussed. To say its important is an understatement—two thirds of the states have or would be expected to have a Small Quantities Protocol. So it's not a small thing. Again where did it come from? Who did it? Who approved it? Those answers are lost. At this point in time, it doesn't really matter very much.

INFCIRC 540 is, if you look at it from the perspective of states and their agreement to sacrifice so much of their sovereignty in the name of this business—that in itself is reassuring. Now, progress towards implementation in a number of states has been slow but it was slow with INFCIRC 153 at the time too. But 540 is a remarkable, highly intrusive instrument and it certainly does strengthen the Secretariat's hand with respect to dealing with the overall safeguards problem. And with that I will stop.

Cooley: Thank you Rich. I think this issue of intent vs. practice is extremely important. I'm very fortunate to have Rich as a consultant because as we proceed with implementation of 540, there's many many things that are in danger of being used sparingly by the Department and so we have to keep reminding ourselves of the intent for which it was developed and to implement and use our rights. So let me introduce our third distinguished panelist, Ambassador Wulf. Norm?

Norm Wulf: My name is Norman Wulf. And I am I guess the newcomer up here. I didn't get into the business until '82. So compared to these two, I'm sort of a neophyte. I won't go through my history except to say that in the Arms Control and Disarmament Agency—some people remember that Agency with affection—I was the Deputy Assistant Director of the Nonproliferation Bureau for about 16 years. About 12 years

after becoming Deputy Assistant Director, I was asked to be the U.S. negotiator to Committee 24, the committee that negotiated the Additional Protocol. I should also say that Committee 24 didn't come and start with a blank piece of paper. Rich Hooper and his office presented us with a draft and the Committee worked from that draft throughout its entire time. And I would say probably the major features, that is to say, the expanded declaration required by INFCIRC 540 and the right of complementary access—those were two features that were there at the beginning and they were there at the end. You may then say well what the heck did you do Wulf in the negotiating process? I think the short answer, is that most of the rest of the other articles came as a result of negotiating process—not all by any stretch. It was driven in large part by a negotiating process that ended up with essentially Germany, Spain, Italy, Japan, and Belgium on one side and perhaps the United States on the other. With the five being much more interested in ensuring that there were adequate protections for states rights and the U.S. trying to protect an aggressive form of inspection activity. As with any negotiations obviously there were compromises on both sides. It is interesting that about a year after I retired, Mohamed asked me if I would serve on a panel of experts to evaluate how the Department was doing with its implementation of the Additional Protocol. At that time I think there were only five countries that had qualified for integrated safeguards, which was a very early stage to be doing such an evaluation. I think it's fair to say that the result of that evaluation led to some criticism by some of the directors of the Ops Division of the compromises we had made in Committee 24. But it was a negotiation and compromises had to be made. Generally speaking, I think the impression was that the document does serve as Rich has characterized as a significant strengthening of the Agency's rights. With that I'll stop and see how the questions go.

Shea: I'm Tom Shea and I've had the privilege to engage in the implementation and extension of the framework created by these two documents from the completion of my doctoral studies in 1970 until the present time. I designed and built safeguards instruments early on. I worked in Washington at the AEC and NRC laying the groundwork for domestic safeguards, particularly in the time when we were considering some expansions—plutonium related work. 24 years at the IAEA in a variety of assignments—first involved in systems studies area—helping to establish the foundations for traditional safeguards, interpreting the language that ended up in 153—significant quantities, timely detection, things of that sort. And then I headed a section of inspectors that was responsible for implementing safeguards in Japan, India for time, Indonesia, Australia, and a few other places. In the last years, I headed an activity called the Trilateral Initiative that was attempting to go into the arms control area to come up with a verification system for weapon materials even classified objects in Russia and the United States. That went on for six years and had a total of 94 trilateral meetings which I thought was really something of a record in and of itself. It didn't survive the transition from Yeltsin to Putin administration or from the Clinton to Bush administrations, but the work is there and maybe one day we'll come back. I also had a hand in studies related to the FMCT while at the IAEA and also the Comprehensive Test Ban Treaty. Today I'm involved in policy studies at the Pacific Northwest National Laboratory and our Center for Global Security; we are providing advice to the National Nuclear Security

Administration, which is the sponsor for this activity today. So it's been my great pleasure to co-moderate this Retro and Prospective activity.

We've now dealt a bit with the origins of how these things came about; we'll go back around the room. Jill, I guess I'll come back to you and see if you have questions or might want to lead off. [NPT Negotiating History] Well I guess I'd like to ask Myron maybe, to go back a bit on the standpoint. George Bunn has provided us with a summary of how Article III of the NPT came about. When we put our DVD together on this event today, we'll include George in some way reading this note or giving information. But he said in discussions on Article III, the safeguards article, that this was the time of a bipolar world, U.S. delegates and Russian delegates—Soviet delegates—were really the key to finding a treaty that would make its way. There were a lot of ideas going back and forth. Apparently what was happened was that in a walk in the woods in Geneva, George and Roland Timerbaev came to an understanding of how this might go forward and they drafted language. Both sides were under instructions by their capitals not to get into this kind of a topic and so in reporting this, each reported it as a proposal from the other side. What a clever way to get around this. George indicates that their delegation informed the Secretary of State as to what had actually happened, so there was no hoodwinking. But the compromise was on the table, and that then allowed the treaty to actually come into being and that set up the basis for the verification system and 153, which the deficiencies, the cracks started showing up around 1990 and that led to the segue into this. So coming back to this earlier stage, maybe you could remark on how the IAEA was chosen to be the verification authority, how it was decided that a model agreement--certainly 66 was not a model—what was involved there?

Kratzer: Well I'd be happy to answer those questions, Tom, but if you don't mind I'd like to add a post script to George's excellent summary of the negotiations on the Treaty itself. The post script is that, and George himself in some correspondence that we exchanged beforehand, acknowledged that there were other things going on that he being completely absorbed and stuck in Geneva where the main negotiations took place, was not directly involved in. There were in fact a set of parallel negotiations on Article III taking place at the same time. And one of those negotiations was above all with Germany. If you put yourself back in the conditions of 1970, the temper of the times was that, no matter how many people, no matter how many governments accepted the nonproliferation treaty, if there was not German adherence, it would not be a successful treaty. And the reasons for that I think are pretty obvious. It was not that long after the end of World War II, there was a great deal of animosity still between the Soviet Union and the Federal Republic of Germany. Germany, along with us, and most other industrialized countries felt very strongly, this was at the very height of optimism about nuclear power. And Germany felt that nuclear power would be a very important industrial activity. They were very concerned that safeguards and inspections that went along with it would affect their nuclear industry in two way: first by resulting in industrial espionage—inspectors gaining access to industrial secrets and passing them along to their home governments or others; and that it would just burden the activities at nuclear power plants and what have you with inspections. In addition to that, the third factor was the European movement was extremely active. If my memory is correct, the

UK had not yet become a member of the European Community, but was on the verge of doing so. Euratom had its own inspections system and that was a very very major obstacle to Article III as we know it today of the Nonproliferation Treaty. Euratom wanted to preserve its exclusive right of inspection in its territory. In fact, the whole thing, I should have said earlier was a three-ring circus. There were the bilaterals, there was the international inspections in other words international safeguards as conducted by IAEA, and there was Euratom. And there was tension between these two. The bilateral-IAEA tension had pretty much dissipated by the time of 1970 and the Nonproliferation Treaty. But the Euratom tension with the Agency was very much alive.

So there was another negotiation going on with Germany and I was part of that. And our negotiating partner was someone known very well to you Gotthard, Wolf Hafila. And Wolf had the idea that the right way to safeguards was by looking at the flow and inventory of materials at strategic points. And he coined the term strategic points. It's obvious from what I've said that Germany had a great deal of negotiating leverage because of the feeling that their adherence to the Treaty was essential. So in parallel with the negotiations going on in Geneva, which Germany was not a part of, because they were not a part of 18 Nation Disarmament Committee. We sat down with German colleagues both in Bonn and in Washington and worked out the language that you'll find in the treaty that refers to strategic points. Now we didn't feel we had lost anything. We felt that this is the right way to do safeguards. When you go to a plant, you don't inspect the men's room or the ladies room. You'll notice how even-handed I was in making that comment. You go to where the materials are and look to see if they're all there and you try to measure their flow. So there's nothing adverse as we saw it, about agreeing that the concept of strategic points should enter into the safeguards system formally. What we didn't want to do, and if you look at the language in the NPT and we succeeded in the NPT of ensuring that it would not be the exclusive means of conducting inspections. That's an answer to a question you didn't ask.

Now the answer to the question that you did ask, how was the Agency chosen. I can recall, not a single instant, that there was any question, that to the extent and this is important, to the extent that the international inspections under the Treaty were assigned to international organization, that organization would be the Agency. The big issue was Euratom. How can we overcome this obstacle and it was an obstacle of Euratom feeling it had the exclusive right of inspection in its territory. And the United States was very sympathetic to the Euratom thing. We felt that the European Communities at least were on the way to solving the age old problem in Europe of enmity between various countries. I remember the Secretary of State saying just exactly that in the safeguards context—we feel that it makes sense to have these countries inspecting each other and they did so and they had the system for doing so and they didn't want to lose them and they didn't want to weaken them. I can't go into the details, but it was solved by a handful of words in Article III that said nations or groups of nations can enter into safeguards agreements with the IAEA. Now Euratom may have felt that that still allowed them as a group to have more or less exclusive rights or a very thin veneer of Agency safeguards. The Soviets would have no part of that. And what was required was some principle that said "yes Euratom can continue safeguarding but in doing so and the

Agency, even though it can make use of Euratom's results, Euratom's inspections, it must satisfy itself". And those words in much more flower language than I can apply to them were embodied in three principles that were, and I even don't know who the author was, but there were three principles, they were engraved in the record of the 18 nation disarmament committee and they were engraved in the record of the United Nations General Assembly when the Treaty was presented to them. They gave us what we felt was the leg up that we needed to ensure that in Euratom territory, the Agency even though it would make use of Euratom records and make use Euratom data, it still had, let's put it bluntly, the upper hand and that it had to satisfy itself. We translated that into this term "independent verification". It was Committee 22, its surprising that there were only 2 board committees between 1970 and 19-whenever Committee 24 met. But, it was Committee 22, the safeguards committee of 1970. In the opening statement of the U.S. representative, Ambassador Smythe, you will see the words "independent verification" and its underlined in the official record, which is unusual because he underlined it when it was given to him in draft to review. And that was really our goal, we had several goals. We were prepared throughout those negotiations to be as accommodating as we could, to adopt language that made people feel more comfortable with safeguards. But there were several things that we were protecting and one of them above all was "independent verification". We didn't think that was going to be so tough, we thought the main issue was Euratom. We thought that the three principles would give us what we needed. But somewhat to our surprise very early in the negotiations from a different source and I'll be very specific because we're all friends here. The Japanese delegation said well really the only thing that safeguards needs to do is make sure that the national system is a good one, that its inspecting adequately, has good standards, has good technical capabilities. Safeguards job is to see that they're doing their job well. We would have no part of that and that led to one of the provisions of INFCIRC 153 that really was one of the major items, major areas, I've forgotten the number, I think it's about 7, paragraph 7. Paragraph 7 which goes into some details about the role of national systems and the essentiality of agency independent verification of not just their findings but of a basic obligation not to divert materials to unauthorized uses. We felt so strongly about that point that the U.S. statement, which I had the fortune of giving, the U.S. statement on that point in Committee 22 is in the record verbatim, in the official record verbatim. That wasn't normally done, but we asked that our statement be in there verbatim. Afterwards we had the chairman, who incidentally was Ambassador Waldheim of Austria of later fame, maybe he was famous then but he became much more famous later as the Secretary General of the U.N., we had had him poll not state by state, but he asked by pre-arrangement, several states, several representations, delegations if they agreed with our interpretation of Paragraph 7 and its in the record that they did so. So that was one of the things we were protecting, independent verification, there were several others, but let me stop at that point so my colleagues can give me hell.

### INFCIRC 66 & 153

Shea: Let me fire back just a come back question of 153. How did it get started? Who did the first draft and how long did that committee take to conclude its work?

Kratzer: Well the committee, the draft and it was an excellent one, was prepared as is customary I think by the Secretariat. The Director General in those days was Rometch—very dedicated, very competent fellow. He came to the job with an enormous background in our opinion. We had that opinion because we were certainly among those who proposed that he take the job. I went to Belgium to try to talk him into it. Rometch was a Swiss chemical engineer probably, but he was in charge of Eurochemic in Moal, Belgium and that's how I came to know. And that was excellent preparation for the safeguards job, because it was safeguards, and it was safeguarded interestingly not by Euratom, but the European Nuclear Energy Agency. In those days, it had its own inspectorate. And the draft was a good one.

Now, the thing about INFCIRC 153 which you've commented on INFCIRC 153 as being unusual and it was. That is that unlike the previous documents--INFCIRC 26 and 66--which were identified on the face of them, on the cover as the Agency safeguards system. This document says that the form and content of Agency safeguards agreements so you have the words in front of you.

The reason for that is two fold. First of all, we were very reluctant--and this goes back a long way to our basic feeling that it would be better if there never had been any safeguards documents and the Agency simply did what the Statute said it can do—have access at all times to all places. Coupled with that, the conventional wisdom was that every time you review the system, it got weaker. If you look at history—that isn't really true—but nevertheless that was the conventional wisdom. The other part of it was that, the NPT says that countries shall enter into agreements with the Agency, or groups of countries, meaning Euratom, shall enter into agreements with the Agency in accordance with its Statute and the Agency safeguards system. Now as we saw it that meant the Agency safeguards system—INFCIRC 66—as it existed at the time the Treaty was written and signed. I don't think you can give it any other interpretation. And we were very concerned that if you started from scratch and created a new system, you would really be in the soup with this process of weakening. So the technicality, now in reality—I think the reality is clear that INFCIRC 153 created a new system—but the technicality of it is—the legal technicality--my legal colleague who is practicing law without a license is that formally we didn't replace INFCIRC 66, we merely adapted it to use in the situation of countries that have become parties to the Nonproliferation Treaty. So that's the reason for that. We didn't want to lose too much. We didn't want to give the Agency too much wiggle room—or member states really—too much wiggle room to weaken it. And we didn't want to run afoul of this language in the Article III of the NPT that says it shall be in accordance with the Agency safeguards system. So its essentially a model agreement. And I think that's been a benefit all along, that you've got it as it is warts and all.

