

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
 Radiation Protection and Nuclear Materials

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Wednesday, November 4, 2009

Work Order No.: NRC-3180

Pages 1-120

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

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

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3 + + + + +

4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS)

6 + + + + +

7 SUBCOMMITTEE ON RADIATION PROTECTION AND

8 NUCLEAR MATERIALS

9 + + + + +

10 WEDNESDAY

11 NOVEMBER 4, 2009

12 + + + + +

13 The Advisory Committee met at the Nuclear
14 Regulatory Commission, Two White Flint North, Room
15 T2B3, 11545 Rockville Pike, Rockville, Maryland, at
16 1:30 p.m., Dr. Michael T. Ryan, Chairman, presiding.

17 SUBCOMMITTEE MEMBERS PRESENT:

18 MICHAEL T. RYAN, Chairman

19 J. SAM ARMIJO

20 DENNIS C. BLEY (via telephone)

21 DANA A. POWERS

22 JOHN D. SIEBER

23

24

25

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

NRC STAFF PRESENT:

JOHN FLACK, Designated Federal Official

MICHAEL TSCHILTZ

CINTHYA ROMAN

DENNIS DAMON

KEVIN MORRISSEY

REX WESCOTT

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

T-A-B-L-E O-F C-O-N-T-E-N-T-S

Opening Remarks 4

Mr. Tschiltz 6

Changes to the SRP

Ms. Roman 8

Changes to Chapter 3 ISA and ISA Summary

Mr. Damon 32

Adjourn

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

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

1:30 p.m.

CHAIRMAN RYAN: This is the Subcommittee on Radiation Protection and Nuclear Materials.

I'm Michael T. Ryan, Chairman of the Subcommittee. Members in attendance are Jack Sieber, Dana Powers, Dennis Bley by phone I believe, Dennis are you there?

(No response.)

He may not be hooked in yet. But he's going to join us by phone. And he'll announce, we'll announce him when he does.

And Sam Armijo.

The purpose of this meeting is to review and have discussions with the staff on proposed changes to NUREG-1520, Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full committee.

John Flack is the Designated Federal Official for this meeting.

The rules of participation in today's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 meeting have been announced as part of the notice of
2 this meeting previously published in the *Federal*
3 *Register* on October 15, 2009.

4 A transcript of the meeting is being kept,
5 and it will be made available, as stated in the
6 *Federal Register* notice.

7 It is requested that speakers first
8 identify themselves and speak with sufficient clarity
9 and volume so that they can be readily heard.

10 We have received no written comments or
11 requests for time to make all statements from members
12 of the public regarding today's meeting.

13 The specific objective of today's meeting
14 are to be briefed and upon the Standard Review Form
15 for the review of a license application for a fuel
16 cycle facility NUREG-1520 Rev 1. And experience with
17 Integrated Safety Analysis within the licensing
18 process.

19 We will now proceed with the meeting. And
20 I call upon Michael Tschiltz the Office of Nuclear
21 Materials and Safeguards to open the presentation.

22 MR. TSCHILTZ: Thank you for the
23 opportunity let you know what we're doing with NUREG-
24 1520.

25 I'll start off by saying, we started this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 project over a year ago in response to several issues,
2 the first being we had gone through the licensing of
3 two new fuel cycle with uranium enrichment facilities.

4 And we had some lessons learned from that. During
5 the process of those reviews there was a differing
6 professional opinion concerning the level of detail
7 that was in the NUREG. And there was concerns over
8 whether or not the information had been submitted by
9 the licensee to, for the staff to make a safety
10 conclusion regarding the facility.

11 As part of the disposition of that DPO it
12 was identified that we should go back and look at the
13 Standard Review Plan to look for places where we could
14 make clarifications as to what was specifically
15 required, and closer link, the Standard Review Plan to
16 the requirements and the regulations.

17 That being said, I think during the
18 process we came to realize that when the NUREG was
19 initially written it was more focused on existing fuel
20 cycle facilities than new fuel cycle facilities. And
21 there was some implications in the in the NUREG that
22 there would be more detail than what the regulations
23 require.

24 So we looked at providing clarifications
25 to those types of issues throughout our process of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 revising the NUREG.

2 So we learned a lot by doing this. I
3 think this is a first step for us. I think as we
4 continue to use the NUREG we're identifying additional
5 areas where we could provide more guidance to the
6 industry.

7 But we have, after a year of working on
8 this, we're moving forward with the revision as it
9 stands right now. Any other revisions to this that
10 are identified will either be handled in the
11 subsequent revision or Interim Staff Guidance
12 positions that are developed to specifically address
13 the issues that we're facing. Because as we go
14 through our license reviews there are new issues that
15 come up all the time.

16 So I guess, the way we conducted the
17 review is we assembled a multi-discipline team. And
18 assigned specific responsibilities of the reviewers to
19 specific chapters in the NUREG.

20 And as a part of that there was outreach
21 to specific, specific technical disciplines that
22 performed the reviews for chem safety, fire safety,
23 radiation protection, etcetera. So we had outreach
24 back to the staff as part of this activity to make
25 sure that we were capturing any issues that came about

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 from prior reviews. And that we were responsive to
2 those.

