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UNITED STATES NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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569th MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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OPEN SESSION

+ + + + +

THURSDAY

FEBRUARY 4, 2010

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Dr. Said Abdel-Khalik, Chairman, presiding.

COMMITTEE MEMBERS PRESENT:

SAID ABDEL-KHALIK, Chairman

J. SAM ARMIJO, Vice Chairman

JOHN W. STETKAR, Member-at-Large

GEORGE APOSTOLAKIS

SANJOY BANERJEE

COMMITTEE MEMBERS PRESENT: (cont'd)

DENNIS C. BLEY

MARIO V. BONACA

CHARLES H. BROWN

MICHAEL CORRADINI

DANA A. POWERS

HAROLD B. RAY

MICHAEL T. RYAN

WILLIAM J. SHACK

JOHN D. SIEBER

NRC STAFF PRESENT:

HOSSEIN NOURBAKSH, Designated Federal Official

KHOI NGUYEN

JOHN RIDGELY

CHRISTINA ANTONESCU

GENE EAGLE

RICHARD STATTEL

MICHAEL TSCHILTZ

DENNIS DAMON

CINTHYA ROMAN

JONATHAN DE JESUS

REX WESCOTT

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P-R-O-C-E-E-D-I-N-G-S

(8:30 a.m.)

CHAIRMAN ABDEL-KHALIK: The meeting will now come to order.

This is the first day of the 569th meeting of the Advisory Committee on Reactor Safeguards. During today's meeting the Committee will consider the following: number 1, draft ACRS report on the NRC safety research program; 2) draft final Regulatory Guide 1.217, "Guidance for the Assessment of Beyond-Design-Basis Aircraft Impacts"; 3) draft final Revision 1 to Regulatory Guide 1.69, "Manual Initiation of Protective Actions"; 4) proposed revisions to NUREG-1520, standard review plan for review of a license application for a fuel cycle facility; 5) status of rulemaking for disposal of depleted uranium and other unique waste streams; and, finally, 6) preparation of ACRS reports.

Portions of the session related to draft final Regulatory Guide 1.217 may be closed to protect unclassified safeguards information.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Act. Dr. Hossein Nourbaksh is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions.

There will be several people from GEH on the phone bridgeline to listen to the discussion regarding draft final Revision 1 to Regulatory Guide 1.62. To preclude interruption of the meeting, the phone will be placed in a listen-in mode during the presentations and Committee discussion.

A transcript of portions of the meeting is being kept, and it is requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest. Sam Duraiswamy, who was with the ACRS for more than 32 years, has retired at the end of December 2009. Mr. Duraiswamy's history with the ACRS is truly remarkable. Sam attended each full Committee meeting since the 210th meeting held on October 6, 1977. That is 459 consecutive meetings.

During his long tenure with the ACRS, he provided outstanding technical and management support to the ACRS. Sam was a key factor in assuring that the ACRS letter reports were of high quality,

accurate, and could stand the test of time. He was instrumental in the early reviews of numerous regulatory guides and also provided outstanding support for the ACRS review of standard plant designs like the ABWR.

His dedication, hard work, professionalism, attention to details, knowledge of the NRC regulation and regulatory processes, and exceptional technical support to the Committee, are very much appreciated. We thank him for his contributions and wish him the best of luck in his future endeavors.

(Applause.)

Steven Alferink is on rotation to the ACRS staff from Region IV. As a reactor inspector in Region IV, Steven performed a variety of engineering inspections with a focus on fire protection. He also held temporary positions as a senior inspector and as a resident inspection at the Palo Verde Nuclear Generating Station. Prior to moving to Region IV, Steve was a reliability and risk engineer in the Office of Nuclear Regulatory Research.

Steve graduated with a master's degree in nuclear engineering and applied mathematics from the University of Missouri-Rolla. He is a Ph.D. candidate

in applied mathematics with an emphasis on statistics at the Missouri University of Science and Technology. Steve is completing a dissertation on prediction bounds in accelerated degradation testing.

Kent Howard is on rotation to the ACRS staff from the Office of Nuclear Reactor Regulation. He has a bachelor's degree in aerospace engineering from Tuskegee University. Kent has worked as a lead project manager in the Division of License Renewal for over three years. He has over 19 years of experience working in both the public and private sectors. Prior employment included Ingersoll-Rand in Augusta, Georgia, as a plant supervisor; Westinghouse Savannah River Company in Aiken, South Carolina, as a senior engineer; and Norfolk Naval Shipyard in Portsmouth, Virginia, as a nuclear engineer.

He also holds a master's degree in administration from Central Michigan University.

And, finally, Avinash Jaigobind, also known as A.J., recently joined the ACRS staff as a support services specialist in January 2010. He received his undergraduate degree in business administration from the University of Maryland.

Prior to joining the NRC, he has worked for several financial institutions in the private

sector. He is currently working on his master's in accounting and financial management at the University of Maryland. A.J. will be working with Theron Brown managing the conference room activities and collaborating with the PNDA staff on special projects.

Welcome, all, to ACRS.

(Applause.)

Before we get started, I would like to make a comment. We are cognizant of the weather announcements forecasting a major winter storm for the Washington, D.C. metro area beginning tomorrow. We are monitoring this situation and recognize that we might need to make adjustments to the Friday and Saturday ACRS agendas consistent with the potential storm impact on the operating status of NRC headquarters and local transportation systems.

We will reach a decision regarding any changes to the ACRS agenda for Friday and Saturday by 1:00 p.m. today.

The first item on the agenda is the draft ACRS report on the NRC safety research program. Before we get to that item, I think we are going to go off the record at this time.

(Whereupon, the proceedings in the foregoing matter went off the record at 8:37 a.m. and went

back on the record at 10:15 a.m.)

CHAIRMAN ABDEL-KHALIK: At this time, we will reconvene.

At this time, we will consider draft Regulatory Guide 1.217, Guidance for the Assessment of Beyond-Design-Basis Aircraft Impacts. And Dr. Bonaca will lead us through that discussion.

MEMBER BONACA: Thank you, Mr. Chairman. I am Mario Bonaca, the Chairman of the ACRS Subcommittee on Safeguards and Security.

Ms. Maitri Banerjee is the Designated Federal Official for this part of the meeting.

This is an open-closed meeting under the provisions of the Sunshine Act to allow a discussion of sensitive unclassified and safeguards material. We will go into the closed session after my opening remarks.

Participation in the closed portion of the meeting is restricted based on a list prepared by the DFO. Any personnel not on that list, and who will not have the proper level of clearance and the need-to-know, will have to leave the room once the closed portion of the meeting starts. O ask the staff to verify.

Also, please make sure that any electronic

devices, like the cell phones that could be used for recording and transmission, be left outside this conference room. This is already provided as an information from the Chairman before.

The purpose of this meeting is to hear a presentation from the staff regarding draft final Regulatory Guide 1.217, "Guidance for the Assessment of Beyond-Design-Basis Aircraft Impacts." This regulatory guide was issued for public comments as the draft guide DG-1176. This guide has been prepared to provide implementation guidance for the new rule or the consideration of the aircraft impact for the new nuclear power reactors.

The Safeguards and Security Subcommittee of the ACRS received a presentation from the staff and the industry on this draft guide during December last year. In 2007, the Committee had to review the staff assessment of various new light water reactor designs to aircraft attack. We were provided a copy of the draft final regulatory guide before the December subcommittee meeting. It was going through the NRC management concurrence review at that time.

Hence, I ask the staff to confirm that no substantive changes were made to the guide after it was provided to the ACRS.

MR. JAIN: We confirm.

MEMBER BONACA: Okay. In various meetings since 2003, the Committee has reviewed the staff assessment of nuclear powerplant vulnerability to aircraft attacks initiated after September 11, 2001, terrorist strike. This included various staff studies and requirements to be imposed on the operating reactor related to this subject.

In the April 2006 letter report to the Commission, the Committee recommended that the pilot studies performed for existing plants be extended to examine the potential for increasing the robustness of the new plants for security events and for including security considerations in the design certification process.

In the April 24, 2007 SRM, the Commission directed the staff to include, in Part 52, a requirement for new reactor designs to perform an aircraft impact assessment and incorporate measures to avoid or mitigate such impact at the early stage of the design process, followed by a February 17, 2009 SRM in which the Commission prescribed the specific requirements of the rule.

Additionally, the Commission, in an SRM dated December 17, 2008, stated that the staff will

have the ACRS review the implementation guidance for the portions of the security rulemaking within the Committee scope.

At the December subcommittee meeting, the ACRS members provided some comments to the staff, and I bring them up here because I think the presenters should probably address them. The members felt that the regulatory guide should be revised to address how the uncertainties involved in the decisionmaking are managed, and that the potential for shock amplification in water-filled tanks should be addressed in the guide.

Members also noted that the methodology of NEI 07-13 may underestimate the shock damage footprint, and the guide should note this portion, so that the analyst can assess and address this possibility.

While there is no uniqueness, and the aircraft model introduces some uncertainty, it is probably small compared with the other certainties associated with such analysis. But the presenters may want to address this issue and give your perspective.

As this meeting is being transcribed, I request that participants in this meeting use the same microphones located throughout the meeting room when

addressing the subcommittee. Participants should first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

And I am asking Mr. Jain of NRO to begin the staff presentation. And I apologize for the length of this reading, but it was all necessary.

With that, Mr. Jain?

MR. JAIN: Thank you. Good morning. My name is B.P. Jain. I'm with the Office of --

CHAIRMAN ABDEL-KHALIK: Mr. Jain, do you have an open part, an open introductory remark?

MR. JAIN: Yes.

CHAIRMAN ABDEL-KHALIK: Before the meeting is to be closed?

MR. JAIN: No. No, not really. I mean, we are here to start and address the Committee's --

CHAIRMAN ABDEL-KHALIK: I would like to get an indication as to when the meeting should be closed.

MEMBER BONACA: I think we should close it now.

CHAIRMAN ABDEL-KHALIK: Okay. The meeting is now closed, and we should verify that everyone in this room is approved to attend and has the need to attend. Would the staff do that?

(Whereupon, at 10:21 a.m., the Committee went into closed session.)

A F T E R N O O N S E S S I O N

1:30 P.M.

CHAIR ABDEL-KHALIK: We will reconvene the meeting at this time.

The item that we will look at on the agenda is Draft Final Rev. 1 to Regulatory Guide 1.62, Manual Initiation of Protective Actions and Mr. Brown will lead us through this.

MEMBER BROWN: Okay, this particular Reg Guide was discussed briefly in a subcommittee meeting and since we have some time constraints, I was going to limit the discussion of that. We had a few comments and discussions. They've addressed them and I'm not saying we agree or not. They were addressing them in their presentation and I will now turn it on over to Khoi to complete the presentation.

MR. NGUYEN: Good afternoon. My name is Khoi Nguyen, Office of Nuclear Regulatory Research. With me here today is Russ Sydnor, Office of Research, Gene Eagle from NRO and Barry Marcus from NRR.

With that, I'd like to present you proposed Revision 1 to Reg Guide 1.62, Manual Initiation of Protective Actions.

The current reg guide has not been updated since October 1973 and in the current revision it does

reference IEEE Standard 279-1971. And the latest standard endorsed by the NRC in 10 CFR 50.55a(h) is IEEE Standard 603-1991. And the current reg guide does not address the diverse manual initiation.

I will summarize the changes, the proposed change in the reg guide. We would like to update the reference IEEE 603-1991 in addition to IEEE 279-1971. And we also want to expand the scope to incorporate the guidance for diversity and defense-in-depth in digital computer-based I&C systems with respect to manual initiation of protective actions.

We want also to expand the scope to provide the applicant or licensee an option to pursue either safety-related or nonsafety manual initiations separately or a single safety manual initiation.

Here are the proposed changes to the regulatory position. In Position 1 we change system level to division level. Same thing for Position 2. In Position 3 we changed system level to division level and we also incorporate information display requirements from IEEE 603-1991. In Position 4 we remove minimum-common-equipment guidance and D3 guidance is now covered under new Position 7.

There's no changes in Position 5. Position 6, we update the reference to IEEE 603.

Position 7 is a new one and in this position we incorporate diversity guidance for manual initiation of protective actions. This guidance is from BTP 7-19.

Position 8 is also a new one. In this new position, we offer an optional manual initiation that satisfies both requirements of IEEE 603 and guidance from BTP 7-19.

CHAIR ABDEL-KHALIK: Could you expand on the implications of the changes in Positions and 1 and 2 from system level to division level?

MR. NGUYEN: Well, in IEEE 279, the scope of the IEEE cover manual initiation for protective action at the system level, when IEEE replaced 279, it changed system level to be division level. The definition of the system level, I mean division level in IEEE 603 which covers system level that satisfies independent and single-failure criteria. So by saying division level which includes the equipment or system that satisfies criteria of single-failure and independents. So it's just a broader cover of the system level. And division level eventually is the system level with more safety requirements in independent and single-failure criteria.

MEMBER BROWN: Let me clarify. Let me try

to summarize that slightly different. If you look at the difference between the original reg guide and the new one and then you go from the original criteria for instrumentation control which IEEE 279-1971, I believe, those both spoke in the words, system level, if you will both of those.

When IEEE 603 was issued, they changed the words from system level to division level throughout for things that they talked about on protective actions. So from 1991 until now, there's been a divergence -- an inconsistency between the two -- one is a requirement, 603 is, but the reg guide in its guidance still used the word system. So the thrust of this and the way I took it was to make the documents consistent, so the new reg guide brought all the words system, changed them to division to be consistent with IEEE 603.

The other thing you started talking about, this independence and things like that, those are covered in other words, but the fundamentals were to make the two documents consistent. And there was considerable discussion on this issue of system versus division level, but that is a comment that they address later, but I wanted to cover that just from that aspect before we went any further.

VICE CHAIR ARMIJO: Charlie, the hierarchy is division level, it's a higher --

MEMBER BROWN: No, the system --

VICE CHAIR ARMIJO: -- is broader than division --

MEMBER BROWN: Well, that's going to be part of the discussion later.

VICE CHAIR ARMIJO: Okay, I'll wait.

MEMBER BROWN: System was more broadly interpreted in the past, in the past, as the overall system. For instance, I'll just phrase this in my thought process. If you have four divisions, that's all part of an overall protective system.

VICE CHAIR ARMIJO: That's what I thought. Sounds like it's changing.

MEMBER BROWN: Well, IEEE 603, if you want to do manual actions, you should perform those at the division level, in other words, if you want to trigger protective actions manually. Forget the reasons for it, but just trigger it. You did it at the division level.

If you went back and used the older words, previously, you could have said well, we can do something which initiates all four trains as long as -- because you still have the other independence issue

in single-failure criteria that you had to meet. So you can't get away with just one switch and one contact to initiate all four divisions. You had to cover all the other requirements of IEEE 279 which you've got to have independent single failure.

So I would like to save this discussion on system versus division until we get to that point and take care of any other questions on the base changes in the positions, if we could.

MR. NGUYEN: Thank you, Charlie. Any other questions on this subject?

MEMBER BROWN: I would make one other observation, if I can. The minimum common equipment was taken out of -- that's Position 4. If you look at the old reg guide, it said when you initiated manual action you had to utilize, correct me if I phrase this -- the minimum amount of common equipment. That has really been kind of subsumed into the new position under this defense-in-depth diversity and it works from that standpoint.

One of my concerns is we lost the thought process of minimum stuff, because if you look at where is the digital I&C actuation, you have to go past the software, where is that embodied? I forgot right now. I don't want to go look it up. It says if -- in

digital systems --

MR. NGUYEN: Downstream of the --

MEMBER BROWN: If you're going to initiate digital systems manually, you have to do it downstream of the software. Bypass that which says oh, okay, that is certainly minimizing common equipment. So there's other guidance that effectively accomplish the minimum common equipment aspect.