Someone commented earlier on this question of—Rich commented earlier on the question of declared material and that to me is the mystery of the ages. How anyone could pick up this document that says in Paragraph 2 that the Agency's obligation—right and obligation—is to apply its safeguards to all material and to end up saying well all we really have to do is apply our safeguards to declared material is to me the mystery of

safeguards. Which has not been solved, which I think has led to great difficulties; certainly it was a critical factor in the Iraqi experience of 1991.

Wulf: I had a question to Myron's comment, when he says that the safeguards system as foreseen by the NPT, the time it entered into force was INFIRC 66 and then I think you then have to take the next step and say it evolved to 153. I think what we're seeing now is a similar evolution of 540 in combination with 153 will evolve to become the safeguards system as contemplated by the NPT.

Hooper: The issue about and the way that the practice of safeguards evolved over the years meaning is—and certainly Myron's point as to how did all nuclear material in Article 2 get interpreted as meaning declared nuclear material? The implementation of safeguards by the Agency—comprehensive safeguards—for its first 20 years by any standard was a very defensive kind of implementation. Why did it turn out that way? At the time, there was great concern in states as to what this new system was going to look like. While Western European states had experience with nuclear material accountancy safeguards, other states did not. Japan in the creation of its SSAC and the language that they had preceded on all these years, I think very much shows the apprehension that they had with respect to this new system. False alarms and the political effect that false alarms and the impact that that would have on their access to technology led the domestic law in Japan to create a system where they themselves come to their own independent conclusion as a way to protect themselves and to deal with their apprehension as to what this new system might mean to them.

### The Evolution of Safeguards

I think that over the years, member states, the Secretariat, have found that the most effective way for them to limit the implementation of safeguards in their territory is to limit the resources available to the Agency. I think that that is changing now, but certainly the safeguards as they have evolved—comprehensive safeguards—as it evolved for its first 20 years, it evolved in a defensive environment of defensive implementation by the Secretariat and a lot of apprehension and concern on the part of states on what this new system would mean to them. I think that that combination of things led to all material in Paragraph 2 being interpreted as all declared material. The very first time in the implementation of safeguards, the first time the Secretariat addressed the question of the completeness of states initial report was at the time of South Africa. And that occurred at the time of the General Conference in 1992. Now it's become common practice since that time. But the implementation of safeguards proceeded for 20 years with the tacit assumption that when states comprehensive safeguards agreement entered into force and they met the requirement to submit an initial report, the question of the completeness of that initial report, the Agency simply proceeded with the tacit assumption that that initial report was complete—that it did not attempt to assess or evaluate the completeness of that. As I said, South Africa was the first time.

Shea: There were considerations in conjunction with the bombing of the Osiraq reactor. We were involved in developing the safeguards approach, at that time being concerned with undeclared production at that facility. To my knowledge that was the first time

where we had actually taken up that issue. And talking with the people about how such a large research reactor as it was called could be constructed and how it was to be viewed. The safeguards approach that was evolving was looking to detect the introduction of undeclared fertile material to the core. That was the first steps—methods—that were available—pretty primitive at the point. Israel came along and the situation changed and it wasn't so necessary. There were these times that came along, my recollection from being at the department from '77 on is that there were no cases where we raised the point of these other issues where the answers didn't come down from the DG typically. These matters were the subject matter of national technical means, but the Secretariat did not need to concern itself with this.

Hooper: Well there is inherent in all this an assumption. And that assumption goes back to the negotiations of 153. And that is that the information necessary to motivate and justify, for example a request for a special inspection, that this information would come from third parties. Never happened. And I think there's a whole variety of reasons why it didn't happen. The first extensive use that the Secretariat, there were specific instances prior to this, but the first use where the Board itself is involved of extensive third party use was Iraq in 1991.

Kratzer: You're probably right in terms of the first use, but Tom you're right about the focus on the Osiraq reactor in Iraq. There was a great concern that its capacity gave it the ability to make probably a significant quantity a year, maybe more.

Shea: It was rated at 45 megawatts, we felt that with modifications to the heat transmitter, it could go to 70-75 easily.

Kratzer: Right. After the reactor was destroyed, there was a great outcry about this. The then Director General at the time, Mr. Groom, Dr. Groom, stated that the Agency had been prepared, had the reactor gone into operation, to apply measures that would allow it to take that into account, to determine whether any undeclared material was being irradiated and converted in plutonium. Why that should ever have been even an issue on a declared facility at a declared site is again one of these mysteries in my mind. It didn't really address the question of the undeclared facility or the undeclared location.

And that really came into play with North Korea. Certainly during 1992, I don't remember exactly when it started, it was discovered that North Korea was already in my view in default of its nonproliferation obligations because they didn't negotiate and conclude a treaty with the Agency in the time schedule that the Treaty required them to and nobody really called them on that. I mean there was a little handwringing, but nobody really went to the mat and said you're in default of the Nonproliferation Treaty because you haven't concluded an agreement with the Agency. At some point, they finally did. By that time though it had become well known through U.S. means that were made available to the Agency that they had what from all appearances was a large reprocessing plant. And that information was shared with the Agency. Probably that step led them to decide that they may as well sign the agreement with the Agency because the reprocessing plant had been detected and revealed. And anyway whatever it

was, they invited Dr. Blix to go out there. He went out there with a team, he saw the plant and they said this our radiation laboratory or some words to that effect. A very large reprocessing plant that you've probably seen photos of.

After the North Korean incident, in 1992, beginning in 1991, the meeting in December of 1991, some 6 months after the Gulf War ended. As a direct result of the findings by the teams that went into Iraq, that the Iraqis had been engaged on the very location of their major nuclear facility where the Osiraq reactors and other things had been situated, undeclared activities in buildings that the inspectors simply walked past. The Director General, Dr. Blix-- it was never called a review, it was never called an investigation--but he undertook some very serious reviews of the situation. It was an Agency conducted thing which I think is absolutely essential that the Agency do these things itself, but there were some outsiders and I had the opportunity to be one of them, to come in to give their thoughts. The thing that stood out was this whole idea that the Agency safeguards had become by whatever means, default I'll call it, confined to declared activities was what we zeroed in on. The result was a Board decision, which I have in front of me, in February of 1992 that said that the Board urged the full exercise of all Agency rights and obligations as provided in all comprehensive agreements which provide for the application of safeguards to all nuclear activities in all peaceful activities. The Board reaffirmed and we were careful to insist that the word reaffirm be used because it wasn't new, the right was always there. If we took the position or allowed others to take the position that this is something new, countries could say but we didn't agree to that. They did, they did when they signed their safeguards agreement. The Board reaffirmed the Agency's right to undertake special inspections when necessary and appropriate and to ensure that all nuclear materials are under safeguards. Then it went on to say that it anticipates that these special inspections should only occur on rare occasions. Now what seems to me as a semi-outside observer, has happened is that the Agency to some extent has given not very much support to what the Board urged them to do and has overemphasized what the Board said it anticipates would happen, that it would only be used on rare occasions. Well of course they would only be used on rare occasions, because noncompliance is rare. Most countries are in compliance with their safeguards agreements. You don't need special inspections every time you sneeze.

Shea: I think we're going to take a break now. When we come back, we're going to open the floor up for questions. And then we're going to come back and one of the matters we want to get into I think is the matter of special inspections and expanded use of ad hoc inspections which also wasn't fully exercised in my mind. So we're going to break now.

### **Timely Detection & Significant Quantities**

Shea: So we're resuming again. The first question that we have is to be posed by Jim Larrimore who is just a wonderful person, whom I've had the great pleasure to know for a hell of a long time. Jim is, among other things, is the director of the division of the INMM that deals with international safeguards. The workshop that will begin this evening, the joint workshop between INMM and the European Safeguards Research and Development Association are taking place at the same time. So we're benefiting from this joint activity. Jim?

Jim Larrimore: Thank you very much. I'd like to ask a question about 153. The objective of safeguards, Paragraph 28 I believe, is what drives a lot of the actual activities and it says that the objective of safeguards is the timely detection of significant quantities of nuclear material. The question to Myron, I guess, and maybe to Rich, where did that come from? What did it mean by significant quantities at that time and how does that relate in your view to this concern about small activities and states which are not involving significant quantities—was that in mind? And then the second part was what did timely detection mean to the framers of this thing?

Kratzer: Well I'll take a crack at it unless you have some comments, Rich. Well I think Jim you have put your finger on the point that there were no numbers connected with those two words: Timely detection or significant quantities. I guess the big answer is we didn't know. The development of the quantitative measure of those came somewhat later as you know and significant quantities were defined very roughly as the amounts required needed to make one nuclear explosive. Timely detection was defined very roughly, and I think probably erroneously—not conceptually erroneously, but the numbers chosen—was defined as the times required to make the conversion from whatever material you were dealing with, whether it was natural uranium or low-enriched uranium or what have you to presumably metal or nuclear explosive components. I did not do that. That was done after I left the scene because I left AEC shortly after the conclusion of the 1971 negotiations. In hindsight, I think it's pretty clear that some numbers were needed. In some ways, it's troubling let's say that the concept of significant quantities has come to mean what you need to make one nuclear explosive because who would make one nuclear explosive? If they tested it, they'd have zero. If they didn't test it, they would have one that they were doubtful about. So it's probably not real. And I've also played around from time to time—not in any official capacity—with the concept that the significant quantity should be a floating number, what's significant for Iraq or Iran and they could make all kinds of trouble with it and as my friend used to say, ruin your whole afternoon with one. It wouldn't be significant or rational for a large country who decides to become a nuclear weapons state—it makes no sense, I won't name any—but big countries with big national security interests and so to have one nuclear weapon. They're either going to have none or a lot of them. But that's the only answer I can give you. We didn't know then what the numbers should be and we left them out. They were supplied later in the form that you all are familiar with.

Hooper: I see Carl at the microphone so I'll just introduce what I anticipate he's about to say. And that is that then Director General Eklund created a Standing Advisory Committee on Safeguards Implementation and it has remained an important body in the Department's work all these many years. This creation of this standing advisory committee, one of their first tasks was to advise the Director General as to what value should be assigned to things like significant quantity and timely detection and Carl was the first U.S. representative to SAGSI and Carl's at the microphone.

Carl Bennett: What I really wanted to say was that the business of significant quantities and timely detection was a preoccupation almost exclusively of SAGSI for the first two

or three years of its existence from about 1976-1979. This was a time when there was a lot of discussion as to exactly how these things should be defined and what timely detection should become. I suspect that if one went back to the SAGSI reports Eklund back to the Director General of that day are available I'm sure, at least diplomatically—through diplomatic channels—if not in the literature. They contain a lot of discussion of just exactly the points with respect to this that you're bringing up.

Shea: Before you go away, during the discussion period when these things were being determined, there were several things going on. First there was a panel convened by the United Nations, not by the IAEA, around 1968 if I remember correctly which gave advice on the amounts of materials that were necessary for the manufacture of a nuclear weapon. And those were the quantities that stuck, they weren't changed at all. 25 kg of U 235 of enriched U, and 8 kg of Pu, and 8 kg of U 233. In interpreting this significant quantity issue, since some of us know that for example in the Nagasaki weapon, there are open publications indicating that there were 6 kgs of Pu in that. Clearly this number was something which didn't have much of a bearing on actual matters. But if you start from the standpoint of a state acquiring its first nuclear weapon, assuming that it doesn't have collusion between states or among states, and they don't have a certified design that's been proven, then they're going to be more conservative in their design and there are going to be losses of all sorts in the manufacture before you actually get to the first one. So the 8 number I always thought on balance was not a bad one. Maybe Rich also can talk about during 93+2, a question was put to the P5 as to whether these numbers were still meaningful.

But at any rate, coming back to Carl's interjections, I know that he was very much involved. I was working the SAGSI side from the Secretariat during the time that these issues were being developed. The sense of how you would define these parameters without...I was concerned that we ended up with a statement about protracted diversion putting the number for one year as though there were something magic about that. I was also anticipating that SAGSI would go beyond but we had a negative environment, shall we say in SAGSI at that point that sort of poisoned the idea that we could start to look at political questions—the size of a facility and what its needs might be. Carl maybe you could join in and come back?

Bennett: I only wanted to add one thing at this point, and as you said there was not necessarily the atmosphere to accept too many things at that time for some reasons. But on the other hand I want to go back to since I'm trying to stay on a technical basis here. But our whole discussions at that time was based on the technical idea that goes clean back to what Myron remembers from INFCIRC 26 and that is the idea that one needed an inspection when an accumulated uncertainty had reached a certain level. This whole technical idea is behind a great many of the things that evolved later in terms of timely detection and significant quantities.

Kratzer: I think the question of whether the number was 6 or 8 or 20 or 25 is not terribly important and not what I was really trying to get at. The concept of what a significant quantity should be is always what it takes to make one nuclear explosive. Is that a sound

concept? I think its unchangeable. People can play around with the numbers but I think that's an unchangeable concept. Even though I think you could make an argument that it should be variable depending on the country you're looking at, which could have some fairly profound effects on the nature of the inspection program.

Shea: But don't you think—and I'll open it up to any respondents at this point—that the current practice for example of looking at environmental samples in countries to give information that there may be some activities that haven't been declared, that that's a significant finding in and of itself. So the fact that Paragraph 28 says something which has been the basis for the traditional safeguards system for putting parameters in place that facilitate implementation. The reality has now shifted to looking to breaches of Paragraph 2 questions of failure to disclose.

Cooley: Well I think this also comes back to Jim Larrimore's second question with regard to smaller quantities. Everything is focused on significant quantities and certainly in the last couple years with the incidences that have been revealed of undeclared activities in a few states using small quantities. The concern was raised internally by the Director General—in terms of is it time to relook at significant quantities? In looking at what our activities are at declared facilities, not going into the whole issue of the Protocol. The idea of using significant quantity and timely detection to set out what sampling plans are and how frequently you go is just the start of it. That's not the only thing we do for safeguards. Every facility in the criteria that we use for planning and implementing safeguards also has an element of looking for undeclared activities, undeclared production at a reactor, undeclared enrichment at an enrichment plant, looking at these smaller quantities. When you start looking at do we need to redefine these, the thing is safeguards has a number of elements and that only drives a certain aspect of it.

Kratzer: Absolutely. I think that if we've learned anything, it's that these activities are what we really should be focusing on, not to the exclusive of classical diversion. From all appearances that's what you should be worried about.

