UNITED STATES OF AMERICA

+ + + + +

NUCLEAR REGULATORY COMMISSION

+ + + + +

BRIEFING ON INTERNATIONAL RESEARCH AND BILATERAL AGREEMENTS

+ + + + +

Tuesday

January 10, 2006

+ + + + +

The hearing came to order at 9:30 a.m. in the Commission Hearing Room of One White Flint North. Chairman Nils J. Diaz presiding.

PRESENT

NILS J. DIAZ	CHAIRMAN
EDWARD MCGAFFIGAN	COMMISSIONER
JEFFREY MERRIFIELD	COMMISSIONER
GREGORY B. JACZKO	COMMISSIONER
PETER B. LYONS	COMMISSIONER

PRESENTERS:

NRC STAFF PANEL:

Luis A. Reyes, EDO

Carl Paperiello, Dir., RES

Charles Ader, RES

Mark Cunningham, RES

Farouk Eltawila, RES

P R O C E E D I N G S

CHAIRMAN DIAZ: Good morning. The Commission meets this morning to have the staff brief us. And the staff, I understand, has been eagerly awaiting to brief the Commission on the NRC'S International Research and Bilateral Agreement.

This is an important part of not only our research program but of the technical foundations of the agency and really it brings in not only the vision and the technical and scientific expertise from the outside, but it also keeps our staff significantly engaged in what is important to safety around the world.

So the staff is going to brief the Commission in detail of these programs and the benefits and our involvement in many of these programs.

As you will probably know, Dr. Paperiello has announced that he is going retire soon. Let me just quote one of my favorite philosophers, "It's not over until it's over."

And we certainly want to thank Carl for his many years of service and in some way or another, we look forward to him continuing to give us his expertise and wisdom in some manner that he will determine in the future.

We have a considerable amount of information to cover. I think the staff has about a 30-minute presentation. We will try to package the meeting in less than a hour and a half and see if my fellow Commissioners have any questions.

COMMISSIONER McGAFFIGAN: Mr. Chairman, I would join you in toasting or roasting Carl, except it isn't his last appearance. So I am going to wait -- I think there is a Research program briefing before he leaves.

CHAIRMAN DIAZ: All right.

MR. REYES: Good morning, Chairman and Commissioners. The staff is ready to brief the Commission on International Research and Bilateral Agreements. And the staff requested the opportunity to brief the Commission separately from the program briefings that we typically have and will have for the Office of Research because of the wealth of activity that we have in this area. And the second part is because we wanted to convey to the Commission how we are increasing the knowledge and technical expertise of the agency while still being frugal with our financial resources.

And we will talk to you today about leveraging those.

And with that, let me turn it over to Carl.

DR. PAPERIELLO: Thank you.

Slide one.

The Office of Nuclear Regulatory Research is pleased today to brief the Commission on our International Research and Bilateral Agreements and how they contribute to the NRC's safety and security mission.

Slide 2. I don't have the time to discuss all the international agreements. But you have been provided with the summary package of these agreements. Today's presentation was going to be limited to an overview and then a discussion of selected programs. But my staff and I are prepared to answer questions on any of these programs.

Slide 3. Why are we doing this? We engage in collaborative research both domestically and internationally to achieve the strategic goals of safety and security in the most efficient and

effective manner. Collaboration spreads the costs and further, offers technical insights of other investigators. In some cases the physical facilities needed to do the research simply don't exist in the United States.

And finally, a great deal of technical research is being conducted outside of the United States and we believe it is desirable to ensure that the current state of NRC knowledge incorporates the results of this research where possible.

Slide 4. Most of the funding -- and I'm talking about money funding -- either people resources involved, but most of the foreign research funding is for experiments. And I don't have to remind people that science and even engineering more in my experience is rooted in empiricism. And these experiments are one way to collect empirical data.

Other ways, obviously, include things like operating experience.

The principle use of the data is the formulation and the validation of models, principally computer models, used for safety and security analysis.

In addition, international benchmark problems also contribute to the verification and validation of complex computer models.

There is also a great deal of data shared, nuclear data, cross sections for various nuclear processes, vision fragment distribution, criticality benchmarks and data of that sort, is all hosted data in the environmental area in terms of various migration parameters, chemical, thermodynamic, but it is a big piece.

And I like to point out that NEA'S Committee on Nuclear

Science and the Data Bank are data sources used by the NRC. Reports issued by this committee are also a source of information on technologies not currently used in the United States.

So if you want to talk about transmutation of transuranic elements, and you asked me something about that, I would go to this committee's website and download some of the documents they have that summarizes conferences that we don't attend and discussions on that particular topic.

Slide 5. We have about 90 agreements with 22 countries; 41 of these agreements encompass just two bilateral programs, CAMP and CSARP, which I will discuss later. Besides financial contributions, the NRC is valued for the intellectual capital and the leadership we bring to the programs NRC supports.

Slide 6. Currently, the NRC contributes about $3.9 million a year to these agreements. In turn, foreign participants contribute about 1.1 million to NRC-sponsored research here in the United States. This is truly collaborative.

The total foreign contributions to the research that we contribute to oversee amounts to about $40 or $50 million a year.

Slide 7. The next three slides are just a summary of the areas of international cooperation. And as you can see, these are almost all the areas in which the NRC has some kind of research or some kind of issues. There are some foreign component.

Foreign pressure vessel data has contributed to the recent development of the technical basis for the revision of the PTS rule. I would venture to say if we did not have that data, we would not have been able to generate the new curves that are to be used in that rule.

A number of projects have contributed to the development

of the technical basis for the revision of 50.46 including piping, thermal hydraulic code application and fuel performance.

Slide 8.

Much of the seismic safety research is conducted with Japan. And I'm going to speak about that a little later.

We share work on PRA, severe accidents, which has a lot of the experimental work we are doing. We do almost no severe accident experimental work here in the United States, don't have many facilities left to do it; and reactor containment structural integrity.

Slide 9.

The NRC will be signing an agreement in the next several months with Germany on spent fuel transportation cask testing. The Commission is aware of that. We have used foreign research data to verify and validate fire codes.

I would also add we are doing it domestically with other Federal agencies. It is not just foreign. It is a combination of foreign and domestic. And environmental models use in decommissioning.

There is a major European program to look at environmental models using the contamination that resulted from the Chernobyl incident. So you have geography and land that is contaminated that you can have something that can be studied which is not available here in the United States, and human reliability.

Slide 10.

You will hear terms Multilateral Agreement, Bilateral Agreement. What do they mean?

And there is obviously, also a bunch of alphabet soup here. And we provided you with a bibliography of what these things all mean.

Multilateral Agreements are those in which the NRC participates that are sponsored under the auspices of NEA. And they include both facility-based research programs and data exchanges.

Slide 11.

Bilateral agreements are initiated under the auspices of an individual country even if several countries participate. For example, the CAMP and CSARP were initiated by the NRC. While others may involve only one other country, such as the package performance study and the agreements on seismic research with Japan.

Slide 12.

COMMISSIONER JACZKO: I'm actually not familiar with what CAMP and CSARP.