MR. NGUYEN: We took -- considered options before we decided to remove Position 4. W did a search and we couldn't find any design basis to make this regulatory position, but we thought that at the time this somehow provides from the defense-in-depth guidance for digital equipment, but now the defense-in-depth guidance are being covered both analog and digital equipment now are covered under new Position 7. So we think that's common sense to remove Position 4 and put it into the new position to cover both analog and digital equipment.

Any other questions?

MEMBER BROWN: Let me make one other point. If you read Position 5 which they say there were no changes, that has an interesting set of words in it because it says, manual initiation should depend on the operation of a minimum amount, not minimum

common, but minimum amount equipment. And that has not changed. So in other words, it's making it as simple as possible to perform the manual operations. So that part hasn't changed. So when they say no changes, that's literally what that means.

The rest of them were roughly -- this was a fairly straight-forward change to a reg guide with two exceptions. One was the system-to-division issue. Three exceptions, let me change that. The second was the two new positions which were really trying to pick up Branch Technical Position 7-19 and reflected in the reg guide relative to manual actuations and diversity and defense-in-depth.

The last one on the Position 8 was to give them the -- if you go through the reg guide in detail, it will talk about safety and nonsafety-related equipment. Both of them can be part of the manual actuation sequence and so you could perform the manual actuations by either initiating the safety systems as one set of initiations and the nonsafety systems, safety-related systems as a second set. Or they introduce the thought process you could do it one set of actuations that covered both as long as you met all the safety system requirements independent, single-failure, etcetera, etcetera. And there was a bit of

discussion on that, but that one kind of washed out.

The two areas where we had -- the one other, the third item that was new, which is an area we discussed on that. We had considerable discussion on was and it's on the consistency of the reg guide on manual operations relative to the guidance we provided in ISG 5, Section 3, relative to time available and time required for manual operator actions. They introduced that concept in the version of the reg guide that we reviewed during the subcommittee meeting. That was the November version, November 2009.

As we talked about that, the other words that they had that they introduced in that paragraph and I wish I had it on the screen because it would be easier for me to show you, were protective actions can be initiated automatically or in certain cases can be accomplished solely, key word, S-O-L-E-Y, if I can find my place again, solely by manual controls. In other words, you may have circumstances which require either reactive protective or safeguards actuations where you don't have an automatic means in place to do it. It can be accomplished by manual means.

They then went on to say that that was then okay, as long as you met considerations of time

available, plant conditions were defined within which the boundaries, within which you could do that, range of conditions over which they're expected to effect and you had adequate displays to tell the operators what to do.

Those last three items, not the time-available, time-required issues, were also encompassed in IEEE 603, Section 4.5.2, I believe. It's in that section anyway. The thing that's not covered in IEEE 603 is the time-available, time-required point. And so the differences here are kind of small. They sound small in words, but if you go back and look at IEEE 279, the first successor to 603, doesn't talk about manual actions solely for taking care of protective actions. IEEE 603 actually says in the words or implies, if you read the words, if you take them, then here are some conditions you meet, but it doesn't cover the time-required points. So we went back and forth on that issue.

One of the comments was to have the staff go back and look at that again and determine whether any clarifications were required to the reg guide to make it consistent with ISG 3 and 4. That's what Comment 1 is all about and the one he was about to address. So that's a little background on that

comment, if that helps.

Do you want to go on?

MR. NGUYEN: Yes, thank you. What Charlie just said, we went back to review the scope of the reg guide review IEEE 603 and ISG 5, ISG 2, and we had concluded the scope of this reg guide, the purpose of this reg guide provide these guidance and installation guidance for manual initiation of protective actions. We should not include operating guidance like HFE or any other methods, guidance in there.

So any timed response which we, the staff, believe that belongs to HFE guidance should be removed from this reg guide. So as a result of that conclusion, we would like to remove the whole paragraph that contains the time response agreement in there from the reg guide.

And the question that you may have and so now time response will be addressed somewhere else and that would be in ISG 5, until Appendix A of Chapter 18 of the SRP approved. Right now it's out for comments, but until it's approved, it will cover the time response with --

MEMBER SHACK: You're not going to just remove the 30 minutes, you're going to remove the whole consideration of time, that whole bullet 1 that

lists 1, 2, 3, 4?

MR. NGUYEN: Yes, that whole paragraph out. That's talking about time response and time available which we believe that belongs to operating and not design, the hardware design.

VICE CHAIR ARMIJO: If the system is designed so that you can do these manual actions, there's an expectation that you'll be given credit for it for being able to do it kind of independent of the time required time. I mean why would you put equipment in if you don't have enough time to --

MEMBER BLEY: It feels like this lets us approve a design that can't be realized operationally. I mean --

MEMBER SHACK: Remember, too, you asked them to make feasible and reliable manual actions when they were substituting.

VICE CHAIR ARMIJO: Yes.

MEMBER BLEY: That would be better. You say you have to send it to the human factors people to --

MR. NGUYEN: 603 has the statement that manual initiation must be provided in a timely manner and that's --

MEMBER SHACK: You've got the minimum of

equipment sort of thing, but I mean I would go for a stronger statement that it should be feasible and reliable, if it's going to be credited solely.

MEMBER BROWN: We took that out.

MEMBER SHACK: I know.

MEMBER BROWN: The whole issue of crediting it --

MEMBER SHACK: Well, but then you have to have a minimum amount of equipment, five or six, which is sort of getting back to that the reason we want to do that is to make sure that you can do it. So you haven't gotten rid of all of the HFE considerations. I don't know.

MR. NGUYEN: Well, to keep the --

MEMBER SHACK: I can see it being 30 minutes.

MR. NGUYEN: To keep the manual initiation --

MEMBER BROWN: Thirty minutes is not in here. Thirty minutes was not in here at any point. It only talked about --

MEMBER SHACK: It was in the draft reg guide. If you go through all the public comments, there was a great pushback on that just like there was on ISG 2, I guess it was, where that was initially

introduced. And then it was taken out in ISG 5, Section 3. I guess the issue I had was once I saw the solely, the solely was kind of a key point of interest to me and so I went back and looked at 279, 603. I went back and looked at the ISG 5, Section 3. And there's no reference in there to solely. It's just if you're going to use manual actions, here's how you do the analyses. Here's how you come up with the --

MEMBER STETKAR: The ISG was developed pretty much for DAS stuff.

MEMBER BROWN: Exactly.

MEMBER STETKAR: You know. It wasn't anticipating a pure manual initiation of all protection functions.

MEMBER BROWN: But if you read, if you go look at 603, it says the following minimum criteria for each action identified for which you have to perform a protective action whose operation may be controlled by manual means initially or subsequent to initiation says the justification for permitting initiation or control subsequent to initiation solely by manual means must be justified, whether you initiate or whether you're going to -- so that says you can do it solely. But yet, if you go through all the rest of the documents --

MEMBER STETKAR: It also says it has to be justified.

MEMBER BROWN: It has to be justified, but it doesn't -- there's no clue as to criteria other than you've got to have displays and/or alarms, and you have to controls and you have to have the guy not dying in an environment where he can't breathe or something like that. So when I was looking at this, my thought process was do we really want to eliminate the concept of manual controls solely since this is a manual initiation reg guide and no place else do you really talk about all the considerations including the time available, time required, other than in the standard review.

ISG, by the way, is encompassed in this Appendix A now in the SRP. So once the SRP gets revised, it will be brought to the Committee, by the way. We will review that before. I read them both side by side and I don't think they changed more than 15 words in the whole thing. It's pretty much -- unless they get public comment on it. But that's -- the idea is that where you put something --

MEMBER STETKAR: Yes, I guess the basic question is is the purpose of this reg guide to provide guidance on the design and installation of

hardware that's used for manual initiation of equipment regardless of the context under which that hardware would be used in terms of human factors. If that's the case, then that's fine. If it's guidance on how to implement manual initiation of functions, then the guidance on human factors belongs in there. So if the reg guide is simply limited to guidance on hardware design, then it's incumbent on the people who proposed that design to justify that it can be used.

MEMBER SIEBER: The difficulty is the design, to some extent, is dependent on the human factors aspect of it.

MEMBER STETKAR: Sure, but on the other hand, you know, that's the basic question is that the fundamental scope of this --

MEMBER SIEBER: You may up-scope design because the human factors part of the manual actuation does not meet the criteria. And if you don't know that here, where do you know it?

MEMBER STETKAR: Okay.

MEMBER SIEBER: You end up winding through a bunch of other regulations. I would prefer to see it here.

VICE CHAIR ARMIJO: It seems to me that makes sense. It isn't just a piece of the puzzle

here.

MEMBER BLEY: And the way it encourages the old way of giving the operator something and telling him to figure out how to deal with it.

MEMBER STETKAR: Without including it in here.

MEMBER BLEY: That's right. And fighting for a long time.

MEMBER BROWN: that was the point I wanted to make sure we discussed. The points 2, 3, and 4 in here are really kind of restatements in a way of IEEE 603.1, was an abbreviated version. That has to be fixed a little bit if we're going to go down that path, because it talks about time available in the wrong context as opposed to the way we had it defined in ISG 5, Section 3 or the SRP. That's the point that we need to come across.

MEMBER STETKAR: I couldn't attend the subcommittee meeting, but was the sense of the discussion at the subcommittee meeting that the reg guide should retain that information, but it needed clarification? The response was well, instead of providing clarification, we'll just remove it.

MEMBER BLEY: My expectation was when you guys went back to reconsider it, and integrate it, and

make it consistent --

MEMBER STETKAR: Rather than just taking it out.

MEMBER BLEY: That was my expectation, but --

MEMBER BROWN: That was my expectation as well.

MEMBER SIEBER: And mine. But the staff --

MEMBER BROWN: I'm sorry, go ahead.

MEMBER SIEBER: Yes, the staff typically does not like to put the same requirement in two different documents because if you revise one, automatically you've got a --

MEMBER BROWN: The way -- I'm not saying -- the only way to me -- I agree. Probably, I agree. You don't want to have detailed, detailed requirements specified in multiple documents. It just gets too hard to manage.

MEMBER SIEBER: Right.

MEMBER BROWN: But when they put this in, is relative to saying hey, we've got two criteria for time, time required and time available. Time required for the operator to take actions and time available for -- I might even have it reversed now. I have to

go back and read the words. The analysis that says how much time you have as opposed, and the evaluation of the human factors part just says you have to have those two factors evaluated. It doesn't give you a limit. It doesn't say what's 30 minutes or five minutes, no criteria. That would be done via the SRP.

VICE CHAIR ARMIJO: And they point to the SRP.

MEMBER BROWN: Well, we talked about that -- thank you. One of the comments was should we reference the document, whether it be SRP, Chapter 18, Appendix A. At that point, we talked about it, but we didn't resolve that either. It was, in other words, that was the point of that right there. Part of the comment that we made was it was left out of that when we wrote it down and it's in the transcript, should it be referenced.

MR. NGUYEN: I remember during the subcommittee meeting there was a question that if the industry was aware of any of this information out there to see -- are they aware of the SRP, cover the response time and I think we answered yes, the SRP -- we expect the industry to look at the SRP during their design phase. And they're aware of what we expect from the industry so -- by -- to go back to your

solely, key word, solely, we discussed about this and we said we don't want to duplicate what the ISG and SRP cover for HFE equipment because in the ISG, after -- if we -- after the evaluation or analysis, if we decided that manual initiation is the only way to go or acceptable and this needs to be followed, and go back to the reg guide, we use solely manual initiation, something similar to ISG that covers the time response requirements and all the criteria.

So removing the time respond discussion from the reg guide is not like we don't cover anywhere else. We have the ISG and SRP covered. That's the thought process that led us to decide to remove it from the reg guide.

MEMBER BROWN: Well, yes, except the ties are spread out.

Go ahead, John.

MEMBER STETKAR: But I was just going to say, I'm just trying to think of new plant designers who are coming in with diverse actuation systems. We've had this discussion with a couple of the new plant reviews and some of the comments that have been made this afternoon kind of relate to that because they well, okay, we're going to put in this manual switch and we should be given credit for that because

we think we have enough time. But they've designed the switch in, according to all of the hardware design criteria and things like that and then they're trying to later justify why that design is okay based on other things outside of that hardware context.

Putting some warning or caution or something in the reg guide to say that before you can acceptably implement a particular design, you need to make sure that it can be justified from these other criteria, seems to make sense.

MEMBER SHACK: I like the paragraph they have in the red line strike out version with the 30 minutes gone.

MEMBER BROWN: Item 1 has to be fixed. That's not exactly --

VICE CHAIR ARMIJO: How does it read?

MEMBER BROWN: We need to fix the first item.

MEMBER STETKAR: How in the interim doesn't make any difference, it's whatever they have today.

MR. NGUYEN: So your recommendation is to retain that paragraph?

MEMBER BROWN: Well, right now, we're discussing it.

MEMBER SHACK: We don't have a conclusion.

MEMBER BROWN: But the idea is to retain the paragraph and then fix up Item 1 just a little bit to include both the time available/time required in their proper context as they're reflected in the SRP. Or another option would be in Item 1 to say one of the considerations is a human factors response as articulated in the SRP Chapter 18, Appendix A, something like that.

VICE CHAIR ARMIJO: Then you will have it.

MEMBER BROWN: And that captures -- it covers both the diverse, because we've got the BTP stuff in there and it covers the solely, when you're doing it as a primary mode of protection as opposed to a backup.

MEMBER STETKAR: And it points a designer and a reviewer to a place to go to think about those considerations.

MR. NGUYEN: To your suggestion to reference SRP --

MEMBER BROWN: It is not approved yet.

MR. NGUYEN: Yes, it's not approved, so it's hard for me to reference something.

MEMBER BROWN: I don't know how we do that. ISG 5, Section 3 is out.

MR. NGUYEN: Right.

MEMBER BROWN: But you don't want to reference something that's an interim guide either. That's why that was part of the thought process of just taking the time available, time required definition is the way we had them in our letter from back last year and put them in in place of Item 1 to make it clear.

Go ahead.

MR. RIDGELY: John Ridgely from the Office of Research, Regulatory Guide Development Branch.

As a matter of process, the way we look at it is that you have the regulations. Then under that you have the regulatory guides which provide guidance on how to meet the regulations. And then there's a Standard Review Plan which tells the staff how to review the application. And as a matter of course, we don't want to reference down. We don't want to reference the reg guide down --

MEMBER BROWN: Good point. Okay. I got that. That further strengthens the thought process of putting the time available, time required --

MEMBER STETKAR: At least some notion of that.

MEMBER BROWN: That's what you want to go

look for.

VICE CHAIR ARMIJO: That is part of your design process.

MS. ANTONESCU: That's what the staff referenced.

MEMBER BROWN: Pardon?

MS. ANTONESCU: That's what the staff referenced under Comment 1. They referenced Appendix A of Chapter 18.

MEMBER BROWN: Oh, yes. But that was just for explanation for us that it's covered somewhere. They're not referencing it. They weren't proposing to reference it. They were deleted totally.

Are there any other questions on this particular item? Dennis, Mike? Okay.

The other -- go on to your next one.

MR. EAGLE: Mr. Brown?

MEMBER BROWN: Go ahead, I'm sorry.

MR. EAGLE: Gene Eagle, I&C. Mr. Stetkar, I think you had a really good point. This reg. guidance is aimed a lot at man-machine interface. It does point a lot toward instrumentation and the actual equipment that's going to be done and more than any kind of details as far as the human factors part of it. So I think you had a really good point about that

in here.

