

John Ruminer in conversation with Paul White, Sig Hecker and Alla Kassianova

Los Alamos, January 30, 2017

JR: John Ruminer; PW: Paul White; SH: Sig Hecker; AK: Alla Kassianova

AK: John, you were the organizer on the American side of the US-Russian workshop on nuclear warheads dismantlement. It was remarkable in several aspects. Where would you like to start telling this story?

JR: One of the significant aspects of the workshop was the timing, early June. It was right after the Cerro Grande fire at Los Alamos. John Browne was the laboratory director at the time and I had been in the Emergency Operations Office throughout the two weeks of the fire. I didn't sleep a lot, especially the first week. So, I had been responsible on the American side for organizing the workshop, and a number of the speakers were from Los Alamos, and I knew we were trying to recover from the fire. The workshop was in jeopardy, and we'd been planning this workshop for years. It was in jeopardy, but John Browne told me, "This workshop is important; the lab will survive without you being here for a week, and I want you to go and I want you to tell the people of Sarov about our experiences in the fire. They are a sister city of Los Alamos". They were very concerned; all of them in the Russian labs and their people were very concerned about our welfare. In fact, very interesting, during the height of the fire, Director Rady Ilkaev sent this letter to John Browne. We received letters from all over the world, really. So, John said, go and tell them about the fire. Tell them about our experiences, and how we're doing. So, I did, and I gave a colloquium. I offered to give the talk and they reworked the agenda to fit it in. These are the view graphs that I used in the colloquium. These are the actual ones. I got a lot of these materials from the director.

AK: You presented these very view graphs in Sarov?

JR: Yes. And they invited the whole community to come out for the colloquium. The place was full. Well, I talk about this in my article, but their fire chief, Anatoli Kravchenko, was so taken by the message that he wanted me to speak to his firemen, and so we arranged that as well.

AK: And then I understand some of the Sarov firemen were able to come here to Los Alamos?

JR: I gave the presentation to the firemen, and this lasted for several hours because they kept asking lots and lots of questions, some of which I could answer and some I couldn't. So, fire chief Kravchenko said, we must get your fire chief out here. I said, we'll see what we can do. I came back to the Sister Cities group in Los Alamos. They just didn't have any funding to support this kind of thing. So what I turned to next was the lab-to-lab program.

PW: The Russian nonproliferation program office was overseeing this, but the key is that the workshop itself was ultimately part of a program under the WSSX Agreement, and WSSX accepted a proposal to establish interactions under the WSSX umbrella to exchange information about fire and other emergencies around facilities with nuclear materials. That was the rubric for the exchange.

JR: That program actually paid for the visit. I made this proposal to the WSSX steering group to share experiences, and the participants would be the fire department, police department, emergency management office, hazmat personnel from our lab and their counterparts from Sarov and VNIIEF. I think it expanded even a little bit beyond that to include others.

AK: So, John, this was the proposal you submitted to WSSX to seek their approval.

JR: In Albuquerque, there was a meeting of the steering group, and I gave a version of this story and then proposed the workshop; and they accepted.

AK: Was it decided right on the spot?

JR: I think it was endorsed right on the spot, and it was probably decided later to approve it.

PW: As in all bureaucracies, there was the chain of command. The proposal went up to the WSSX Joint Steering Group representatives of the Department of Defense and the Department of Energy, and they approved without a question.

JR: The workshop in Sarov was followed up with the workshop in Los Alamos later, and that was a wonderful experience for all of us.

SH: How many came over here?

JR: I think it was ten or was eleven.

PW: And that was their first visit. There were somewhat fewer people for the second visit.

AK: Oh, there was a second visit?

PW: There were two visits here and two visits there. In the second round of exchanges we sent the new fire chief off to Sarov, and later, the new fire chief of Sarov came here with their teams - that was done under Sister Cities. The first visit from Los Alamos to Sarov in 2001 and the reciprocal visit of Chief Kravchenko and his colleagues in 2003 came under WSSX.

SH: How could you justify spending WSSX money on firefighters?

PW: The issues were the danger to facilities where nuclear material was handled and stored; and the imminent danger by fire was recognized as a common problem that could be dealt with by shared understandings and learning. And we did it. As it happens, they had fires in Sarov.

JR: They had a peat fire. Chief Douglas Macdonald from Los Alamos and Chief Anatoli Kravchenko had talked about how would one fight a peat fire during one of their exchanges, and then Sarov actually had such a fire. Of course, the Cerro Grande fire burned through about 40% of the lab property and burned up quite a number of buildings, not major facilities, but storage areas and what not, and the Sarov fire was very soon after the Cerro Grande fire. It was on everybody's mind.