### North Korea's Nuclear Program

I'd like to go back to the North Korea thing, the Agency and I think this is to their everlasting credit discovered independently, it didn't depend on any hints or imagery or what have you from anyone else, that the initial inventory provided by North Korea when it finally got around to entering into a safeguards agreement was wrong. They didn't accept it automatically as you said was the practice before. They did some very clever work. They discovered that there was some plutonium lying around that had an isotopic composition that didn't coincide with what they had been told. Therefore there had to have been some reprocessing that take place that the North Koreans did not own up to. Therefore there was some plutonium somewhere in North Korea that had never been declared. Certainly at the time, the Agency didn't know how much plutonium was involved. To the best of my knowledge, I may be wrong, I've been out of the picture for a long time, they still don't know how much plutonium was involved in the initial North Korea concealment and false declaration. But the significant thing is that they did it.

After many many conversations between various people including the Director General and the North Koreans, without any satisfactory explanation, they went to the Board and asked for access to a place namely some suspected waste tanks that the North Koreans rejected. And then without any further ado, they were found to be in noncompliance and referred to Security Council, which incidentally did very little. But that's really not the point. First of all, that's not the Agency's department. Secondly, what the Agency did was to set in motion a remedial program that resulted in the so called Agreed—was it the Agreed Framework? As a reward for their noncompliance, they were to be given two full scale nuclear power reactors. You can argue with whether that was a good thing to do or not. In hindsight it doesn't seem to have been very smart, but the point is that they were caught. To this day, I contend, that if they had not been caught by the Agency, we would be in the dark. They would have been well along on their program of concealment probably having what they now claim that they have, without anyone being the wiser.

Wulf: Can I just say a couple of comments? This was the first time, at least in my experience, that the United States Government took satellite imagery and showed it to a group of foreigners, with respect to the North Korean waste sites. Secondly, whether the Agreed Framework was or was not a good idea, I'll leave to others to decide. Since I was on the negotiating team, I kind of think it was a good idea. We were basically faced with the choice of having a continuing violation of Article III of the NPT, or an immediate violation of Article II; I think we made the right choice. I contrast that to what's been happening since the cheating that occurred by North Korea in 2001. Since that time they've taken the spent fuel, which we know the quantities/amount of plutonium—at least we have a pretty good idea—the amount of plutonium that was in that spent fuel and they've reprocessed that. The Agreed Framework could have prevented that. Their 5 megawatt reactor has been operating continuously I think since roughly 2003 producing roughly--you all are the experts--but I think it's about a bomb's worth of plutonium a year. So I'm not very impressed with the present approach of dealing with the North Korean nuclear crisis. It seems to me it's getting much much worse. The idea of perhaps building, at least pouring a lot concrete which is all its ever done to build 2 light water reactors in North Korea seemed to me at the time and continues to seem to me as a good idea. Why would anybody in their right mind, who has their hand firmly on the plutonium side on the North Korean program take their hand off that because they're starting to develop on the enrichment side. Why wouldn't you just slap the hand on the enrichment side and keep the other one in place?

Hooper: A couple of comments. I want to emphasize that these idea of significant quantities and timeliness are accountancy ideas. Significant quantity is at this point in time largely arbitrary. There were times in the past when the Secretariat has gone back to what they call the technology holders and asked them whether these numbers were still the right numbers and each time when they do get a response, the answer is yes. But all things are taken into consideration—the availability of nuclear weapons design information, the capabilities of the safeguards systems—these are still the right numbers. But as I said they're largely arbitrary.

This idea of timely detection in terms of how the way it was implemented by the Secretariat. Timeliness was taken as synonymous with estimated conversion time, simply because the Secretariat took the view that it had no way to ensure the absence of the clandestine means to convert at the time of the diversion. That is if spent fuel was diverted, they had no assurances that a clandestine reprocessing didn't exist on the other side of the hill, ready to receive and reprocess the fuel.

With the Additional Protocol and I want to emphasize the measures of the Additional Protocol, they now can say additional nuclear processing is required to bring diverted material into weapons usable form but they do now have some assurances of this rationale for decoupling to some extent this idea of timeliness and conversion times.

As regards DPRK, the inspection results that were presented to the Board in their special meeting in February of 1993 had three components. The first was that if this single reprocessing campaign that DPRK had declared was as declared, then the product that was declared to have resulted from this campaign, and the waste that was also said to have resulted from this campaign, there's just simply no way the two go together. Now what's really important here, is that if that campaign was carried out as declared, you couldn't reprocess the same fuel that they had identified and batch it in a different way, you could affect the answer to that question. Secondly, the plutonium and it was a small quantity of plutonium but very homogeneous that the DPRK declared and presented—Myron's right—there were some environmental sampling results from the plutonium finishing area in the so-called radiochemical laboratory that showed the existence of species of plutonium not present in the product that was declared presentable. And finally and in some ways most difficult, was that these plutonium particles showed three different times of separation, where DPRK had declared a single time of separation. And so these were the inspection results presented to the Board, prior to presenting this third party information, that was the dramatic satellite imagery that indicated the existence of and then the eventual disappearance of a nuclear waste storage kind of facility that the Soviets had supplied in the old days along with the RRT5000 reactor. It was actually precisely the same as one that existed in Iraq at Tuwaitha, so there wasn't any difficulty recognizing it.

### IAEA Use of Third Party Information

I talked to Myron about this recently, people tend to think of that Board meeting that's a really important outcome that the Secretariat went to the Board requesting that the Board support it in its request for a special inspection to these nuclear waste locations and the Board agreed. At that point is when DPRK walked out and eventually the Agreed framework came along. But a much more important thing happened in that meeting and that is the Board tacit acceptance that the Agency would receive and make use of third party information and that was that satellite imagery that was presented at the Board literally and particular Board members in particular were literally stunned to silence. I'm not overemphasizing or making it more dramatic than it was, it was that dramatic. Because prior to that time a number of Board members had taken the position that the Agency should not receive and make use of third party information that all member states were in a position to provide. And it was in that moment that at least from that point

forward the Board tacitly accepts that the Agency will receive and make use of third party information.

Wulf: You in fact built on that North Korean action in the Program 93+2, where you have the Board expressly adopting language that said that they could accept third party information.

Hooper: That's right. The Secretariat was very careful to caveat this. That it would not draw any safeguards conclusions based on third party information that it could not independently confirm. And that this was not a two way street—that when information was provided there was no quid pro quo. But with those caveats aside, yes absolutely.

Kratzer: I think its essential that when the Agency receives information of this type, that it has the ability with its own staff and preferably with nationals from countries other than the one who supplied the information to examine it and reach conclusion independently and on its own as to its plausibility. I doubt whether they could confirm it. If they could confirm it, they have some equipment flying around up there that I'm not too familiar with. They do have to examine it and decide if its plausible before they act on it or take it into account.

Wulf: The Agency is doing that with its own satellite interpretation capability and INMMJ capability.

Kratzer: Sure

Hooper: I want to emphasize that the language that they used was that they would not draw safeguards conclusions. It doesn't mean that they won't take action. They said that they would not draw safeguards conclusion based on any third party information that they couldn't independently confirm. They did not say that they wouldn't take action.

Kratzer: Going back incidentally to 153, the record shows this quotation can be found, I looked for it last week but I couldn't find it because I don't have a complete set of the official records anymore. But the record does show that a particular delegation, namely the U.S. delegation said that the Agency could make use of information from "whatever source". The document itself 153 says that the Board in reaching these conclusions about compliance or noncompliance—whether an action is essential and urgent or not—could use relevant information. There was clearly an expectation that it would not depend only on the information gathered by the Agency itself in the course of its inspections.

### **The Inquisitive Inspector**

Let me comment on that and it gets back to the Iraqi thing. There are two kinds of information that inspectors get and I've never been an inspector, although several worked for me. They get what you can call the objective technical information—not just accountability information but information that a seal is broken or that the camera did so and so on the record, the camera record showed so and so. That's technical and its

objective and that's safeguards information. But they also have the capability—and you folks have been at the forefront of pushing this—of gathering information that is more subjective let's say, maybe even impressionistic about what's going on in a place, how do people act, have personnel changed, have they been switched around, observational information. You're giving inspectors training as I understand it in observational skills. It seems to me that there's almost certain to be things that are subject to observation in countries of limited industrial and technical resources. If they're engaged in a separate clandestine nuclear activity, it's bound to have some linkages, not necessarily in material linkages but maybe just these personnel and other linkages with these facilities that we do know about. One of the questions that I have put time and time again, not in the last few years, but in the past is whether yes inspectors get this training in observational skills which is great. This is exactly what should be done. Is that a formal part of their instructions whatever form they may take, that you are to use these skills and that you are to come back and report them. And if you don't want to put them in writing, do it orally. The other side of the equation is there a formal procedure that requires that returning inspectors be orally debriefed—and not just the team leader, but every one of them because you know that's why you send more than one at times. I don't know the answers to those questions, I'd love to hear them.

Shea: I think you're more current than I am.

Cooley: I was going to say that certainly in the last five years in particular since the Protocol has come into force, this expanded emphasis is on the "inquisitive inspector" and not just going and doing the measurements and checking the books and ticking off, but to be looking around and observing. We have really expanded our in-house training course. We have as you indicated, observational skills training, proliferation indicators training, so inspectors can see how a facility of a certain type is supposed to operate versus what indicators would be if it was being misused. We've been implementing training inspectors with our whole state evaluation process where we're trying to evaluate all of this information and look beyond the facilities and look at the fuel cycle and the state activities as a whole. It's a change of culture. Not every inspector—all people aren't equal—all inspectors aren't equal. It's not easy to train given the skills and whether they are a personality to be inquisitive that we find that a difficult thing that we're still struggling with. On the debriefing side, there is a process in place when an inspection team comes back. And I haven't been in Operations myself so maybe Tom can speak to that. But the team is certainly debriefed. The forms, the way that results of inspections, there are a lot of free format fields, so that inspectors can write down their observations as opposed to being just a tick list. We certainly are into the process, but it's still evolving. Let me say that.

Shea: I'm going to make two cases—one is countries in which there isn't an Additional Protocol in place, the traditional safeguards is still all that's available. And certainly there's been much greater awareness about the needs to be alert. The training is for all inspectors independent of whether there's an Additional Protocol in place or not. Inspectors before they go out have an assignment and the assignment is gone over shall we say at a briefing meeting which is carried out on a division level or a section level

depending on how the inspections are arranged and the three operations/divisions. The facility officer and the country officer have an opportunity to put in a specific request to follow up to ask questions and so on. After the inspection there's always a meeting, a debriefing, in which the inspectors report on what was accomplished and if there are follow-up actions, those are made known. Then the inspection report takes some time to compile, it's all computerized and there's a lengthy period that is necessary to compile all of the information before you finally have the conclusions and the statements that go back to the countries as a result. The questions then of if there's an anomaly detected, how early in the process is this registered and follow-up actions undertaken. In the case of the Additional Protocol it's much more of a --and you have to complement or both of you since you have much more experience in that--there's a group that monitors activities at the state level. For large countries with extensive nuclear activities, this is done at a DDG and a Director level. At a smaller state kind of thing, there's another group that handles countries that have less going on. The look is at a country wide basis of what are the motivations, what are the current situations in a country, the experience of safeguards as it is applied, the whole process of when the Additional Protocol is in place and receiving the reports and coming to a final determination that things appear to be hunky dory in which case integrated safeguards can come.... Would you like to pick it up at that point?

Cooley: This whole idea of looking at information for a state applies to every state—Additional Protocol in force or not. And certainly states with larger fuel cycle programs where there's more activities going on and more things to follow up on. There's greater interest at senior management levels. In particular when states, I can speak to Japan, Japan is one of the states where a lot of effort was done and before we were able to draw this broader conclusion, that not only there's been no indication of diversions of declared material on the correctness side but as well that there's no indication of undeclared. For a country like Japan it took years of effort to follow up on all the information, to try to get a consistent story across the whole state. So there was a lot of effort, the same thing has just been concluded for Canada. The same effort has just been done. So for the bigger states its an effort that involves a lot of teams and a lot of people across the Department.

Kratzer: I'm glad you said it applies to every state because it seems to me that the obvious argument is that it's probably more important for the states without a Protocol.

Shea: The Protocol offers additional opportunities with complementary access in particular. Maybe you could summarize the first year that this was in place, there was a couple etc and it kept increasing. How many complementary access activities were there last year?

Cooley: In the SIR, I think there was close to 200 maybe 180 instances of complementary access in 30 countries.

Wulf: How many locations other than those listed in the Article II declaration?

Cooley: Well Norm, you know I had those numbers for you a couple of years ago right off the top of my head. What Norm is referring to is that complementary access is often done for the purposes under 4ai to ensure that there's no undeclared nuclear material or activities at sites where there are declared nuclear materials. That's where we have easy access, where we're doing our inspections and you can easily call a complementary access. So most of our complementary accesses fall in that regard. In the locations that are declared under Article 2 that do not have nuclear material so R&D sites doing R&D without nuclear material, manufacturing sites, you have to have a specific question or inconsistency put in writing to request a state before a complementary access can be done. We do do a number of those, certainly not the great percentage. Again unfortunately I do not have those numbers at my fingertips. It's over 10% and maybe close to 20% of the accesses we're doing.

Wulf: What about the third category—locations not listed in Article 2 or declared?

Cooley: We've done a few. Less than a handful.

Hooper: But you mean locations for the purpose of implementing environmental sampling for example?

Cooley: Yes. Right.

### Access to Locations

Kratzer: I'd like to raise a question not in the spirit of creating any basis for contention or argumentation of course. If you look at Article 4 of the Additional Protocol, and I may have the structure a little mistaken, you have, I think three categories of locations to which the Agency has an unquestioned right of access. This is all to the good, when one of things that this clearly does is close the Tuwaitha door, in other words putting facilities on the very site of declared activities and not declaring them and having inspectors walk right past them thinking they have no right to look at them even though they did. Each one of those categories is identified, the word identified appears, in other words facilities under Section so and so identified by the state. Now I'm trying to imagine a state engaged in a undeclared activity that would have the lack of something up here to declare it and identify it. Doesn't that give you some pause? In other words it throws the real problem into the last category that Norm mentioned of locations identified by the Agency. But if you look at that language, and I understand what Norm says and Norm says these are all negotiations and you need to give and take and what have you. I don't know how much negotiation there was with this language. Its fairly conditional. The states can say we can't do that, we've tried our best efforts and we can't do it. Then what you end up with if he says yes, is the right to take environmental samples. I know that this is a very powerful tool, it's very important. But let's face it, environmental samples begin to work only once a facility is in operation or at least loaded with special nuclear material. What you really want to do is get there before it ever starts operating. What's the answer to this? In other words do you have rights that are strong enough in your view to deal with Category 3?