MEMBER STETKAR: That's part of it, but I think as Dennis mentioned, we've lived in a world where the hardware designers design things according to the hardware rules and then later hope that the people who write procedures and train operators make them perfect to use that hardware. And we're trying to get away from that a bit, so that if there isn't referenceable guidance in terms of an existing reg guide or a rule, something that's higher or parallel that can be used to point people towards some guidance for the integrated human hardware stuff, it seems like at least this reg guide should somehow point to that. Perhaps not give the detailed guidance about how to do the human factors analysis, you know, but at least point to the fact that one ought not to --

MEMBER SHACK: Not all manual actions are not created equal.

MEMBER STETKAR: All manual actions are not created equal. You have to satisfy certain hardware criteria, but don't even go think about trying to satisfy those criteria until you can justify that you can actually use said hardware.

MEMBER BROWN: Any other? Okay. Go ahead to your next one, I'm sorry, I lost the bubble there.

MR. NGUYEN: The next comment by the ACRS subcommittee member was could there be manual actions for systems classified as regulatory treatment for nonsafety systems, RTNSS, in the new passive reactor designs. The second question was does any guidance exist to help people deal with RTNSS?

To answer the first comment, we reviewed Reg guide 1.206 and there's a statement in there saying systems classified as RTNSS may be required after 72 hours of an initiating event and may have automatic as well as manual controls. However, the revision of Reg guide 1.62 applies to manual initiation of protective actions, which are required within 72 hours of an initiating event. So RTNSS will not be part of the reg guide scope, but that's another question of the Committee members.

MEMBER BROWN: Dennis asked this question on the RTNSS. I had it, he just beat me to it.

MR. NGUYEN: Right, and you said that, but RTNSS has any manual action requirement, depends on the design of the particular passive reactors, but we think the manual and automatic controls are associated with RTNSS, but it is not part of this reg guide.

Another question you ask is there any guidance out there to help the industry deal with the

RTNSS. The answer is yes. Reg guide 1.62 --

MEMBER BLEY: Yes, I don't know. I have to look at that. I don't recall if that says anything about human actions. I have to go look again.

MR. NGUYEN: I think that's Part 4 of the reg guide. That's called RTNSS and you do the -- there's a processor to analyze all the active systems to decide it is going to the RTNSS criteria and you have to follow some of the guidance.

MR. EAGLE: The DCD also has very strong RTNSS, answering the RTNSS, going through and making an analysis of five criteria on RTNSS systems, and then the COLs can follow that if they accept it by IBR.

MEMBER STETKAR: That's to identify what's in RTNSS. I think our concern is what do you do after you have that list and how do the reg guides and review criteria address that list. There's guidance on how to create that list, but we're looking at a reg guide now that's going to be released in 2010 and applied, maybe for another 30 years. So it's a question of should this reg guide items that are in that RTNSS list or is there other equivalent guidance available to address the stuff that's on that list.

MR. NGUYEN: So right now, Reg guide 1.62

is, I believe, the only reg guide that provides RTNSS guidance.

MEMBER BROWN: Did it use the word RTNSS in there? I've got a section called an I&C section, 1.206.

MR. NGUYEN: 1.206 --

MEMBER BROWN: CI 7.7 says control systems not required for safety. I have no idea what that means.

MEMBER BLEY: I don't know, it's been a while.

MEMBER SHACK: I has Chapter 12.

MEMBER BROWN: That's all I've got on it.

MR. NGUYEN: Did you go to Tab 4 of that reg guide?

MEMBER BROWN: I don't know. Chapter 12?

MR. NGUYEN: I have a copy here.

MEMBER BROWN: I don't have that. All I've got is Section 7.

MR. NGUYEN: C49.

(Off the record comments.)

MEMBER STETKAR: We can look at that later. It's just that right now the staff is saying that the scope of this reg guide only covers --

MR. NGUYEN: Manual initiation --

MEMBER STETKAR: Equipment for a new plant would be considered safety related.

MEMBER BROWN: Safety related. And it says that in the lead-in. Any more on that one?

MR. NGUYEN: Okay, this one is the wording comments and is resolved with the member who had the concern of the wording. I don't know if you want me to cover this?

MEMBER STETKAR: You said you were going to fix the wordsmithing that was suggested, so --

MR. NGUYEN: Right, but after consulting the Reg guide Branch, we have to get clarification on that statement. That's not the intent of the statement to change the word or to -- we will retain that statement in the reg guide.

MEMBER BROWN: I just lost you.

MR. NGUYEN: We have John Ridgely here, we'll ask him more clearly to --

MR. RIDGELY: John Ridgely again, the wording there is meant to be -- it's approve by OGC for one thing, and so we have to go back to them to get it changed. This is intended to allow people to use what's in the guide, propose something different or use something else that's already been accepted. And so the wording here, maybe the confusing part is

the fact that you're equating proposed and used, when it should be proposed versus use a previously established accepted --

MEMBER BROWN: The exact words that were referred to is under implementation. It says in some cases applicants or licensees may propose or use a previously established acceptable alternative method.

MEMBER BLEY: This fixed it.

VICE CHAIR ARMIJO: This fixed it, yes, I see what they're saying.

MEMBER BLEY: Propose an alternative or use previously.

MEMBER BROWN: Okay, I am happy with that. I heard you say that we couldn't change it because it was mandated by somebody else.

MR. RIDGELY: No, I'm just saying the words came from OGC, so they'll have to go back there to be approved again.

MEMBER BROWN: Before you do anything, you've got to get their concurrence with this.
And this generic language goes in all the regulations.

MEMBER POWERS: This is very generic.

MEMBER BROWN: Okay.

MR. NGUYEN: Do you have any questions on this?

MEMBER BROWN: Okay, read to go to 4?

MR. NGUYEN: On the second part of this is public comments and resolution. One of the public comments was to suggest revision of Rev. 1 to include the statement that allow manual initiation as a system level that meets single failure criteria and independence requirement.

We went back to review, take a look at the reg guide and we found a statement in the reg guide which also integrates the IEEE 603 Division definition Division definition in both IEEE and the Revision 1 of the reg guide, it says division as the designation applied to a given system or set of components that enables the establishment and maintenance of physical, electrical and functional independence from other redundant sets of components. So by saying this, we already have a system that satisfies independence and single failure criteria, so we don't need to revise the reg guide to include the statement as the industry suggested.

CHAIR ABDEL-KHALIK: If you are to insert the word system there --

MR. NGUYEN: I highlight it for you to see. That is right now currently in the proposed Rev. 1 Reg guide. It's already in there. And this

statement, we took it out from IEEE 603. We didn't make it up.

VICE CHAIR ARMIJO: I guess I'm confused.

MEMBER BROWN: Let me walk you through. If you go back to IEEE 279 which says system, the first Reg guide 1.62, both have the word system in them. 603 changed system to division. It actually defined a division as these words in IEEE 603.

VICE CHAIR ARMIJO: So division is a hierarchy?

MEMBER BROWN: No. Division is still a part of the system. Okay? Let me finish the whole -- this is a shaggy-dog story.

So for years, you had this inconsistency between the manual initiation actuation reg guide and IEEE 603. The industry, as part of their comments, suggested, said hey look, this gives us -- they pushed back on this. The reason they did that was because their thought process on how you do division and how you do system stuff, you've got to need single-failure independence anyway and it gave them more flexibility in the design. So the inconsistency helped them. So they could play both ends against the middle.

Now we come along and we change the reg guide to say division and they say ooh, that

constrains us. Now we have only one way. Now we have to argue whether we're complying with the rules when -- since IEEE 603 is actuated at the rules, but they had another guidance that said you could, if we wanted to do something at a higher level. But met all the other requirements of 603.

So after 40 pages of discussion in the transcript, their final thing was really, they wanted to have the words system-level actuation included in the Reg guide 1.62.

And the staff did not accept that comment during their preparation of the last revision, after they received all the public comments. So what we asked them to do was go back instead of trying to resolve it in the subcommittee meeting, correct me if I'm wrong, Dennis, was to go evaluate that again and when they came back and they said well, just a minute, we've incorporated already the words out of IEEE 603 which define a division and the definition of division -- and Terry Jackson made this statement I think in the transcript -- really covers the broader allowance to use systems.

When I looked at the words down here which says which define functional independence from other redundant sets, that doesn't compute very well. I've

now said a division is equal to a system.

MEMBER STETKAR: Let me ask the staff who wrote the reg guide a simple question. Suppose I have a high-pressure injection system in my plant. It consists of four trains of equipment. Each train of equipment is actuated from a separate division of electrical power and automatic signal logic.

Does the reg guide allow me to manually start all four trains of that high-pressure injection system via a single switch? Yes or no?

MR. EAGLE: That would be one interpretation --

MEMBER STETKAR: Does it? Does the reg guide allow me to start all four trains of that system via a single switch? That's a yes or no question.

MR. EAGLE: It would still have to meet, as long as it met all the other criteria, the independence --

VICE CHAIR ARMIJO: It couldn't be redundant.

MR. EAGLE: Probably just a switch could do that and meet the other criteria.

MEMBER BROWN: If you have a multi-deck switch.

MEMBER STETKAR: You have a multi-deck

switch with four trains on it.

MEMBER BROWN: Or a mechanical shaft, okay, but a multi-deck switch which is commonly used to do

-- maintain independence under many circumstances, this going to division, their argument would be that you have now prohibited them from a simple quick -- I'm just saying that's what they are --

MEMBER STETKAR: I want them to answer yes or no.

VICE CHAIR ARMIJO: Plead the Fifth.

MEMBER STETKAR: I am not going to design that switch. They have to meet all the design criteria. I am not going to design the switch. I'm just asking does the reg guide allow me to initiate that system with a single switch? I'm an operator. I walk up to the board and manipulate a single button, turn handle, something or other and all four divisions start.

MR. EAGLE: I think, if you say operate at the system level, then it's permitted. If you change it to division level, then you may need something more than that. But you still have to -- as long as you're meeting the independence and other criteria, the old plants you may have cases where you do have something

very similar to that.

MR. NGUYEN: Well --

MEMBER STETKAR: I didn't say an old plant or a new plant. I have a four-train system with four pumps in it, four divisions of electric power.

MR. NGUYEN: Are they independent to each other?

MEMBER STETKAR: Yes, they are.

MR. NGUYEN: Okay.

MEMBER STETKAR: The electric power supplies are independent.

MR. NGUYEN: Redundant.

MEMBER STETKAR: They're redundant. Any one of the four pumps can save the day. They have four independent divisions of displays to the operator, except that I'm the operator and I want instead of pushing a button in train one and another button in train two and a third button in train three and a fourth button in train four, to get all four of those pumps running, does the reg guide allow me to push one button?

MR. NGUYEN: I believe the answer is yes, if it meet the independence and single-failure criteria. If it meets those requirements and --

MEMBER STETKAR: And perhaps I have two

buttons, that both initiate all four trains, so I can meet a single failure of the mechanical shaft. But as I said, I'm not going to design these buttons.

MEMBER SHACK: But as I read this, the division has to have -- there has to be something else that's got redundant components.

MEMBER STETKAR: That's right. That's why this -- the highlighted word in there only confuses the situation, because I interpret this as you can't do that. I would have interpreted that and I think the industry interpreted that that you can't do that. That's why I'm asking what the intent was, what the intent is.

CHAIR ABDEL-KHALIK: If the intent is to allow them to do that, why not explicitly state it? Why bury it in a definition?

MEMBER STETKAR: See, they spent a lot of time going to the division level and the intent of the division is that I must have four push buttons in my example.

CHAIR ABDEL-KHALIK: But you can if the intent is to allow them to do it on a system level with a single push button, just state it explicitly.

MEMBER BROWN: In the meeting --

CHAIR ABDEL-KHALIK: -- provided that they

meet the constraints that you specified.

MR. NGUYEN: the problem is that throughout the IEEE 603, this use of division level as the requirement and it's in the rules and --

MEMBER STETKAR: See, the common interpretation of the word division level would be four push buttons and everybody understands that. What I'm hearing you say is no, no, because of that highlighted word in this sentence here, we really mean it's at the system level. So that's why I'm trying to understand what you really mean and how that's consistent with the IEEE standard.

MR. NGUYEN: Well, the highlighted system word in here is not -- we don't want to tell you that division level is a system level. We're not trying to compare that. But --

VICE CHAIR ARMIJO: That's what your definition says. I'm confused because there's apparently more than one definition of system. Maybe system with a capital S and system with a small S. I don't know.

MR. NGUYEN: The standard defines the division given to a set of components, a few components or a system. It doesn't have to be the whole system.

VICE CHAIR ARMIJO: Subsystem, I could understand that.

MR. NGUYEN: Right, that satisfies independent and single failure criteria.

MR. EAGLE: Charlie Brown has pointed out here quite well is when they had the word system in there, it was left to an interpretation on both sides. If you put division in here, now you're getting to the point of looking at four switches.

MEMBER STETKAR: That's right.

MR. EAGLE: Or something --

MEMBER BROWN: Industry's position or comments were that this increased the number of actions potentially in order to initiate critical protective or safeguards functions when you may not have -- if you think about it, how hard is it to turn four switches? It depends on far separated those switches are and where they are located on the panels, whether he sucked in his last breath before he hits the last button, what else is going on.

MEMBER BLEY: What else is going on.

MEMBER BROWN: He thinks he hit all four, but he didn't. And so their idea was if you could allow as part of the reg guide the thought that this is what IEEE says, whatever is in there, all those are

there, but we would accept for manual operation something that meets the switch level if it meets failure, single failure and independence criteria. That's what their question was to us when we left. So we threw the dog onto the bus and shipped it off to the staff to evaluate this. But we're going to have to resolve this at some point.

MEMBER STETKAR: Certainly, if the actual intent of the reg guide is to allow that single button, we'll call it that, or I'll give you two buttons to take care of the mechanical failure of the shaft or whatever, but with appropriate separation of the contacts and things like that, but to allow, in principle, a single button to start all four trains, it seems that at least the explanatory material and the definition in the reg guide needs to be clarified so that designs know that that's something that is acceptable, because a simple reference to the --

MEMBER BLEY: And reviewers.

MEMBER STETKAR: And reviewers -- well, yes.

MEMBER BROWN: The staff actually made the comment in response to the industry's discussion on that issue stating that yes, system level actuation that meets those requirements would be acceptable.

MEMBER SHACK: All John is saying is I can't get that --

MEMBER BROWN: I agree. And your point was that's not evident from the words as proposed. And so that's why we tossed it in and said hey, go think about it some more and we would resolve it in our full Committee meeting once we had a good discussion on it. Are there any other questions on this one?

I apologize. I'm sorry.

MR. STATTEL: I'm sorry. My name is Richard Stattel. I'm a technical reviewer on the Oconee project. And I'd just like to point out because that's really our most current application of this. For the Oconee, there were really two divisions of actuation and they had two push buttons. That's how they designed the system.

MEMBER BROWN: Oconee is a funny-looking system with half voters here and half voters there.

MR. STATTEL: It's actually not all that uncommon.

MR. EAGLE: A lot of the current plants you have two trains that do work, so in a way you can have the two different buttons. The next level of plant, the newer plants, they're starting to get four

trains. So everything is very divisionalized. Everything is very, very independent.

MEMBER BROWN: Good point, and the biggest part of the discussion on that came from the AREVA and Mitsubishi. I guess it was the US APWR, whoever, the gentleman Scarola who was US APWR. Thank you. So that's where the biggest interchange. We spent quite a bit of time on that. So it's the new plants.

MEMBER STETKAR: Well, it's new plants because they're very highly divisionalized and more equipment than the older plants, more trains in a system.

MR. EAGLE: Also because we've gone to more and more digital electronics, there's more and more concern about common cause failure and therefore the division, the separation is also a bigger, more important area because when you start combining -- you may have an old mechanical switch, but now all of a sudden you have an electronic switch. In fact, we have this very interesting case right now with Toyota and it's a gas pedal which they're relating to their computer that used to be a mechanical arm and now it's being done by an electronic computer system and it may be part of the problem.