AK: Can I ask about the personal side of the story? When you learned that you are going to be involved in this workshop - was there any prehistory to that? Why did they ask you and at what time did you actually start to do that?

JR: My first encounter with the Russians was when I was division leader of the Weapons Engineering Division in the mid-nineties, and there was a Surety Technology workshop in Albuquerque in the fall of 1993 on transportation and container safety. So, I attended that workshop, and there I met what I consider my counterparts at Sarov and Chelyabinsk (Snezhinsk). We had some very nice conversations. And then, there was an effort for a number of years to move toward exchanging information on dismantlement safety; director Rady Ilkaev was very much a leader in that effort. From the early nineties on he talked about the weapon systems in both countries being beyond their normal design life. That makes it a little bit tricky for dismantlement and then he said there were some systems with corrosion, and it makes it more difficult yet. He said there are opportunities for both sides to learn from each other about the safety issues relating to dismantlement and so he was very much promoting it all along, but the governments of both countries were in the beginning reluctant to have weapons engineers talking about actual warhead safety.

AK: So, what changed that allowed the dismantlement safety workshop to go ahead?

JR: From my perspective, we gradually developed trust. We saw the scientific exchanges and exchanges relating to materials safety over a number of years – five, six, seven years – there was a gradual increase in trust.

AK: But the decisions were made in the government. So, did the government also have more experience?

PW: Certainly, the government had more experience. But just as a punctuation mark or a footnote perhaps, to what John said: the original premise for negotiating and signing the WSSX agreement were just these questions that Rady Ilkaev posed in meetings during a very early visit to Los Alamos and later Sandia. These issues percolated up to our governments, and led to the negotiation and signing of the WSSX agreement in 1994 and full implementation in 1995. It then took us another five years before we finally had this workshop. And it was this, as John said, slow development of trust, partly on the Russian side because of a slight difference between the ways the bureaucracy works in Russia, and in the US. People in the then Ministry of Atomic Energy, Minatom, who were in positions of responsibility, came directly from the weapons labs. And so, they had good lines of communication. They were themselves sometimes involved in these early exchanges; so the development of trust was not just between scientists, but between those responsible in the ministry.

SH: Specifically, you are talking about Viktor Mikhailov, at that time the minister, and Lev Ryabev, the deputy minister, and then later, Nikolay Voloshin. All of these people came out of the laboratories themselves.

PW: And they came to the WSSX meetings; the leaders from the ministry were at many of these exchange meetings that we had. So, it took a while, but we got there.

JR: And once we had that level of approval, probably 1997 or possibly 1998, I started having phone conversations with my counterparts over there.

AK: How did you call each other? Did you have security people standing next to you?

JR: No, there were no security people, at least not at my end. But we had each other's name and phone number and we had an interpreter. We just started talking to each other. Just Vladimir Afanasiev and I talking about some of the areas we might exchange information on, as well as a timeframe, that is, for how many days. We discussed some of the logistics of it and I remember one of us would say, let's target such and such a date in early 1999. Well, as early 1999 approached, we had to postpone it. We agreed on another one, but we had to postpone it, too. We had about three target dates for this workshop, but we had to postpone them all. I don't remember why. But that's why, when we finally got everything organized, all the papers translated and then exchanged, and all the visas taken care of, it was so disappointing to realize that we might have to postpone yet again because of the Los Alamos fire. Fortunately, we did not.

AK: Had you met Vladimir before you talked to him on the phone?

JR: No.

AK: When you met him in person, did you have the feeling that you knew the guy?

JR: No, not really. I had seen pictures of him, so I knew what he looked like, and we had talked quite a number of times, so I knew we are going to get along just fine. I had had some feedback from one of my colleagues that he wasn't very friendly; well, that wasn't my experience. He was very friendly; very earnest. As we were leaving, he brought his daughter and his wife to send us off. He was very nice. When we had the exchange on the fire workshop, when they came over here, he came as well. That may have been partly because of the good

relationship that we had developed. I had him over at my house, and we had a wonderful evening, he and a couple of his colleagues. It was just very memorable.

AK: So, weapons engineers coming together - that was really rare even for that time.

PW: It was unheard of. Never happened before.

JR: You know, the scientists, they can continue to talk to each other; they publish papers; they go to conferences, so many of the scientists know each other. Weapons engineers have no contact whatsoever with their counterparts. That's what made this is so unique.