Cooley: Well I think one of the most important things that the Agency does is in terms of doing consistency checks with open source information and one of the strongest ones that we've been utilizing and it has come to reveal some of the R&D activities in several countries, scientific publications, in terms of research. I mean scientists love to publish. They love to go to technical meetings. And so we have—in fact that's been one area of open source searches, we've focused a lot on trying to target R&D type activities in scientists—trying to develop that. It has to be triggered by information. That's what we're stuck with. I think that again, it's just been a handful of instances, but I think the mechanisms to go ask the states, I think in most cases, the revelation, discovering information in open sources that's not consistent with what a state's declared and going back to ask for more information. States have been quite open in providing information, providing access.

Shea: These are states that don't have anything to hide?

Cooley: Well of course, the question is, what aren't we seeing? That's of course, we don't know what we're not seeing. I don't know maybe Rich can speak to the issue of the tools available.

Hooper: In the beginning, in realizing some of the limitations that all this has, we proceeded on the basis that it was possible through creating an appropriate declaration base from a state to gain a high assurance of the absence of undeclared nuclear material within the declared program. And so that was really objective #1. How do you proceed in a way that you have a high assurance that if there are undeclared activities they are not at declared locations? I think that the Protocol does that. I just can't imagine a state being so stupid as to try to hide an undeclared activity within existing infrastructure. If you then say okay if there are undeclared activities, they will be at some other location. What is going to direct you to those locations? In the end it comes down to information, whether it's from a third party or what not. If there is information that directs you to a location, then the Additional Protocol takes you some way in following up on that. If you ask for access to collect an environmental sample and the state is unable to provide access to a building for example but because of the nature of environmental sampling they could say but can't you collect a sample outside. And the Agency would probably say yes. And when those results come back and they don't prove anything, they're nonconclusive, the Agency can go back to the State and say we didn't learn what we needed to learn, we still have a problem and request more intrusive kind of access. Where the State could say well this is in private hands. We've made every reasonable effort and we're unable to provide. At that point, the Agency then can, depending on how strongly it feels, request a special inspection. Which the state is then obliged to take whatever domestic action is necessary to provide access. Now all this could go on for an extended period of time. The Additional Protocol, there are numerous areas within the Additional Protocol where the Agency has a right to request additional information where the period of time within which the State has to respond is not specified. Depending upon the nature of the information and how urgent it seems, yes there's a whole range of responses, but I'd really emphasize that the primary objective was to assure the absence of undeclared nuclear material and activities in the places that the Agency knew about.

Wulf: With respect to these five C activities or locations, certainly the U.S. preference going into the negotiations was anywhere any time. And we got something like that. Its not how we would have drafted it if we had the panel all to ourselves but it's something like that. I think in justifying in favor of the ratification of the U.S. Additional Protocol, I think that my statement was that I thought that the biggest contribution that the Additional Protocol makes is the right—the legal right—for the Agency to ask questions and for the Board to draw conclusions based upon the answers they're given or not given. I continue to think that's the case. Because I think you're permanently correct. A guy who's really cheating ain't going to let you in. All you have to do is watch what's happening in Iran. He's let us in to some extent because he's been outed. What more is out there, none of us know. Its important that the Agency and the Board in particular be able to draw conclusions from the failure of a state to respond to a question that the Agency has a right to ask. Some people draw the conclusion that maybe the entire Iranian experience could undermine any reliance based upon the Board actually doing something like that. Certainly I think for years I was saying it was easy for the Board to do the right thing in the case of Iraq. After Kuwait, after invading etc, it had no friends, it had no influence. Everybody could vote for doing something stringent in Iraq and their problems. Same is true of North Korea—an international pariah, totally isolated, no economic clout, etc, etc. Now we are nudging up against a real tough problem because Iran is not Iraq and it's not North Korea. They have got very skilled diplomats, they have a lot of economic clout and they're using it. We see it even today that they're saying well exactly. So that is not a defect of the Protocol per se, that it a defect of the international system.

Hooper: I think it's easy for this prolonged debate in the Board to obscure what is really an amazing inspection process and the really tremendous progress that has been made in through that process Iran. Are all the questions answered? The answer is no. But has a really significant thing happened with respect to that inspection process? The answer is yes.

Kratzer: But it seems to me that Rich put his finger on it when he said that at the end of this long road and its up to the Agency and its Board to define what is the end of the road I guess. You have a device--this is not a criticism, these are two documents that are supposed to be read as one whole—you have a device that allows you to ask the question in such a way that it becomes a legal obligation on the part of the state to answer or not answer and if he doesn't answer, he is in unambiguous default and then if you're following the Statute, you go to the Security Council with it. Who may or may not do something about it.

### Special Inspections

Wulf: As Rich said the narrow ground on which North Korea was referred the first time to the Security Council was for the refusal to allow the special inspections that the Agency asked for. So we've got a good precedent out there already.

Kratzer: This takes me back to my question earlier. How did we move from—well maybe we didn't move, maybe we're still in the process—but to an outsider it seems as if we've moved away from what the Board said urging the use of all the Agency's rights and obligations to one in which we're paying far more attention to what they say about we anticipate that these will be done rarely. Since North Korea, rarely has been zero.

Shea: There were several different kinds of special inspections, there were about a half dozen or so that were carried out before North Korea.

Wulf: Special inspections what Myron was referring to.

Shea: Not special, special. But the whole question of the use of Paragraph 73 in 153, there are two provisions. One is which you just don't have enough time or whatever to carry out your activities and the other is you're not able to conclude based on the information available to you. That's the trigger for an expansive mode. In a sense, my own reaction has been that having to do with the effectiveness of verification that the institutions started carrying out safeguards with equipment that inspectors would carry with them on airplanes. Half the time when they would get where they were going and it wouldn't work or it would be so Phd oriented that they wouldn't be able to use it effectively anyway. To the point that over the years the methods that have been put into routine practice are phenomenal in comparison with the outset. So verification effectiveness at declared locations has improved immeasurably over that period. And now in the same token when the cracks showed up about the fixation on the declared facilities and the issues of what else is going on, this environmental sampling in particular has been just a tremendous boost to the verification capability—the technical aspects. What's lacking still is the institutional capability to cope with a situation of finding of whether something is an act of noncompliance or whether something is a material breach or however the language would be characterized and what follow through. As Norm says in the case where a country is weak or is not able to influence the larger spectrum of the international community, it's easier to form a consensus.

We're aiming towards a break now coming up towards lunch and I'm just sort of introducing a wind-down kind of a thing. As we look towards the problems we faced, we have the institutional framework. We have its implementation by an international institution. Having worked there for 24 years, I was amazed that you could get any international institution to do anything useful at all. That was really a common thing. That people would come from different countries and be seized with the importance of what they were doing to the point that they would work in a way... And when I went there it was in 1977 and there was still a lot of drinking I guess, I would say and biology was very active in the Secretariat. Now when I go there, stress-related syndromes of people working so hard, they're pushed to the point. Staff considerations and the well-being of the institution gets to be an issue that we're all concerned with for the future. If the capabilities that were reflected in the Nobel Peace have to stimulate our protection and building of this as we go forward.

When we come back I want to talk a little bit about some of the underlying assumptions—collusion among states. Rich and I had a conversation on this. That's sort of an underlying premise. Another is this aspect of the assumptions that's almost naïve that a country wouldn't be able to get very far before you'd find out about it. Now we know in Libya and what things that turned up there. How does that change the overall perspective? We start to look at the issues of things going on: black markets; taking advantage of industrial capabilities in one state to further the ambitions of another perhaps without the knowledge of the government of that state or perhaps with its collusion.

Anybody have any remark before we now take our break. In that case we're going to break now for an hour. There's sort of a lunch that's being provided. Thanks very much to the hospitality of the Institute of Nuclear Materials Management and Aquila Technologies. CUTOFF

## Part II

### Decreasing the Cost of Safeguards vs. Strengthening Safeguards

Susan Pepper: Hi I'm Susan Pepper from Brookhaven National Laboratory. We're all familiar with the phrase increasing the effectiveness and improving the efficiency of safeguards. I was in Vienna from '94-'98, so I was there during the time when the Additional Protocol and the strengthened safeguards measures were being negotiated. I recall there was a time when the member states were a little hesitant to sign up to the new measures. I don't know if it was the United States that came up with this argument but the argument that was proposed was that introducing these new measures might cost more in the short term, but in the long term there would be a decreased cost of safeguards as a result. So my question is, do you think that because of this argument the idea of decreasing the cost of safeguards has actually become more important than the concept strengthening safeguards?

Norm Wulf: I think it has for some countries. But I can quickly disabuse you that it was not the United States that came up with this notion. My recollection is that it was a Secretariat paper that talked about being a temporary blip when it got a little higher but over time it would result in a decrease in costs. The notion that I personally was never comfortable with, which the United States on I think numerous occasions said effectiveness remains the sole criteria. Efficiency's important, but effectiveness is the primary. The Director General himself has made that statement as well on numerous occasions.

Rich Hooper: There was, in the course of the consultations that accompanied Program 93+2, the sense that there needed to be a quid pro quo. That if states were willing to accept this new kind of transparency and additional openness of strengthened safeguards that there needed to be a payback. It was a political decision taken within the Secretariat and it was termed as cost neutrality. There would be this initial period, referred to as the "hump", as these new measures were being put into place and that following that there would be sufficient reductions in the intensity of verification of material accountancy

safeguards to compensate. At the end of the day you would reach this magic cost neutrality position and not additional costs. As time went along, even though that political position was defended or at least stated on numerous occasions, even after Dr. ElBaradei replaced Blix as Director General, I think it's now nobody believes that. This idea of cost neutrality at this point in time has gone the way of some other things. But certainly that was a strongly stated position of the Secretariat throughout the course of Program 93+2.

Wulf: It sort of led to, at least in my view, some sort of undesirable results. And one of those undesirable results is that at least in minds of countries with major nuclear programs the concept that there will be less safeguards activity in their country as a result of their joining to the Additional Protocol. That was never a position that the United States signed onto. But I do think integrated safeguards in fact is in part enriching and Jill may not agree with me on this, but in fact is part of that overall philosophy that we need to try to shall we say reduce the burden, reduce the costs.

Hooper: I think from the very beginning there was a belief that through strengthened safeguards that the assurances you gain regarding undeclared nuclear material and activities will of course vary from state to state. That these assurances in a developed state will never ever rise to the level that you might expect them to in an undeveloped state. The view although unspoken at the time was that this was acceptable because those states were states with democratic open forms of government and that you could live with this lower level of assurance in those developed states. But certainly there was never a view that there would be some sort of minimal assurance that would be acquired for every state. In states that are less developed where they have to go outside to gain certain capabilities than your possibility is much better. But in a developed country that has an infrastructure large enough to support anything they have in the way of a declared or even an undeclared program is much more difficult. But certainly it was with those states that have the highest burden of financial support of safeguards that that political statement was taken with respect. It was not undeveloped states or states where this was the greatest concern.

Kratzer: Well this is not entirely unlike the situation when the NPT came along which is that we said to ourselves and to other member states that when you have the opportunity to inspect everything in a country, which the NPT gave you for the first time, because before that the only thing inspected was what was supplied externally by a supplier who required safeguards or voluntarily placed under safeguards. When you have everything in a country and I'll even accept the proviso of everything declared in a country under safeguards, you have opportunities for cross checking and so on that ought to simplify and somewhat reduce the safeguards burden. Which we insisted was not very great to begin with and I think that was correct then and I think still is. When it comes to the Protocol and the improved ability to rule out undeclared activities and I prefer to put it that way, not the increased assurance that there aren't any, but the improved ability to see that there aren't any. I think it is defensible that you can reduce the intensity of classical safeguards, presumably to the extent--although it's not measurable that the level of assurance is still about the same country wide. What you should not do is cut back on

classical safeguard measures in a way that leaves any credible diversion pathway solely detectable via measures of the Protocol via information analysis. I think that position has been pretty much adopted, recommended by the experts committee and adopted. I hope that's the case.

Cooley: That certainly is a very important assumption. As we've gone forward in developing the concepts of integrated safeguards, this point that we are still doing nuclear material accountancy and inspections are still a fundamental part. If there's an acquisition path that involves both declared and undeclared facilities, we would not rely only on the detection of the undeclared. We have to still cover the declared facility and declared nuclear material.

Kratzer: But you have to look at it in a fairly fine grain if I may. In other words you really have to look at individual diversion pathways not just well this facility is being safeguarded, we're doing safeguards, so it's okay. You have to look at the individual pathways.

Cooley: As I said, developing the specific approaches for facilities, looking at it from this perspective, effectiveness as Norm indicated, the Director General on multiple occasions over the last couple of years has reminded the Board that the important thing is to maintain the effectiveness of the system and if we can gain some efficiencies in how we're going forward, great. But that is not the driving force as we're going to integrated safeguards in these new ideas.

Hooper: The discussion about resources and there's never been a Board meeting where there wasn't a discussion of resources and this idea of balance. Historically most states don't value the Agency for their safeguards work; they value the Agency for its technical assistance and technical cooperation. At any time that there was a discussion of the resources available to safeguards, you could anticipate without disappointment that there would be a corresponding set of comments regarding the importance of maintaining the balance. If you increased the resources available to safeguards, you likewise had to increase the resources available to the other part of the Agency's activities.

Safeguards, the budget today is \$100 million something like that. What an incredible bargain. What an amazing bargain—security bargain—safeguards is. \$100 million, it hardly buys you an F-16. It really is an amazing bargain.

Cooley: Is there another question from the floor? Jim?

### Access to People

Larrimore: I'd like to ask a question about access—access to people. I believe it's correct, Myron Kratzer mentioned that in the Statute, I believe that's correct, that the Agency has the access to people for safeguards on projects. In the United Nations mandate on Iraq, there was access to people. And if I'm not mistaken, in the September 24 Board Resolution on Iran, it urges that country to provide access to people. The

question is what happened to people in 153, what happened to people—access to people—in 540?