3 So with that, I'll turn the presentation
4 over to Cinthya Roman.

5 MS. ROMAN: Good afternoon. My name is
6 Cinthya Roman.

7 Today I'm going to discuss the general
8 changes to the SRP. Then Dennis will discuss the
9 changes to Chapter 3 ISA and ISA Summary, the
10 Integrated Safety Analysis.

11 In general, we update the SRP to make it
12 more consistent with Part 70. We've tried to improve
13 the linkage of the review content with the regulatory
14 requirements. We also incorporate Interim Staff
15 Guidance just to make sure that the reviewer have all
16 the documents in a single place. We also tried to
17 update the SRP based on the lessons learned during the
18 past ten years that we have been, that the licensees
19 have been using the ISA. And we also added a new
20 subsection named, "Review Interfaces". We just want
21 to make sure that reviewers know that they need to
22 coordinate with other reports when they are doing
23 their technical evaluations and reviews.

24 We just put out additional guidance in
25 some of the chapters. And we tried to remove vague

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 guidance and things that are not really requirements.

2 Today I will discuss only the chapters
3 that I am showing on the color black. The blue ones
4 I'm not planning to discuss because the changes were
5 minor. If you see an icon like the letter "I", that
6 means that I have additional information. If you want
7 me to stop by and discuss more just let me know.
8 Otherwise, I'll keep going.

9 First, I would like to start with the
10 introduction. The introduction was revised to include
11 information to clearly specify the applicability of
12 NUREG-1520.

13 NUREG-1520 is for Part 70 licensees. That
14 is people, licensees having a critical mass of special
15 nuclear material. And the ISA guidance does not apply
16 to conversion facilities which are regulated by Part
17 40, gaseous diffusion plants or GDPs which are
18 regulated by Part 76, reprocessing facilities we are
19 not regulating those, and plutonium processing
20 facilities such as MOX which have their own SRP.

21 MEMBER ARMIJO: Before you leave that, you
22 don't, this guidance doesn't cover gaseous diffusion
23 plant but it does cover enrichment by, let's say,
24 centrifuge technology?

25 MS. ROMAN: Yes.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER ARMIJO: Well, the gaseous
2 diffusion plant is --

3 MS. ROMAN: Actually, Part 76 is for USEC.
4 And for, I don't remember the facility but it is for
5 those two.

6 CHAIRMAN RYAN: You can't rub on the
7 microphone.

8 MEMBER ARMIJO: Okay. It would cover just
9 pretty much the commercial fuel manufacturing
10 facilities. And enrichment facilities --

11 MS. ROMAN: And --

12 MEMBER ARMIJO: -- uses centrifuges. Not
13 if they use gaseous diffusion.

14 MS. ROMAN: Yes.

15 MR. DAMON: No, that's not it. It was
16 just the existing gaseous diffusion --

17 MEMBER ARMIJO: Okay. So that particular
18 --

19 MR. DAMON: -- because they were pre-
20 existing regulated under DUE. They were grand-
21 fathered by Part 76.

22 MEMBER ARMIJO: Okay.

23 MR. DAMON: But any new, any new
24 enrichment facility --

25 MEMBER ARMIJO: Whether it was gaseous or

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 centrifuge or laser or whatever.

2 MR. DAMON: Right.

3 MEMBER ARMIJO: Okay. So the, you know,
4 this new thing that's going down in Wilmington, the
5 laser enrichment, would that be covered by 1520?

6 MR. TSCHILTZ: Yes.

7 MEMBER ARMIJO: It is covered by 1520.

8 MR. TSCHILTZ: Yes.

9 MEMBER ARMIJO: Okay. Thank you.

10 MS. ROMAN: Okay. We also add information
11 about what is IROFS Boundary Packages. Basically, we
12 are, this is like when we have, IROFS, items relied on
13 for safety, we want the applicant to provide
14 information about support systems or systems that also
15 support the applicability of the IROFS when it is
16 needed. We also make a distinction saying that, "This
17 is not required to get submitted by the licensee."
18 But it would be better for us in terms of planning to
19 plan the Operational Readiness Review.

20 So --

21 CHAIRMAN RYAN: Now, just, would define
22 Operational Readiness Review in this context a little
23 bit more? That means different things to different
24 folks.

25 MR. TSCHILTZ: Sure. I can do that. Part

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 70 requires that we perform an Operational Readiness
2 Review before we provide the licensee the authority to
3 operate the facility or introduce uranium
4 hexafluoride. Specifically, for the enrichment
5 facilities. It isn't specified for the other type of
6 facilities.

7 But typically, where there's been a major
8 change in facility where they create a new product
9 line we typically perform an Operational Readiness
10 Review. Sometimes it's imposed by a license
11 condition.

12 So when we licensed ACP and the LES NEF
13 facility we imposed license conditions for them to
14 provide the IROFS Boundary Packages in support of the
15 Operational Readiness Review.

16 What the Boundary Packages do basically do
17 is define what falls within the scope of the item
18 relied on for safety. So if it's a, an engineered
19 feature, what type of management measures are in place
20 to make sure that its availability and operability is
21 ensured to the degree that it's taken credit for in
22 their safety analysis.