DR. PAPERIELLO: I am going to discuss them later.

COMMISSIONER MERRIFIELD: There are actually four pages of acronyms at the end of this presentation beginning with Slide 17 and going to Slide 20, which in my eyes does a record for the Commission. But understanding --

Mr. PAPERIELLO: I apologize. I inherited this.

CHAIRMAN DIAZ: Go ahead, Carl.

DR. PAPERIELLO: Slide 12.

Research and the NRC is involved in a number of NEA committees and working groups. This slide shows those in which Research is an active participant. NRR and NMSS are also involved with other committees and working groups at NEA.

Further, the DOE represents the United States on some NEA committees. Two of these I previously mentioned and are important to us, and that is the Nuclear Science Committee and the Data Bank.

Slide 13.

There are other international initiatives shown on this slide. Most of these are benchmark comparisons or information exchanges. The MCMA is the MELCOR Code Modernization and Assessment. This project involves the conversion of MELCOR severe accident code FORTRAN 95 in Russia.

Modernization of the code has two benefits to the NRC. Excuse me. I caught my wife's cold.

On a modern computer platform, FORTRAN runs much more efficiently than FORTRAN 77; and two, it is easier to maintain now and in the future. At some point, FORTRAN 77 will not likely be available for the platforms and the operating systems in use.

Also, the cost of this conversion has been attractive. FORTRAN 95 also has some parallel processing features, and parallel processing is arriving, I think, in another year or so. Most of the desktop PC microprocessors will have at least two CPUs on them.

Slide 14.

The Office of Research has also hosted six assignees in the last five years in Switzerland, Sweden and Korea. Most of the assignments, at least in recent years, have been working with NRC computer codes. And their assignment has really been at minimal or no cost to the NRC. Their own countries pay their way and have ever made a financial contribution to us -- and they exercise codes for us and we publish the results.

Slide 15.

I would like to talk about a sampling of specific projects. The Commission has extensive background material on all of these projects and back up slides for most of them.

In SECY-05-0156 we have provided extensive information on the HALDEN project. I believe the Commission is well aware of that project, so I'm not going to discuss it at this meeting.

I would like to first discuss the PAKS fuel project because I knows there is a fair amount of interest by the Commission in this project.

In April of 2003, during a fuel cleaning operation at the PAKS Nuclear Power Station, spent fuel overheated and sustained severe damage. Since the conditions that caused fuel damage were very similar to LOCA conditions and the cladding is similar to modern United States fuel alloys, the NRC joined a multinational research project to examine the fuel.

This work is also applicable the revision of 50.46(b) and the provisions in that rule that deal with cladding embrittlement and how you account for it.

Phase 1 was the clean-up, removal and shipment of the spent fuel. And this has not been accomplished to date due to the very fragile condition of the fuel. Phase 1 involves no cost to the NRC.

Phase 2, the examination of the fuel, is expected to cost approximately $1.5 million of which the United States contribution would be approximately $600,000 over a four-year period.

What has been learned to date? Several impressions or lessons can be gained from the PAKS-2 fuel cleaning accident. First, the fuel was in a closed water filled tank, where insufficient cooling led to boil-off, high cladding temperatures and oxidation in steam.

Second, although the cladding temperatures were high, they were limited by residual heat transferred to the walls of the immersed tank and fuel melting did not occur.

Third, the cladding remained at elevated temperatures for a long time -- hours -- causing massive oxidation with oxygen ingress into the metal, and this resulted in severe embrittlement of the cladding. That is part of the reason why it has not been moved yet. The question is how can we move it without having more of it break apart?

Finally, much of the embrittled cladding collapsed when exposed to mild mechanical loads when the tank head was lifted. In summary, this behavior is more like a beyond-design-basis LOCA than such as a spent fuel pool accident, and the ability to cool colapsed fuel debris in this case, although not always guaranteed, does demonstrate the appropriate conservativeness of our LOCA rules, which try to ensure that fuel rods do not collapse by retaining cladding ductility.

NRR has contacted other regulators and informed us that the French, German, United Kingdom and Swedish regulators did not initiate any new regulatory requirements as a result of the PAKS fuel event.

COMMISSIONER MERRIFIELD: Mr. Chairman, just a clarification for the record.

For an individual who might have just listened to that portion of your presentation, who may not be familiar with the event, I think it is important to note that the fuel that was involved in the PAKS event had just recently come out of the reactor. And that the phenomenology with fuel just recently out of the reactor is quite different --

DR. PAPERIELLO: Was fresh fuel.

COMMISSIONER MERRIFIELD: Was fresh fuel.

DR. PAPERIELLO: This was not aged fuel.

COMMISSIONER MERRIFIELD: It was not aged fuel. So

the event was dramatically associated with that particular characteristic.

DR. PAPERIELLO: Oh, of course.

COMMISSIONER MERRIFIELD: Because I think some who are not familiar with that might get confused.

DR. PAPERIELLO: The importance of this is trying to measure the degree of change in the fuel as a function of the temperature curve and how long the temperature lasts.

COMMISSIONER MERRIFIELD: Right. But after even a relatively small degree of cooling, you would not see the same type of phenomena that was exhibited in this particular event.

DR. PAPERIELLO: Right.

Phebus-Fission Product is a bilateral agreement with IRSN in France at a current cost of about a tenth of an FTE and $50 to $90,000 a year. It is coming to completion.

Its purpose was to conduct tests to study the processes governing the transport, retention and chemistry of fission products under light water reactor severe accident conditions. There is no comparable facility in the United States.

Currently, most of the work is in the analysis of data obtained from past tests and the incorporation of these results into our severe accident codes like MELCOR. The data is used by NRR, NMSS and Research in the severe accident consequences area.

In response to a NRR request, Research is completing a revision of NUREG-1465, the Accident Source Term Report for High-Burn Up and MOX Fuel based in large part on this data.

The followup to Phebus-Fission Product is Phebus Source Term. Like HALDEN, the Commission will be consulted before any

financial resources are committed to this project.

I don't know exactly where it stands. Several months ago I was involved with a meeting with IRSN. And part of this is planning, what will be accomplished? What data are we going to get? When we are going to get it?

And this is looking at not integral source term but what is the source term as a function of time, and a lot of items involving iodine properties.

The initial proposal we want to change this to -- I can't tell you where we stand on it, but there will be no financial commitments until the Commission agrees. You will get a paper just like we sent one on HALDEN.

Cabri. The Carbri International Program is a multinational project coordinated by OECD. The experimental facility is operated by IRSN in France. No similar facility exists in the United States. The purpose of the research is to study the behavior of high-burn up fuels under reactivity-initiated accident conditions.

The NRC contributes approximately 559,000 Euros -- it can't be approximate, it has to be exact. But anyway, at one time the agreement was written in dollars, but with the relative change in value, our partners wanted to change it to Euros.

And the program costs itself about $15 million a year.

We also spend about a tenth of an FTE.

More than a dozen reactivity-initiated tests have been conducted at Cabri. They have provided the technical basis for NRR to prepare a proposed revision to Regulatory Guide 1.77 and for reviewing an EPRI topical report on reactivity-initiated accident.