AK: How did you relate to them when you finally get together?

JR: The first day of the workshop, I thought, was a little bit stiff, a little formal. People got up, gave a talk, sat down. At that point, I talked with Vladimir – I said we don't know who these people are who are talking. We don't know what their role is in the weapons program; have they been hands-on weapons engineers for their career or not. It would be much more meaningful to have the speaker introduce himself; tell us what their role is. And so, beginning the second day, that's what we did. That helped a lot. We knew, oh that person has been working for 20 years. He's worked in the area of whatever he did – design or safety, or whatever. Over the week of the workshop, I could see a loosening up of conversations and more questions being asked. In fact, I found one aspect of the conversations to be very humorous. Towards the end of the week, the Russians were criticizing their counterparts. For example, the engineers from Sarov would say to the ones from Snezhinsk (and vice versa), "You're not being open, you're not telling the truth here," very much like the relationship between Livermore and Los Alamos engineers.

AK: How did you know that? They were speaking in Russian, were they not?

JR: We had interpreters. We asked them, what are they saying to each other? "You're not telling the whole truth." That experience showed me that had we been able to have subsequent workshops, they would have been much more productive than just having one. Nevertheless, there were some benefits that we received and they received from this first and only workshop. I know we Americans think we have so much oversight and regulations and formality in everything we do and it's very burdensome. We found out it is the same over there. Their procedures are very well established, and reviewed. So maybe that's the right way to do this kind of work.

AK: You don't do this kind of thing with your British counterparts?

JR: We have many exchanges and talks with the British on these kinds of topics. I can't recall a specific exchange focused on dismantlement safety, but there might have been others and there might still be. But you see, there's nobody in the world with more experience in dismantling nuclear weapons than our Russian counterparts and that's why we were so interested to talk to them.

AK: You mentioned you had tours there. What tours were they?

JR: They toured us through one of their laser facilities and, of course, the Museum, and then the countryside.

AK: But nothing related to your workshop subject.

JR: I would have liked that on subsequent workshops, I would personally have liked to see their environmental test facilities - temperature conditioning facilities. How do they do high-explosive sensitivity testing? I would have liked to have seen some of those facilities because they relate directly to what we do. I know that the laser

facility is one of their favorites and they show it to everybody. It was interesting to look at the equipment, to see what the labs look like. But it wasn't that close to home for us.

AK: Did you socialize at all outside of the workshop?

JR: Every evening we had dinner together. Actually, every meal! Certainly, in the evenings.

SH: Breakfast the Americans typically had by themselves.

PW: But lunches were together in what was not exactly a cafeteria – but more like a dining room, associated with the House of Scientists.

SH: One of the things that was really interesting was the breakfast when I was involved in the plutonium workshops. First of all, the Russians didn't come for breakfast; they were not there for breakfast. Then they separated Los Alamos and Livermore participants, because that's exactly the way you think they would do it for VNIIEF and VNIITF. They are separate; they don't talk to each other much.

JR: The food was delicious, which I was not expecting. I thought the trip was going to be a hardship, and I was worried about the water. There was plenty of bottled water at every meal and very delicious soup at every meal, lunch and dinner.

AK: Do you remember any memorable conversations, impressions outside of the workshop?

JR: When I first arrived there after an all-night train trip from Moscow, I knew that the Russian lab people would be very interested in this workshop, but I didn't realize how interested the community would be. When we showed up, they introduced me and others to the director. There were other members of the community there, and I didn't know who they were. But the next day, they had an article in the paper with picture of Vladimir Afanasiev and me shaking hands. I think the headline said, "It's all about safety" or something like that. And the next day, the paper reported that we were signing papers, and the following day there was something else. Anyway, to me that was a very good indication. A number of people from community also showed great interest in the colloquium I gave on the fire. Mrs. Ilkaev, the wife of the director, was there for it. It was heartwarming to see that.

There was one sort of sad story; it was on our trip from Moscow to Sarov on the train. Around midnight we stopped at some village and there was a lady selling ice cream. We bought some ice cream and she was kind of muttering, talking and talking, but we didn't know what she was saying. Afterwards we asked the interpreter what she was saying to us. It turns out she said, "I didn't use to have to come out here at midnight and sell ice cream. This is all your fault." So, she recognized that we were Americans, and she was very angry at her situation. And so, we thought, what kind of reception are we going to get in Sarov? The interpreter said, "Well, they were quite happy to have you here. We've been waiting for this to happen."

AK: Was this your first time in Russia?