23 So the reason we felt the need to include
24 that definition in the Standard Review Plan was, it
25 wasn't commonly understood amongst the industry what

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that meant. Back when new applicants came in and we
2 started discussing IROFS Boundary Packages they didn't
3 know or understand what we meant.

4 So it was our attempt here to provide
5 clarification of what we expect licensees to submit in
6 support of their Operational Readiness Reviews during
7 the course of us providing them authority to operate
8 the facility.

9 CHAIRMAN RYAN: But the key is this is
10 pre-radioactive material introduction in to a system.

11 Is that -- that's where you are in an ORR stage.

12 MR. TSCHILTZ: Yes. Before any materials
13 is introduced in to the system.

14 CHAIRMAN RYAN: So any radioactive
15 material licensed activity doesn't occur until the ORR
16 is passed.

17 MR. TSCHILTZ: Yes.

18 CHAIRMAN RYAN: Correct. Okay. Thanks.
19 That's helpful.

20 MS. ROMAN: We also added information
21 about the level of detail that is expected in the
22 license application and the ISA Summary. We talk
23 about, like for a new, for a new facility sometimes
24 the design is not complete. So we really don't
25 require it at this time to be final at that stage.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 But we do require that they identify all the IROFS
2 that are necessary to meet to prevent accidents that
3 are high consequences or intermediate. To meet the
4 performance requirements of 10 CFR 70.71,

5 MEMBER ARMIJO: When does the information
6 have to be available? At the time of the ORR?

7 MR. TSCHILTZ: Basically, yes.

8 MEMBER ARMIJO: Everything has to be
9 wrapped up that's pending from the original
10 application that wasn't complete.

11 MR. TSCHILTZ: Yes. I mean, I mean,
12 obviously when they are constructing the facility the
13 design has to be complete to the degree that they can
14 construct what they're, what they're working on. But
15 the final compilation of all the programs and
16 processes that are in place to support operation of
17 the facility, is, the ORR is the culminating point for
18 all those things to be in place.

19 CHAIRMAN RYAN: So just to clarify a
20 little bit more. At the ORR stage, are you really
21 looking at those things you mentioned, the programs,
22 the procedures, and systems, to make sure the facility
23 is meeting its operability requirements? Or are you
24 really in the final detailed design and construction
25 phase? Or -- I'm just trying to understand, you know,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 what, where the break points are there.

2 MR. TSCHILTZ: Well, the way I would
3 respond to that is, I think we try to focus on those
4 things that are most important to safety. The things
5 that are of highest risk significance. So we're
6 looking at the things that are in place to mitigate
7 the higher and the intermediate consequence accident
8 sequences.

9 CHAIRMAN RYAN: Okay.

10 MR. TSCHILTZ: So we, I mean, it's not a
11 comprehensive review from the standpoint of, if you
12 look at everything that was done, we do a sampling
13 review to determine whether or not their programs and
14 processes are effective to support operation facility.

15 CHAIRMAN RYAN: Okay. But the design
16 review of the actual component systems and features of
17 the plant, you've already done that in the design
18 phase.

19 MR. TSCHILTZ: Yes. The design pretty
20 much is, to a certain extent, can be conceptual. I
21 mean, the regulations allow that. The licensing
22 review turns out being more of a program than process
23 review to make sure that they have the programs and
24 processes in place to support safe operation of the
25 facility.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN RYAN: Okay. Thanks.

2 MS. ROMAN: I'm going to jump Chapter 3.
3 1 and 2 I'm not going to talk about. Because it's
4 just general information. And Chapter 3 Dennis will
5 discuss that later.

6 Basically Chapter 4 was updated to clarify
7 the responsibilities of the staff. That is in the
8 section Review Interfaces that we add. And we also
9 incorporate the Interim Staff Guidance Number 2.
10 Accident sequence that result in consequences below 10
11 CFR 70.61. That is performance requirements.

12 MEMBER POWERS: Can I interrupt here? Is
13 this coming before the full committee?

14 CHAIRMAN RYAN: We are going to make that
15 decision at the end of this Subcommittee meeting. My
16 guess is, I would think that we will make a report to
17 them. The full committee may then ask for a briefing
18 at that time. That's just where I'm at, at the
19 moment.

20 MEMBER POWERS: What I'm concerned about,
21 we do not have any of our PRA folks here. If we are
22 going to incorporate the word "risk" then --

23 CHAIRMAN RYAN: Correct.

24 MEMBER POWERS: And that's going to --

25 MEMBER ARMIJO: That's why Dennis is going

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to be on the line with us.

2 CHAIRMAN RYAN: Dr. Bley, are you there?

3 MEMBER ARMIJO: Dennis Bley.

4 DR. BLEY: I am here. I've got a bad
5 connection. I'm here.

6 CHAIRMAN RYAN: Okay. Well --

7 MEMBER ARMIJO: Did you hear Dana's
8 comment?

9 DR. BLEY: No, I couldn't follow Dana.

10 MEMBER POWERS: I'm sure there's something
11 very metaphysical about that.

12 The problem I foresee in bringing this
13 material forward to the full committee is the word
14 "risk". You, George, and John, are all going to
15 interpret risk in a fashion that's different than the
16 way it's intended here.