One significant safety finding -- and I have to say, let me

make it very careful, it does not have a consequence for an operating plant in the United States. We have in the Regulatory Guide an enthalpy criteria that is not conservative.

And what you find out is you can get failures in the order of 100 to 120 calories per gram versus the criteria in the regulatory guide of right now of 280 calories per gram. That number was generated 30 or more years ago.

Now, I want to emphasize, it does not have a safety impact on any existing plants. It's a question that the number in the Regulatory Guide is not correct and it's incorrect in a nonconservative fashion. That was a significant finding of these experiments.

The collaboration with the Japanese on seismic issues is a bilateral agreement with the Japanese Nuclear Energy Safety Organization. And in this collaboration, Japanese researchers provide seismic test data and actual earthquake data while the NRC work has been focused on analytical results.

The Japanese researchers have very large shake tables and can accelerate reactor components to large accelerations. And we look at the data, we analyze the data. That's our contribution to the project.

And this information is being used to reduce the uncertainty associated with seismic PRAs. And if you recognize that, particularly for new designs as the internal PRA risks is driven very low, the seismic PRA dominates, the seismic component dominates -- to make it very clear -- they are not a whole lot different than existing plants in the new design. But what you have done in the new designs, those caused by internal events, are one to two orders of magnitude or more lower than existing plants. So now this uncertainty in the seismic

PRA becomes a dominating -- potentially a dominating issue.

The results also include the revision of 10 CFR 50.46 and the review of the ASME III code rules for seismic qualification of piping.

CAMP.

COMMISSIONER MERRIFIELD: Carl, again, just a clarification for the record. Just so I think it's clear what you meant by that.

Generally, we have all been under the presumption that the overall risk for the new designs is less from a probabilistic safety standard in the existing fleet.

DR. PAPERIELLO: That's right.

COMMISSIONER MERRIFIELD: What you are saying is the portion of that risk contributed by the seismic risk is a greater proportion of the overall number?

DR. PAPERIELLO: Yes. What happened, Commissioner, is first the process -- they were similar but. When the new designs -- what you see is you see the internal events going way down.

COMMISSIONER MERRIFIELD: Other events are a smaller proportion.

DR. PAPERIELLO: Yes. So, that's it. When you look at the -- where could you gain more?

COMMISSIONER MERRIFIELD: It is just from the viewpoint of the public who may be watching, it is not that there is a greater amount of risk of seismicity in the new designs, it's just as a portion of the overall risk, it happens to be higher, even though, in fact, it probably is a smaller number.

MR. REYES: As you approach zero risks, then the

components become different.

COMMISSIONER MERRIFIELD: I understand it. I'm just trying to make sure that individuals who might not be familiar with these things that it is clear.

DR. PAPERIELLO: I understand. We are trying to say that.

CAMP. The Code Applications and Maintenance Program is an NRC-sponsored bilateral research program with separate agreements with 22 countries. That's why you can wind up getting 90 different agreements because 22 of them are CAMP.

The NRC provides members with the NRC's primary thermal hydraulic reactor systems analysis codes. And the NRC receives about a half million dollars a year in monetary contributions from 22 member nations.

Foreign partners assist the NRC in the verification and validation of the primary thermal hydraulic codes. They provide identification of code errors, fixes for identified code errors, identification of needed model improvements and suggested resolution, testing of new models and assessment to confirm that the new models improve speed, accuracy, robustness and usability of the NRC's code.

Their reports are documented. They are somewhere in the order of 150 -- they are not a NUREG, but they look like a NUREG, and the color is a little different, and they have a different numbering system, but reports in the public domain of their exercising of the codes.

These codes, the thermal hydraulic codes, support the analysis for anything we do that involves thermal hydraulics such as 50.46, the design certifications for the AP1000. We recently provided to

NRR the codes modified for the ESBWR. We would be doing the same thing for the EPR. We have used these codes for the resolution of two generic safety issues and other licensing actions.

CSARP. That's the Cooperative Severe Accident Research Program. It is much like CAMP.

It is a NRC-sponsored bilateral program involving 19 countries. And the NRC provides the MELCOR severe accident code to participating countries, and in return, it receives sever accident experimental research results, new or improved code models and code assessment. Funds received from countries participating in CSARP is about $300,000 a year.

We are going to be releasing this year the FORTRAN 95 version of the code and participants will provide feedback on its performance.

This code has been used to revise the NUREG-1465 previously mentioned as the alternative source term for MOX and high-burn up fuel. It will be used for the up to date severe accident consequences reevaluation. And it has also been used in a variety of security studies.

And lastly, the Melt Coolability and Concrete Interaction Project is a multilateral research agreement under NEA involving the United States and 12 other countries. And this is being conducted here in the U.S. at the Argonne National Laboratory. The results are being used to assess debris coolability models. The results have been used during the design certification of the AP1000, and will be used in the design certification of the ESBWR and EPR design.

Also, the results of this work need to be folded into the technical material provided to the staff in our own Incident Response

Center for the management of potential severe accidents.

Slide 16.

I would like to summarize. I been trying to give you a cross section of what we do. We have multinational agreements where the work is done overseas. We have multinational agreements where the work is done in the United States.

We have bilateral agreements where the work is done in the United States. And we have bilateral agreements where the work is done overseas. And, of course, we belong to organizations where we share information.

This research has supported, I believe, NRC programs and will continue to support the programs in the future. Like anything else we do, we have to make sure the work is still relevant.

Priorities change, as you know, and technical circumstances change also. Programs need to be terminated, changed or added.

The Office of Research will not hesitate to recommend changes to the Commission in the interest of efficiency and effectiveness as we have done in the case for the COOPRA program.

It's essential that the NRC and the Office of Nuclear Regulatory Research continue to import knowledge. No one country can afford the entire cost burden.

Some knowledge comes from the research that NRC sponsors. Some comes from collaborative work with either the public or private sectors. And some comes from non-nuclear sectors.

I keep pointing this out to the staff.

Work in digital I&C, seismic, fire, structural, geochemistry, mathematical analysis and computer techniques is widely used outside

of the nuclear industry. And is up to my office to bring that information into the agency and make people recognize that it is there and we can use it.

And we also have to reflect that much of the research that's relevant to the NRC's needs is conducted either outside of the United States or certainly outside of the nuclear industry.

And I have to reflect. I'm a physicist and I reflect on all of the advances in the 20th century physics that occurred in Europe, whether it was the discovery of radioactivity, discovery of nuclear fission, quantum mechanics relativity and the like.

We have created an internal web site to make available to everybody the reports received on international research.

And I been involved in knowledge management for some time. And also been involved in it before we had a word for it. I called it teaching. But I think it is essential that besides gathering information and creating web sites and libraries, whether they are computer based or paper, that systems be created to ensure the staff absorbs the information.

Thank you. This ends my presentation.

MR. REYES: Chairman, Commissioners, that concludes the staff prepared remarks. We are ready to answer any questions.