MEMBER BROWN: Okay, I will ask again, can

we go on to the next public comment? Are we finished with this one?

Okay, Khoi?

MR. NGUYEN: The second comment from the public was how to accomplish Position 8, optional single safety manual initiation that satisfies IEEE 603 and BTP 7-19?

Well, there are some new reactor designs that have been done to accomplish this Position 8. One of them was in the U.S. EPR, the one reactor trip -- I mean the reactor trip buttons in the main control room are hardwired. That means pressing one manual reactor trip button sends a signal directly to all individual -- divisional reactor trip breaks and opens the breaks for that division. This design meets the safety-related requirements of IEEE 603 and since it is hardwired, it's not a computer program. There's no common-cause failures so that meets Position 4 BTP 7-19. That's the one example.

Another example is the design of the Oconee Reactor Protection/Engineered Safety Features Actuation System Features. These are safety-related manual initiations, so it meets IEEE 603 requirements. And the manual initiation connects to the downstream of the system puts which satisfies BTP 7-19

requirements.

In Figure 1, shown here, we have four trains of the ESFAS, Engineered Safety Features Actuation System and reactor protection system here. And they are safety-related and the manual initiation connected to the downstream of the system outputs here. They're not connected upstream or before the voters. So this will satisfy BTP 719.

So those are two examples that illustrates how to accomplish Position 8 which the industry concern was having to combine one unknown safety-related design and safety-related design to one and these two examples are not the only ones, but showing how to do it.

MEMBER BROWN: Do you have anything on this, Dennis? We discussed this a bunch, but I came to the same conclusion. We agree to that.

MR. NGUYEN: So that will end my presentation. Any further questions?

MEMBER BROWN: Anybody? Additional comments, questions.

MR. EAGLE: Just the big thing in this item 2 here, the big thing was, of course, was to emphasize -- more of an emphasis that there are two requirements for manual activation, but they can be

brought to one under proper conditions.

MEMBER BROWN: If they satisfy --

MR. EAGLE: If they satisfy --

MEMBER BROWN: Diversity requirement and the IEEE 603 requirement.

MR. EAGLE: Correct.

MR. NGUYEN: We just show it is possible to do it, but industry says it's impossible. That's one of the concerns; one safety-related and one not safety-related, how can you do it from bottom up and these examples show that's possible to do that. But we don't want to tell how to design.

MEMBER BROWN: No, that's right.

VICE CHAIR ARMIJO: But is it also practical or is there any downside of trying to do it this way?

MR. NGUYEN: Actually, the up side, it saved industry a lot of money to design two individual, one is safety related and one is not safety related manual initiation. If you combine it to one in the initial phase of the design, you save a lot of money.

VICE CHAIR ARMIJO: That is really up side, rather than down side.

MEMBER STETKAR: I think all of the

diverse actuation systems we've looked at employ something like that. They're nonsafety systems that come in downstream from the safety signals.

MEMBER BROWN: I guess that wraps it up, Mr. Chairman.

CHAIR ABDEL-KHALIK: Thank you.

MEMBER BROWN: I'll pass it back to you. We're ahead of schedule.

CHAIR ABDEL-KHALIK: Great, thank you.

MEMBER BROWN: We're back on schedule, I should say.

CHAIR ABDEL-KHALIK: At this time, we'll take a break and we'll reconvene at 3 o'clock to consider the Standard Review Plan for review of a license application for a fuel cycle facility.

(Whereupon, the above-entitled matter went off the record at 2:39 p.m., and resumed at 2:58 p.m.)

CHAIR ABDEL-KHALIK: We have a quorum, so we can start. The next item on the agenda is the proposed revisions to NUREG-1520 Standard Review Plan for review of a license application for a fuel cycle facility. And Dr. Ryan will lead us through this.

MEMBER RYAN: Thank you, Mr. Chairman, and good afternoon, ladies and gentlemen. We had an excellent subcommittee briefing several weeks, maybe a

month or more ago, and we're going to have a summary of that briefing and on the Revision 1 of the Standard Review Plan for the review of a license application for a fuel cycle facility.

And Michael, I guess, you're going to lead us off, please?

MR. TSCHILTZ: Yes, good afternoon. My name is Mike Tschiltz. I'm a Deputy Director responsible for fuel cycle facility licensing in the Division of Fuel Cycle Safety and Safeguards in NMSS. I appreciate the opportunity to come before the ACRS and discuss the planned revision to NUREG-1520. This has been a long effort for us.

The initial NUREG was issued in 2002. Since that time we've licensed several new facilities, one of which, LES, is getting ready to commence initial operations. During the course of those activities, we utilize the Standard Review Plan and we gained experience with it. During the course of those licensing reviews there were a number of Interim Staff Guidance positions that were issued to basically provide additional details in the Standard Review Plan where it was lacking in some areas. And it was determined that we were at a good point in time to go and revise it and update the guidance based upon where

we were and what we learned.

We started this effort over a year ago. We formed a multi-discipline team to look at the different areas. We interacted with members of the staff and each of those different technical areas to obtain input on things that should be revised in the Standard Review Plan.

We published a draft for public comment and interacted with public stakeholders in the industry on it and we got specific comments, after publishing a Federal Register notice. We've gone through a process of resolving those comments. After we resolved those comments we made another version of the draft revision to the NUREG available to the public. Since that point in time I think we have -- we are expecting a letter from NEI to raise several issues. I'm told the letter was written and issued Monday, but we don't have a copy of it, so I can't speak specifically to the letter. But NEI has provided some comments on the revised draft revision that we made public in early January.

So that's, I guess, what I would like to go through as far as opening remarks. And on the next slide, the specific items that are highlighted on this overview of changes slide are the specific areas that

we intend to discuss during our presentation. I think those are the areas where we think the most significant changes to the Standard Review Plan were made. And so that's the focus of our presentation.

Next slide.

MR. DAMON: My name is Dennis Damon. I'm a senior level advisor for risk assessment for NMS, but I'm in the Division of Fuel Cycle Safety and Safeguards. And my other background is that I participated in the rulemaking that established 10 CFR Subpart H that required that integrated safety analyses be done and that generated the Standard Review Plan. So I wrote the original ISA chapter of this Standard Review Plan and I've been involved with the process over the years. So that's why I'm doing the background here.

Let me make a remark about the tenor of the presentation we're about to make here. It really is just an overview of the changes. We made a more detailed presentation to the Subcommittee on the details of what these are, so this is an overview and it's going to focus on the response to the comments because that was something that was not presented to the Subcommittee, so that's the general tenor of this presentation.

The background is that there was a process that went forward. It started about 1992-93 through 2000 that resulted in a revision to 10 CFR 70 that added Subpart H and that was completed in September of 2000. And this regulation required a thing called integrated safety analyses be done by the licensees and they had until October of 2004 to complete these and then to submit a summary of these integrated safety analyses to the staff for review and approval.

Upon approval, the full content of Subpart H would be implemented which defines a full, over-arching safety program consisting of a number of elements. The contents of Subpart H include defining consequence criteria. It defines three levels of consequences using two boundaries. One is a boundary between intermediate and less-than-intermediate consequences. Intermediate consequences, for example, for a worker are, for example, in the dose area. It's 25 rem, an accident that would expose a worker to 25 rem, whereas the next boundary up is high consequences and that's greater than 100 rem to a worker. So Subpart H defines these levels, both for radiological consequences, and for criticality consequences and then it also has language defining a criticality accident as being something that also has to be

addressed.

Dr. Ryan asked me to address what example is an integrated safety analysis as compared to a PRA. An integrated safety analysis is, has a very similar structure to a PRA, but a different purpose. It starts with what's called a process hazard analysis which is, the purpose of which is to identify accident sequences that could occur. So this is very analogous to the fault trees and event trees that are produced in the PRA, where you're identifying what can go wrong qualitatively.

Then the next phase is to identify, once the accident sequences are identified is to categorize them as either intermediate, less-than-intermediate or high-consequence accidents, using the criteria that are defined in the regulation. As opposed to a PRA which actually, if you do a Level 3 PRA, you're going to quantify the actual numerical value of the consequences in detail. Well, you don't necessarily have to do that for an ISA, you just have to get them in the right bid. They're either high-consequence, intermediate, or less-than.

The next stage is to assess the likelihood of the accident sequence. And unlike a PRA, the regulation does not require that this be a

quantitative determination that's left to the licensee to have the flexibility that they could actually define purely qualitative criteria for what constitutes a highly unlike accident sequence. And so that's the final difference. But, in fact, most licensees do the likelihood quantification part with some degree of quantitative evaluation to it. And some are fully quantitative.

Then you have to recognize what the purpose is. The output of an ISA is a list of accident sequences, categorized as low, medium, or high, and a list of items relied on for safety that were identified as those things that are going to either prevent or mitigate that accident sequence. That language, items relied on for safety is in the regulation. Once those are identified, they become part of what's called an integrated safety analysis summary which is submitted to the NRC. So now we here at headquarters have a document that tells us all the items relied on for safety to achieve, make accidents, like for example, one requirement is a high consequence of this must be a highly unlikely. And the highly unlikely is not defined quantitative in the rule. That flexibility again, was with the licensees, although there is guidance in the Standard Review Plan

as to what we think highly unlikely is.

Then the output, as I say, is this list. And the items relied on for safety then are tied into other requirements in Subpart H. The management measures are required to be applied to them, to make them highly reliable and available to meet this highly unlikely criterion and there are other constraints. So the purpose and output of an ISA is this identification of IROFS and tying it to the regulatory requirements as opposed to a PRA where you get a quantitative risk profile as an output which you do not get with an ISA. You have individual accident sequences and there's no summation of quantitative information adding up all the accident sequences. They're all individual. So that's the difference.

So now here we are ten years after the regulation went into effect, and actually the original draft of the Standard Review Plan actually was in final form at the time the regulation was promulgated. So it's been ten years since the document has been updated. And so now -- and at that time when the first one was issued, of course, the integrated safety analyses had not actually been done. And consequently, as a result of the industry performing these analyses, and staff reviewing them and then once

they're approved the licensees have been operating under these plans for now on the order of four, five years, there are lessons that we've learned. And so that's the purpose of updating the Standard Review Plan. Incorporate the lessons we've learned from this ten-year process, improve the linkage of the review content to the regulatory requirements. And over these years, as the ISAs were being done, issues arose, questions, and problems. And so there were a sequence of workshops held between the industry and the staff to clarify these issues and how they might be resolved. And the staff issued Interim Staff Guidance documents over the years and so actually the biggest bulk of what's changed, is going to be changed in this Standard Review Plan is to incorporate these Interim Staff Guidance documents into the Standard Review Plan.

Then there was a new subsection on review interfaces to clarify that. These reviews are actually quite complicated to do. The analyses are as well. The analyses are done by teams. The integrated part here in ISA means that you're doing a review, an accident identification process in which you have a team that consists of chemical, fire, and criticality and radiological safety people simultaneously on each

process. And the integrated part is important because what we found is that some of the safety controls that are applied for one type of problem like fire, has an adverse effect on criticality safety. And so you have to do this simultaneously and jointly.

And then on the review side, the reviews are complicated because you're doing not only the interdisciplinary thing, you're also doing a simultaneously a programmatic review and you're also reviewing individual processes and you have the multi-discipline, you have multiple people involved. So this thing clarifies how that process will unfold.

The NUREG has been reformatted to fit the standard NUREG format and there's been additional clarification in references for meeting regulatory requirements. We got quite a few comments, both from the staff reviewers and from the industry as to issues that needed to be clarified in the language of the Standard Review Plan, so that was an important thing. And then we removed the redundant and vague guidance and things that really were not requirements, just to really tighten this thing up and not say anything more that really needed to be said.

I hand it back now to Mike Tschiltz.

MR. TSCHILTZ: Right. One of the issues

that I think that led us to the initiate the change was one that came up during the design reviews for applications for the new facilities and that was concerning the completeness of the facility design. If you look at specifically in the regulations, the regulations don't require that a final design be submitted for the staff to review, but it does require or the regulations do require that the design be at a stage where all the credible high- and intermediate-consequence scenarios or events are identified and the items relied on for safety that the licensee will use in their processes are identified as well to either prevent or mitigate the consequences of those sequences

So there was some controversy during the course of these reviews. A Differing Professional Opinion was written on this concerning a level of detail and as a result, one of the things we're trying to clarify is exactly what's required by the regulation and not require anything more in the Standard Review Plan.

I think when the Standard Review Plan was initially written, it was written with the idea that the facility was already built and existed and it led the reviewer to believe that there was maybe more

required for a submittal for a license amendment than what the regulation specifically required. So we've been very careful to go out and take anything that would imply that we would need a specific line diagram of a system showing electrical schematics specifically of a specific item relied on for safety. That is something that's actually verified at a separate stage of the process. For fuel cycle enrichment facilities facility, we're required to do a verification that the facility was built as licensed prior to allowing them to operate. We also conduct operational readiness reviews, to make sure that the processes stay committed to in their licenses in the program that they've committed to in their license have been implemented so that we think that they can safely operate the facilities. So there's two separate parts of the process before the facility actually operates where we can verify the details that weren't necessarily specifically submitted in their application.

MEMBER STETKAR: Michael, during the review process if you don't have that design information, even in simple terms like one-line diagrams, how does the staff address the issue of completeness in terms of that list of accident

sequences. In other words, how do you independently check whether the list of sequences that the applicant provides in the ISA is reasonably complete, that they haven't omitted something because they've overlooked a feature of the design?

MR. TSCHILTZ: Right. I think, and I'll allow Dennis to answer this too, as well, but I think for certain features where it's very important say for criticality safety, the licensee or the applicant would have to supply the detail necessary for the safety reviewer to make his determination. But certain other areas where there's a general process description, in some cases that's adequate, but the regulations, basically allow that to be kind of as a case-by-case basis for the specific system or control that's required.

So in many cases there are details, but say, for example, a pressure trip on a system, you wouldn't have to submit a line diagram showing where the pressure sensor was and how that was connected, but just the general description that there would be a high pressure trip on the system would be adequate for our review.

MEMBER STETKAR: Thanks.

CHAIR ABDEL-KHALIK: I still find the word

all to be troubling, because without knowing it, you can't tell that you have identified all.

MR. TSCHILTZ: Right, well, I think the key point there is the design has to be complete to the point where you can identify the accident sequences. And the specific aspect, say for example, of whether this pressure gauge was located in the correct location to actually sense the pressure that could be something that could be verified in during a construction inspection or operational readiness review. So there isn't that just one check during a license review. There's these other steps in the process before they operate that gives us confidence that the system is designed and constructed in a safety way.

MEMBER STETKAR: Do they typically go back after the design is more final or let's say final and reevaluate the ISA to see whether they've missed anything during the original one or that any specific features of the design have introduced new sequences that they had thought about before or didn't exist before because at some point in the design evolution changes were made?

MR. TSCHILTZ: They are responsible for making sure the ISA is up to date and complete and so

I don't know if they have any specific process that would lead them to do that, but they are accountable and responsible for making sure that all the sequences are identified.

MEMBER POWERS: That is Part 22 or something like that makes them responsible for that if it comes up the design process.

MR. DAMON: They are required -- the regulation requires them to do an annual update of the ISA --

MEMBER STETKAR: Okay.

MR. DAMON: -- and submit an ISA summary to us annually, every year. So as a result of that, as Mike says, that has to be --

MEMBER STETKAR: Thanks. I wasn't aware of that.

MR. DAMON: -- a document.

MEMBER STETKAR: Thanks.

MEMBER RYAN: If I remember, we talked a little bit about the fact that would be the basis then for the next set of on-going inspection activities, that update, that would focus you on things that have changed that you might want to look at when the inspection comes.