17 DR. BLEY: I think that's true. Yes.

18 MEMBER POWERS: We're going to have to
19 resolve that.

20 CHAIRMAN RYAN: Well, you know, in our
21 discussions to prepare for this meeting that's the
22 exact point I conveyed. So, you know, I hope a couple
23 of things.

24 One is that we can probe that question
25 here at the Subcommittee and perhaps form our own

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 views of how to present it to the full committee in
2 our report to them. And then for the follow-up
3 discussion with the staff and the full committee, we
4 could maybe focus in on that aspect of it.

5 So I'm hoping we can shape that as we go
6 through this afternoon. Fair enough?

7 MEMBER POWERS: All right.

8 CHAIRMAN RYAN: Okay. Thank you.

9 Cinthya, please.

10 MEMBER POWERS: We'll get to it when we
11 get to the slide where the sequences --

12 CHAIRMAN RYAN: Yes.

13 MS. ROMAN: Chapter 5 is criticality. We
14 added additional guidance and clarification about the
15 Criticality Safety Program. And we tried to remove
16 redundant and confusing statements that needed further
17 regulatory compliance.

18 We add guidance on code validation. But
19 based on our lessons learned and recent reviews we
20 added other areas, guidance in places where we didn't
21 have enough guidance before.

22 And we provided more reference, and we
23 added a new appendix. Which is Interim Staff Guidance
24 Number 3. Which discusses acceptable ways to elevate
25 the quality of analysis and meet the performance

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 requirements.

2 MEMBER POWERS: When you --

3 MS. ROMAN: Chapter 6, chemical safety.

4 MEMBER POWERS: -- when you --

5 CHAIRMAN RYAN: Yes.

6 MEMBER POWERS: -- charging too far down
7 criticality safety. The double contingency has a
8 hallowed position in the lexicon of safety. Is that
9 distinct from all this IROFS and TSA business? Or is
10 it, have you, is there a nice way to fold double
11 contingency into the rest of the world?

12 MR. MORRISSEY: I think I can answer that.

13 My name is Kevin Morrissey. Actually I'm a PM for
14 MOX. But I'm also a criticality reviewer and an ISA
15 reviewer.

16 Double contingency is required in all new
17 facilities, by regulation. All the existing
18 facilities are required to have double contingency by
19 license condition. So the double contingency
20 requirement is, it applies really to all facilities
21 which are subject to Part 70.

22 MEMBER POWERS: Yes. I mean, kind of a,
23 with criticality safety we have the double
24 contingency. All this IROFS business and things like
25 that, that's kind of for everything else.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. MORRISSEY: We haven't thrown the baby
2 out with the bath water. They say.

3 The two, especially in criticality, in
4 criticality safety. You know, the emphasis is still
5 on the criticality safety program, the programmatic
6 requirements associated with that program, double
7 contingency, you know, calculations, that's, the IRA
8 is a demonstration of the margin of safety. And that
9 demonstration sort of crosses between that but is not
10 meant to, it's a supplement. It's not a replacement.

11 MEMBER POWERS: We try to quantify the
12 violations, the double contingency, or do we just
13 accept double contingencies?

14 MR. MORRISSEY: I'm sorry.

15 MEMBER POWERS: Yes. Any double
16 contingency is going to have a failure rate.

17 MR. MORRISSEY: Right.

18 MEMBER POWERS: Do we try to quantify that
19 or we just accept it?

20 MR. MORRISSEY: We accept, by definition,
21 to independent robust controls. Robust being subject
22 to --

23 MEMBER POWERS: Yes. And all the stuff
24 that goes with that.

25 MR. MORRISSEY: Right. But there is a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 standard.

2 MEMBER POWERS: Yes. Okay.

3 MR. MORRISSEY: And the standard is
4 "robust". Once again, and that's at the discretion
5 of the reviewer to determine --

6 MEMBER POWERS: A certain amount of --

7 MR. MORRISSEY: Right.

8 MEMBER POWERS: -- of engineering
9 judgment.

10 But in the end somebody has a facility and he says,
11 "Hey, I got a double contingency on this point or
12 whatever the operation is --

13 MR. MORRISSEY: Right.

14 MEMBER POWERS: And when, when we attempt
15 to evaluate risk do we look at the rate at which that
16 double contingency is likely to fail. Or do we say it
17 has a failure rate of zero?

18 MR. MORRISSEY: Not in a -- its acceptance
19 is not purely quantitative.

20 MEMBER POWERS: Okay.

21 MR. MORRISSEY: The ISA, it may be
22 quantitative when you discuss the likelihood of
23 failure of controls. Which are controlling
24 criticality. That may be quantitative. Semi-
25 quantitative or qualitative. It sort of runs the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 gamut.

2 Of all the facilities there are about, I
3 think, there are eight operating facilities. And we
4 have, you know, three or four new ones. The
5 methodology for those facilities are unique to each
6 facility. Of the 11, if you drew one out, it would be
7 different than the other 10.

8 MEMBER POWERS: True.

9 MR. MORRISSEY: So some of the staff
10 challenges have been to provide a consistent review
11 and, you know, regulation, meeting the regulations
12 when everybody uses a completely different method.

13 MR. DAMON: Maybe I should, this is Dennis
14 Damon, maybe I should clarify something. Most of the
15 licensees do, in fact, quantify or approximately
16 quantify all the accident sequences that lead to
17 criticality.