CHAIRMAN DIAZ: Thank you, Mr. Reyes. Thank you, Carl. I know you work hard at this and we appreciate your efforts.

Commissioner Lyons.

COMMISSIONER LYONS: I want to second the Chairman's comments. It is obvious that this was a very significant effort to pull this together and certainly from my perspective it was greatly appreciated.

I think if there was any doubt about the importance of experimental research activities to our safety mission, your comments should thoroughly have dispelled those questions.

You also mentioned many times, Carl, and I'm comfortably aware of it, that in many cases the U.S. is no longer the leader in key areas, and we certainly have, in many cases, very few, if any, of the appropriate facilities.

And for that reason, in my book, it is just absolutely essential that we get the maximum benefit that we can from international research and international collaborative research wherever possible. That's to me just very, very positive.

And when I came on the Commission, one of my biggest concerns, mainly because I been stung so many times, is how good are our codes? And you emphasized many times in your comments the importance of getting data that validates our codes.

And many of these highly stressing tests can only be conducted in a few places. And we need, I think, to extract every bit of information that we can out of those.

That might be one place to start with a question.

You mentioned the PAKS accident. That presents an extremely interesting opportunity to get additional validation data for some of our codes.

There was a D-note about a meeting coming up in Budapest at the end of January to decide on subsequent steps for the PAKS research program. I'm just curious if we are going to have some representation or some way of contributing to that meeting and to the PAKS program?

DR. ELTAWILA: For that meeting coming up on January

30th and 31st, we are not going to have a representative. We are plugged in with OECD and IEA about this program. And this is a planning meeting. So we can gain the same information with e-mail.

But as far as the actual participation in the program, we agree on the content of the agreement, for example, on the analysis procedure, on the experimental program that they are proposing.

But for that particular meeting we are not sending anyone because the people that will be representing NRC in the PAKS activity are the same people we are using for the security analysis and for the state of art consequence analysis. So we thought leaving them back here will help us accomplish some of this effort and at the same time, we are plugged with the OECD and IEA.

COMMISSIONER LYONS: As long as are you confident that we are still well plugged in, in my book that's fine. This will be an area of code validation that I will be very, very interested in, in the future.

DR. ELTAWILA: We will participate in all the activities. The actual technical work, we will be sending people.

COMMISSIONER LYONS: Maybe a fairly general question. You spoke to this -- or at least referenced it in some of your comments, Carl, and that would be to talk a little bit further about some of the processes that you and you in conjunction with your staff and with Luis go through in terms of evaluating the relevance of the international experiments to NRC safety and interest.

DR. PAPERIELLO: On all of these projects, we take a look at what tools we have, not only our codes but also our written guidance.

And I know more about the one on Phebus because I was

involved in the meetings, and that is the experimental program that was being proposed by IRSM and was laid out.

We took a look at for our reactor designs and the kind of guidance we have, is this our priorities for information.

And I just know from those meetings they had some issues that we thought the sequence in which the information was going to be obtained really was not all that useful for it.

But most of these programs have been going on long before I arrived in Research. So I don't want to take responsibility for -- the code sharing programs have been going on since Three Mile Island. So it has been a long time.

I been actually spending more time looking at those, seeing which ones are not all that useful and maybe need to be terminated. And I don't see -- and that's in part why we -- and there has been some overlap.

I know the Commission has been sensitive to overlap between NEA and IAEA. And I have really spent most of my time looking at -- I'm going to ask the division directors -- Farouk, you have a lot them.

And many of these things originated before I got here.

DR. ELTAWILA: I think we enter into this agreements for the relevance of the information that are going to be produced for the NRC. For example, as Carl indicated, the Phebus Project, we entered in that program, and we would recommend to the Commission to continue in this program because it continues to be relevant for the work we have done.

For example, the MOX fuel, we needed information to support activity related to MOX. There was no facility in the United

States to produce the data. We talked to Oak Ridge National Laboratory at the time we started doing this work. And we found that the sum cost at the beginning to just get the facility started in the United States was about $5 million, and after that, about $4 million to shut down the facility and to clean it up after the end of the test. And $1 million per test.

So if you want from five tests, are you talking about for $14 million. But $9 million will be the sum cost that you will not get any benefit out of it.

So we found by joining the Phebus program, we would be able to get this experimental data in a very timely fashion. The timeliness is also an issue. They have a program that is ongoing. They have this data so we were able to analyze the data immediately.

Same thing with high-burn up fuel and the Cabri program. These are all -- so we looked at the value of the program to NRC. In the future, for example, the follow-up program to the Phebus, we talking about the iodine chemistry, and I personally feel that some of the information is going to be relevant to the issue of chemical effect of the sumps, because whether you need the TSP or something like that is questionable given the information that we are getting out of the iodine chemistry right now.

MR. REYES: I think it is driven by user needs. When we have users who have identified the need for the information and Research having contact and awareness of all the facilities and what is going on around the world brings that connection to the table.

The other one is because of that same knowledge of what's going on with their colleagues, Research may identify something that we have not thought of that is relevant.

I think the third one is opportunities have presented themselfs like the PAKS fuel events, where once an event happened, we saw all the opportunities to now obtain data of a task that was not scheduled, it was not a prepared task.

So those three categories, I think, is how we get into the research.

COMMISSIONER LYONS: I very much appreciate that you continue to evaluate the relevance of this work. At the same time, I personally would like to be assured that we are putting adequate resources in from our end to be sure that we are extracting the maximum amount of value.

And frankly, on the one data point that I have, and it's one microscopic data point, the one HALDEN meeting that I attended, I was concerned that we did not have enough people there to fully assimilate the data that was coming in.

I know there were various reasons why we cut back on travel at that time. But I am over my time, sir.

CHAIRMAN DIAZ: Thank you, Commissioner Lyons.

Let me try to start with an overarching question now that we still have the good fortune of having Carl in here.

Carl, you have a tremendous amount of experience in the agency and you have seen these issues from different viewpoints, even when you were at NMSS, when you were Deputy Executive Director for Operations and now, directly in charge of it.

When you look at the mix of programs and the needs that the agency has, are we doing all we need to do to position the agency to discharge its functions in the next five years? Give me five years.

MR. PAPERIELLO: That is difficult --

CHAIRMAN DIAZ: I know it's difficult.

MR. PAPERIELLO: This is really more of a subject for the meeting we're going to have on February 8th.

But since you opened up the door, there is the immediate needs of the agency which is well covered by the user need process which I fully support and which I have done a lot of outreach to the other offices for.

There is what I'll call relatively long lead time research. We are not doing research for 50 years from now. You used the right time, five years. We need to do more, not a whole lot more, but to identify sources of information that we might need.

In other words, when you look at advanced technology, I would not put major investments in it. But the question is where would I get the information?

Where would I get the information? How would I go about getting information on reprocessing? I don't know whether or not we are ever do reprocessing, but we know they are being discussed?

Where would I get that information? Where would I get information on metal cooled reactors if I needed it? What is out there that I can use and I can build on? If I was going to do more, I would do that.