JR: Oh, yes.

AK: Did you go afterwards?

JR: That was the one and only time. Well, I had several other interactions with Russians: one in Vienna, about six months later, and then, of course, the fire workshops in Los Alamos. 2000 – that was about the time when things began going downhill with our collaborations. The high point was towards the end of the Clinton administration, I would say. Not just in our program. The relationships with the Russians were quite good at that time.

AK: So did this whole experience change something in how you look at Russia? Are you paying attention to what is happening in Russia today?

JR: It certainly gave me fond memories. There is also a certain sadness that the relationships are what they are today. In my retirement, it gives me really good stories to tell people. And frankly, the experiences at the Stanford workshop and contributing to “Doomed to Cooperate” have in some ways been one of the highlights of my retirement.

AK: Are you telling those stories when you’re doing those tours here the Los Alamos History Museum?

JR: Probably one activity that I have been most involved in since I retired is supporting the local Historical Society in different ways. I am a docent at the museum and have been for ten years or so, which is a good experience. I see so many people from around the country and from around the world. Los Alamos still has a certain magic to its name and people are curious. They come in, and I find it very fulfilling to talk to them. When they find out I grew up in Los Alamos, they're even more interested in talking to me. I enjoy that. I've been on the board of directors for 8 or 9 years now and there's been so much change, so many positive changes in what we've been able to offer to the public in the way of the historic houses, museum exhibits, new archives, things like that. I don't do the tours except for friends, which I'll be happy to do for you. My job - one of my responsibilities - has been to look after the historic properties that we have - namely two of them – historic buildings, houses on what's called Bathtub Row. The house where Robert Oppenheimer lived during the war and another house right next to it where two Nobel laureates Hans Bethe and Ed McMillan lived during the Manhattan project. We've completely refurbished the Bethe house and put exhibits in there. And one day, we'll be doing the same for the Oppenheimer house. It is still occupied by a woman who's lived there for 65 years and really taken wonderful care of it, and it just it looks the same as during Oppenheimer's days.

AK: Is she related to Oppenheimer in any way?

JR: No, she's not. She just happened to be in the queue when they were selling the houses and she and her husband were the occupants.¹ They purchased the house and then about 7 or 8 years ago they sold the house to the Historical Society under a life trust which means they can stay there until they die. After a couple of years, she said, you don't need to pay us; we are just going to donate it. She's 97 years old now and she's doing just fine. I see her every week to check how she's doing and how the house is doing. She tells me stories. She still has good memory and is an avid reader. Her name is Helene Suydam. Her husband, Jerry, is deceased now. He was a theoretician at the lab.

PW: Let me interject a comment. In reading the article by Afanasiev, you appreciate the responsibility that he had within the Russian nuclear enterprise for safety of nuclear warheads. And they obviously assigned the responsibility for this area of our technical exchanges to the key person from their laboratory. This kind of workshop happened, I think, because of the relationship that John was able to establish with Vladimir. You know, it couldn't have happened without that level of trust and not just systemic organizational trust. It all builds on person-to-person relationships; and John gets a lot of credit for the fact that this workshop happened, and happened so successfully.

JR: I wanted it to happen. When you read the articles in the “Doomed to Cooperate,” and read the impressions that a lot of the Russians have, you see they were very curious. They did not have the experience to come to America, to share information with colleagues; and I have to say that it was the same motivator for me as well.

¹ Immediately after the war, after the Manhattan Project, the government retained ownership of all the housing. Only later were these properties put up for sale for private ownership.

What an opportunity, a history-making opportunity this was, and so I wanted it to happen. That was what prompted the person-to-person telephone calls.

AK: It is very remarkable that it was over the phone - not seeing each other, kind of indirect - that you were able to establish this kind of relationship.

JR: I was not a participant in any of the earlier planning meetings in Washington. There might have been a face-to-face meeting with some of my colleagues. I know they had been here earlier.

PW: Afanasiev participated in some earlier workshops that were not directly related to dismantling, and he was a member of the Coordinating Group for the Russian implementation of the WSSX agreement. So, he'd had a number of encounters with people associated with this general activity, but in order to make the workshop happen, he had to work directly with someone like John who had the responsibility in this country.

SH: Let me ask you a question. In terms of safety, weapon safety, how has your view of Russian weapon safety evolved from the days of Chernobyl, which was obviously reactor-related, to the current time? Particularly, what about the early years of trying to make contacts, and then eventually the workshop, and the time since? How would you describe how Russian nuclear weapons safety has evolved?