18 But at least one, does not. They do it
19 purely qualitatively.

20 So, in fact, two of the licensees in fact
21 do it fully quantitatively. So they actually quantify
22 the frequency of the criticality sequences. Even
23 though they are doubly contingent.

24 Whereas, like another of the licensee will
25 simply say, "I meet the double contingency principle",

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and that's it. And they don't quantify it.

2 So the rule allows them that flexibility.

3 They get to make there choice.

4 MEMBER ARMIJO: That's interesting.

5 MEMBER POWERS: I think -- my problem --

6 MR. DAMON: Yes.

7 CHAIRMAN RYAN: The important part I think
8 to take away is that's not a matter of this revised
9 guidance. That's a matter of the rule allows that.

10 MR. DAMON: Yes.

11 CHAIRMAN RYAN: So I think that's an
12 important --

13 DR. BLEY: Mike?

14 CHAIRMAN RYAN: Yes, Dennis.

15 DR. BLEY: Can I sneak a question in here?

16 CHAIRMAN RYAN: Yes you may, please.

17 DR. BLEY: On the double contingency
18 aspect how rigorous is the requirement for
19 independence? Is it just a surface appearance of
20 independence? Or do they have to get down and prove
21 they're no interactions that could create
22 dependencies?

23 MR. MORRISSEY: I would say that the
24 requirement for independence is rigorous.

25 As a matter of fact, lots of times we've

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 gotten in to semi-heated discussions, I would say,
2 with licensees over things which are controlled
3 by, you know, computers. You know, systems which
4 could, you know, what's redundant, what hard wired,
5 what's independent. Because a lot of the systems, a
6 lot of the criticality controls are active engineers
7 controlled. Which are controlled by computers.

8 So whether two computers are used or one
9 computer is used it shuts two valves and it's got, you
10 know, a lot of discussion has been based on
11 independence. So I would say that this standard is
12 rigorous.

13 CHAIRMAN RYAN: Okay. So does that answer
14 your question Dennis? Anything else?

15 DR. BLEY: As much as I can hear. It's
16 cutting in and out. I'm going to call back on another
17 line. And see if I get a better connection.

18 But, yes. I think it was mostly what I
19 wanted to hear. And what I couldn't hear probably was
20 the rest of it. Thanks.

21 CHAIRMAN RYAN: Okay. Well, we'll wait
22 for you to beep back in. Go ahead.

23 All right. Thanks. Will you continue?

24 MS. ROMAN: Chapter 6 is chemical safety.
25 Basically, we updated the chapter to make sure that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 we explain what information should be in the ISA
2 Summary. And what should be in the license
3 application.

4 We divided the chapter in five
5 subsections. Chemical process description, accident
6 sequence, accident consequences, IROFS and sole IROFS
7 and management measures. And then we provide guidance
8 on how the reviewer should look at those and how they
9 should coordinate with this with the ISA reviewers and
10 the reviewer of Chapter 11 which is management
11 measures.

12 CHAIRMAN RYAN: How much of the changes in
13 this chapter have been a result of changes in the
14 types of facilities you're licensing? Or, you know,
15 new technology? Or new approaches? Versus updates to
16 the guidance that's evolutionary rather than
17 revolutionary, I guess.

18 MS. ROMAN: Basically, the update was more
19 in terms of how we conduct our reviews.

20 Usually when we do a chemical safety
21 review we look at those five areas. So we used the
22 experience from people to see how they conduct their
23 review. And the things that they look at. And we
24 added that in the in the chemical safety chapter.

25 So --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN RYAN: So you are being much more
2 explicit about how you are going to conduct your
3 review --

4 MS. ROMAN: The --

5 CHAIRMAN RYAN: -- that's been the nature
6 of the changes in this --

7 MEMBER ARMIJO: It's sort of technology
8 independent really.

9 CHAIRMAN RYAN: Yes, it sounds like it.

10 MS. ROMAN: Yes.

11 CHAIRMAN RYAN: Thank you.

12 Dr. Bley, I guess you're back.

13 DR. BLEY: I'm back, yes.

14 CHAIRMAN RYAN: Okay. And you sound
15 better. So I hope we do too.

16 DR. BLEY: So far, it's a go.

17 CHAIRMAN RYAN: Okay.

18 MS. ROMAN: Chapter 7 is fire safety. We
19 added guidance in terms of co-deviations and in terms,
20 and to make NUREG-1520 more compatible with, in our
21 fire protection guidance.

22 The version that we sent to the public, I
23 think that, we tried, we are going to try to improve
24 what we said in that revision. Just to make sure that
25 we also considered other state officials regarding

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this fire safety and code. In terms of provide,
2 demonstrate compliance with fuel cycle facilities.

3 We also put out all this stuff as specific
4 information likely to be required for the staff
5 review. The fire safety. We included criteria for
6 the ISA review of fire initiated accident sequence and
7 associated IROFS and measures.