The second thing is, I have started an approach of having research plans. We done this in digital I&C because when I looked at what we were doing in digital I&C, it was clear -- I was bothered by, I could not see the regulatory focus.

I mean, I very much tried to emphasize, I am Nuclear Regulatory Research, even though we frequently say the Office of Research has to be nuclear and has to have a regulatory application.

Regulatory application is a rule. It is a Regulatory Guide. It is a Standard Review Plan. It's a code going to be used by the staff. It's going to be a consensus code. What for digital I&C is the end product? Then you have your plan of working backwards. In the final analysis, sometimes I found this office looking at what information is available, and what would be fun to do or good to do or interesting to do or something without mapping the whole process down to the end regulatory product.

So I'm beating around the bush but before I would say I would go overseas for the information, or go to the airline industry for the information, the first thing you need to do is define what is your regulatory product. I would say we are doing much of what we ought to do; if you ask me what would I add, I would add resources for the five year time frame. And I would look at where -- just identify where I could get information.

CHAIRMAN DIAZ: Looking at the international arena, do we -- are we well positioned to make decisions in the next year, the next two years into where can we find the right information or deliver the right request for programs or to move our international partners into areas that will benefit this agency?

DR. PAPERIELLO: I can't answer that question because I realize and this was -- getting ready for this meeting was very good because we pulled this information together a year ago. I had staff pull together a matrix of all the agreements.

This is the first time I have had write ups on all the agreements. So this is really the beginning and I want this maintained.

I believe there are people doing work out there that we don't know about that might be relevant to us. If there is anything we

should do, we need to be aware of what is happening.

And Europe is one place but I think what I don't know other than seismic, I have no idea what's going on in Asia.

I'm talking about me. There may be somebody but I think the first thing to do is finding out what people are doing. I hope I answered your question. I may have talked around it. I apologize.

CHAIRMAN DIAZ: All right. Commissioner McGaffigan.

COMMISSIONER McGAFFIGAN: Thank you Mr. Chairman. Carl, Let me bring up an issue that I think there is some international cooperative work going on although I'm not sure they are in the tables here, I try to master them, on GSI-191 the sump screen issue, the chemical effects issue. I could have sworn the French were attending some of the testing and cooperating in that. I didn't find it on this list. But it sort of gets the issue of how we -- obviously, there is great frustration on the Commission, at least with this Commissioner, that the chemical effects issue sort of arose so late in the process of resolving that.

I'm not sure we would have benefited from an international approach or whatever, but, the facts are that we started worrying about chemical effects after the ACRS sort of raised the issue, maybe simultaneously, the staff was raising it. But if we take that as an issue that is very important, that a French study recently looking at various possible improvements to the 900 megawatt series of French Westinghouse type reactors, said that it's the single biggest improvement in their PRAs that they could see if they increase the size of the sump screens and all that. Are people thinking strategically about this stuff in saying, okay, we got this generic safety issue, it's scoring high for some of our plants. Let's put some international

resources into it. And do you ever sort of look back on whether there were opportunities that were missed to identify some of the stuff earlier that might have been out there in the international regime?

MR. PAPERIELLO: I know it was discussed in NEA. And I know when I made a presentation this past summer, I presented more results than any of the other countries. I went to the Euro Safe meeting in November and the French to a good deal of my surprise made a presentation on the research they were doing.

They didn't present a lot of results, but, there was no inconsistency between their results and what we were getting.

I was not prepared to discuss such an agreement with them but I did raise it because I did stop in Paris, and I did meet with IRSN after the Euro Safe meeting to discuss another issue and that was the one that the Commission wanted me to look into getting into collaborative research on low doze effects.

And the summary of my discussion with them, I think was provided to you in my trip report. I did raise the subject with them. I didn't get a lot of enthusiasm. I didn't say I was turned down or anything like that but they were not prepared to discuss it. They will be coming to the RIC.

COMMISSIONER MCGAFFIGAN: You are merging two issues. They weren't prepared to discuss GSI-191 or they weren't prepared to discuss low doze effects?

DR. PAPERIELLO: Oh, no, no. We did discuss -- we were talking about low doze effect. We did that discussion.

COMMISSIONER McGAFFIGAN: But stick with GSI-191 at the moment; were there opportunities missed in the late 90's when you all were first working on this issue? You all sent a paper over to

NRR in September of 2001 that sort of summarized Research's proposed resolution to NRR of this issue and there were things missing.

MR. PAPERIELLO: I can't answer that question. I don't know.

COMMISSIONER McGAFFIGAN: There are some other staff here who have been there who are longer of tooth in research. Do any of you want to comment?

MR. REYES: Let me just add something. We have issues in our generic letter to require some modification on some of the sumps –

COMMISSIONER McGAFFIGAN: No, I understand what we are doing.

MR. REYES: Let me finish. When you look at the French situation, it is a completely different situation than our situation in terms of, they have 3 designs to work on and they don't have the issue that we have in the United States where we have permutations and combinations of sodium hydroxide or dry sodium phosphate with every kind of insulation you can imagine with any kind of design in the geometry of the sump.

So for the French, it is a straight forward approach. We need to make sure that we are doing it right for everybody. And so we have a little bit of a bigger challenge.

COMMISSIONER McGAFFIGAN: I understand we have a bigger challenge, I have used my time up.

I was exploring when we have generic safety issues that are important, that on their face, look important as I think this one would have looked to a staffer in the late 90's in the bowels of the Research office, that they didn't think strategically about, okay, you know, how do

I find out what everybody else is doing in the world and how do I gin up some international conversations as to what others are doing in the face of this?

Now, I understand we always have the most complicated issue because we in our first generation of plants, decided to let a 1000 flowers bloom. I guess we went to Mao Tse Tsung, school of nuclear development and which obviously was a mistake. So we are hoping this next generation will have a different approach and a more standardized approach.

I was only trying to understand that with the single most important generic safety issue for us and for the French and perhaps for others who operate PWRs at the moment is this issue. And I was trying to see whether anybody sort of thought this is a place to have some international cooperation.

MR. PAPERIELLO: I can't tell you what was done at the end of the 90's.

CHAIRMAN DIAZ: This is a very important issue. I think what Commissioner McGaffigan -- I don't want to paraphrase it but are we now from what we have learned, ready to utilize our pressing know how and leverage it in international arenas so that we all can learn the safety issues that need to be resolved even if they are different.

COMMISSIONER McGAFFIGAN: If I were in another country, I would want to be talking to us because obviously we are putting real money into interesting tests and I'd want to know the American results and therefore there is an opportunity for us to give back to the international community in this area. But also, perhaps to learn something from somebody else.

CHAIRMAN DIAZ: Okay. Commissioner Merrifield.

COMMISSIONER MERRIFIELD: Thank you. I would say a couple of quick comments. I thought the briefing book that you had your staff put together is very good. It's going to be very helpful certainly for me and my staff in keeping up with the work you do.

I was heartened, we've had a lot of meetings like this in the past. We've had this ongoing debate about anticipatory versus non-anticipatory research and the money we spend on one vice the other.