JR: I've mentioned the one area that I was most surprised at and pleased to hear about was the rigor that they put into the safety of their operations. I had no idea. Not only their procedures, but the way they qualify their workers and the kind of oversight that they provide - it's different, the way they approach this is very, very different from us. They have a doctor evaluate the psychological and physical condition of their workers before every shift. There's a doctor whose job it is to do that.

SH: For every shift?

JR: Yes. He's part of the team; or, rather, I'd say, it is a group of doctors. Whereas we depended on, I'd say, self-reporting. We train our workers to be aware of their teammates' physical and mental condition and report if there are any concerns. That was the subject of one of the talks I gave at the workshop, about worker qualification. And one of the questions I got was, "Well okay, in principle you have self-reporting. Does it ever happen?" Because they were amazed that our workers would report on their co-workers. And I actually had statistics that it had happened. It does happen. It happens during our regular reviews of the condition and qualifications of the workers who actually have hands-on responsibilities around nuclear devices. So, that was a revelation to me about the way they do business.

SH: They do it through medical doctors being emplaced essentially into the workforce.

JR: Yes. That was one of their presentations, and that's how they were different from us. These are the types of impressions that we could come away with. We could listen to their presentations and then start to read between the lines. And try to interpret things that are not said. For example, I came away with an impression that materials corrosion was a much bigger problem for the Russians than for the Americans. And I guess - I won't go into why it wasn't as great a concern for us - but clearly that that was a concern for them, which means that they dismantle their systems much more regularly than we do. And this was Director Ilkaev's point, too. Corrosion, he said, is a problem for certain systems. And then, several of the speakers said - and all of us know - dismantlement is much more difficult than assembly. When you assemble a nuclear weapon, you know every dimension perfectly; the materials are pristine. We have fixtures that are designed to handle things and it's a very smooth and safe operation. When you dismantle an aged weapon system, there are chemical reactions, dimensional changes, parts are glued or welded together, making it difficult to take the weapon apart, which isn't the case when you're assembling. So, several of the Russian speakers said, which I was so pleased to hear, you know, this is the most

difficult part of the life cycle; the most hazardous part, which is why we're meeting here. In our presentations, the Americans actually talked about incidents that occurred in the assembly bay during dismantlement. They were not small incidents; I am talking about a fire in the bay or dropping a weapon. We call them safety incidents. We described them and then described the procedures that were put in place to make sure that doesn't happen again. The Russians did not present anything like that. They only said they'd never had an accident with their weapons during dismantlement. And what they meant by that was they've never had a high explosive detonation occur. We would have liked to have heard more about the safety incidents, and I am confident, if there had been follow-on workshops, that's what we would have heard more about.

SH: Why is it important to discuss those things? Particularly if you look at that versus the risk of somehow engineers getting together and you wind up exchanging secrets.

JR: Once we know the safety hazards - potential safety hazards – then we can design diagnostics to anticipate; you might have a diagnostic to measure some gas effluents before taking the unit apart. So, it's important to know what each other's experience was. And then, I think, we could cooperate on developing diagnostics so you have more information prior to the disassembly operation; and it is going to make it that much safer for both sides. Our systems aren't pristine either.

AK: How sensitive was this really? You mentioned that this one Russian guy who said that they stink when you take them apart, and you got a sense of what might be the chemical composition of stuff. Is it something sensitive from security point of view, talking about that?

JR: Yes. Still, in our minds, we suspect what gases might have been produced from their materials. Rotten eggs – that tells you something.

AK: Did you have any accidents when someone would say anything that they were not supposed to say? Did you have any occurrences like that?

JR: During the workshop? I don't think so. We were prepared. We exchanged the topics; we had our talks all reviewed by classification. But there's a lot you can talk about without revealing secrets.

AK: Do you believe that diagnostics is one of those things that could be fruitfully discussed together?

JR: Yes. Very definitely.

AK: Did you prepare a proposal about that, and it just died out? What was the Russian response to that diagnostic idea?

JR: My comment in my write-up was I felt that the Russians would be even more interested in diagnostics, and some of the questions they asked made me realize that they would like to see this kind of information exchange. I thought it was a natural topic for the follow-up workshop to focus on certain areas instead of just procedures.

SH: So why did the workshops not happen?

JR: I think that's a question Sig can answer better than I can. It was a period of time when relations and trust between the Russians and American governments were beginning to decline.