Kratzer: People aren't mentioned in 153, but they aren't excluded when inspectors make inspections, they do talk to people. I actually witnessed an inspection and saw some people talking to each other. The implication in the Statute and we used to talk about this a little bit the way people talk about how many angels can you put on the head of a pin—in other words it was sort of a metaphysical discussion. The implication in 153 is that you can go way beyond the boundaries of inspections that's normally understood and knock on the door of a Chief of State and ask him what's going on. I guess in the Iraq situation we didn't go quite that far, get quite that far, there were these very adversarial, Jacques knows about it, interrogations. I can only say that there's nothing in 153 that excludes doing that as part of the Agency's access rights. It hasn't happened outside of Iraq to my knowledge, in other words outside of the framework of an inspection visit for other purposes.

Hooper: In the case of 540, access to individuals, putting that into the Additional Protocol at least on the basis of every reasonable effort was discussed at length. It came at a time, however, when the Agency had recent experiences that convinced it to go a different direction. And that was the nearly coincident inspection experiences in Iraq, South Africa, and DPRK. In the case Iraq, they had a legal obligation to provide the people, and eventually they did. But in a very torturous, lengthy process. In the case of South Africa, they had no legal obligation, but they immediately in a proactive way provided access to people. And it was absolutely necessary that they provided that access. The South African enrichment process was absolutely unique and very very difficult to understand. It had a lot of idiosyncrasies, without the kind of insider information that was provided to us, we would have had no chance. The conclusion was that, legal obligations aside, providing access to the right people will always come down to the state's cooperation, just as strengthened safeguards foresees a higher level of cooperation than the minimum necessary to implement material accountancy. And so it was on that basis that the Secretariat chose not in its draft Additional Protocol to address access to individuals.

Wulf: We saw a few things that the Secretariat did not ask for in their draft in the course of 540 negotiations. We did not pick up on this one and did pursue it.

Hooper: The situation in Iraq with respect to their centrifuge enrichment development was really a study. Almost from the beginning as we became aware of the existence of this program there just were a lot of things that made no sense. I can remember a guy that I view even with the passage of time with a lot of sympathy, who was being advertised to us as the head of the centrifuge enrichment program, Dr. Farce. This poor guy, I tell you, he was called up to lie time and time, and he would immediately begin to sweat profusely. We used to tease him you know. "Stop taking notes Dr. Farce, you're starting to sweat again". As this whole thing developed, we had Urenco guys, each of the participating states in the Urenco consortium all provided contributions to this. So all the early inspections team all included a Urenco expert to each of the three partners. And

these were real experts. We had the design of the Iraqi centrifuge and it had confusing aspects. It wasn't that people didn't think it would work, it looked like a particular generation Urenco machine in some ways, different in others. What's going on here and why is it different? Where did it come from? It got to be a really interesting story in the end. I remember one magic day, when they finally produced the guy and all the fog just went away in five minutes. In the absence of that, I mean you flounder, because you simply have no way to understand why did things develop the way they did and therefore to go to the next question. Access to individuals is absolutely essential in any of these circumstances. In most states, a mandated access to individuals is contrary to their constitutionally protected rights of privacy. Had it been requested or had the Secretariat pursued that route, it would have been in the Additional Protocol with that qualification. That qualification actually with some clever negotiating ended up with this every reasonable effort. The original draft spoke to the subject of constitutional limitation and what not and that disappeared. And it was a good thing it disappeared. But certainly access to individuals as a absolute obligation had no chance.

Kratzer: There is an aspect of the special inspection provisions in 153 that bears on this and which I think is worth mentioning in its own right. And that is that one of the aspects of a special inspection under 153 is that you can ask for a special inspection in order to get access to additional locations or additional information. In other words a request for a special inspection does not have to be location specific. And it seems to me that that is a potentially valuable tool because there certainly is a chance that your suspicions about a state's engaging in undeclared activities will come from let's say export information that they have been ordering and receiving things that have nothing do with their program, but you don't know where its going. Under the special inspection provision that allows you to have access to additional information which in the final analysis has to come from people, you have every right to say "We know you ordered some maraging steel or something, where is it now?" This seems to me that it was relied upon to some extent, although the Board chose not to call it a special inspection, in the Board resolution of sometime in 2003, when they said that it was essential and urgent for Iran to supply a lot of things—many of the items of which were information, they didn't say employing the authority of Section so and so of 153, which is fine if you choose not to do that. I think to some extent that did get the ball rolling with many of the response that you got, incomplete though they were, from Iran. I don't know if that's a correct assessment but that was done.

Shea: What's the sense in this restriction of special inspections to rare occasions?

Kratzer: Oh there is no such restriction. The difference is this, that under 153 you have to ask for a special inspection after going through a consultation procedure which is normal and the state has to agree to it. But their disagreement, their rejection, can be overridden by a Board determination that is essential and urgent. If they agree to it, then that doesn't come into play.

Wulf: I have a question to what you quoted earlier, the Board decision of '93 I believe it was, when they said that the special inspection exists, but its exercise should be rare, or

should be exercised rarely. My recollection is that the price of getting some countries to acquiesce in recognizing that special inspections existed, in terms of adversarial such inspections was acceptable language with respect to they won't be exercised except in rare circumstance. Whether that was a good or bad compromise, who knows? But I would go back to the point Myron made earlier, the question of what's rare was not defined and it clearly is not something that would be used as an every day tool.

Shea: And it would be different if a state had a Protocol versus if it did not. But that's not specified in that particular...

Kratzer: You could argue this endlessly. The Board didn't really say use this tool only rarely. It said that it anticipates that it should be used only rarely. In other words, I take it, where I went to school, urging is more powerful than anticipating something. I assume that it was meant in that way and I wonder if its being applied in that way.

#### 540: A New Legal Instrument

Cooley: Let me go back to a point that Rich made in his introductory remarks in terms of when it was decided that more legal authority was required following Program 93+2 and agreement of the Part I measures. You indicated Rich that there were three options being considered either reinterpret 153, modify 153 or go for a new legal instrument. I think it comes back to this issue of access and information. Maybe you could elaborate on why the decision was to go with the new legal instrument.

Hooper: The extent to which the so-called strengthened safeguards could proceed through a reinterpretation or a changed interpretation of the existing measures was the preferable route and it was one that had been pursued successfully in the past. As we looked at the objectives of 93+2, and realizing that objective number one was to gain the declaration basis to assure the absence of undeclared nuclear material and activities within the existing infrastructure, the existing program. The conclusion was that there was simply no way, no magic that could be sprinkled over 153 that would stretch so far as to include the declaration basis required for those kinds of activities. The example being nuclear sites and all of the activities and the infrastructure that are contained within those sites. As far as the facility itself was concerned that was much less a problem, but the site as a whole, there just simply wasn't any way that at least the Secretariat believed that it could be stretched so far. The decision to proceed in the direction of new legal authority was primarily motivated by information requirements of strengthened safeguards, not access. Because I don't think that anybody believed that the special inspections provisions couldn't be interpreted as a way to support that strengthened regime, if there had been a way to gain the information without the new legal authority. That was why things developed the way they did but it was the information requirements, not the access requirements that directed the way things went.

Kratzer: To me it's a truism that the more information you get the better. That's not subject to argument. The thing that puzzles me a bit though is the weight you are prepared to give information which is supplied by the state itself when you view the state as the adversary or the potential adversary. In other words to put it in simple terms, no

state in its right mind who's engaging in an undeclared activity will put that or any information that it thinks might lead to that knowledge in its declaration no matter how broadly you frame it, and how many items you include in it.

Hooper: That view goes right to the methodological basis of safeguards. I remember in the early days of Iraq, I believed and I think as time went along that belief was proven to be correct that the Agency went into those inspections in Iraq with a tremendous advantage vis a vis UNSCOM. The reason was that the Agency had immediate access to a large cadre of experienced inspectors and but more importantly they knew how to inspect. That sounds like a trivial thing, it's not trivial. The Agency never ever went into a building without a declaration in hand. It's not whether the declaration is true, it's that becomes the basis that you take the next step. Almost none of the Iraqi initial declarations regarding activities in the building were the truth, but it provided a basis to go further. If you just simply walked into those buildings, and many of them were damaged or tell tale equipment had been removed and you just walked around and kicked the tires and say well what do you think happened here? What do you think they did here? You just simply have no basis to make progress. Now UNSCOM did that for three years. They made no progress. It was only after they realized that they had to go back and get a declaration and something to inspect against, that they began to make inspections. In the process of that, discovered that they themselves had destroyed a lot of the information that they would need down to road to close some of these issues. It's not a question of whether a state tells the truth or tells the whole truth, it's a question of the whole disciplined way that you can proceed. Of course they're not going to tell you the truth, if the truth puts them in noncompliance. That declaration is the basis of everything.

Wulf: Another part of it is because of the complex or the semi-comprehensive nature of the Article 2 declaration required by 540, the states got to be pretty darn clever in trying to make sure that everything matches up. And they have to worry about the fact that imports and exports too of that state are going to be reported and this declaration better get that right. So they got to get a lot of things right. Most of these countries are pretty clever and they have a lot of clever people. And my guess is that they probably get the declaration right, so all the contradictions sort of work their way out. I've always thought that one of the largest values of the safeguards regime itself is that it forces the proliferators to do, to try to cheat on it. That activity is often times is the most visible thing, and that's when you catch them.

Kratzer: I think that your explanation Rich is powerful and correct. But it seems to me that it goes primarily to the issue, to use the common expression, the correctness of the declaration. In other words whether the information which they give you when viewed on the ground turns out to be confirmed or verified. But it doesn't really answer the question of its completeness. Let's say they have a completely undisclosed site that's never been report that they choose to exclude from their declaration. You're really in the same situation you are with the current not very complete declaration called for by 153. It's a site or a location that you know nothing about. Let's just postulate that you have knowledge, and incidentally, I think what Norm says is very much to the point. Export information deserves a special privilege because it isn't supplied by the state, it's

supplied by the exporter and that changes everything. Let's say you have export information that they have been ordering centrifuge components, that won't appear in their declaration, it doesn't appear in any current declaration under 153 alone. In that respect nothing has changed. A lot has changed in respect to declared sites. What you said earlier that the Protocol has effectively closed the door on the use of declared sites as a place to carry out undeclared activities I think holds all the water that it can. But I don't know that the situation has changed that much, really undeclared locations, by reason of the declaration. I'm not saying that it hasn't proved in other respects, I think it has.

Hooper: No and I think that's right. I think that what the Additional Protocol and the access that it calls for does allow you to believe that if there are undeclared activities, those are at undeclared locations. Okay you're dependent upon information from other sources, not information from the state, obviously it's not an undeclared location, if they've identified it. But it has strengthened the Agency's hand in a considerable way in that it's much more difficult to hide these activities if they're removed from the existing infrastructure. Because if they move these activities off to a undeclared location, they've got all kinds of security problems associated with having the appropriate people and infrastructure--things that become visible. Certainly if a state's got undeclared activities at an undeclared location, they're certainly not going to make the Agency aware of it.

Kratzer: By definition, they're no longer undeclared, once they declare them.

Hooper: I think that the step that strengthened safeguards took was simply to provide some assurances, that if there are undeclared activities, that they are being carried out at undeclared locations.

Kratzer: Right, and I think that's ample and more than ample justification for everything that's in 540. I think it's very important. I think that two things we have to be somewhat concerned is number one not allowing the existence of the Protocol to undermine even if its only by suggestion the validity and the strength of the rights that preexisted it. And I think that that can and maybe to some extent has happened just through the process of explaining its value and importance. I think you have to do that carefully. The other proviso that I put on it, which is true of any piece of safeguards documentation is that you don't oversell it. You don't say that it can do something which it cannot.

### Universal Adherence to 540

Shea: We agree that it's urgent and essential, are we doing enough to get universal acceptance of 540 as a condition of the Article 3 definition of the Agency safeguards system? What could we be doing in addition to that? There's the question of entry the entry into force of the U.S. Protocol. There also a question of how high up is this on the scope so to speak in bilateral relations and the activities undertaken by other countries. Japan has a great interest in this, Australia, and some other states. Where are we on this? Are we doing enough? What can we do beyond what we're doing now?

Wulf: I'll give you two answers. I'll talk about the U.S. entry into force in a few moments. On the question of seeking additional adherence to the Protocol, the G8 last

year took on that as a task. The U.S. had the chairmanship of the G8 last year. We demarched every capital in the world to go in and urge ratification. Basically we got some to move, but a lot did not. The Brits have the chairmanship this year and they are in the process of following up on our series of demarches. Each time those demarches are made, it's not just the United States going in, it's the entire G8. So you got a fair amount of horsepower backing up the effort. Have we done enough? Heavens no. Should we be doing more? Absolutely.

My guess is that in time we need to make Protocol adherence a condition of supply in the Nuclear Suppliers Group Guidelines. Right now there's still resistance to that notion in some governments in the NSG. But I think in time we'll get to that place.

With respect to U.S. adherence, as you know the President submitted the Protocol, the U.S. Senate has given its advice and consent. Before we bring it into force, we need implementing legislation to give us the legal authority to do all the things that are required. We have not been able to get that legislation primarily as a result of concerns in the House. If the Senate had concerns, you think that it would never have had enough to get two thirds for advice and consent.

The House concerns at least in my judgment, my personal views, originate in large part from the experience that the United States had with the Chemical Weapons Convention. When the United States signed the INF Treaty back in the mid-80s, which called for permanent presence of Soviet inspectors in the United States in Idaho and permanent presence of U.S. inspectors at a similar facility in the Soviet Union. The United States created something called the On-Site Inspection Agency in the Department of Defense. When the Chemical Weapons Convention was signed, the thought was "let's just have them do it". And they did do it. They brought to that exercise the same mentality that they brought to exercise when they were doing the Soviets--the Soviets are going to use every opportunity to lie, cheat, and steal and otherwise grab secrets from the United States. Same mindset applied to OPCW. Remember, under the Chemical Weapons Convention, the United States is as much a target as any other country in the world. Not like the NPT, where we sort of in a special category, where they'd really like to know what we're doing, but they're not going to take the time to find out, and they have no legal right to. But that mentality we have to be terribly preoccupied that any international inspector coming to the United States is here for one purpose and one purpose only and that is to steal our secrets. That is effecting how some of the agencies look at the implementation legislation for the Protocol and that has delayed substantially enacting the legislation. I'm hopeful that next year when we're a little less hopefully contentious time that maybe some more progress can be made on that. But right now that's where we are. It would help I think because at least it gives you the talking point when you're talking to another government—you really ought to ratify the Protocol—if we can say and we've already done so. Right now there's that little embarrassed pause after you really ought to do it.