MR. TSCHILTZ: Yes, that as well as on the

reactor side there's a process where licensees can make changes to the facility without prior NRC approval. We look at those changes. We're focused on the ones that affect the items relied on for safety. Those components, those changes that had any impact on items relied on for safety are the principal focus of our reviews in those areas.

The ISA summary is actually what is submitted to the staff, not the ISA itself and all the credible sequences are required to be identified as well as the items relied on for safety associated with those sequences, and I guess the point to make is that the sequences that screen out as low consequence are not required to be included in the ISA.

The changes made to the standard review plan were intended to clarify these issues, specifically for the staff and for the information of the applicants, so that's principally the changes that were made in the introduction.

MEMBER STETKAR: Is there any -- in the details, is there any guidance about the definition of the term credible? When I think of credible I immediately start thinking about frequency.

MR. DAMON: Yes. There was -- the regulation itself does not. The regulation requires

that the applicant define it and what we did is in the Standard Review Plan there's a little section that defines what the staff thinks and that section says there's three things, three criteria by which something could be screened is not credible. One would be an external event with a frequency -- but the accident was initiated by an external event with frequency less than 10^{-6} per year.

Or (b) the action sequence is not physically possible.

MEMBER BLEY: I like that one.

(Laughter.)

MR. DAMON: But you know, you thought of a sequence and then later you analyzed it and said well, yes, that can't happen.

And the third one is a sequence of human actions for which there is no reason or motive. What I was thinking of when I wrote those words is that always some human being can get in his head I'm going to make an accident happen. He can run around and do anything he wants. We don't need to see accident sequences like that.

MEMBER BLEY: I think I probably brought it up during the subcommittee meeting, but that's a tricky one because there are situations that can be

invoked by the design of the human interface, by a design of the procedures people use in their training that actually set them up to do things that on the surface you would say there's no reason for this. We get to see them all the time by reviewing event reports at facilities. So finding a way to systematically look to find that sort of thing so you're not dismissing very important scenarios out of hand I think is something you guys ought to be thinking about in the future because when you first see those events you think nobody could do that and then when you see how it happened you understand yes, the whole system set them up to do what looks incomprehensible at first blush. And people have worked on that for the last ten years quite a bit.

MR. TSCHILTZ: Next slide, please. Another issue we thought would be beneficial to include in the Standard Review Plan was a definition of IROFS Boundary Packages, items relied on for safety boundary packages. Actually, this turned out to be somewhat controversial with licensees. Our intent of including this in the Standard Review Plan was purely to be helpful to them; as far as staff had written in license conditions for applicants that had completed their license application and we've approved their

license that prior to the operational readiness review that they needed to have a complete listing of these items that were to be included in the boundary packages and it's seen as one method or one acceptable method for demonstrating that they -- the IROFS can perform their intended function, that they're going to be available and reliable.

And I think it's very helpful for the staff when they go out in conducting their inspection activities for the initial licensing to be able to see all of what's included that's going to be relied on within this boundary for either admin. controls, the training associated, the procedures, or if it is hardware, the maintenance that's done on that, the controls, the surveillances that are done and other supporting equipment that's needed for the item relied on for safety be reliable and available when it's needed.

So this was purely intended to provide a description of that. It's in a footnote in the introduction. But this is one issue that the industry has taken exception with and particularly, they want to see it in the Standard Review Plan. This doesn't impose any new requirements. It's just one acceptable means of demonstrating that their IROFS are going to

be available and reliable and so it's meant to be helpful to both the staff and to the licensees and applicants for how they can demonstrate that. So that's why we pointed out to you in somewhat an issue of controversy. I'm not exactly sure why, but that's the issue.

MR. DAMON: One thing I thought -- it just occurred to me I should mention about the process of doing an ISA review. An ISA is intended to be complete in the sense that all areas of the plant that have potential hazards are addressed and all items relied on for safety are identified. However, the staff does not review every single process in the plant and approve the design of each and every process in the plant.

What they do is they're making a determination that the licensee has an effective ISA program and that the licensee has done this. So they do what we call a horizontal slice look to see if a licensee has covered everything in the plant. They review the programmatic elements of the ISA and the methodologies and then they review a small selected subset of individual processes in detail and they try to cover -- it's called a vertical slice. And you're trying to cover the different, qualitatively different

types of things in the plants and focusing on the high-risk areas. So it's a very limited review and the staff does not approve every single process design.

Consequently, once a program is in effect, and a licensee is operating to it, inspectors will go out and they may look at processes that have never been looked at before and they may find interesting things. So that's the tenor of the process.

MEMBER BLEY: I know in the reactor side in all the regions, they now have people who have been trained back here on PRA and can do PRA analysis. Are the inspectors all trained on how to, in this area, trained on how to look at the ISAs and understand them and use them?

MR. DAMON: They are. However, they're not trained like senior risk analysts. They're not PRA trained.

MEMBER BLEY: They're not trained to do the analysis, but they're trained to understand it?

MR. DAMON: Well, there's a training course on ISA methodologies that reviewers go through. There's also a NUREG-1513 which is an ISA guidance document which describes methodologies involved in doing integrated safety analyses. So the inspector is

supposed to be familiar with the methodologies and with the licensees, of course, describe the methods in their ISA summary which is submitted. So that's available for inspectors to study before they go and if they don't understand it, they can come to me and ask. But --

MEMBER BLEY: I guess what I'm asking is I know the other guys come for three months or a year here and learn the details. Is their level of understanding such that they can -- as they look around the facility, look back at it to see that things they found and might be interested in are actually covered in the analysis, maybe looking for completeness or looking for the scenarios they think might be important within the structure of the ISA?

MR. DAMON: Like I say, they're not -- inspectors are not trained like senior risk analysts. And so they, themselves, are not like an experienced fault-tree guy or an experienced person doing what they call HazOp analyses. But they've read a lot of them. They've seen a lot of them. They're more familiar with the plants than say than a typical license reviewer. Inspectors visit the plants all the time. So they're pretty good, actually, at identifying things. I mean I can remember one of our

reviewers went to the plant and said here's this line that comes from this process and goes to this room, and I don't see in the ISA summary, I don't see where you've got a leak in this line as one of your action sequences and you don't have a detector in the room to detect the leak. And they said oh, well, yes, that was an oversight. We'll fix that.

Six months later, that actual line leaked and caused an exposure. So the inspectors are not too bad, actually, considering that they aren't trained as fault-tree analysts. But I mean it is something that we've sort of identified that it's one of those areas that we could improve on. We're embarked on a program to -- or we're about to suggest to the Commission that we embark on a program to do a revisal fuel-cycle oversight program. Well, part of that will be addressing the exact issue you're talking about, who needs to be trained to what level in these techniques.

MEMBER STETKAR: I was going to say even at the regional level, I don't know how the organization is set up, but it seems that you might be able to take advantage of the expertise even in the regional offices, although the machines are different, the technology is different and perhaps the guys on the operating reactor side wouldn't know what that

pipe contains. They do have the experience to kind of think about completeness issues, the generic kind of questions to ask without even necessarily bringing some of your inspectors back here for formal training.

MR. DAMON: Yes, that's what we're identifying as part of this attempt to revise the fuel-cycle oversight program is that we have this thing. We've got SRAs at the region. We've got inspectors at the region. We've got a different type of inspectors at headquarters. They've got me at headquarters. Okay, maybe that isn't -- how do we revise this situation and put in place people in the right places with the right skills. That's what we're going through right now is trying to figure that out.

MR. TSCHILTZ: I think we've recognized the need, as we move forward, to have something equivalent to what would be a Senior Reactor Analyst in the fuel-cycle world. Dennis kind of fulfills that function for us right now. But we realize it could be a benefit to have in --

MEMBER BLEY: How many facilities are there? We've got a lot of reactors. We don't have so many --

MR. DAMON: It's about 12, I think.

MR. TSCHILTZ: Twelve, yes.

VICE CHAIR ARMIJO: Now , this doesn't cover conversion facilities, enrichment facilities?

MR. DAMON: Yes, I mean fuel-cycle facilities. This Standard Review Plan addresses all fuel-cycle facilities except MOx and GDP. The GDPs were certificated under a different regulation, Part 76.

MR. TSCHILTZ: Right, Part 40 is not covered as well which is the conversion facility.

MR. DAMON: Right, they're not covered.

MR. TSCHILTZ: The Honeywell conversion facility is covered under Part 40 which does not have a requirement for ISA. So these are the facilities that have ISA requirements, right, Part 70 licensees, basically.

VICE CHAIR ARMIJO: Okay.

MR. DAMON: So this slide here is just referring to the fact that one of the significant changes that was made was to address this issue of human factors engineering. It wasn't -- these words, the words human factors engineering are not explicitly mentioned in the regulation, but it's by implication that there are procedures that need to be specified and we call them administrative controls. And of course, the way these things are -- and not only that,

but even the hardware controls, all the hardware is often operated manually. It's not fully automatic. There's some operator there taking actions to operate, so the human factors engineering has to be applied in order to make -- avoid accidents. They need to engineer them for human factors. So it turns out the other Standard Review Plan that we use for MOx facilities had a section on this subject and so this was brought in and incorporated into the Standard Review Plan for the other facilities.

Next slide.

One of the issues that came up based on a comment from the industry was that in the Chapter 5 on criticality safety there was discussion of operating limits. It could have been read to have implied that it's required to submit operating limits to the NRC which is not true. It's not a requirement. It's not normally done. So this was rewritten to clarify that it's not -- there's no requirement to submit criticality operating limits or safety limits to the NRC. What the requirement is is that they exist, that they be done by the licensee and so it was described as there must be procedures described for establishing operating limits.

Chapter 5 was reformatted to create a

clear distinction between review of the license application, the NCS program and the safety program review. And these are all somewhat separate things. The license application typically contains a high-level description and various commitments to the contents of how they conduct, how the licensee conducts a nuclear criticality safety program.

The nuclear criticality safety program itself has much more detail to it, contained in procedures at the facility, and the Chapter 5 is reviewing that program. It's providing guidance to the reviewer to review that program, that nuclear criticality safety program, but then in addition the reviewer is going to review the ISA and look at the criticality action sequences in the ISA and the ISA program and that ties them into the whole safety program that's described in Subpart H, so it was rewritten to clarify that he's really doing two different kind of reviews here. He's doing a programmatic review of the nuclear criticality safety program, but he's doing a programmatic review and review of certain of the ISA and ISA sequences from a criticality safety perspective.

CHAIR ABDEL-KHALIK: On the first bullet, how are these procedures for establishing operating

limits reviewed?

MR. DAMON: Partially, like I say, they're described in the license application. There will be a section in the license application on nuclear criticality safety program and the subject of establishing limits involves saying okay, I'm going to control mass in this process and limit the mass to a value such that it will remain sub-critical under all credible conditions. But they need to determine what that mass is. That's the limit that they're interested in. We typically call that a safety limit. And then they often have an operating limit where they're actually, the amount of mass that normally would be in the process is less than that and they might set some control to limit the normal amounts that would ever be in the process. But they need to determine what that safety limit is, so they do criticality calculations.

They're using neutronics codes to determine how much mass under optimal, usually what they do is say you're controlling mass. You set a limit by assuming the most conservative, most reactor condition of all other parameters. Optimal moderation, optimal geometry or heterogeneity, reflection, all these other parameters are set to a

maximal value and then they determine a mass that even with everything else that is worse case, you're still subcritical and then they set that limit. So that's the limit that we're talking about here.

CHAIR ABDEL-KHALIK: But it's not just calculationally based. I mean they must have instrumentation in criticality alarms that would allow them to -- so how do you review, for example, not just the calculations that go into that, but also the alarms and the set points, etcetera, for those alarms?

MR. DAMON: Typically, criticality controls are pretty simple. Like if you're limiting mass, often what you do is you limit the size of the vessel or container so that it only can hold that much. So it's very simply use a three-gallon bucket and that's it. And keep anything other than these three-gallon buckets out of this room. So that's typical criticality control or geometry is much more obvious. There have been calculations done, pre-calculations and there are ANSI, ANS standards establishing which diameters of pipe are going to be subcritical under what conditions. And so you say okay, I'm going to use a safe geography pipe in this process and that's it. They don't even have to do a calculation. It's all been done for them up

front. So most criticality controls are of that nature. They're not really active controls. They're very simple concepts. They're either an administrative concept saying don't do this, do that. Use this bucket. And then geometry, geometry control. Some of them are more subtle, things like moderation. You've got to make measurements of the moisture content of UO_2 powder and things like that. But typically, there are relatively few active engineered controls involved with criticality safety.

Now chem safety is a whole other subject. It's quite different. So that's the end of my stuff. I'm going to hand it off to Cinthya.

MEMBER STETKAR: Mike, be careful when you turn the page and hit the mike.

MEMBER RYAN: The reporter gets a sonic boom in his ears when you hit the microphone.

(Off the record comments.)

MS. ROMAN: Good afternoon. My name is Cinthya Roman. I am chemical engineer for the MOx branch. I am also the project manager for the revision of 1520.

We received a comment from NEI from the industry for Chapter 6 which is chemical safety. They

want us to add a definition to hazardous chemicals in the SRP, but they want a definition that is in Part 70.4. And we added the definition basically that the definition says that substances having licensed materials as a precursor or substances that physically or chemically interact with licensed material are considered hazards chemicals for this for this licensed material, but do not include substances prior to process addition or after process separation.

However, we also make a distinction that the MOU between NRC and OSHA says that hazardous chemicals that are not produced from licensed material, but that could create a condition that may affect the safety of the licensed materials and present an increased radiation risk to workers are also considered by NRC.

MEMBER RYAN: Just as an example, Cinthya, there's a large tank of acid that could somehow be disrupted and interact with licensed material. That's something of interest to the NRC.

MS. ROMAN: Yes.

MEMBER SIEBER: But a large tank of acid by itself that doesn't involve licensed material does not fall under NRC jurisdiction. Is that correct?

MS. ROMAN: Yes, that would be OSHA. If a

person can receive an occupational dose and that would be OSHA. But let's say the two chemicals can react and create an explosion and release some nuclear material, we care about that.

MEMBER RYAN: Just a question and it's a de minimis question. How do you separate processed chemicals from licensed materials and say the processed materials are clean and don't have any licensed material in them? That's a tough one.

MS. ROMAN: Well, they will have to explain that in the ISA and justify it.

MEMBER RYAN: I see. Residual contamination and acid or some processed fluid still means it's licensed material for all practical purposes.

MEMBER BLEY: I'm trying to remember, on the Subcommittee, one of you talked about the Memorandum of Understanding with OSHA and how things were divvied up. Is this just the day it is or is there something a little more complicated to it?

MR. DAMON: No, I think Cinthya said it, pretty much she was quoting the criteria in the Memorandum of Understanding. I am not intimately familiar -- it's licensed -- if you've got uranium, uranium is a licensed material or plutonium, so if

you've got a compound that's got uranium in it, that's covered. And if that compound has toxic properties like UF_6 does, the toxic effect of an accident is something we cover.

MEMBER BLEY: So you cover the toxic site even though it's the chemical toxicity.

MR. DAMON: If it's chemical toxicity, yes.

MEMBER RYAN: Uranium is driven by chemical toxicity, not radiotype toxicity.

CHAIR ABDEL-KHALIK: So red oil explosions would be covered by this.

MR. DAMON: Yes, because they're processing, you're processing the licensed material in the solvent extraction -- in those processes. And then as Cinthya said very correctly, precursor materials, in other words, I've got something here that's going to reactor with your licensed material. That reaction is covered. That causes, for example, if you uranium oxide, one of the first steps in the processing might be to dissolve it in nitric acid. If you do that wrong, you can produce a lot of nitrous oxides which are toxic. That action sequence is covered because it involved a reaction with the licensed material leading to a release of toxic

material.