SH: I think we can actually go back to the Stanford workshop that we held where we talked about the demise of WSSX. And what sticks in my mind, several of the Russians, but Olga Vorontsova particularly, said you Americans, you kept loading more and more things into WSSX, which really didn't fit with WSSX objectives. Paul, I would let tell you this story, because it is very important.

PW: It is exactly right. First of all, the workshop John talks about took place in 2000, and it was just the time that the sides agreed to renew the WSSX agreement for another 5 years. But there had also been added in the year or so before 2000 a set of additional activities that were not directly related to WSSX. I'll just use the term "transparency". The US government, or parts of the US government, was pushing to do more interactions with the Russians that were not directly related to WSSX and that were at least as sensitive as some of those activities of WSSX. And the US wanted to push to expand the areas of interaction. Then they wanted to do it less in the spirit of pure scientific exchange where there was reciprocity - we learn as much from you as you learn from us. Those same parts of the US government wanted to pay the Russians, in effect, to tell them more and more about how they followed the dismantlement process - not safety issues, but rather how the weapons move around in the enterprise, how the dismantlement is overseen, how do you assure dismantlement has actually occurred. The Russians, at the same time, were wanting the kind of financial support that the US activities implied. They had become better off economically, but they weren't entirely out of the woods. Yet at the same time, they were concerned about the sensitivity of these exchanges; so some on the Russian side said well, we should have an agreement that somehow recognizes that this is sensitive, and we should seek protection over this kind of exchange. But parts of the Russian government said it's too difficult to negotiate a new agreement. The best thing we can do is slide this under the existing umbrella of WSSX. That was for better or for worse agreed at the same time that this agreement was renewed in 2000, that this new activity would be swallowed up under it. And all of a sudden, WSSX was heading off in a different direction. While some Russians were saying, this is too sensitive, we want to step back - and so they pulled back in all areas, including WSSX, in addition to transparency. Transparency became a bad word. The US kept pushing, Russians kept retreating and retrenching and putting up barriers; and so by the time 2010 rolled around, it was virtually over.

SH: This is a classic case of what happened to many of our interactions once the lab-to-lab was starting to close down, and the Washington bureaucracy took over. We saw the mingling of two totally different objectives. Our objective on the science side was to do science together; that is, to do new things. Then we used those connections to get a foothold in the other areas such as nuclear material and nuclear weapons safety and security. On the other hand, Washington, or let's say the political people, wanted to mix in issues like transparency. Well, the Russians view transparency very differently than Americans. To them, transparency is spying. But the Americans saw transparency as a part of arms control, thus transparency was an arms control objective. In other words, if you're going to do things, we want to make sure you are sufficiently transparent as to what happens to the weapons; does the number of weapons really decrease; what happens to the materials? The Americans wanted to be able to account for all of these things. But after 2000, the Russians just didn't want to do that anymore. They never liked giving that much information to begin with. So, when arms control objectives were mixed with science, safety, and security - it didn't work. It sort of worked in the 1990s because the problems were so big, and the Russians also needed money. And then from 2000 on, they did not need the money as much anymore, and they got a much better handle on these safety and security issues themselves. To me, that was one of the main reasons why their cooperation already started going downhill. So, the more people in Washington pushed for transparency, the more their security people objected, and by that time the security apparatus in Russia had regained some of its Soviet-style influence. It's unfortunate, because in the 1990s we actually had the security people at their labs working with us hand-in-hand on MPC&A and in WSSX, too; they were part of the team. By the time 2000 came around, the security people were not working with us, they were working against us. The important lessons are: don't mix objectives, have both sides agree, and keep the security people on your side.

AK: John, did you feel it at that time?

JR: If I had been a time traveler, and I had been able to read "Doomed to Cooperate" before I went to Russia, I would have known so much more about how to do this workshop. I really had not been that familiar with all the previous work that had been done or the past 10 years to set the stage. And, I'll just confess to you that at the

opening of the workshop I had a surprise. We had an agenda and I think the agenda said that Director Ilkaev will give some welcoming remarks, and then we'll get right into the papers. Well, Director Ilkaev gives his opening remarks, and he said now John Ruminer will give his remarks. I was unprepared. I remember walking up to the podium thinking, "What am I going to say?" I don't remember what I said!

PW: Whatever it was, it was fine.

SH: I am confident it was good, John.

JR: And if I'd known then what I know now, I first of all would have acknowledged the strong and important influence that Director Ilkaev had over the years, and then I would have also acknowledged our expectation that there in the audience, the Russian engineers were the most experienced in the world, and that's why we're here to learn as well as to educate.