And I've been very pleased with the direction you have given your staff to focus on, are we doing the research necessary to make regulatory decisions? I applaud the direction you are giving your staff there.

As a followup to the Chairman's question, we talked about are we doing the right research, and are there areas, reprocessing and others down the road that we may need to put some more money in down the road. But I guess to put it succinctly, to get more of a yes or no answer; are we doing the research we need to do, or are there gaps in our research for helping us make regulatory decisions today?

MR. PAPERIELLO: By and large, we are doing the research we need to be doing for the challenges that were realistically likely to come up in the next couple of years. I mean, and I know the Commission has discussed this, when you talk about new reactor technologies, whether the probability of -- I'm thinking of evolutionary light water reactors. If there is one area which I still have a concern with and that is getting the program truly launched and digitalize the area.

The reason is, we are already retrofitting existing plants. And there is nothing we are going to do to stop it. Our homes are digital

I&C. And but the big thing for us is to learn. This is one of these things where it isn't throwing money somewhere. I mean, you might have to spend some money but there is clearly, billions.

I know you're going to have a meeting on FISMA which is digital I&C applied to us, that's what it is. I am one senior manager that read the FISMA guidance documents.

I could turn around and use it for digital I&C for a reactor.

COMMISSIONER MERRIFIELD: So I take it that if you had -- the answer to the question is no, there aren't gaps but you think there is more we can spend -- perhaps we can look a little bit more at digital I&C. And that is an area as you mentioned, it is not necessarily, just obviously nuclear power. It is a lot we can gather.

Mr. PAPERIELLO: That's right.

MR. REYES: There is one thing, though if I could add and I know you like short answers. This isn't my time. We are working on the 2008 budget as we speak and we've been approached by a vendor from a non light water reactor technology.

And the problem is that when you get outside the light water reactor technology, the amount of knowledge and tools that we need to gear up to is substantial and in answering your question, if that were to happen, the answer we are giving you would be completely different. And you will see us when we come to the Commission for the 2008 budget, you see some requests in that direction.

COMMISSIONER MERRIFIELD: But that's an open policy question, if the Commission wants to go on non-light water reactor designs.

MR. REYES: Correct, correct.

COMMISSIONER MERRIFIELD: You mentioned CAMP

in the value that some of our former participants have added to that. I think it was around $500,000, if I went back and found the slide. But thats doesn't quantify the non-monetary value, and all the work that they are doing to validate, to compare and whatnot. Obviously, that is a significant additional contribution.

You specified the monetary value and said there are other non-monetary values associated with that work.

DR. PAPERIELLO: Then, I apologize. I should have --

COMMISSIONER MERRIFIELD: Do we quantify the non-monetary value?

MR. PAPERIELLO: When I used the word "verification and validation," I thought I said a lot. In other words, they identify code errors, fixes for identified code errors needed for model improvements, suggested resolution, testing of new models. They are all the things you get out of them exercising the code because they find problems that we may not have found. And they run experiments. They will run experiments for heat transfer, model -- create physical models of portions of reactor systems.

COMMISSIONER MERRIFIELD: Let me clarify this. In your presentation on that, you said the NRC receives about $500,000 a year in monetary contributions. If one is analyzing the value of the contribution of reform, counterparts, obviously can't look at just that $500,000 figure.

Now, you outlined the work done in terms of verification, validation, code errors. And you did list that. But those were all non-monetary values, which if you actually put a quantification to that, is quite significant. And we arguably, significantly exceed that $500,000 value.

MR. PAPERIELLO: That's actually right.

MR. ELTAWILA: Can I add something? Each country is supposed to provide us with two assessments per year. So if you look at these two assessments on the average, an assessment can cost between $20,000 to $50,000. So do the math, you will find additional $1 million of actual assessment is provided to NRC that would have had to spend that money our self.

COMMISSIONER MERRIFIELD: The point I'm trying to make is, it is very difficult to try to say, we send this much abroad and get this much back. In the case of something like CAMP, the non-monetary value of the contribution received from our foreign partners is significantly greater than that which is indicated on the dollar value.

DR. PAPERIELLO: I would agree. And I did mention it goes the other way, too. What we contribute to others programs that is not money but rather technical advice and support, I mentioned are intellectual capital and leadership are also valued in that. So it works both ways. That's why you say, at one time, this office has used the term "leverage" and I don't like to use it. It is collaborative.

CHAIRMAN DIAZ: Okay, thank you. Commissioner Jaczko?

COMMISSIONER JACZKO: I just want to start by echoing the comments of many of the Commissioners. I think this was a very good briefing and a very good briefing package, and I will reinforce what Carl's desire was, to keep it updated. And I do hope that we can keep this information up-to-date and add to it as new agreements come into shape and detract from it as agreements are no longer maintained.

So I do hope that is something we will be able to do. I want to follow-up a little bit on what Commissioner McGaffigan was discussing with the PWR sump issue because I do think this is an important issue. And it is one where we do seem to be very unique in our efforts on this area in terms of the research. And you talked a little bit on activities going on internationally. It seems what I understood is that the French are perhaps looking at some things but their look is very narrow in scope because they have a very narrow problem given that they don't have the multitude of insulations and other sump configurations that we have.

But, I'm wondering if beyond that, if there are for instance, Carl, you mentioned that you are not as aware of what is going on in Asia in terms of research. Are there activities, you think, that are going on in that area that might be addressing this issue? Or even, I think you also mentioned, looking beyond, sometimes, the nuclear sector, that there are other areas of international research that may be looking into some of these problems that we could collaborate there in terms of getting access to some additional information more quickly.

MR. PAPERIELLO: Commissioner, there may be. I would not be surprised if there are. But I sitting here don't know. I don't know. People know, I do a lot of general reading and I do a lot of web searching on my own time. And I have been -- I found a lot of stuff in Europe. I tried some searches in Asia and I have not been very successful. Maybe a language; I don't know what journals are used for sure. Perhaps a Ashok Thadani could answer that question better than I can. I just don't know or maybe my staff can.

DR. ELTAWILA: It is not related directly to sump blockage issue but to the chemical effect itself and its iodine chemistry.

Our requirement of 30 years ago about buffering the sumps, we need to reexamine that and there are a lot of iodine chemistry work being done in France, in Canada and in other countries.

COMMISSIONER JACZKO: In the nuclear sector?

DR. ELTAWILA: It's in the nuclear sector specifically. So we can capitalize on this information and try to come up with the consensus among the leader in this area. And we have of course, our own contractors at Sandia National Laboratory and we can capitalize on the information coming out of this program to reexamine the need for the old requirement. If we need to really buffer the sump or the sump is self buffered or the maximum benefit you get out of it is not that significant and so on; because over the past 30 years, we learned a lot about chemistry of the iodine and we need to utilize this information.

COMMISSIONER JACZKO: One area that I also want to touch on a little bit here and I think you mentioned this a little bit in your briefing too, is how we record some of the information that we get or how we make that available. I think you mentioned on the internal web site, you tend to provide copies of the reports and all these things.

Do we also make these reports publicly available, certainly the ones that I guess are in the English language?