8 And the last bullet we were supposed to
9 remove that. Because we --

10 CHAIRMAN RYAN: Which one?

11 MS. ROMAN: The last bullet.

12 CHAIRMAN RYAN: Is out?

13 MS. ROMAN: Yes.

14 CHAIRMAN RYAN: Okay.

15 MS. ROMAN: Okay. Chapter 8, I'm not
16 going to talk about because the changes were minor.

17 Chapter 9, basically, we removed a lot of
18 the details that are actually in another guidance.
19 Which is NUREG-1748. Environmental review guidance
20 for licensing actions associated with NMSS program.

21 And they added more language for different
22 categorical exclusions that we use more often.

23 Chapter 7, the revisions were, I mean,
24 Chapter 11, the revisions were minor.

25 Section 11.2 was updated just to reflect

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 current practices. And they also include the new
2 section for the responsibility of review, update that
3 section.

4 Section 11.3 and .4 were updated for
5 internal consistency. And the additional, an
6 additional section for new facilities.

7 And now I'm going to let Dennis talk about
8 Chapter 3.

9 MR. DAMON: My name is Dennis Damon.
10 Introduce my background. I was on the team that wrote
11 the regulation, Part 70 Subpart H, that requires these
12 ISAs years ago in the late '90s. And I was on the
13 team that wrote the original version of this, of the
14 Standard Review Plan. And now I'm on the team to
15 rewrite.

16 MEMBER POWERS: That sounds vaguely
17 incestuous.

18 MR. DAMON: And -- well --

19 CHAIRMAN RYAN: That, or you did such a
20 good job they had to have you back.

21 MR. DAMON: But I would like to make
22 excuses here for what happened. We were writing this
23 Standard Review Plan for a new, totally new regulation
24 before an ISA had ever been done. So we were trying
25 to anticipate how things were going. And so that's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 really one of the major reasons for this rewrite.

2 Is now, here we are nine years later, the
3 ISAs have been done by the licensees. They've been
4 submitted. They've been reviewed by the staff. And
5 now we're regulating to those things. Well there's a
6 lot of lessons learned in here. And most of it is in
7 the appendices. Not in not in Chapter 3 and these
8 chapters, it's in these Interim Staff Guidance that
9 are now appendices to this --

10 CHAIRMAN RYAN: I was going to say, you
11 have the cooperation of the Interim Staff Guidance
12 that was developed through that, you know, two
13 decades, it's really where the action is, I'm
14 guessing.

15 MR. DAMON: Yes. There's a tremendous
16 amount of content there. Which I'm not going to talk
17 about. Because it was all a matter, it's all been a
18 matter of public record.

19 But I focus your, if you want to, the
20 story of what was learned over that this decade of
21 implementing this thing, it's a, almost all of it is
22 there in those appendices.

23 CHAIRMAN RYAN: Yes. I found them to be
24 very rich in the amount of information that was there.

25 MR. TSCHILTZ: Just on that point, I would

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 just like to point out that we have received comments
2 from the industry on a revision. And they didn't have
3 any comments on those appendices. So it was a pretty
4 well wide acceptance that what was in there was
5 accurate.

6 CHAIRMAN RYAN: This is more of a
7 curiosity question, but do you have an active working
8 group? I mean, this is a relatively small industry
9 segment with just, you know, a dozen or less
10 facilities. Do you have a active working group where
11 you meet regularly with them? Or is there another
12 kind of working group among all the facilities among
13 all the facilities for these kinds of things? Or --

14 MR. TSCHILTZ: Yes. The industry has
15 organized through NEI. And as issues develop that
16 effect across the spectrum of licensees they
17 collaborate in, in fact, the comments we got were a
18 compilation of comments from the different licensees
19 that were coordinated and submitted through NEI. So
20 yes, they do, I mean, this is a highly competitive
21 industry. But they do collaborate on these issues. I
22 think, I mean, they're all regulated to this. And
23 they all can be impacted. So they all have their
24 issues with it. So.

25 MEMBER ARMIJO: So is that exactly what

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 happened? You didn't get independent comments on this
2 from, let's say, the GEH? Or the Westinghouse fuel
3 facility?

4 MR. TSCHILTZ: That's correct. They were
5 all --

6 MEMBER ARMIJO: They all went in through
7 NEI.

8 MR. TSCHILTZ: Yes.

9 DR. BLEY: Mike, can I step in --

10 CHAIRMAN RYAN: Yes. Anytime Dennis,
11 please.

12 DR. BLEY: Dennis, since you acknowledge
13 writing the rule maybe you can give us a little bit of
14 the thinking that led to the discrimination from the
15 ISA and the qualitative allowances that it shows and
16 quantitative or probabilistic safety assessment. And
17 why you went the way you did. And given that, from
18 what we just heard, most of the applicants licensees
19 are using the fully quantitative approach. Is it
20 still the, a good idea? What do you expect to see in
21 the future?

22 MR. DAMON: Well, I really can't predict
23 the future. That's for sure.

24 MEMBER POWERS: Oh. You know, prediction
25 is very difficult especially when it's about the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 future. But --

2 DR. BLEY: Is that original?

3 MR. DAMON: But the thinking that went on,
4 the original, the original, in the original draft of
5 the rule the idea really was to identify accident
6 sequences and identify items relied on for safety that
7 were, you know, part, preventing these accidents.

8 And then it became clear that, gee, we
9 have to say something about whether these items relied
10 on for safety or the set of them is adequate.