SH: John, one other thing. The DMSO story. Could you give me some more detail on that?

JR: Yes. Let me tell the story. This was one of the presentations that was a little later in the agenda because in the beginning we were talking about process, and then got to specifics. Jerry Dow, from Lawrence Livermore, reported on a program of several years of investigation that Lawrence Livermore lab had done on better techniques to remove high explosives that are bonded to metal parts. They had a traditional method using some kind of solvent, but that solvent had environmental drawbacks and even effectiveness drawbacks. So, over a number of years they evaluated different candidates and one was a solvent called DMSO (dimethyl sulfoxide). He described all the experiments they had done in comparing its effectiveness, and he described the environmental features of the process. He just laid it all out for the Russians. And one of the Russian engineers, and I don't know who it was, but he stood up and said, "You have given us a gift," because obviously that was a part of a process that they were struggling with. I would be very surprised if they're not using that process now in their dismantlement.

PW: My footnote on that is that talk specifically addressed one of the issues that Ilkaev had raised during that very first meeting in Los Alamos that helped precipitate the WSSX Agreement. And because of the experience that Livermore had with this particular issue - they had with at least one - probably more than one - system, we knew about that and included that talk specifically to address that question. And Jerry was the right one to give it.

JR: Yes, he did a good job. And that got right to the heart of what people really hoped to get out of the workshop.

SH: John, did you say the other solvents they had worked with had environmental problems? We had those problems throughout the whole weapon complex over the years. Particularly solvents, but many other things became environmentally outlawed. What's so interesting about this DMSO, dimethyl sulfoxide, is that it is a common industrial solvent, even used as a household solvent. So, this is not some super high-tech special solvent. I love to tell the story that the Russian engineer actually stood up after Jerry's presentation and made this comment, "You have given us a gift".

JR: He did.

SH: I wanted to make sure that's right.

PW: Made the whole workshop worthwhile.

SH: Did you have any indication that they did more mechanical disassembly than dissolution, or had they also tried solvent?

JR: I don't know. This is removing aged explosives, which are more sensitive than new explosives.

PW: The words of the interpreter during that initial meeting in Los Alamos are just engraved on my mind - the removal of high explosive from other material to which it had become adhered. Those are the words that Rady Ilkaev presented as a common problem they had.

AK: I'm just wondering and it's probably a small question to ask - did you recognize that the Russian audience came from different labs?

JR: They actually gave us a roster of the attendees. Yes, there's one that stands out. There was one organization that wasn't one of the weapons labs. He was a medical doctor who gave a talk about putting hundreds of sensors in the skull of a worker to measure stress and to control stress. And the weapons lab folks, I have to say, they really laughed at him. He was from the Institute of Biophysics. Of course, we knew from which organization each of the speakers came. Somewhere we have a list of the participants who were directly involved with papers in the evening sessions. And then of course, there were probably hundreds of engineers from Sarov present.

Another impression that I came away with was that dismantlement is a more stressful occupation for the Russian workers than it is for the American workers. It was just an impression that I got because they talked about it so much. It might be because of the condition of their weapon systems when they went out of service.

AK: Also the general working conditions may not have been people-centered.

JR: Yes, that may be, and maybe they don't report incidents the same way we do. We have quite a thorough vetting of our workers who have actual hands-on responsibilities, such as drug testing, yearly physicals; we review their work performance, their security performance every year. When I was at the division director level, one of my jobs was to chair a panel to review every worker every year, and the doctor and the security people and the supervisor would describe what the person's job was and their performance. And there were a number of cases where we would temporarily remove a worker for six months. Maybe there was a problem at home or something – we would temporarily remove someone from the assembly-disassembly operations. And then sometimes we put him back on, after things were resolved. We came into that very seriously, and the Russians used a different approach, but we can tell they took it very seriously.

SH: So how do you feel today about Russian nuclear weapons safety and American nuclear weapon safety?

JR: From what I understand, the Russians have been very busy upgrading their stockpile. You know, these old systems have been replaced with new systems or redesigned new systems. And from what I understand, their facilities are much improved for testing, evaluating, assembling, disassembling. So, I think we're probably much more on an even footing. I think our procedures and facilities are still first-rate. I don't have any reservation about the way we're doing our job. Things have certainly improved on their end. I wish relations were better. I really do. I feel bad that there are so many potential benefits in cooperating and sharing information - some day perhaps...

AK: When did you last speak or write or exchange any communication with your Russian colleagues?

JR: The last time I communicated with Vladimir Afanasiev was about two weeks before I retired; I sent him a nice long email.