Hooper: I'll tell you a funny story. After the Additional Protocol was approved by the Board, there was a provision in the Additional Protocol that provides the state with the

right of managed access. It specifies the reasons they can give and that managed access is available to them to prevent disclosure of specified kinds of information. The Secretariat and state have to agree on what these provisions would be and the Agency has to be convinced that they can still achieve their objectives. In the aftermath of the approval, there was a lot of consternation regarding managed access and how do inspectors deal with this when they're confronted with this on the spot and they have to take decisions. There became a discussion about we don't have experience. The Chemical Weapons Convention has managed access provisions, as does the CTBT. How do those organizations deal with this? There certainly are some inspection activities, particularly the bilateral inspections between the U.S. and the Soviets, that were issues of managed access. How did they deal with it?

So we put this little project in place to learn about managed access in the CWC. We did and it's completely different and has no relevance to the Agency's work at all. The CTBT is a very very limited kind of managed access having to do with rights of transit—moving through a building to get to a particular location. So that wasn't really very helpful.

But when we put requests to both the U.S. On-site Inspection Agency and their Russian counterpart requesting some assistance from them just simply dealing with these provisions of managed access as inspectors. We didn't get any response at all for quite awhile from the Russians, but we got a very quick response from the On-site Inspection Agency--no. It really took us back, that wasn't what we were expecting.

As time went along and I knew the civilian guy not the military guy, but the civilian guy that was running the Inspection Agency. So one day I just gave him a call and asked him what's going on. Well we didn't think it was in our interests to try to teach the Agency on how to defeat managed access. In both cases they had taken that request to be the Agency requesting information on how to defeat managed access, not how to deal with managed access in terms of evaluating and can we still achieve our objectives. As time went along and we clarified it, then we got some assistance and it turned out really well. The immediate response was in both cases was that the Agency is requesting us to teach them how to defeat managed access, which gives you some idea of their own mindset.

Shea: Different set of problems. [\[Resolution 1540\]](#) We're in our third session and we'll go for one more after this. But I'm wondering if we can start now to look at more of the current situations Norm, if I could ask you a question which comes to sort of a grand common denominator that suddenly the Security Council passed Resolution 1540 here a bit over a year ago and that creates a sweeping requirement or set of requirements under the Council's Chapter VII capabilities. I'm wondering if you could put that in perspective and context of where the United States was on the creation of this. What the reality is today? Where it goes in the future? And tie it into our nonproliferation regime issues at the same time.

Wulf: It's an interesting question because I've been sort of ruminating about a theory that sort of—I won't call it Einstein's universal theory that ties everything together—but

it's something like that. I went back and looked at the Lillyenthal plan used the word safeguards, not in the same way we use it, but the fundamental essence of the plan was that this technology to enrich or separate plutonium is so complicated, so sophisticated that there are so few countries in the world that are technologically advanced to do this. That concept I think permeates the Atomic Energy Act of 1947. I think it permeates to some extent, I would even say the drafting of 153. It permeates the Nuclear Suppliers Guidelines. Yet even with the Nuclear Suppliers Guidelines, by 1990 it was obvious that controlling just Trigger List items was not enough. You had to go back and control the technologies that could contribute to or help you make the Trigger List items. So they came up with the Dual Use List. We know that globally countries have technologically advanced so that there's a lot of countries out there that can undertake a lot of very sophisticated manufacturing. Whatever hopes we had that the existing regimes could be adequate to stem proliferation I think were destroyed by the A.Q. Khan network. I don't think anybody in this room has any confidence that anybody with the right amount of money cannot go out and buy a centrifuge plan right now on the black market. And it may not be from A.Q. Khan. He may be tied up. But if you've got it in the hands of the Iranians and the Libyans among others, it's got to be out there for anybody with the money.

We saw with the case of Libya that they could find a country to do the manufacturing for them, shall we say off site or beneath the radar. And the Malaysian government claims they have no knowledge of this. We also know that they couldn't get a lot of the things that they needed themselves. They had to get it from some place else. Ring magnets probably are the classic thing, very high speed inverters to control the speed of the centrifuges--very hard things to come by. So there's still an export/import operation going out there.

When the U.S. Government looked at that, they came up with two different approaches. One was the draft resolution that became Security Council Resolution 1540. And the essence of what 1540 says is that every country in the world must establish an export control regime that controls sensitive technologies. The Security Council created a 1540 Committee that right now looks at legislation that countries are putting in place to meet that requirement and looks at the assets that the country is devoting to actually enforce those requirements. Presumably—the 1540 committee was given a two year life initially—if it is continued it presumably will look eventually at how effective these countries will be at putting their export control laws in place. Obviously this isn't going to stop it all. Particularly if you have another Malaysian type situation where people do things underneath the government's radar and ship it out without their knowledge as reportedly is the case in Malaysia.

To deal with that and to deal with cheaters, you also have this so-called Proliferation Security Initiative. Basically saying in the initial drafting, we have sought agreements from countries that any ship flying their flag, we can board if we have good reason to believe that there is weapons of mass destruction related equipment on board that ship. And we've been relatively successful in getting countries to sign that. In London recently the International Maritime Organization adopted a change to the suppression of

unlawful acts on the high seas to include transfer of mass destruction equipment without a license. So there are efforts being made shall we say put things in place, but I think what it underscores is that the tools that we relied on in the past basically relying on scarcity as our best defense against proliferation simply are inadequate. And they have got to come up with new more imaginable ways to of dealing with this. One of them is the suggestion that Director General ElBaradei made with respect to no further enrichment and reprocessing activities in states that do not already have that capability. That was Bush's proposal. The ElBaradei one is to say let's do it under international organization or international auspices. But in any event both of them have the same idea. This technology is getting to be simply too dangerous to have it continuing to spread. Whether that effort goes anywhere remains to be seen. I think the same type of thinking motivated the proposal in the IAEA to create this special committee on safeguards. There has been a sea change at least in the U.S. Government's view in terms of proliferation threat. We need to make sure that we have looked as safely and as analytically as we can at what additional tools might be out there that can help us deal with that sea change.

Shea: So we have this Safeguards Committee as you've indicated. I want to ask a question that will lead into that. But I want to close out on 1540. My understanding was that the United States was a supporter of this and yet when it came about, the arrangements for its implementation, let's say that they weren't thoroughly foreseen and planned, and that as a result our own government's reactions have been sort of ad hoc. That's a good way to put it. With other countries, the last time I heard a number, 101 countries had submitted reports. Of course there's no standards against which these things should have been prepared and no common basis yet as I understand it on to how they should be evaluated. What happens next any rate? Coming up to the second year anniversary, I think it's April of next year, is that correct? If there's an extension that's a reasonable thing, but if all countries are not honoring the obligations under this, what's the Security Council do? And how does this morph into, if it's successful how do we cope with that? How does it morph into strengthening state systems of accounting and controls of nuclear material? Since we're nuclear people and that's our issue rather than the chem/bio/missile related aspects of that?

Wulf: I think you ask some very good questions, I'm not sure that I have any very good answers. Certainly with respect to the U.S. declaration that was filed, it was not as good as we'd hoped. One of the problems of having a fairly very large diverse government is you have to pull a lot of different strings together and then you end up with a committee that does the drafting and we all know what is it? The camel is a horse designed by a committee? That's certainly what our report ended up looking like. It's an early stage, we certainly hope that it will be extended. It needs to be extended because simply two years is an adequate time to deal with it. What do you do with countries that haven't filed? All I can say is I hope we do better than we did with the countries that did not meet the 18 month requirement for bringing safeguards agreements in force that became part of the NPT. My recollection is that we're still about 40 countries...

Cooley: 36.

Wulf: 36, yes! 36 countries. Myron brought up North Korea, they signed the NPT in 1986 and didn't bring a safeguards agreement into force until 1992. Note to the Security Council. There has to be and it's not clear yet to me that there is a real consensus among Security Council members. There was a fleeting moment in the Security Council's history—basically from the collapse of the Soviet Union until the rise of oil prices-- in which we could count on fairly good cooperation and a similar view from Russia and China. But increasingly as Russia get its economic feet under itself, as it sees its own interests diverging markedly from U.S. interests, its taking a much more independent stance. We may very well be approaching an era in which the dormancy of the U.N. Security Council becomes a common denominator, not the activism. I think I want to go back and look at the statistics. I think we're not yet 2000 now as the number of Security Council resolutions. You'll find that the vast majority were passed in the last 10 to 12 years. Prior to that, it was a fairly slow dormant process. I fear, and not only because of the actions of Russia and China, I think also because of some things that the United States didn't do right, that we are approaching a period in which the Security Council's active role may be far less than it has been in the past. And my own view is that we'll pay a high price for that.

Hooper: This question of universality is really an important one because until such a time as states have met their obligations for comprehensive safeguards agreements and there is adherence to the Additional Protocol at least among states with nuclear programs and nuclear ambitions that the safeguards system will not--to whatever effectiveness it has--it will not reach that effectiveness. The Secretariat is really limited in what it can do. I mean it can do outreach seminars. It can try to persuade. I can't remember a major speech that the Director General has made in the last 3-4 years where he doesn't at some point address this idea of universality. This kind of bilateral diplomatic action that Norm made reference to, is I think it the only thing that has any chance. But saying all that, there's still been a lot of progress. There are a lot of states with Additional Protocols. The Board decision to, in terms of universality issue, the Board decision to modify and correct some of the deficiencies in the Small Quantities Protocol was no small part of that. And even though that will be a lengthy process, it's really really an important decision.

Kratzer: I think one of the things that we have to be somewhat careful is not to let this situation with centrifuge enrichment and A.Q. Khan and so, lead us into the trap of forgetting about the plutonium route. I'm serious about that. I'm not saying that I know or suspect any situations at the moment other than the obvious one of the heavy water reactor in Iran. But I'm of the school of thought which may be very parochial and very out of date, that enrichment is still fairly tricky, pretty hard to separate isotopes. Its duck soup to separate plutonium from even pretty highly irradiated spent fuel. And we really should not forget that.

### **Restricting the Spread of ENR**

Shea: I think that there's progress under way in the long term in new energy programs, like the INPRO Program that the IAEA has and the Gen IV program that the United

States and some others around the planet of trying to take a notion of proliferation resistance and to somehow build that in so that the systems deployed in the field are less able to create things. But I think the basic still for the future is the restraints on access to what's called ENR—enrichment and reprocessing technology. That to my mind can't be something which you try to compel because that would be difficult but it has to be something for which there's an economic and programmatic justification which is compelling in and of itself. For example, countries don't wish to take on Airbus and Boeing to build large-scale commercial airliners, because they know that the costs of getting into that business are simply enormous. To be able to reach a capability that's as reliable and safe is something which is probably unreasonable to even commence, so that you can buy or lease these things. If nuclear energy distribution takes on that kind of a basis, that it becomes sufficiently attractive so that it does not encourage states to attempt to acquire through any means indigenous enrichment or reprocessing capabilities. Then there's a hope I think in the future.

Wulf: On the reprocessing end, I would think one part of that equation is finally wrestling to the ground the solution what you do with spent fuel? The storage question has not been resolved in the United States and near as I can tell virtually nowhere else.

Kratzer: The world is awash in spent fuel—not just power reactor spent fuel but a lot of research reactor spent fuel I suspect is still out there. I have to take some exception, Tom. I don't think it has much to do with constraining the distribution of what we and of course we don't have any reprocessing, but what France and the UK what have you, have to offer in terms of reprocessing technology because that's not the reprocessing technology that any proliferator would go for. I really believe that reprocessing on a small-scale is easy and well within the capability of nearly every country with very little recognizably specialized equipment.

Shea: I don't think we're in disagreement. I think from the standpoint of expanding use of nuclear energy in the century ahead—some estimates are that maybe 1,000 reactors in operation by 2050. I don't know that that's realistic. But the expectations are that this is a growth industry. If we don't try to do the right thing for most of those countries than we end up with problems which are hopelessly chaotic. There'll always be the opportunity that a state can build a clandestine recovery operation, try to conceal it, and go its own way. The extent to which that rides on the heels of a civil industry—sort of an Article IV kind of a thing—that they claim that this is part of their inalienable right to pursue peaceful nuclear applications. When it's really a guise for an activity to get a capability. That's when I think we need to limit. I don't think we can prevent it. But to limit it.

Kratzer: I think we should constrain the spread of reprocessing and enrichment technology. I think it would be a big mistake to try to do it by ensuring means that openly conflict with Article IV. I think when you do that, you just give them—they being whoever you want to define it as—a seemingly valid excuse to develop independent programs. We have to go back a long way and remember why this all came about. It came about--this being the Atoms for Peace Program, NPT, and so on--when

we moved away from an era of total constraint, total non-cooperation. It wasn't working. We can't forget that. We shouldn't forget that even if we close all these doors and knock off cooperation in favor of denial. The other route is still open.

Wulf: I think there's another element to trying to make sure that we don't see more proliferation, whether its on the plutonium side or on the HEU side. And that is this question of some consistency—consistency with respect to noncompliance. And that's one of the things that troubles me personally about the Iranian situation. I looked at that November 2003 report and I see very clear evidence that noncompliance occurred in a major way and that should have gone to the Security Council. What they did with it is another matter. My view is that was probably a mistake. My view is that the Administration's decision to seek to pursue a possibility of engaging in civil nuclear cooperation with India is a mistake. Not because I have anything against the United States wanting to expand its relationship with India, I think we ought to. There are many good reasons why we ought to. But the one thing that we have been able to point to with respect to countries that criticize our quote exception for Israel is we've been able to say with a straight face—we engage in no civil nuclear cooperation with Israel. If this cooperation agreement goes forward with respect to India, does anybody believe that Israel will not be in—I think they already have been in--asking for exactly the same treatment? Of course they will.

Shea: Pakistan also.

Wulf: Pakistan will be a little bit later, but not much later.

Kratzer: There's always Cuba.

Wulf: Then comes the question, how do we say no to Pakistan when we need their cooperation with respect to Afghanistan and al Qaeda? You've got a real possibility of tearing shall we say a significant hole. So consistency becomes important not just because consistency is the hobjob of small minds because that's how you demonstrate what the cost-benefit calculation is that any proliferators out there has to take it into account. Right now they're totally confused as to whether there is a cost in proliferating. You take a situation like North Korea. In theory, a lot of things have been written, I don't believe it's true, but I could see why people could reach the conclusion. In the case of Iran, we're pushing aggressively to go to the Security Council. In the case of North Korea up until recently, we weren't doing a thing. People concluded why—because North Korea had nuclear weapons. So the way to get off and to get out from under any pressure is sneak in your own program and you've got it made. The reality is I think, the reason we didn't do anything in North Korea had very little to do with the fact that they may or may not have had nuclear weapons. It had much more to do with the fact that in the first Administration there was an ideological barrier that could not be overcome in terms of talking and dealing with this issue seriously in negotiation. We're not there now. Hopefully the process may lead to some more productive result. But those kinds of inconsistencies I think kill you over time. The problem with incremental decision-making when you apply it to a general principle is over time incremental decision-

making destroys the principle. I think we're making shall we say some very large bites, into that general principle by what we're doing these days.