11 So then the idea that you had to have a
12 performance requirement. And the first thought was,
13 we just put the double contingency principle in there.

14 So it has to be doubly contingent.

15 Then we realized well, there probably are
16 sequences where you don't, you don't need to have
17 double contingency or you cannot have it because you
18 can't really achieve true independence.

19 And consequently, the thought was, well,
20 what can we do next? And we came up with the idea of
21 framing it in the in the terms of risk, you know.
22 That the high consequence of action sequences should
23 be highly unlikely.

24 And there was, the thought was it would
25 allow licensees flexibility to use either quantitative

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 or qualitative methods.

2 But the staff was pushing for
3 quantitative. In fact, after we got everything almost
4 essentially wrapped up as to how the rule was to be in
5 the in the Standard Review Plan, the next step was, we
6 proposed to the industry that we develop guidance on
7 acceptable failure rates. And the probabilities of
8 the failure on demand and human error probabilities.
9 That we would, the staff, would endorse and if the
10 industry used it they could do it fully quantitative.

11 But the industry was not interested in
12 doing things fully quantitative at that time at all.

13 DR. BLEY: Hmm.

14 MR. DAMON: And they made that crystal
15 clear. So we just, we dropped it.

16 And what that, what that does is, it
17 forces a couple things. One of them is, if you're, if
18 you're, if you can't be certain that people are going
19 to use a quantitative method, how can you sum up
20 accident, risk from accident sequences?

21 And so there's a whole, the whole things
22 was wrapped up in that. If we, the only way we could
23 have made this thing a nice neat package, the way that
24 you might ideally think about it, would have been to
25 mandate that the ISAs be done fully quantitatively.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And that was just not in the cards. It just was not.

2 The industry didn't want it. The Commission agreed
3 that they, we should not do it that way.

4 DR. BLEY: Okay. When people do the
5 quantitative analysis tough, your definition of risk
6 would be the common one that's used in other areas?
7 Is that right?

8 MR. DAMON: Well, like I said, in this ISA
9 analysis, accident sequences are treated separately.
10 So they're not, they're not summed up. Say that
11 assessment --

12 DR. BLEY: Even when people quantify them
13 they never sum them up.

14 MR. DAMON: Right. They do not. Every,
15 it it's always done on a per accident sequence basis.

16 DR. BLEY: Okay. Good ahead. I'm good
17 now.

18 MR. DAMON: Okay. Chapter 3 is, Chapter 3
19 is ISA and ISA summary. The background here I have a
20 background slide to remind us that, what these ISAs
21 were about.

22 They arose out of a belief by the staff
23 that they really wanted to have more information about
24 what items were relied on for safety that the
25 licensees had. And to jointly integrate chemical,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 nuclear, criticality, fire safety, and also
2 radiological safety. So that's the where the term
3 integrated comes from, in the Integrated Safety
4 Analysis. It was integrating these things.

5 Because before this rule the NRC, for
6 these facilities, did not regulate the chemical
7 consequences of the licensed material. So if someone
8 was injured by the chemical properties of a material
9 we were not licensed, we were not regulating that.
10 And that this rule, that was one of the things that
11 was done to change.

12 And the, an ISA starts with what's called
13 a Process Hazard Analysis. And that terminology comes
14 from OSHA which has a chemical, regulates chemical
15 facilities. And so this rule intended to, to not only
16 integrate, but to be congruent with what OSHA does for
17 the, for chemical safety. So that RICs didn't have to
18 replicate. If they did something for us it would be
19 the same thing as what OSHA would want done.

20 And so PHA is the, it's like the front end
21 of a PRA. It's a systematic identification of
22 accidents that could lead to high or intermediate
23 consequences to the workers or the public.

24 And high and intermediate consequences are
25 defined in the rule with respect to radiological and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 chemical safety. And they're defined for both workers
2 and the public. And of course, the criteria for
3 members of the public are less.

4 The high consequences are greater than 100
5 rem to a worker. For it could endanger the life of
6 the worker.

7 But really, the accident sequence is when
8 you look at most of the things than can happen that
9 meet these definitions, these are fatality events.
10 You know, it's not endanger the life of the worker.
11 The worker, it is a fatality. It's nuclear
12 criticality that gives a dose of 2000 rads. Or a
13 chemical exposure that's fatal. That's the more
14 typical accident sequence.

15 CHAIRMAN RYAN: Dennis, I have a question
16 on the PHA side of it. And Dennis, help me out here
17 if you can. The PHA is the step where you kind of
18 look at component by component how a system is put
19 together. And trying to assess things like failure
20 rates or reliability factors or, you know, things of
21 that sort. Am I -- is that is that right?

22 DR. BLEY: I think you would be doing the
23 -- so I'll let I'll let the other Dennis help you out
24 more. But I think you would be doing the quantitative
25 part here, you'd be laying out the functional physical

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 relationships among -- is that right Dennis?

2 MR. DAMON: If you look at the last bullet
3 on the slide. And most of the licensees use, the
4 structured method that they use are, one of the
5 favorite ones is a thing called HAZOP. Which is a
6 structured thing that is done in the chemical industry
7 that uses guide words and questions that are asked.