SH: When was that?

JR: It was about 10 years ago. It's actually about 12 years ago. But anyway, I just said how much I did enjoy the several exchanges we had and that I hoped they were still continually progressing in this area, but that I was

retiring and I would not be involved. One of the things that I enjoyed in my interactions with Vladimir was that his daughter was an interpreter. She's very nice lady. And she had a brand new little boy.

AK: Oh that must be Kolya. We have a picture of Vladimir and his grandson in the book.

JR: And I enjoyed that in the evenings we talked about our grandchildren, which tells me he's more like me. And then he brought his daughter and his wife to the train to send us off. Then, when we met in Vienna six months later, I took a little children's book. It was just a little cartoonish book. I said, I want to meet with you in private. I wanted him to give it to his grandson. I could tell he was so pleased.

SH: What did you guys do in Vienna?

PW: It was this artifact or construct in which WSSX was part of the activities within the Reis-Ryabev framework.

SH: So, it was the Reis-Ryabev WSSX meeting. John, was it your last one with the Russians?

JR: No, there was the fire workshop. That was in November 2000, and the fire workshop was later.

PW: It was within that segment of the WSSX umbrella. The meetings were held in this sequence: Dismantlement Workshop in Sarov (June 2000); Reis-Ryabev Meeting in Vienna (November 2000); and WSSX Wildfire Workshop in Sarov (March 2001).

SH: I gave a talk about the book that addressed nuclear cooperation between Russia and the U.S. and asked the rhetorical question "What's it worth it?" So, let me ask you, in your opinion, was the cooperation on nuclear weapon dismantlement and safety worth it?

JR: Absolutely. No question. Twenty years of lab-to-lab exchanges brought many, many benefits to both sides. Absolutely. The workshop on Dismantlement Safety - I think it was worth it because it checked off a box that was needed from day one that showed and demonstrated we could have a useful exchange. We didn't have a problem with security. We did not violate any rules in terms of classification and secrecy. We did not spill the beans. And the fire safety workshops were just unexpected but valuable serendipitous outcomes that I think were invaluable for us.

AK: The Russian wanted those workshops.

JR: Oh yes, the fire chief Kravchenko; they drove it. And Sig, my involvement in this was so close to my retirement. Had I been 10 years away from retirement, maybe I could have made things happen. My successors didn't really pick up on it.

PW: I would think it's important to emphasize this. What evidence do we have of the specific benefits of that dismantlement workshop? In addition to the kind of trust, the demonstration that we could do this right up to the edge of permissible exchanges, I don't think we ever expected to know specifics. I think it is very hard to get feedback unless there is somebody standing up and saying, "You have given us a gift." We did answer, in that workshop through that presentation by Jerry Dow and others, the specific questions that had been raised. Did we learn something? We certainly gained confidence in the seriousness with which they addressed safety issues. But I think we could also turn to the words that Afanasiev used in the paper that he wrote for the book. He had the central responsibility for writing standards that would be accepted within the nuclear complex, and he said that they definitely benefited from the exchanges. Could he have been more specific - I think not, because that would have crossed the line. I think and we shouldn't expect more.

JR: Had the workshops gone 5 more years, we definitely would have had joint projects. These would have been working projects as in many of the other parts of the cooperative programs, but it just did not happen.

SH: I think the point that you made is that you were getting to a place where you were looking for what could be done to sense if you may have a problem in disassembly. So, you were looking for diagnostics. That would have been an area for joint research and demonstration without getting into classification problem. You indicated in your earlier comment that this was recognized, and that was why it was important for you to talk to each other. After all, here were the two countries that had more experience than everybody else put together. You could have gone in that direction, and we did do that in many of the other areas as you know. We did systems for MPC&A and we did the plutonium workshops. We did things together, lots of things. And here you were just opening the door.

JR: It would have been so fulfilling.

PW: To the benefit of both of us.

AK: To the whole world I guess.

JR: And we certainly had the upper-level management support for this kind of thing.

PW: Which reminds me - not only did Afanasiev say what he did about the benefits, but we know that his paper had to get approved. So, whatever he said, it was endorsed at a higher level, at that time.

SH: Everything they submitted went through Moscow, but Minatom (and then Rosatom) in Moscow at the time was still being run by people who came from the labs. They also must have believed there had been benefits to both sides and the world. I think they are getting farther and farther away from having that history of the institutes' involvement. But we won't know until we once again get a chance to look at the potential of collaboration and who knows when that may come.