Shea: I think we're now going to now break again for ten minutes. And when we come back, I'd like to encourage you to have some questions ready that address what we've talked about. And then we'll start to go off into the wild blue yonder. Thank you.

BREAK

### Nuclear Weapons Free Zones

Mona Dreicer: I'm Mona Dreicer, from Lawrence Livermore National Lab. I'd like to ask a sort of general question on the significance of the Nuclear Weapons Free Zones. Why were they initially instituted and what kind of role do you see for them in the future? General question to anyone who would like to answer.

Shea: Yeah, its always seemed to me that these countries sign up for something and then they just go away and that there's no follow-through or whatever. I'd be interested to hear our panel's sense of what's the value in all this? What could be done to make it more worthwhile?

Wulf: The fundamental reason that they came into being--Tlateloco obviously preceded the NPT. The NPT was specifically drafted in such a way as to allow the United States to continue to provide a nuclear umbrella with/to NATO. So it does make provision for stationing or allowing weapons to be stationed on your territory. Nuclear Weapons Free Zones precludes that. In Tlateloco, any country for example who signs up to a Nuclear Weapons Free Zones and that Free Zone is in place has agreed that it will not allow a nuclear weapons state to station nuclear weapons on its territory. I think there was utility in them in the days of the Cold War for those countries who wanted to be off limits. It sort of started in 1959 with the Antarctic Treaty which is sort of not a classical nuclear weapons free zone, but basically the 12 parties then said no nukes stationed in Antarctica. After the Cuban Missile Crisis, the countries of Latin America said you know we don't really think it's a good idea to have nuclear weapons stationed in our portion of the Western Hemisphere. The United States after the Cuban experience agreed—we don't want anybody's stuff here. So we encouraged Tlateloco.

Since that time you've had the South Pacific Nuclear Weapons Free Zone--Raretonga. Its in force, I think all the nuclear weapons states except the United States have ratified the Protocols. We've signed but not ratified. You've got the Pelindaba, the African nuclear weapons free zone. That was 1990—I forget the year.

Hooper: Bangkok was in between them. It was in between Raretonga and Pelindaba.

Wulf: Okay, whenever it was. That is not yet in force. Nor is the—Pelindaba's not in force, but neither is Bangkok. Then there's the Central Asian Nuclear Weapons Free Zone, which been signed by—no I think it's been agreed to by 5 or 6 of the Central Asian Republics. But it a hole in it that makes it unacceptable to 3 out of the 5 nuclear weapons

states. That basically says that nothing in this treaty shall override existing security arrangements. Existing security arrangements between those countries and Russia include the right for Russia to move or station nuclear weapons in the area. What the hell kind of Nuclear Weapons Free Zone is that? We have told them and said if you want us to become a part of this, it's got to be fixed or we're not signing. Even if we sign, it is not clear that there's much interest in this Administration in ratifying a Protocol to these that would provide a security assurance.

Dreicer: So did this play a really significant role in a global nonproliferation regime? Or in the end, it really hasn't made a big difference or won't make a big difference in the future?

Wulf: I think Tlateloco clearly played a big role particularly because of its predating the NPT. Now with near universality of the NPT, it's very difficult to see how it can make a major contribution. With one exception at least in my mind, and that's the Middle East. Where if you can get a Nuclear Free Zone in the Middle East that includes Israel, you've got a major accomplishment. There has been at least lip service paid to supporting a Nuclear Weapons Free Zone by Israel, as well as all the other Arab countries surrounding Israel. So at some point, it may make a contribution. My own personal view is that the zenith of Nuclear Weapons Free Zones is long since passed and we're now somewhere down near the nadir or whatever the opposite of the zenith is.

Hooper: The Secretariat's interest in Nuclear Weapons Free Zones is primarily that. At every General Conference, there's always discussion about a Nuclear Weapons Free Zone in the Middle East. Secretariat support for example of the Treaty of Pelindaba wasn't so much interest in that part of the world per se, but it was the Middle East is where the primary interest was.

Shea: I think the Director General has been charged with responsibility of having negotiations or at least consultations in the Middle East to see about making progress in that particular theatre.

### **Linking Technical Assistance to Noncompliance?**

Carrie Mathews: I'm Carrie Mathews from Pacific Northwest National Laboratory. My question has to do with the technical assistance cooperation that the IAEA provides to Member States. My question is you talked a little bit about things the Secretariat could do other than to report a country to the Security Council to encourage its compliance with its nonproliferation obligations? My question is has it been considered to make compliance with whatever the standard is for safeguards, whether it's the AP or 153, make that a condition of providing technical assistance?

Hooper: Well the short answer's yes. In terms of enforcement, the only enforcement possibility that the Secretariat has unilaterally without referring something to the Security Council is in terms of withdrawing privileges and membership and therefore access to technical cooperation, technical assistance. So yes. I don't know that its ever been

formally put to the Board; I don't think so. But it certainly is an action that has been discussed a number of times. Yes.

Kratzer: In a way, the more general question that triggers in my mind is what are the forms of—punishment is a poor word—of response of sanction that really work. There's been a tendency from the very start—it's reflected in the Atomic Energy Act, it's reflected in the Nuclear Nonproliferation Act—you just take away their nuclear cooperation, that's the right thing to do. My guess is that while it's not the wrong thing to do, it's never enough. You have to go beyond the confines of just taking away nuclear cooperation which they have probably already discounted when they went into this activity and do something else. It may be something economic. It may be something political. In the final analysis, it may be something with whatever authorization is adequate and proper, more severe than that. But I don't think—there really has been this tendency as I say, reflected in our own legislation, that the punishment is take away their nuclear cooperation. Fine, but don't stop there.

Shea: I think the attitudes are often difficult to say what's going to happen in the future. I was talking with an Indian friend when I was in Vienna last month. He said that a large part of the Indian community—technical community—was not at all in favor of its development of nuclear weapons. And that they've asked questions since then. Imagine that they had not gone that way. And that they had gained cooperation. And that they had 50 or so we'll say nuclear power reactors that they'd imported from Western countries. Where would their economy today be? Would they be substantially ahead? He seemed to believe that that was very much the case. The question of what the impact is? It's still useful at the time. If a country's dead set on getting weapons, they don't give a hoot about help in radiological health physics teaching or cancer therapy or whatever the sources of TC would be. They would be motivated to proceed ahead. So it's not strong enough to stop, but the net result in the long run may be to disadvantage.

Kratzer: An interesting question is whether the cut off of nuclear cooperation to India, which was fairly general. We stopped, Canada stopped, I don't think France did at first, but maybe eventually other than continuing to supply fuel for Tarapur. Is whether that slowed down their program—not because they were deprived of things but because it was a price that they were unhappy with? I don't know. I mean there was no visible—I'm sure there was a lot going on behind the scenes, but from the '74 tests onward, nothing took place until when was it?

Shea: '98?

Wulf: Something had to be going on from '74 to '98, just nothing visible.

Cooley: Another question? Diane?

### Environmental Sampling

Diane Fischer: Diane Fischer, Oak Ridge National Laboratory. The panel has mentioned environmental sampling several times today. I was wondering if you could elaborate on

a little bit more on how environmental sampling became part of the Additional Protocol as a verification measure.

Hooper: The Agency's first experience with environmental sampling was in Iraq. This goes back to the very early days. These samples were collected without a real awareness on the part of inspectors that were collecting them and what use they'd be put to. As things developed both in Iraq and later in Program 93+2—and I'll call them technology holders—found themselves in a trap. And that is on the one hand, they wanted to maintain these techniques as part of their clandestine intelligence gathering apparatus. On the other hand, they were interested in seeing these techniques used in specific areas of interest. Iraq and then later DPRK are two examples. Because the Agency inspectors, of course, have access. In the early days of 93+2, there was an advisory committee, a very large advisory committee, a number of states participated. After a plenary session, they were broken into groups dealing with technologies like the enrichment group and reprocessing group. The U.S. delegation in particular was under heavy instructions that this word "particle" was not to pass their lips. There was a particular moment in the enrichment group—and at that time I was just simply moving between the groups--there was a Russian guy, well known as the primary spokesman from the Russian side during Chernobyl. Carf is his name. He was there with an interpreter. As I walked into the room, there was a U.S. guy giving a presentation about environmental sampling results around Oak Ridge. These were whole sample results not particles. As I walked in, I've never verified this directly with him or to the extent that he did this with malice of forethought. He did time it as I walked into the room and he interrupted and said no, no, no that's not the way you do it. And then proceeded to dump the whole particle business. For me, it was a poignant moment. And on that basis then, the whole thing just simply came tumbling down. Within just a couple of weeks, we had substantial briefings from a number of states regarding their interest and capabilities. The whole thing then proceeded on its own.

Wulf: When you said at the start it was done in Iraq in the early days, you're saying in Iraq pursuant to the Security Council Resolution or under standard 153?

Hooper: Pursuant to the Security Council Resolution. The first evidence of a—and it wasn't immediately recognized—the first evidence of the Iraqi EMIS Program (electromagnetic isotope separation) was a particle that was removed from the clothing of a... Remember these people that were used as shields—human shields—that the Iraqi regime had placed these people around at various locations with the idea that they wouldn't be attacked with these people there. There was a particle, a single particle, removed that had isotopics that you could only get through EMIS kind of separation. That was the first hint of an EMIS Program in Iraq. But that then promoted the interest in the collection of environmental samples. Certainly that whole process would not have gone forward as well as it had if it hadn't been for the environmental sampling because at the time the inspectors went there, all of these nuclear facilities—obviously undeclared even at that time--had been stripped. All the equipment had been removed, hauled out to the desert. Big holes had been dug. The equipment had been dumped in these holes and blown up.

The tie between the equipment and how they were been used and then back to the location, environmental sampling eventually provided that.

DPRK in the very early days, before they began to realize what was happening to them and the Agency requested to collect environmental samples. These samples were collected inside facilities. And DPRK agreed. When they began to realize the kind of difficulty it was going to create for them, they very quickly changed their mind. But there was no obligation for them to agree at that time. In fact in a broad sense, the collection of environmental samples by Agency inspectors as an obligation did not come about until June of 1995 as a Part I measure. In my view, the collection of environmental samples is the single most important technical measure ever introduced to safeguards. In some ways it didn't come easy—it's still not easy. There's capability and capacity problems and other things. But it has made an enormous contribution. Much of the progress that's been made in Iran is as a result of environmental sampling.

Kratzer: You answered a question that I was about to ask which is that it is a legitimate Part I measure? Does that mean that it must have consent or that it can be done without it?

Hooper: It's an obligation. It became a legal obligation that the Agency had the right to collect environmental samples everywhere they had access. When the Additional Protocol came along, the action—the technical measure of environmental sampling—was already approved. All that happened as a result of the Additional Protocol with respect to that is that you had broader access.

Wulf: I wanted to know sort of related to what you just said. I can still remember that was floating around in the early days after the Iraq War and that was that these big round things were seen exiting out the back of buildings and disappearing out into the desert and no one knew what they were. And finally they tracked down some old "codger" at Los Alamos or some other place who was able to say that those are calutrons or whatever they're called... Is that true?

Hooper: Partially. The first Agency on-site inspection team to go to Iraq, this was in mid-May of 1991. Other than priority #1 was to be sure you could find the material you knew about. To be sure that the declared nuclear material was there and you could fully account for it. It was only then and it was during that same inspection that they proceeded to locations that had not been declared. And the primary one of those was Tarmia, which of the two Iraqi EMIS sites was the furthest one along. Now Tarmia had been very heavily damaged by the bombing in the Gulf War. And the Iraqi military had been—between the end of the Gulf War and the start of the inspectors—had come and stripped all the equipment away. So when the inspectors got there—you know try to imagine, the Iraqi's declaration had to with chemical or rubber coating of vessels, I don't know. But anyway there was a lot of discussion and debate going on as to what had happened there.

There was a guy from Oak Ridge by the name of Jerry Nichols who in my view never ever really got the credit he should have. Because he did the most really most brilliant assessment of what was available, what could be observed there and came to the conclusion that this thing had been for electromagnetic isotope separation. That was prior to the “chase the disk”. And so at the time of the “chase the disk” inspection, this was toward the end of June 1991, the Nichols’ work was in hand. But with that “chase the disk” and it became obvious almost immediately that these big poles for electromagnetic isotope separation magnets, Jerry Nichols’ work kind of disappeared. But actually, very really brilliant piece of work was prior to there actually being direct evidence that in fact that’s a route that they were going. It was at that point in time when this whole facade came down. So the Iraqi was at that point--Blix and Ekeus visited Baghdad and they were taken to the desert—and the Iraqi side then acknowledged the existence of this EMIS Program. That happened in very close sequence of time, just over the matter of a few days. There was another guy from Oak Ridge that also postulated such a thing, but the really definitive piece of work that I saw at least was Jerry Nichols work. That was prior to the “chase the disk” inspection.

Shea: There are so many occasions when we wish we had been able to do more. That was one occasion that was quite a substantial success and laid the groundwork for adoption of various strengthening measures--the 93+2 Program and all that that’s brought about. There’s still a few things left unspoken for shall we say, wide-area environmental sampling provision in the Addition Protocol which will require the Board to conclude that this is technically workable before it can be adopted. What are the prospects that you see for that, Rich?

Hooper: Slim. The inclusion of wide area environmental sampling—which is really the kind of wide area search or monitoring kind of application--depends upon for the most part different technologies both from a collection standpoint but also from an analytical standpoint. And there are a number of very difficult problems. In crowded parts of the world, like Western Europe for example, it’s almost impossible to imagine a wide area environmental sampling undertaking by the Agency. Just the attribution problem alone is almost unsolvable. If you should see some kind of indication of an activity, to try to figure out where did it come and particularly where these samples may be collected over an extended period of time--several days or even weeks. The attribution problem is a primary problem. But all of this stuff is very expensive. Because none of these things--the analytics of safeguards interests do not lend themselves to in-situ measurements. So that means that somebody has to go and collect the samples and put a new sampling medium in place. The analytical techniques themselves are expensive. I would say as things stand right now, there’s very little possibility of this going forward. A few minutes ago we talked about a Nuclear Weapons Free Zone, and that is an area that I could imagine wide area environmental sampling being utilized, where you’re talking about maintaining surveillance over a region. Middle East in particular. I could imagine a verification regime in connection with a Nuclear Weapons Free Zone making very effective use of wide area environmental sampling methods. But I think that it’s on a regional kind of context, not on a state by state context.