MR. PAPERIELLO: It becomes - we have to be careful. The information we get from HALDEN for example, is proprietary. And so when you start dealing with research outside of the -- what I do, if it isn't security work, obviously, it is made publicly available. But if done collaboratively, is governed by the particular agreement.

I mean, there are issues in countries of Europe, the regulatory structures are different. I visited one country where their

equivalent of our FSARs were security matters. This is long before 9-11. They would not show them to me.

They showed me the thickness of the book and they showed me the index. And I thought, made sure the emphasis was a FSAR. But that was -- so, we make it available through some mechanism, maybe just in ADAMS if we are allowed to do it. But we are not allowed to make all information publicly available, depending on the agreement because some countries consider the information proprietary.

MR. CUNNINGHAM: If I may follow up. You used the example of HALDEN. HALDEN considers the information proprietary. They also have a policy, however, that says after a certain amount of time, that proprietary flag to it is removed so it is publicly available, made publicly available through HALDEN.

COMMISSIONER JACZKO: So, just to follow up then, certainly, then, if we are using this information in the context of reg guides or modifying others, it would certainly be made public in that context, then, actually gets used in modifying any kind of document that we make publicly available.

MR. PAPERIELLO: Right.

COMMISSIONER JACZKO: Thank you.

CHAIRMAN DIAZ: All right, we'll go the second round.

COMMISSIONER LYONS: I appreciated your answer Carl on both the Chairman’s and Commission Merrifield's questions on the need for additional research.

In my mind, too, trying to look -- you suggested some needs in the long term research anticipatory area, of the sumps that have been discussed quite a bit, I think ideally would have would have

been anticipatory research. But that's hindsight.

But I do think -- I certainly agree with you that high level waste issues, reprocessing issues, high temperature gas reactors, liquid metal reactors, the effort that we put in certainly has to be limited until we know exactly how it will be applied.

But I very much agree with you that ideally, there would be enough efforts going in within the Research organization to know where to get the data, and where to plug into the best data sources and to start getting ourselves up to speed.

A particular question that I wanted to ask and didn't get to before, and again, I hate to keep going back to HALDEN but it is only data point I have.

I was very, very surprised at the HALDEN meeting that DOE was simply not represented. And in fact, DOE isn't even a member of the HALDEN collaboration. Number one, that amazes me given the type of work being done at HALDEN. But speaking in general, is there any kind of a forum where NRC and DOE in some sense coordinate who's going to support which areas of international collaboration?

MR. PAPERIELLO: I'm not aware of any. I did meet with Mr. Magwood right after I took over the Office of Research because that was an area in DOE in which at least, nuclear -- I'm going to make it very clear that we are now talking about nuclear reactors, because the reality is, we work very closely with other Federal agencies including DOE in the environmental and decommissioning area. So put that aside.

We are now talking about nuclear reactors. DOE has some amount of research or has had, that organization, to improve the

efficiency of the current generation of reactors. But they do not do research on second or third generation reactors.

If you visit their web site, they recently awarded or had a solicitation of academic research for reactors, and explicitly stated they did not want to fund research; that would be more appropriate for the NRC. So you start dealing with a lot of research, you just don't have research as immediately relevant to what we are either licensing or likely to license over the next two to three years.

COMMISSIONER LYONS: At least in my mind, having such a forum to discuss this issue could be very, very useful because the same research that we identify as having a specific regulatory impact, at the same time is going to have an impact, I believe on how one operates existing reactors or extending lifetime.

The whole NEPO program in DOE is supposed to be working on plant optimization which includes and I don't mean to be lecturing to you, but that is supposed to include things like how does one optimize extension of life. We're interested in extension of reactor life. We are interested in it from a safety perspective.

But the two interests to my way of thinking have a very, very strong nexus and I think that it would be very useful to have such a forum for those kinds of discussions. In many areas, they would have a lot more money to put into this than we do.

CHAIRMAN DIAZ: Okay, I hear you and I think it is something that we need to do and I think it falls into the series of actions that are very appropriate.

Putting some bite on the technical side of what Commissioner Lyons said, we talk about digital I&C but in reality, if you look at the five to ten year frame, the issue of human reliability is now

becoming prime for actually, doing the right amount of research on it and that will be an area that I think would benefit from the interaction with DOE. Let me go to that.

I know that, because I part of it, that one time I was very sceptic of moving human reliability, human factors into a major activity. I was convinced that the data, the state-of-the-art was not there to really make an effort that was conducive to regulatory activities or decision-making.

When we have the meeting with the ACRS, I brought the issue out and they seem to believe that now, the maturity is there. Do you agree with that?

DR. PAPERIELLO: I'm going to have to ask a human reliability person to answer that. I am not an expert on human reliability.

CHAIRMAN DIAZ: I'm disappointed, Carl.

MR. ADER: I'm not a human reliability expert but HALDEN is -- the last few years, our staff has been working with them to move some of the human factors testing they are doing into the human reliability area.

I think when you met with ACRS, they were either right before or after getting a briefing from the HALDEN staff on the program there trying to take crew operations, looking at varying some of the context of information overloads, masking of tasks with other things going on.

I think they feel there is some promise and the true experts, I think they feel there is promise in that area to validate.

CHAIRMAN DIAZ: There is a nexus between the next generation of Digital I&C, human reliability. Probably can't do one

without the other. I see Commissioner Lyons agreeing with me, I take a note of that.

COMMISSIONER LYONS: If I could just say, yes, I very much agree with you. I was incredibly impressed with the human reliability work being done at HALDEN. But I also came way concerned that HALDEN is using European trained reactor crews in all their testing. To me, maybe not the NRC, maybe it's EPRI, but somebody ought to be getting that data on U.S. trained crews. Maybe they are similar, but I don't know.

CHAIRMAN DIAZ: Duly noted. All right, Commissioner McGaffigan.

COMMISSIONE McGAFFIGAN: Thank you, Mr. Chairman. I just want go back to what I see as the need to think strategically as we do these programs, think about what we need here.

Commissioner Lyons just mentioned EPRI. It may well be that EPRI does some of this stuff for us. But you take the aging management issues, the materials degradation issues on which there is an industry initiative of some sort with EPRI pulling together a bunch of programs and I think we had a separate Commission briefing on that. Again, there is certainly materials degradation issues buried in a couple of -- more than a couple of these international agreements. There's an awful lot of stress on reactor vessels and pressurized thermal shock rules and all that.

But I don't know whether anybody is saying okay, we are not the only ones with aging reactors and how are we going to share databases about aging effects and how are we going to prioritize research?

Maybe we've delegated that to EPRI on an international

scale. I'd like to you think about how to say, okay, what are the big issues, and materials degradation for plants that are going to run 60 years is a big issue. GSI-191 is a big issue.

And then are we structured in our international activities in the best way to be able to suck in whatever needs to be done. And frankly, if we are ahead of people like we are in GSI-191, give other people the benefit of our efforts.

And the other thing I want to stress, this is more statement -- I really entirely agree with you that as Commissioner Lyons said earlier and my colleague, Commissioner Jaczko, we have to focus on other industries. We have to learn from other folks.