Just the pure nitric acid or -- these processes end up often producing a byproduct HF, you know. And that gets stored some place. As she said, very precisely, once it's separated from the process and goes to storage, if that storage tank ruptures, that's not our problem. That's HF, has no uranium in it.

VICE CHAIR ARMIJO: That is part of their industrial safety program.

MEMBER RYAN: One of the logistics things, I would imagine in most of these plants, there is an area that's marked chemicals only, no radiological material or something like that, to help people keep all this straight or separate materials or not?

MR. DAMON: I wouldn't know the answer to that.

VICE CHAIR ARMIJO: It's plant specific.

MEMBER RYAN: Yes, probably.

MEMBER RYAN: Thank you.

MEMBER SIEBER: And that is just licensed quantities of radioactive material, not residuals, right?

MR. TSCHILTZ: Well, once it's introduced into the system, it has to be separated from the

isotopes to be considered not a --

MEMBER BLEY: I guess back to Mike's question, that's a tough thing. When does it get signed off as no longer having licensed material in it. Is it a test? You guys sign off on the process and after this point, the process can upset and all of a sudden you've got material where you didn't expect it.

MEMBER SIEBER: There is a point below which, a concentration below which is no longer licensed.

MEMBER BLEY: By rule? Or usually that seems to change as we get better at detecting.

MR. DE JESUS: I'm Jonathan De Jesus. I'm a chemical engineer in the Fuel Cycle Division. And I know for Part 40, there's a regulation that says if it's below, I think it's .05 percent, it's not considered -- it's except from Part 40. And it's in Part 44. Part 70, I'm not aware there are such things as certain concentration below this concentration of special nuclear material. There's no --

MEMBER RYAN: It's .05 percent, by the way you're writing it, right?

MR. DE JESUS: Yes, source material, that's Part 40.

MEMBER RYAN: And the interesting part is that has absolutely nothing to do with anything that's a risk-based definition. It's strictly --

MEMBER STETKAR: It's something you can measure.

MEMBER SIEBER: Once it's below ten miles an hour, you can call the sheriff.

(Laughter.)

MS. ROMAN: Before I go to the second comment from NEI, I would like to first talk a little bit about performance requirements related to chemical exposure, so you can better understand the comment from the industry.

As Dennis mentioned before, the risk of each high or intermediate consequence event should be limited by using IROFS. Specifically, here is a table that I copied from Chapter 3A from the SRP. It says, for example, high consequence events should be limited so that it is highly unlikely so the risk is acceptable. Or intermediate consequence events should be unlikely.

When we talk about chemical exposure consequences, we say a high consequence event would be one that endangered the life of a worker, or it could lead to irreversible or other long-lasting effect to

the public or in the immediate site of the controlled area. An intermediate consequence event is one that could lead to irreversible or long-lasting effect to a worker or could mild transient health effects to a member of the public.

CHAIR ABDEL-KHALIK: Could you sort of just help us with a probability number that would be associated with both ends of this spectrum, the highly unlikely and the not likely.

MS. ROMAN: Highly unlikely --

MEMBER POWERS: Ten to the minus to ten to the minus sixth; ten to the minus two; ten to the minus four, ten to the minus two.

MR. DAMON: Well, like I said before, the credible number we use is ten to the minus sixth for a year. That screens things out entirely.

CHAIR ABDEL-KHALIK: Completely.

MR. DAMON: The licensees are free to submit their suggestion to us as to how to define highly unlikely. Typically, when they've done it quantitatively, it's ten to the minus four per year is the boundary of highly unlikely. And ten to the minus three --

MEMBER BROWN: You said boundary, you mean the lower boundary?

MR. DAMON: Yes, the lower. In other words, if you're -- if you're above ten to the minus four, you're not highly unlikely.

CHAIR ABDEL-KHALIK: So would there be hundreds of these scenarios?

MR. DAMON: Yes. Typically, most of them -- there's a few chemical scenarios that will get you -- and there's just lots of -- everywhere there's fissile material, there's a possibility of a criticality usually, and so there's criticality sequences all over the place.

CHAIR ABDEL-KHALIK: If the boundary of the highly unlikely is ten to the minus four and the boundary of the unlikely was say ten to the minus two, the lower boundary, and you have hundreds or thousands of these, is this something that people just sort of expect to happen?

MR. DAMON: No. What's really true -- first off, one has to look at it from individual risk, first, for worker. Criticality is almost entirely of concern to the workers. Beyond a couple hundred yards doses to public are manageable. And so you're really concerned about giving a worker a fatal dose is really the whole game.

And really, the fatal radius for a typical

criticality is only about ten feet. And so really what you're looking at is only the sequences occurring in the process that the worker is standing right in front of. So it's not the whole plant. A criticality happens anywhere and he's dead. No, it's just the few sequences that occur in the one process that he's operating is the typical thing.

Now for a big chemical accident, like a rupture of a big cylinder, there may be some facilities that have public close enough that would be affected by that and then that, of course, it could be a rupture of any cylinder, but typically, the only cylinders that are at risk from that are those where the UF_6 is actually in a liquid condition at the time and that usually is a very limited number, you know, one, two, three, four, those kind of numbers.

So the number of places at which you have this ten to minute four risk is very limited.

MEMBER SIEBER: But in a criticality accident, I presume that the assumption is once it occurs it dismembers itself and becomes self-critical?

MR. DAMON: Most of the time. There have been criticality accidents. Tokai Mura was one of them. There was one in the Idaho Reprocessing Plant which went on for a protracted period, but it requires

special conditions for that. Usually what you said it rue. Usually, the thing disperses itself in a way with the initial pulse, but sometimes they go on. At Tokai Mura, I forget the length of time, my memory -- it was either 18 hours or 2 days or something before they figured out how to get the thing shut down.

MEMBER POWERS: There was one in Africa that went on for a couple million years.

(Laughter.)

Why do you think we have giraffes, you know?

MEMBER SIEBER: How do you deal with something like that where you can't predict that it will shut itself down? Should there be some safety measure in place in the event something like that would occur?

MR. DAMON: To my knowledge, there's never been any kind of attempt to impose requirements to deal with shutting the processes down. What is in place is Section 70.24 that specifies the preparations and things you have to have in place to react to a criticality event. And then we have to have criticality alarms that go off and warn people. Staff has to be trained to evacuate when the alarms occur and there have to be preparations in place to do

medical treatment of people that get exposed as a result of the event. And then there's emergency plans.

MEMBER SIEBER: You don't have a dump valve or something that would change the geometry.

MR. DAMON: Well, this is all up to the licensee and it's an individual design issue, you know, how they're going to design the thing. And if something goes wrong, how they would set it up so they could react to it. And like I say, most of the time, these things they're self-terminating, but you know the Tokai Mura one was quite well contained. It had a cooling jacket around it that reflected it. It had all kind of characteristics that allowed it to sustain itself.

MEMBER SIEBER: But you don't require them to have a way to -- for example, if you had too-high enrichment in a vessel, you don't have a requirement that would impose either an absorber or change the geometry. You'd just say --

MS. ROMAN: They are required to have IROFS in place to prevent criticality.

MEMBER SIEBER: Right.

MS. ROMAN: So they are required to have these twin dependent IROFS to prevent criticality.

They can choose which one they would like to use. It is geometry.

MR. TSCHILTZ: Also, all criticality sequences are considered to be high consequence sequences so that in itself requires that they have additional measures to prevent it from making it highly unlikely. So you have another order of magnitude of protection with requiring it be a highly unlikely.

MEMBER SIEBER: Okay.

MS. ROMAN: 10 CFR 70.61(b)(4) and (c)(4) says that if an applicant possesses or plans to possess quantities of material capable to chemical exposures, that could be high consequences were intermediate, they need to propose appropriate quantitative standards to assess the consequences. Also, Part 70.65 requires that they provide that information in the ISA summary.

The quantitative standards are not limited to inhalation exposures. Actually, in the regulations of Part 70, we don't say if we are talking about dermal exposure or if we are talking about inhalation exposure. So it's really not as specific.

The industry does not agree with NRC's interpretation of the rule. Specifically, they don't

think that they have to develop standards for dermal exposure to the workers, especially for example, liquid HF exposures or other chemicals that could cause skin exposure that could endanger the life of the worker. The industry had several discussions with NRC. We had a meeting on November 12th.

The industry stated that basically NRC staff implicitly agreed with their interpretation and we approved past ISA Summaries.

MEMBER BLEY: Say that again.

MS. ROMAN: I'm sorry.

MR. TSCHILTZ: Basically, they're saying since we didn't include or they didn't include dermal exposure sequences in their ISA summaries and we did a vertical and horizontal review of the ISA summary and issued a letter saying it was acceptable, that that in effect tacitly approved their not addressing that. It's currently an issue that we're having discussions with and meetings with the industry on our interpretation of the regulations is that they specifically require that you address exposures in inhalation and it doesn't exclude dermal exposure.

MEMBER RYAN: They agree to the Part 20 requirements for radiation protection. They have to agree with skin exposure.

MR. TSCHILTZ: Yes, we're talking about chemical dermal exposure to chemicals.

MEMBER RYAN: Oh, just the chemical --

MR. TSCHILTZ: Yes.

VICE CHAIR ARMIJO: Could you give an example of a thermal exposure?

MEMBER BROWN: Thermal or dermal?

VICE CHAIR ARMIJO: Okay, I kept hearing thermal. Dermal, okay.

MS. ROMAN: If a worker gets exposed to liquid HF that could be another exposure of a chemical.

VICE CHAIR ARMIJO: Is that covered by their industrial safety program, acid burns, stuff like that?

MEMBER SIEBER: Which is, unless it's licensed material.

MS. ROMAN: Yes. We looked at previously approved ISA summaries and we looked at some examples that they did address the liquid HF spill.

VICE CHAIR ARMIJO: Nitric acid, all the laboratory acids?

MS. ROMAN: Yes, also, they also talk about exposures to nitric acid and they also talk about events that could result in spills with HF, so

we did consider this in other ISA summaries. So actually, we issued a letter to the industry on June 12th and we did consider this in previous ISA summaries and we are going to keep our position.

MEMBER BROWN: Can I -- I just want to try to understand the argument. Effectively, you're all saying that your rules or your regulations require this inclusion of this evaluation, whatever it was. And they're saying because you approved the document that didn't explicitly say that, therefore, they're okay and they didn't have to do anything else.

MR. TSCHILTZ: Right.

MEMBER BROWN: Did I get that kind of --

MR. TSCHILTZ: Yes, but as Cinthya pointed out, we found specific examples where dermal exposures were addressed in the ISA summaries.

MEMBER BROWN: I'm just curious, you had open public meetings on these areas, I assume, as you were going through the development. Did unions participate in those public meetings? I've done some work with the railroads and they're actively involved in everything dealing with safety, but I didn't see it in nuclear business.

MR. TSCHILTZ: One of the challenges is the regulations require that you address situations

where there could be long-lasting health effects. And for dermal exposure to HF that's kind of a special science, I believe, and there aren't standards that specifically address that. So the industry would have to out and develop specific standards for dermal exposure to HF.

In situations where that has been addressed, there's been specific studies that have been cited by certain applicants that we approved as something that was acceptable for establishing a standard for their specific instance.

MS. ROMAN: So as a result of that comment, we revised the SRP just to improve clarity, but we didn't think that we were interpreting the regulation so there is no change in our position. And the applicant's ISA should evaluate the degree of hazard and routes of entry of the hazardous chemicals, and then submit to NRC that information.

VICE CHAIR ARMIJO: So since you don't think you have to change your position or you don't -- you aren't changing your position and someone comes in with an application that doesn't address dermal exposure of these chemicals, you would reject it?

MR. TSCHILTZ: We would ask if there was credible sequences that involved dermal exposure, we

would require that they address it, yes. It's an issue that we're currently having meetings with the industry on to try to see if we can gain a path forward on this. If we do decide to change the staff position, we will issue an Interim Staff Guidance on this to clarify. But the words currently in the NUREG are consistent with what we consider our position to be at this point.

MEMBER RYAN: Okay.

MS. ROMAN: Chapter 7 is fire safety. NEI had a comment for the new section that we add Section 7.4.3.2, Deviation from NFPA Codes. Basically, they said that they have a conflict -- the section conflicts with some of the authority granted to local and state authorities. Therefore, the staff update of the section to grant -- to reflect the authority granted to local and state officials in regard to design of the fire safety and code compliance for fuel cycle facilities.

The revision establishes that NRC is the authority having jurisdiction for IROFS relative to their nuclear safety and designates the Director of the NMSS as the person having jurisdiction on these issues.

MR. TSCHILTZ: So an example of this would

be if the licensee has a sprinkler system that isn't credited as an IROFS in their safety analysis, they have other measures that they're crediting to make fire sequences highly unlikely. If the local inspector that was coming in and doing an occupancy inspection for the building had a problem with the sprinkler system, we would not have a specific say. He would be the adjudicatory authority on this. So they would have the final say because it's not a matter that directly impacts the safety of the facility.

MEMBER STETKAR: Do you, then, have agreements in place at each facility between the Agency and the local fire department that --

MR. TSCHILTZ: No, no. It's dictated by the ISA. What are the items relied on for safety? If it's an item relied on for safety that's a fire control, that would be the authority.

MEMBER STETKAR: I understand that.

MEMBER SIEBER: And it's the building code inspector that has all the other functions.

MR. TSCHILTZ: Right.

MEMBER STETKAR: All I'm concerned about is do they know, do they understand that? Do they understand that they need to be looking at this thing

even though it's in an area that they think has something to do with nuclear safety, do they understand that you're not looking at it because it's not included in the ISA.

MR. TSCHILTZ: Our experience is they have their requirements that they need to meet. They make sure that they meet their requirements, kind of obvious to what we're doing. And if there's an intersection between the two where there's a conflict, the NRC is the authority that has the jurisdiction for the ones that involve --

MEMBER STETKAR: What I'm hearing you say is they do their inspections facility-wide regardless.

MR. TSCHILTZ: Right.

MEMBER SIEBER: It's the same as a power plant. You have state inspectors in there doing elevators and air receivers and chlorine tanks and all kind of stuff. And they are separate from the NRC function.

MR. WESCOTT: Hi, my name is Rex Wescott. I'm a senior fire safety reviewer and I'd like to say that our experience with the local jurisdictions has been quite positive. I mean they understand what the problems. They interface with us well. Sometimes the codes may require sprinklers and the licensee will say

well, no, there's a criticality concern there and so they'll give them an exception having sprinklers there. We haven't run into problems where they say no, you have to do this. We say no, you can't. I mean they're familiar -- a lot of them are familiar with our reg guides and guidance. I mean it's been a pretty positive experience. We just had to put this in to make sure that we recognize that they do have certain authority and certain responsibilities and we have certain authorities and certain responsibilities and we wanted to lay that out.

MEMBER BROWN: Are there Memorandums of Understanding or is this just an understanding?

MR. WESCOTT: There is only -- no. In reactors, these Memorandums of Understanding have normally been fire departments and the plant or mutual assistance. I don't believe we have any that I'm aware of like that.

MEMBER BROWN: So it's just a working relationship.

MR. WESCOTT: It's a working relationship, but also it's a recognition of each other's authority and who has to grant what. I mean we don't grant occupancy permits, local authorities do. But they don't allow them to give them a license to operate

either. We do that. So we don't give recognition of each other's recognition or authority.

MEMBER SIEBER: Sometimes a state inspector, a building code inspector will also be the fire insurance inspector, and you will perform a dual role. So if they don't you one way, they will get you the other way.

I've never heard of a conflict between NRC inspectors and insurance inspectors or building code inspectors.

MEMBER POWERS: I can't speak to the issue of the NRC. I can say that we have within the DOE complex run into conflicts between security inspectors and safety inspectors. And particularly with respect to criticality evacuation routes.