## The Future of the IAEA

Shea: We're now aiming toward the last quarter of an hour or thereabouts of our lengthy discussion here this afternoon. Again coming back to the fact that these foundation documents have been the basis for careers of many of us and one thing I would like to engage us on in the remaining moments is the health and well-being of the IAEA in the future. If this is almost unique in the sense of an international organization whose contributions bear directly upon our own country's national security and on the national security of other countries as well, regional and global stability, the questions for us that I would like to see some response to is what should we be doing to assure the health of this organization? And that has to do with money, which is also an issue, in which funding was raised not long ago. Staffing and support of activities, the Special Committee or other venues that may come along. Your reactions?

Wulf: I can start a little bit. I think I made some remarks during the course of this day that some may consider critical of the Bush Administration, but this is one area in terms of funding I think they got it right. Because it was the Bush Administration that was able to first internally overcome the hurdle that we've been sort of locked against for almost two decades. And that was zero real growth for all international organizations full stop. John Wolf was able to convince John Bolton that we ought to do a zero base study as to whether the Agency could continue to survive and do its job based on that. Michael Rosenthal did that study. It came up with a figure in excess of what the Agency actually asked for and that result was approved by not only the powers that be in the State Department but also by most importantly of all the Office of Management and Budget, which is crucial to any money. And we were able to persuade the other donor countries with some reluctance I might quickly add that it really was time to come up with some money for this Agency. I think that's the one area which we can be rightly proud of the U.S. action.

The area that I'm most concerned about—and Jill and Rich have both heard this before so it's not going to come as a surprise to them—is moving the Agency into even more political grounds. Let me explain that. First the decision that was made in 2003, not to urge the Board to report the violations by Iran because they didn't perhaps rise to enough of a violation, departing from past practice. That started to politicize the issue. Whether it was the right or wrong decision with respect to Iran, at that time I could perhaps be persuaded that maybe it was the right decision. With respect to the future of the Agency, I think it was clearly the wrong determination because it makes what was a fairly technical determination, much more of a political determination.

The reason I mention Jill and Rich is because I very much have a concern that the concept of integrated safeguards and the concept of the state approach may lead to a perception that different standards are being applied to different countries in such a way that countries no longer are prepared to cooperate with the Agency. I recognize that clearly there are differences between countries. I recognize that we need to make distinctions. And I very much appreciate the efforts Jill is making to ensure that the basis for distinctions in treatments of countries are based on objective criteria. So that can reduce it. But I still have the concern that we could very well see the day when the IAEA

becomes very much like the U.N. General Assembly—largely irrelevant. I don't want to see that happen. I'm not sure there's any way to guarantee that it won't happen. But I think its something we have to continue to be on constant guard against.

Kratzer: One of the areas that comes to my mind Tom, and I'm not sure where my own opinions on it stand, which is very unusual. One of the immediate byproducts of the negotiation with Germany that I referred to earlier was the U.S. voluntary offer associated with the NPT. That was a sine qua non—I'm absolutely convinced that it was a sine qua non for the NPT because a lot of countries adherence depended on it. We really were very sincere about that. We expected to have a lot of inspection activity in the United States. It was of course for the obvious reason of saying that we will take the same medicine that we're advising others to take. But it had other motivations. One of them is we wanted to see what the Agency is doing. If necessary to make them do more, make them do a good job. None of that really has come to pass. I don't think—I don't know—I don't think anything is being inspected in the U.S. at the moment, other than the Russian material.

Shea: There's nothing being inspected in Russia at all. The United States since 1994, the United States put weapons-origin material under...

Kratzer: Yeah the weapons material--but no civilian nuclear activity—to the best of my knowledge is being inspecting. The question it raises in my mind is whether it wouldn't be good for us and for the Agency and for safeguards—and I know it costs—to increase substantially the level of implementation of the voluntary offer—here, maybe elsewhere too, the UK, maybe France? I really think it ought to be looked at again.

Shea: It certainly is an issue that managed to raise itself shall we say at the NPT Review Conference process about the whole matter of Article VI and the lack of evident progress in the eyes of some at any rate. There have been reductions of weapons. The United States may be in the forefront of steps being taken in comparison with the other weapons states. For which they are generally reluctant to even recognize that there is an Article VI.

Coming back to the sense of where the Agency is... To my mind, what's happened in the past, there was much more participation by industrialized states in providing competent staff. We find that as a condition of Germany is largely out of the reprocessing business –MOX etc. So they don't experts that are coming up through industry. The United States hasn't had an industry in that area for decades now and whether something comes in the future... The economics of staff positions has not been very attractive for some countries. So as a result today, I'm looking at Susan Pepper, we have a decrease in the American participation on the staff to something like 11% was a number that I'd heard recently. Whereas the United States by its budget contributions is entitled to 25% and has traditionally given 5% for developing countries, still there's a substantial gap. From a standpoint of if this is an institution which is going to continue to perform such that its contributions are of "incalculable importance", then it is essential that the mechanisms be provided for this.

Hooper: This staffing problem at the Agency, it is a problem. It's a problem in a way that could have been anticipated. The staffing of the Department of Safeguards had a very rapid increase in size in the years immediately following the NPT. The people that joined the staff at that time did so at about the same age. So what's happened in recent time, is that that large—what was now senior staff—that large cadre of people came to retirement age at the same age. In a relatively short number of years, the loss of senior people, its hard to imagine any organization not really suffering from that. The Agency suffered from it in an exaggerated way. This loss really came at a time when there was a new Director General. And the new Director General had interests in establishing his own constituency. One way he has available to him to do that is through senior staff appointments. So the kinds of extensions and other things that could have softened the blow a little bit, just didn't happen. I think in the statistics area, the analysis of inspection data, we came to a conclusion a long time ago—1990—there was no possibility to recruit the people we needed—they just simply didn't exist. That we had to recruit people that were well-trained, but we'd have to grow our own. I think that that is the situation now in the broader safeguards department. The emphasis has to be more and more on finding the right people that have the right basic training and then really making a much larger and more consistent commitment in the training area. I just don't see any way that recruiting alone is going to solve this problem. In my view, it is a really acute. Its been chronic, but it's acute today. It's not just for the United States—that's a problem and a real one and one that needs to be addressed. Its much broader than that.

Shea: We have the laboratory situations in the United States, which have traditionally been a pool of well-qualified people to take on such assignments. But the way that the contracts are organized with the operators of the laboratories, none of them encourage and reward assignments of this sort. Generally the people that take these are outside the mainstream with no guarantee of coming back into the fold so to speak. Or even less that their experience would be such that they would be encouraged to do this. It's mostly a career break with questionable outcome. I think in terms of, given the absence of an industry in the United States, I'm going to turn to Susan in just a moment, I keep wondering how far afield should we be willing to go? I throw out this from the standpoint that I often throw these rather ambitious ideas out that are quickly dismissed. In the United States, we have service academies for the Army, the Air Force, the Navy, the Coast Guard, the Merchant Marine. The idea that there should be an academy for experts in the field of nonproliferation, nuclear safeguards in particular, strikes me as being something that perhaps we as a nation should support—a degree granting kind of a thing. I appreciate that you'd want to take in people from around the world, and somehow have it such that you're not training proliferators, but inspectors. This question of the inquisitive inspector, the highly skilled expertise, very selective and narrow disciplines that Rich has mentioned, I don't know how else we address this question. Susan, I think you're going to solve this problem for us.

Susan Pepper: I just want to say, since you mentioned my name, that this is an issue that the U.S. is very concerned with—not only our representation being lower than it has been in the past, but the whole issue of continuity of knowledge, continuity of the expertise at

the Agency with all the retirements happening. In the U.S., we have undertaken to have a more intensive effort to recruit U.S. citizens for the IAEA. We've also started an internship program for younger people, so we can get younger people interested in not only the IAEA, but the nuclear industry in the U.S. as well, which is experiencing a lot of the same issues. We have a junior professional officers program. We're starting to try to find opportunities, since the IAEA has very few entry-level positions, we're trying to find opportunities for young people to get involved. Also at the request of DOE, I've prepared a white paper to address the obstacles to recruiting U.S. citizens for the IAEA. That white paper has a number of recommendations, many aimed at the U.S. Government, for ways to make assignments at the IAEA more acceptable for U.S. citizens. I was talking to Nancy Jo Nicholas just today about the fact that she's been talking to people at Los Alamos, so this addresses the issue of national laboratories. She's been making presentations to people at Los Alamos about accepting or considering positions with the IAEA. She said she's gotten a lot of good feedback from that. So we are making efforts within the U.S. to try to resolve this issue. It sounds like the experts here have a lot of good ideas about how to do that. So maybe we need to talk to you further about that.

Hooper: We could re-recruit Diane.

Pepper: If you want to get into that also, there are some issues that the U.S. is concerned about regarding the IAEA's own policies, that are kind of shooting the Agency in the foot. There's the rotation policy which I understand the reasons for that in the United Nations community as a whole but in the nuclear industry when you have an ageing population and you have a limited number of experts, the rotation policy and the retirement policies are counterproductive to the institution. We've tried to make arguments to the Agency and we've run up against a wall. For one reason, because the Agency isn't able itself to change these policies because they are in fact United Nations policies. These are things that the U.S. Government could affect and maybe with our new Ambassador in Vienna, Ambassador Schulte, his connections, and the Department of Energy. I realize that the DVD that's going to be produced from this is probably going to reach the ears and eyes of some highly placed people who can maybe influence these situations.

Hooper: We have some progress on using old guys—I'm still involved.

Wulf: How old is the DG?

Shea: He's just a kid.

### Concluding Remarks

Kratzer: One area that may be intractable, Rich mentioned earlier that safeguards was the biggest bargain around, and I couldn't agree more. The whole notion which has drastically affected safeguards from the very beginning is this concern with interference, this concern with the loss of industrial information and so on. All of which I think is grossly exaggerated. From the very start, it was grossly exaggerated. I know I'm talking

to folks from some of the countries who have had that point of view. But that's hurt safeguards all along. Its put this pressure on for so-called fish and sea which is often a codeword for not as much safeguards and not as much effectiveness. How can we turn this around? How can we get senior policymakers to accept the proposition that for the country in compliance, this is nothing? Just let the inspectors in and let them do what they want. How can it hurt you? It would really make the whole area of safeguards more palatable, more acceptable, and more effective. I don't know how you get to it, but I'd like to see someone try.

Shea: I can't imagine of a better closing statement Myron, than that which you've just said. Perhaps these remarks today will find their way into somebody's hand where this will start to happen on a more serious basis. I think that we ought to go round, Myron, you're in the process of making...

Kratzer: I'll stop.

Wulf: I'll make mine while he's thinking. Mine is to pay tribute to the one who's thinking, to Rich. I mentioned earlier that when Committee 24 started, we started with a draft that he was largely responsible for creating. What I didn't say is that as the Committee started meeting, we fumbled around for quite some time trying to figure how to do this. Because here was this text, and Rich was under some pressure from upper management not to be talking too much. I took it upon myself to try to explain why the Secretariat was seeking this particular provision. It was pretty artificial and it also it had the unfortunate connotation of suggesting that the United States really drafted this. Eventually, I think after maybe the second meeting, we adopted the policy, and the Chairman would always when we came to a new section of information that we were going to examine, the Chairman would automatically call on Rich and Rich would explain the rationale as to why this was there. Usually by the time Rich had finished his explanation, there was no one in the room who wasn't convinced that he was right. I think you've heard him today. You can see how persuasive and how insightful he is. That was certainly the case in Committee 24. Even for the governments who were concerned about the Additional Protocol—the five I mentioned earlier. Their concern was not to weaken the Protocol, their concern was to ensure that their rights were protected. To the extent that there was commentary on it, it was how do you ensure that you don't step on member state's prerogatives? So I just want to take this opportunity to pay tribute to the guy who really is the father of INFCIRC 540.

Hooper: In this esoteric business where everything is connected to everything, I admit to having some trepidations about this session today. There was a time in the early days of 93+2 where Myron's negotiating history of 153, I almost had total recall. I used to wake up in the middle of the night. I have lost some of that. I'm happy for that actually. Not only has it been an important instrument to the Legal Division in their work, but it was really fundamental in some of my own participation.

During the negotiation of the Additional Protocol, there was a period of time during the October negotiating session where I think, and Norm can give his own feelings, but I

think most people believed there wasn't going to be an agreement. Or there there was certainly an open question whether there would be any agreement. Between that October session and that was a very difficult time within the Secretariat. There was a lot of blood spilled. Not so much of my own, but I watched others bleed. It was during the time when the Director General Blix had indicated that he would not stand for reelection and so there was a lot of jockeying and positioning to select his replacement. And that certainly was part of the difficulty.

When Committee 24 reconvened in January of 1997, it was, for me it was one of the most stunning experiences of my life because you walked away with this doom and gloom from October. In this January session, it was goodness and light. I tell you with Norm and Riart Gosh the head of the German delegation, they had literally sorted this whole thing out. The Secretariat had no role, no knowledge of it. It was literally lockstep—one would raise a question, the other just happened to have language. Myron, maybe not knowingly, but Norm certainly knowingly... I'm very grateful to them both and I'm grateful for this session. Thank you.

Cooley: I just want to thank Tom for inviting me to participate. I've had the pleasure of working with all three of our distinguished panelists in one form or other. As you can easily see, their knowledge is critical and so important to what we've accomplished in the past and what we need to do in the future. I want to thank them all. I also want to thank the audience for this four hour plus session. You don't know the planning—or lack thereof—that went into before this. I think this was an excellent idea Tom, so thank you very much. And thank you to the audience.

Shea: I would like to close out by thanking you all for your patience and endurance. For the brilliant contributions of our distinguished panel of experts which are after all the basis for being here today to have created this whole framework that we live in. I also want to thank the National Nuclear Security Administration for the grant that allowed this activity to go forward. And for the supplementary contributions of the Institute of Nuclear Materials Management and from Aquila Technologies. And with that I'd like to draw this to a close and look forward to a quiet evening. Thank you all.

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