We had a discussion recently that was at the Millstone event last year. I forget -- some sort of finger effect -- tin whiskers. And again, that's something we might have learned from people in other sectors. So again, I think the staff has to think strategically about how to engage other sectors who may be experiencing similar issues. Instrumentation and control is obviously one of them as Commissioner Lyons said. And what didn't come across in this presentation, to be honest with you, I agree there is lots of agreements and you described them well and all that. But I didn't get a sense what lies behind our decisions as to where to engage and where not to engage. There is a lot of tactics in here, COOPRA, whatever, but the sort of strategic thinking that has to be -- your office has to be a sentinel for the entire agency, the NMSSs and NRRs, and whatever right behind you there. But you have to be thinking for them as well, I think. But I have used up my time.

CHAIRMAN DIAZ: Commissioner Merrifield.

Mr. CUNNINGHAM: I'm sorry, I just wanted to follow up,

just in the area of environmentally assisted cracking, and that sort of thing, materials degradation. We have a fair amount of work underway that is not captured in the books because we don't have agreements yet, but there is work out there that we recognize that is a big issue throughout the world.

It's just not -- it hasn't matured yet enough to the point we have agreements. You will hear more about it next month when we have that discussion on that particular subject.

Mr. PAPERIELLO: Can I pursue what Commissioner McGaffigan said?

COMMISSIONER McGAFFIGAN: I strategically used my three minutes.

CHAIRMAN DIAZ: He used all of his time but if you can make it in 30 seconds.

DR. PAPERIELLO: I agree with the Commissioner. I have created plans in the office in conjunction with the offices we support for seismic digital I&C and thermal hydraulics.

It has to be a two way street so the offices we support have to be willing to engage, not just the user need but they have to look for -- when I was director of NMSS, I made sure we were watching what Research was doing on our behalf. And that is -- it's is a two way street.

And my ultimate goal was to have plans to cover all of Research so we know where we are going in regulatory space, then how are we going to get there. There are too many cases we worry about how we are going to get there and not deal with the end product.

CHAIRMAN DIAZ: If I may summarize, the strategic direction of Research is an agency mission.

MR. PAPERIELLO: That's right.

CHAIRMAN DIAZ: A mission that needs to be incorporated, the staff and the Commission thinking of where we are going. I think it needs to be and it might very well be that in the area of Research as we approach this new turbulent times, that strategic component needs to be brought up in a different manner. I think that's a very worthwhile undertaking.

Commissioner Merrifield?

COMMISSIONER MERRIFIELD: As a follow up to a question Commissioner Jaczko had relative to sharing information externally, recognizing that there are specific agreements we have with some of our multilateral or bilateral partners that prohibit us from releasing information, I have to agree. I think we really do need to think about systematically going into some of these agreements and saying, is there information that we can be sharing with the folks that we regulate, because there may be insights that we are gaining that's just sitting in a book on somebody's desk. That's not going to do anybody any good.

If we paid value either through a monetary or non-monetary sum, and there is a way of getting that not to just internal NRC users, but if we can also get it external and enhance that value, I think that that is something we ought to make sure we can take a look at. I don't know if you have –

MR. PAPERIELLO: I agree. My concern is much internal with the agency as outside, that Research produces a lot of documents and a lot of information. The people within the agency, whether it's Research staff or the rest of the technical staff doesn't read it, it doesn't do anybody a whole lot of good. That's the reason why I initiated the

monthly seminars as a way of transferring some of this information to the staff. I mean, I just read a lot.

It's my personality, and article I read, I realized, I'm a gatekeeper. But people, other people are not like me. It has to be in somebody's head to be used.

COMMISSIONER MERRIFIELD: Right. I just think to the extent we can share that information be get a value not only internal to the agency because someone finding out about that might bring up an idea we had not thought of. But I think we get that same value externally. I would just encourage you to go in that direction.

In the materials, we do have counterparts of ours, and the French are an example, where they have actively tried to have their staff go abroad to participate in research projects. You mentioned five or six individuals that we hosted.

Have you all thought about the possibility of having someone from the Office of Research going abroad to participate in a research effort outside of the U.S. and the value that may bring?

MR. PAPERIELLO: I haven't. I understand we may have done it in the 90's.

Mr. CUNNINGHAM: There were several examples in the 90's where people were assigned to the HALDEN project either NRC staff or people working for us working at the National Labs that went to HALDEN for a year or more or something like that. I think the bilateral agreements offer in almost every case, that opportunity, but it's been a while since we probably used that very much.

COMMISSIONER MERRIFIELD: Well, I know there is always a hesitation to send people abroad and there are obviously significant costs and complications associated with that. But I do think

that the staff at least needs to take a look at, is there a selected or a couple of selected areas that may be useful and how that may bring value back the agency. Thank you Mr. Chairman.

CHAIRMAN DIAZ: Commissioner Jaczko?

COMMISSIONER JACZKO: I want to focus on one specific project at the ACRS meeting, I have some questions about the state-of-the-art and fire modeling.

We have one of the projects that we are currently involved in is the international collaborative fire modeling project. I wonder if you can comment very briefly, one, that project apparently is intended to last through roughly March of this year or some time this year, according to the information.

What I wanted to know, if that has been a productive project? And second, what the current staff thinking is with regard to extending that into a second phase?

MR. ADER: It was productive. We have used the results from that collaborative program to benchmark some of the codes. They are actually NIST codes, plus EPRI – one of the MAGIC codes, which is a French code but EPRI has access to. So we have used it.

It's going to form part of the basis for a V&V report on fire modeling. It's getting very near being published. There has been some discussions of continuing it but we have been focused on kind of wrapping up the first phase. So we are not that far along on whether we would pursue it.

There are some areas coming out of that program that we understand the Germans may be interested in doing some research on, high energy arch that gives us an opportunity to have another forum to discuss with them some potential areas of cooperation.

MR. PAPERIELLO: I would point out, though, this is one area of collaboration where we have the option and we actually do have a great deal of domestic collaboration with other Federal agencies, obviously. There is a lot of Federal agencies which have an interest in fire modeling.

And so, it is actually a choice of, would we gain more by international collaboration versus domestic collaboration, what's it going to cost? How fast can you get the results, things like that. That's part of the decisions we are wrestling with right now.

COMMISSIONER JACZKO: Thank you.

CHAIRMAN DIAZ: All right, well, thank you very much. I think we have almost 11:00. You guys are on time today. And I want to thank you.

I want to thank the EDO and the Office of Research for briefing the Commission and providing us with a very significant amount of information. As Commission Merrifield said, we have a very good set of background which I think you needed and certainly we.

DR. PAPERIELLO: You're right Mr. Chairman. It was very useful to me to pull all this together.

CHAIRMAN DIAZ: I especially want to thank Carl. I know you had your heart set on this and I appreciate it. I'm sure my fellow Commissioners do. It's valuable and we will take it forward and do what we need to do with it.

With that, we are adjourned. Thank you.

(Meeting adjourned)