MEMBER SIEBER: Right.

MEMBER POWERS: Chaining doors shut so people couldn't come in and consequently that evacuation route was lost from the criticality evacuation pattern.

Now one question that comes up, of course, is that we see a variety of local authorities now under substantial budgetary pressure and the impact that that's likely to have on them carrying out their particular functions.

MEMBER RYAN: I am not too sure if there are any facilities that are Agreement-State-licensed as opposed to directly with the NRC in this area, but you'll see a lot of collaboration among state agencies on the Agreement States side for licensed activity for their other types of inspection requirements or state inspection requirements. In South Carolina, there's even some cross-training inspectors to help keep it coordinated and well organized.

MS. ROMAN: The comment -- this is a comment that came up during our presentation to the Subcommittee. I don't remember who asked, but somebody asked about the safety-security interface, if we are addressing that in the SRP.

We don't address anything related to security in our SRP. We have several SRPs that are for security. These are done by NSIR. Here I put a list of the ones that we use for fuel-cycle facilities.

I was talking to people in NSIR and they told me that for nuclear power plants they have a specific requirements that request them to address the safety-security interface, but for fuel-cycle facilities, we don't have a requirement.

MR. TSCHILTZ: Let me just expound on

that. We actually, after we got the comment from the Subcommittee went and looked at where we could put that guidance in because I think it's a good idea. But we were stopped from doing that by OGC because there is no specific legal requirement in the regulations. But I should say that we are -- NSIR is undertaking a Part 73 rulemaking for fuel-cycle facilities and we intend to include that in there to give us the regulatory authority to mention the safety-security interface in this. So it will be addressed. We just can't address it in this revision to the reg guide, the SRP.

MEMBER BLEY: We were hoping you would look into it in the future. I've got to go back and look. I'm not -- I don't recall that the SRM that said integrate them specifically was narrowed to reactors. It sounds like you're saying OGC says it is. But I'll go back and look.

MR. TSCHILTZ: The regulations specifically address reactors right now don't address fuel-cycle facilities.

MEMBER BLEY: But the Commission gave direction to begin to pull them together and I don't recall that that was pinned to reactors.

MEMBER POWERS: The SRM specifically said

all and it was highlighted.

MEMBER BLEY: Did it? Okay, I thought it did.

MEMBER POWERS: And that was underlined and bolded.

MEMBER BLEY: There is an SRM that is pushing everybody in that direction and I think you guys as well.

MR. TSCHILTZ: Right, and there is a Part 17 rulemaking that's on the plants.

MEMBER BLEY: When is that coming up?

MR. TSCHILTZ: I don't know the exact schedule. I can get back to you with that. We discussed it during a recent budget so it's not too far off.

MEMBER BLEY: As I recall at the Subcommittee, we weren't figuring you could get it in here at this time, but we wanted --

MEMBER RYAN: Down the line, we'd appreciate hearing more about that.

MS. ROMAN: Just the summary. In general, the industry supports the incorporation of the ISG. Also NEI supports the effort to remove vague guidance and language that is not based on the existing regulations. The general comments of the industry

had were chemical standards for the workers and the public, operating versus safety limits in Chapter 5. And they were also concerned about the addition of IROFS Boundary Packages as Mike mentioned before.

We don't have any new technical positions, no new staff positions. We just provide better linkage between regulations and sections of the regulations.

Right now, we are planning to start a concurrence process. OGC is reviewing the document. We are planning to get Division approval by March and then Office approval by April and then publish the final SRP in May 2010.

MEMBER RYAN: Thank you. Any other questions?

VICE CHAIR ARMIJO: What is the likelihood of significant changes during these reviews and concurrences?

MR. TSCHILTZ: OGC has already done a review of our draft that we put our for public comment. That's where we got the legal position that there were no new technical positions provided by the staff. I don't think the -- what we've changed since then will result in a change in that determination.

MS. ROMAN: Actually, they contacted me

today and they don't have significant changes, just minor wordings, OGC at least.

MEMBER RYAN: Have you receive any industry comments at this point, any other comments?

MR. TSCHILTZ: As I mentioned, at the outset of the meeting, NEI has sent us a letter that raises some concerns that we have yet to see. I think they're just reiterating some of the points that they made in their initial letter that we didn't accept or we had a different opinion when we addressed the public comments.

MEMBER STETKAR: One of the items you mentioned and you might have mentioned it earlier in the presentation is industry comments on the IROFS Boundary Packages. Is NEI reluctant to do that?

MR. TSCHILTZ: On this specific letter here --

MEMBER STETKAR: I'm curious why --

MR. TSCHILTZ: -- I can they've said in the letter.

MEMBER STETKAR: That would be helpful.

MR. TSCHILTZ: It says, finally, we are troubled by the inclusion of a new term not defined by Part 70. Specifically, the draft NUREG includes the term IROFS boundary package. The term is not based on

a regulatory requirement or any apparent safety basis requiring the development and submittal of such information by the licensee or applicant in preparation for an NRC Operational Readiness Review. All industry appreciates the need for well-informed inspectors during an ORR. We respectfully suggest that the NRC access the vast array of relevant operations information available on site since the cost to the industry of preparing such a package far outweighs the potential additional NRC inspection time and associated costs to both the NRC and its licensees. That's the comment on the IROFS Boundary Package.

VICE CHAIR ARMIJO: So this is a new document, a new compilation of new information that you would want them to prepare that they haven't prepared in the past?

MR. TSCHILTZ: Yes. And we've specifically written in license conditions that require before we conduct the operational readiness review that they prepare these and it came up in discussions with potential applicants of what they should be preparing during the licensing process and that this is both helpful to the staff and I think to the licensee through the applicants as well for them

to organize their safety program.

It's a significant challenge for an inspector to go on site in one week and then pull this all together, so I think in the end it will benefit both parties. And it was intended to be that way.

VICE CHAIR ARMIJO: But these things exist, the parts exist.

MR. TSCHILTZ: The parts exist.

VICE CHAIR ARMIJO: You're not asking them to assemble them into these boundary packages which they haven't done before.

MR. TSCHILTZ: Right.

MEMBER BLEY: But if I understood what they were, the thing that bothered me -- I've never worked my way through ISA, but from the way it was described, it's a very large catalog without much structure and this sounds like it would begin to add some structure so you could help find your way through it. Am I reading that right or --

MR. TSCHILTZ: I would say yes, that is helpful. It isn't a requirement. It's one acceptable means for them to demonstrate that the IROFS will be available and reliable as it's claimed in their analysis. So it's one of the ways we can help them verify it.

VICE CHAIR ARMIJO: So if they didn't prepare it, they could still provide the information as they have it.

MR. TSCHILTZ: Right. I think we intend to write license conditions for all new facilities to require that they submit it before or have it available before the operational readiness review, but for existing facilities, they don't have them in all cases. We don't require them. It's a different story for existing facilities than it is for new facilities. It was meant to be helpful in the clarification.

MEMBER RYAN: I would agree with you, Dennis, it would be helpful and offer some structure.

MEMBER BROWN: We're going to be reviewing an Interim Staff Guidance for digital instrumentation and control for fuel facilities here in another month and when looking through the SRP chapters I didn't see anything that related to controls or safety protection controls of the electronic stuff. Is that included in here somewhere?

MR. TSCHILTZ: No, it's not.

MEMBER BROWN: I guess the point of my question is when you all do a Standard Review Plan, it is included for power reactors. There's a chapter to address protection, so it's not part of the review

plan for licensing a new facility.

MR. TSCHILTZ: It would be included in the revision, the next revision Standard Review Plan. We were developing that guidance kind of in parallel with this. It goes through the Interim Staff Guidance, as you're well aware, goes through its own public vetting process and that was a separate effort from this. There are other areas that the Standard Review Plan doesn't specifically address what we're looking at including as well in future revisions.

VICE CHAIR ARMIJO: Well, there's a lot of IROFS in that area.

MEMBER BROWN: Well, it talked about the IROFS that were associated with it and we had questions at that time relative to the redundancies and independence and the whole world was different.

MEMBER RYAN: You still have the Interim Staff Guidance mechanism.

MEMBER BROWN: Yes, we have that. I didn't see any basis thing that was covered previously like there was for some of the other ones in the power reactor world. So that's to come is what you're saying.

I view this like you've got this other piece coming and some time it will have to be

incorporated in here.

MR. TSCHILTZ: Yes, I think that's what we intend. The Interim Staff Guidance is out there and it will be incorporated in the next revision to the Standard Review Plan.

MR. DAMON: I thought it might be helpful for the Members -- have I mentioned -- to sort of describe what the nature of the facilities are with respect to the documentation, the documents we're talking about that there's quite a variation among facilities for one thing. For example, the number of items relied on for safety in a plant varies between 60 and about 2,000. Some plants have a huge number. Others have a very small number.

VICE CHAIR ARMIJO: That tells you something, doesn't it?

MR. DAMON: Yes. Different plants -- an ISA summary may be two three-ring binders. That's what gets sent to the NRC. The ISA documentation, the Subpart H requires not only documenting the ISA itself, but what's called process safety information. So anything about the processes that needs to be described to deal with safety, that might be a whole room full of filing cabinets, so that's the scale of things we're talking about in terms of documentation

and the variability of it, among licensees.

VICE CHAIR ARMIJO: I would hope it was electronic format.

MR. DAMON: I know BWXT, for one, their whole thing, they were the first ones to do this. They had whole things on computers, you know.

VICE CHAIR ARMIJO: So assembling compilation would be --

MR. DAMON: If they had it organized right, they could pull it together electronically.

MEMBER RYAN: All right, any other questions or comments?

Well, ladies and gentlemen, thank you again for a nice briefing for the Full Committee and I appreciate the depth you went into for the Subcommittee. It was very, very helpful and you've done some good work, we think. So thank you very much.

Mr. Chairman?

CHAIR ABDEL-KHALIK: Thank you. We will take a break at this time. We'll take a 15-minute break until a quarter to 5.

Before we go off, however, the schedule has changed. The Agency has allowed all staff, if they wish, to stay home tomorrow, and therefore the

people who were supposed to make a presentation to us in the morning have opted not to do so.

(Laughter.)

Therefore, our agenda has now changed. We will stay tonight until 9 p.m. with the aim of producing as many of the three letters that we heard discussions of as possible. We'll start with the highest priority which is the aircraft impact rule and then we'll decide on which of the other two to take second and then third, if there is time.

Tomorrow, there will be no presentation and therefore, the meeting will adjourn at 9 p.m. tonight. We are off the record.

(Whereupon, the above-entitled matter went off the record at 4:28 p.m.)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Revision of RG 1.62
"Manual Initiation of Protective Actions"

Khoi Nguyen
Division of Engineering
Office of Nuclear Regulatory Research

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Revision of RG 1.62
"Manual Initiation of Protective Actions"

- Background
- Summary of Changes
- Proposed Changes to Regulatory Positions
- ACRS Subcommittee Comments and Resolutions
- Public Comments and Resolutions

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Background

- Current regulatory guide – Has not been updated since October 1973
- Current standard referenced – IEEE Std 279-1971
- Latest standard endorsed by NRC (10 CFR 50.55a(h))– IEEE Std 603-1991
- Current regulatory guide does not address diverse manual initiation

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Summary of Changes

- Updated to reference IEEE Std 603-1991 in addition to IEEE Std 279-1971
- Expanded the scope to:
  - Incorporate guidance for diversity and defense-in-depth (D3) in digital computer-based I&C systems (BTP 7-19) with respect to manual initiation of protective actions
  - Provide the applicant/licensee an option to pursue either safety-related and nonsafety manual initiations separately or a single safety manual initiation

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Proposed Changes to Regulatory Positions

- Position 1: Changes “system level” to “division level”
- Position 2: Changes “system level” to “division level”
- Position 3:
  - Changes “system level” to “division level”
  - Incorporates information display requirements from IEEE Std 603-1991
- Position 4: Removes minimum-common-equipment guidance (D3 guidance is now covered under new Regulatory Position 7)

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Proposed Changes to Regulatory Positions (Cont.)

- Position 5: No changes
- Position 6: Updates reference to IEEE Std 603-1991
- Position 7 (New): Incorporates diversity guidance for manual initiation of protective actions (BTP 7-19)
- Position 8 (New): Allows an optional manual initiation that satisfies both requirements of IEEE Std 603–1991 and BTP 7-19 guidance.

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ACRS Subcommittee Comments and Resolutions

1. Comment: Clarify the scope of the RG with regard to response time (time available and time required)

   Resolution: the staff agrees. Response time is an HFE factor and should not be part of the scope of the RG, which provides guidance on design and installation for manual initiation of protective actions. The paragraph that contains response time will be removed from the RG. The SRP (Chapter 18[1]) will provide guidance on response time.

[1] Until Appendix A of Chapter 18 is approved, ISG 5 provides the response time guidance.

ACRS Subcommittee Comments and Resolutions (Cont.)

2. Comment: Could there be manual actions for systems classified as regulatory treatment of nonsafety systems (RTNSS) in new passive reactors? Does any guidance exist to help people deal with RTNSS?

   Resolution:

   - Systems classified as RTNSS may be required after 72 hours of an initiating event and may have automatic as well as manual controls. However, the revision of RG 1.62 applies to manual initiation of protective actions, which are required within 72 hours of an initiating event.

   - Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," provides guidance to handle the RTNSS in passive advanced light-water reactors.

ACRS Subcommittee Comments and Resolutions (Cont.)

3. Comment: the second word “or” in second paragraph of the Implementation section should be changed to “to”.

   Resolution: The staff agrees that the current language in the mentioned section is not clear and should be revised to read:

   “In some cases, applicants or licensees may propose an alternative or use a previously established acceptable alternative method for complying with specified portions of the NRC’s regulations.”

Public Comments and Resolutions

1. Comment: A suggestion to revise the final Rev. 1 of RG 1.62 to include text that allows system level manual actuation that meets single failure criteria and independence requirement.

   Resolution: Section A (page 2, 4th paragraph) of the RG states "*Finally, the standard defines a "division" as "the designation applied to a given system or set of components that enables the establishment and maintenance of physical, electrical, and functional independence from other redundant sets of components."*

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Public Comments and Resolutions (Cont.)

Thus, the RG already covers the designs in which system level manual initiation that meet independence and single failure criteria are acceptable. A revision to the Final Rev. 1 of RG 1.62 is not necessary.

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Public Comments and Resolutions (Cont.)

2. Comment: How to accomplish Position 8 (single safety manual initiation that satisfies IEEE 603 and BTP 7-19)?

   Resolution: There are some new reactor designs that satisfy this position. For example, in the U.S. EPR, the reactor trip buttons in the main control room are hardwired. Pressing one manual reactor trip button sends a signal directly to its divisional reactor trip breakers and opens the breakers for that division. The manual reactor trip is safety-related and meets all the requirements of IEEE Std. 603. Since it is not programmable technology, there is no potential for a software CCF. Therefore, it also meets Position 4 of BTP 7-19 by providing system-level manual actuation for the diverse actuation system reactor trip functions.

   As another example, the design of the Oconee Reactor Protection / Engineered Safety Features Actuation System features safety-related manual initiations (meeting IEEE Std 603 requirements) connected to the downstream of the system outputs (satisfying BTP 7-19) as shown in Figure 1.

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Public Comments and Resolutions (Cont.)

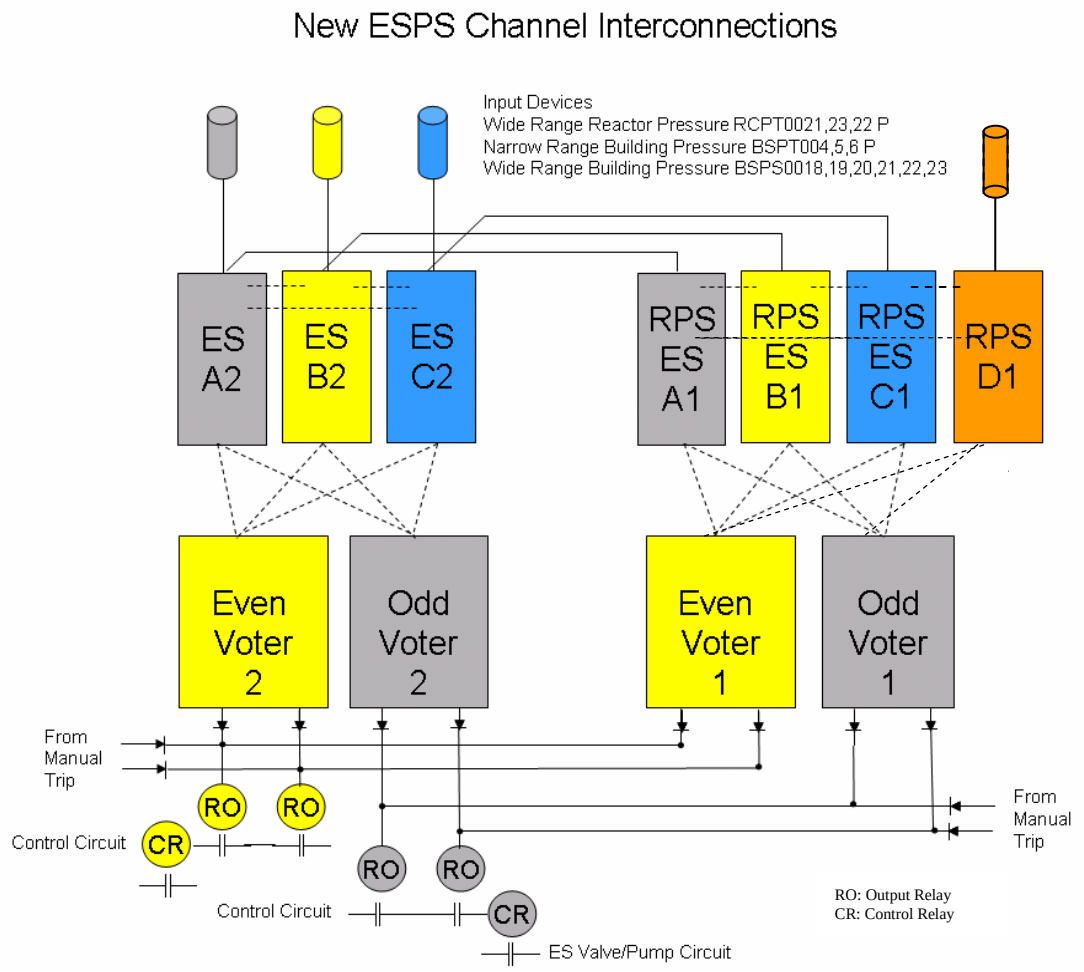

Figure 1

End of the Presentation

Revision 1 to the Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility (NUREG-1520)

February 4, 2010

Agenda

- ACRS Opening Remarks
- FCSS Opening Remarks
- Overview of changes to NUREG-1520
- Public comments and disposition
- Summary
- Questions/Comments

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Overview of Changes

- **Introduction**

Chapter 1, General Information

Chapter 2, Organization and Administration

Chapter 3, ISA & ISA Summary

Chapter 4, Radiation Protection

Chapter 5, Nuclear Criticality Safety

Chapter 6, Chemical Safety

Chapter 7, Fire Safety

Chapter 8, Emergency Management

Chapter 9, Environmental Protection

Chapter 10, Decommissioning

Chapter 11, Management Measures

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Background

- The Commission promulgated a major amendment to Part 70 on September 18, 2000 (65 FR 56211).

- The amendment, which primarily involved the addition of subpart H to 10 CFR part 70,
  - identifies appropriate consequence criteria and the level of protection needed to prevent or mitigate accidents that equal or exceed these criteria;
  - requires affected licensees to perform and maintain an integrated safety analysis (ISA) to identify potential accidents at the facility and the items relied on for safety necessary to prevent these potential accidents and/or mitigate their consequences;
  - requires the implementation of management measures to ensure that the items relied on for safety are available and reliable to perform their function when needed; requires the inclusion of the safety bases, including a summary of the ISA, with the license application; and
  - allows for licensees to make certain changes to their safety program and facilities without prior NRC approval.

- On March 2002, NRC staff published NUREG-1520 to address the new requirements of the revised Part 70..

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Background (cont'd)

- Ten years after the addition of Subpart H, the staff has updated the SRP to:
  - incorporate lessons learned from licensing experience and provide technical clarifications;
  - improve linkage of review content to regulatory requirements;
  - incorporate Interim Staff Guidance positions and update references;
  - add a new subsection: "Review Interfaces";
  - reformat the chapters for consistency with NUREG format;
  - add additional guidance, clarification, and references for meeting regulatory requirements;
  - remove redundant and vague guidance, non-requirements and commitments to follow the regulations

Introduction

ISA Completeness

•10 CFR 70 does not require a final facility design.

• The facility design must be to the point that enables identification of all
  •credible accident sequences that could exceed the performance requirements in 10 CFR 70.61 and
  • items relied on for safety used to reduce the likelihood of a credible accident sequence with high or intermediate consequences.

•All credible accident sequences and the items relied on for safety must be identified in the ISA Summary.

•Accident sequences that result in consequences below the performance requirements of 10 CFR 70.61 should be evaluated by the applicant; however, the applicant is not required to provide this information in the ISA Summary.

•The introduction was updated to clarify these points.

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Introduction

IROFS Boundary Packages

•Regulations in 10 CFR 70 do not explicitly require the licensee to provide an "IROFS Boundary Package". However, the licensee's safety program must ensure that each IROFS will be available and reliable to perform its intended function when needed (10 CFR 70.61(e)).

•Staff believes that in order to evaluate the availability and reliability of an IROFS through inspection, the support systems that are essential to the IROFS performing its safety function (i.e. within the boundary of the IROFS) need to be specified.

•Support systems that could prevent the IROFS from performing the intended function should be considered in the licensee's safety analysis and provided for Staff review.

•The development of IROFS boundary packages is an acceptable means to provide the information needed to determine that the IROFS will be available and reliable to perform its safety function consistent with the assumptions made in the analyses.

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Chapter 3, ISA & ISA Summary

- Addition of Appendix 3E: Human Factors Engineering for Personnel Activities.

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Chapter 5, Criticality

- There is no specific requirement to commit to operating limits therefore the phrase "NCS operating limits for controls" has been removed and replaced by "and procedures for establishing operating limits".

- Chapter 5 was reformatted to create a clearer distinction between the review of the license application, the NCS program and the safety program review.

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Chapter 6: Chemical Safety

- Hazardous Chemical Definition:
  - Substances that are toxic, explosive, flammable, corrosive, or reactive to the extent that they can endanger life or health if not adequately controlled.
- Hazardous chemicals produced from licensed materials (§70.4):
  - Substances having licensed material as precursor compound (s) (e.g. include substances such as hydrogen fluoride that is produced by the reaction of uranium hexafluoride and water) or
  - Substances that physically or chemically interact with licensed materials;
  - Do not include substances prior to process addition to licensed material or after process separation from licensed material.
- Hazardous chemicals that are not produced from licensed material, but that could create a condition that might affect the safety of licensed materials and thus present an increased radiation risk to workers are also considered by NRC (NRC-OSHA MOU, 1988).

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Chapter 6: Chemical Safety (cont'd)

- Performance requirements related to chemical exposures (10 CFR 70.61)
  - The risk of each credible high or intermediate consequence event should be limited.
  - IROFS shall be applied to the extend needed to reduce the likelihood of occurrence of the event or its consequences are less severe.

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Chapter 6: Chemical Safety (cont'd)

Risk Matrix Based on 10 CFR 70.61

Severity of Consequences	Likelihood of Occurrence		
	Highly Unlikely	Unlikely	Not Unlikely
High Consequences	**Acceptable Risk**	Unacceptable Risk	Unacceptable Risk
Intermediate Consequences	**Acceptable Risk**	**Acceptable Risk**	Unacceptable Risk
Low Consequences	**Acceptable Risk**	**Acceptable Risk**	**Acceptable Risk**

Chemical Exposure Consequence Severity Categories

	Workers	Public	References
High Consequences	Endanger life of a worker	Could lead to Irreversible or other serious, long-lasting health effects to any individual located outside the controlled area.	70.61(b)(4)(i) 70.61(b)(4)(ii)
Intermediate Consequences	Could lead to Irreversible or other serious, long-lasting health effects to any individual located outside the controlled area.	Could cause mild transient health effects to any individual located outside the controlled area.	70.61(c)(4)(i) 70.61(c)(4)(ii)

Chapter 6: Chemical Safety (cont'd)

- 10 CFR 70.61(b)(4) and 10 CFR 70.61 (c)(4):
  - "…If an applicant possesses or plans to possess quantities of material capable of such chemical exposure, then the applicant shall propose appropriate quantitative standards for these health effects, as part of the information submitted pursuant to 70.65 of this subpart."
- 10CFR70.65(b)(7) requires:
  - "A description of the proposed quantitative standards used to assess the consequences to an individual from acute chemical exposures to licensed material or chemicals produced, from licensed material…70.61(b)(4) and (c)(4)."
  - The requirement in 70.65(b)(7) clearly applies to both high consequence events[70.61(b)(4)] and intermediate consequence events [70.61(c)(4)], and **does not distinguish between workers (i) and member of the public (ii).**
  - **These quantitative standards are not limited to inhalation exposures.**

Chapter 6: Chemical Safety (cont'd)

- Quantitative Standards for Chemical Exposures
  - Industry doesn't agree with NRC's interpretation of the rule [1, 2].
  - Specifically, that 10 CFR Parts 70.61 and 70.65 require licensees to develop quantitative standards for dermal exposures of workers exposed to liquid hydrofluoric acid or other chemicals that could cause a skin exposure which could either endanger the life of a worker or lead to irreversible or other serious long-lasting health effects.
  - Industry discussed topic with NRC during a public meeting (November 12, 2009) [3].
  - The industry stated that the NRC staff implicitly agreed with the industry's interpretation (i.e., that the Commission's regulation only require the evaluation of internal chemical exposures) when staff approved past site-specific ISA Summaries.[2]

REFERENCES:

[1] LETTER, NEI TO NRC SEPTEMBER 8, 2008; ADAMS ACCESSION NUMBER ML083360632

[2] LETTER, NEI TO NRC, FEBRUARY 24, 2009; ADAMS ACCESSION NUMBER ML090690732

[3] MEETING SUMMARY OF NOVEMBER 12, 2009 MEETING WITH INDUSTRY TO DISCUSS DERMAL EXPOSURE ISSUES; ADAMS ACCESSION NUMBER ML093200082

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Chapter 6: Chemical Safety (cont'd)

- The NRC staff has examined several prior approved ISA Summaries, and has determined that a number of these summaries address both internal and external chemical exposures, and some make specific reference to hydrofluoric acid spills and/or dermal exposures [4].

- For example, licensee ISAs or ISA Summaries have been noted to:

  - address liquid hydrofluoric acid (HF) spills and include "…personnel exposure to liquid HF …" Items Relied On For Safety (IROFSs) include piping integrity and HF detectors, which would alarm due to HF evaporating from the spill. Other scenarios include HF and uranium hexafluoride (UF6) releases, and IROFS include first aid and safety showers;

  - discuss exposures to wet nitric acid and HF;

  - recognize that a large spill of HF could result in serious injury to a worker from both inhalation (respiratory) and contact (skin) exposure; and

  - address large liquid HF spills; associated IROFSs include both HF and Hydrogen detectors.

REFERENCE:

[4] LETTER, NRC TO NEI, JUNE 12, 2009; ADAMS ACCESSION NUMBER ML090920296

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Chapter 6: Chemical Safety (cont'd)

- There has been no new interpretation of existing Part 70 requirements.
- Staff revised the SRP to improve clarity, however our position regarding chemical exposures remained unchanged.
- The applicant's ISA should evaluate the degree of hazard and routes of entry of the hazardous chemicals.

Chapter 7: Fire Safety

- Deviation from NFPA Codes
  - Section 7.4.3.2 was updated to reflect the authority granted to local and state officials in regard to design for fire safety and code compliance for fuel cycle facilities.
  - The revision establishes that NRC is the authority having jurisdiction (AHJ) for IROFS relative to their nuclear safety and designates the Director of the Office of Nuclear Material Safety and Safeguards as the AHJ on such issues.

Additional comments

Safety Security Interface

- Security reviews are conducted by NSIR utilizing
  - Category I:
    - **NUREG-1322**, Physical Security Plan Acceptance Criteria
    - **NUREG-6668,** Training and Qualification Plan Standard Review Plan
    - **NUREG 6667**, Safeguards Contingency Response Standard Review Plan
    - **Regulatory Guide 5.70**, Guidance for the Application of the Theft and Diversion of Category I Special Nuclear Material Design Basis Threat in the Design, Development, and Implementation of a Physical Security Program that meets 10 CFR 73.45 and 73.46 Requirements (U) (Confidential)
  - Category II/III:
    - **Regulatory Guide 5.59**, Standard Content and Format for Physical Protection of SNM of Low and Moderate Strategic Significance
  - Category I/II/III:
    - **NUREG-1615**, Physical Protection requirements for Category I/II/III Fuel Cycle Facilities

- No specific regulatory requirement for consideration of safety/security interface for Part 70 licensees.

- Required by 10 CFR Part 73 for nuclear power plants.

- For fuel cycle facilities this is currently not specifically required. Staff will evaluate adding this consideration during an upcoming Part 73 rulemaking.

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Summary

- Industry supports the incorporation of the previously established interim staff guidance documents
- NEI supports the effort to remove vague guidance and language that is not based on the existing rule
- The industry had comments about the following topics:
  - Chemical standards for workers and public
  - Operating versus safety limits
  - Concerned about the addition of IROFS Boundary Packages definition

References:

Letter from Janet R. Schlueter, Senior Project Manager, NEI to provide industry comments on NUREG-1520 (October 23, 2009).

Staff Response to Comments Received on Draft, NUREG-1520, Revision 1 (

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Summary (cont'd)

- No new technical positions
- No new staff positions
- Better linkage between review sections and the regulations

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Schedule

- ACRS Presentation—February 4, 2010
- Concurrence
  - OGC Review—February 2010
  - Division Approval—March 2010
  - Office Approval—April 2010
- FRN and Manuscript Publication—May 2010

References

- Federal Register Notice: Proposed Revisions to NUREG-1520 (ML091470567)
- Memo to E. Hackett re: Transmittal of the Proposed Revision to NUREG-1520 to the ACRS (ML091610106)
- Memo to J. E. Lyons re: Transmittal of the proposed revision to NUREG-1520 to the CRGR (ML091610661)
- Draft Proposed Revision to NUREG-1520, Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility (ML091670528)
- Federal Register Notice NUREG-1520, Rev. 1 - Comment Period Time Extension (ML092220186)
- Summary of Public Meeting with NEI to Discuss Revision 1 to NUREG-1520, "Standard Review Plan for the Review of License Application for a Fuel Cycle Facility." (ML092880360)
- Resolution of Comments Received on Draft NUREG-1520, Rev 01 (ML093451424)

WebPages

- Web pages
  - Proposed revision available in the Agencywide Documents Access and Management System (ADAMS): http://www.nrc.gov/reading-rm/adams.html
  - Draft is available in the Public Website "Draft NUREG-Series Publications for Comments" http://www.nrc.gov/reading-rm/doc-collections/nuregs/docs4comment.html
  - NUREG1520 Website: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1520/

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Questions are welcome!