8 You look at the process parameters like
9 flow, temperature, pressure. And you say, "What if
10 the pressure is high? What if the pressure is low?"
11 And it's a very structured process and you march
12 through it. And answer the questions. And what
13 you're trying to identify is what can go wrong that
14 would lead to consequences? A

15 And at least one licensee uses fault
16 trees. They actually use SAPHIRE. And one is
17 currently using event trees.

18 So they use, they are all structured
19 methods. These methods that are, the staff finds
20 acceptable are described in NUREG-1513. Which is a, I
21 forget the full title. But it's a handbook on how, on
22 doing Integrated Safety Analysis. But it's focused on
23 Process Hazard Analysis. Which is this identification
24 of accident sequences.

25 Then in that--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 DR. BLEY: Dennis, can I'm ask another one
2 Dennis? I like the idea of it being integrated on all
3 the hazards. I'm just curious as to how NRC was able
4 to do that since legally they don't have that. Is
5 there a Memo of Understanding with some of the other
6 agencies that gives them the ability to regulate
7 chemical hazards and other things?

8 MR. DAMON: Yes. There's a Memorandum of,
9 Memorandum of Understanding with OSHA that describes
10 which chemical accidents are within the jurisdiction
11 of the NRC.

12 DR. BLEY: Okay.

13 MR. DAMON: And I don't want to try to
14 quote that thing from memory.

15 DR. BLEY: No, that's not necessary.

16 MR. TSCHILTZ: A clarification too, in 10
17 CFR 70.4, has a definition section. And it talks
18 about chemicals that are used in the process of
19 dealing with nuclear materials are under the authority
20 of the NRC. So it's covered under that aspect as
21 well.

22 MS. ROMAN: I'm going to include that in
23 Chapter 6. The industry actually had a comment they
24 want to know about chemicals. I'm going to include
25 that in the revision.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN RYAN: On the MOU is it, does it
2 give any detail? Or is it just very general?

3 MR. DAMON: It has statements like, "The
4 NRC is responsible for chemicals that are, any
5 chemical form, the chemical consequences of any
6 chemical form that is a licensed material." Such as
7 the, you are licensing the possession of uranium, of
8 enriched uranium. So anything that has any compound
9 of enriched uranium will also now regulate the toxic
10 effects of that.

11 And similarly, any, there's another type
12 where if the material is in a process and reacts with
13 the licensed material then that, we're responsible for
14 the effects of that as well.

15 CHAIRMAN RYAN: It might be helpful if we
16 could get a copy of that just so we can understand
17 that --

18 MEMBER POWERS: I mean, a lot of this is
19 in the CFR.

20 MR. DAMON: Yes.

21 CHAIRMAN RYAN: Is the MOU in the CFR as
22 well?

23 MR. DAMON: No.

24 MR. TSCHILTZ: No. But, I mean, the
25 definition of the material responsible for, I think is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 kind of --

2 MR. DAMON: Yes.

3 MR. TSCHILTZ: -- equivalent to what
4 Dennis is talking about.

5 CHAIRMAN RYAN: Again, it would just be
6 helpful to have a copy of it. That would be great.
7 Thanks.

8 MEMBER POWERS: Let me come back. You
9 mentioned that, for most of the events that you
10 identified in the HAZOP type analysis, the chemical
11 events are fatalities. Not injuries. Not anything.
12 I mean, the worker fatalities. Does that speak to the
13 process? Or it's under an investigation of this that
14 speak to an inadequacy in the identification of
15 accident sequences by the licensees?

16 MR. DAMON: You mean that they're aren't -
17 - I didn't say there weren't the possibility of non-
18 fatal exposures.

19 MEMBER POWERS: Mm-hmm.

20 MR. DAMON: I'm just saying that --

21 MEMBER POWERS: You said most of them are
22 fatalities.

23 MR. DAMON: Yes. I'm saying, yes.

24 Well, let me put it this way. Supposing I
25 -- these are hypothetical. Right? Hypothetical

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 accidents. Supposing I hypothesize that I have a leak
2 from some part of the process that has toxic chemical
3 in it. And that a worker is exposed.

4 Well, the odds are, the magnitude of the
5 leak will be such that if the worker is in a certain
6 place it will be a fatality. So that, embedded in
7 that sequence is a subset. I mean, in some cases it,
8 the exposure would not be. And in other cases, it
9 would be. But when you identify this hypothetical
10 sequence it will have the spectrum. But embedded in
11 there will almost always be a fatality.

12 Now because the only time that's not true
13 is where the leak is clearly so small or the mechanism
14 that got exposure is limited in some way such that it
15 could never be a fatal exposure. And there are
16 probably are sequences like that.

17 But what I'm saying is, most of the
18 sequences, if you look at, you say, "Yes. If this
19 thing happens and the guy is standing in the wrong
20 place at the wrong time, you know, he could be, get a
21 fatal exposure."

22 MEMBER POWERS: I guess I'm asking not
23 hypothetically but in actuality. If they are not
24 identified events that are non-fatal but injurious
25 events, are they doing an adequate HAZOP? Is the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 question I'm asking. And if they're not, is it
2 because of some failure in the guidance that they're
3 getting?

4 MR. DAMON: Now, you're saying if they --

5 MEMBER POWERS: If they are not coming up
6 with accident sequences that involve injurious but
7 non-fatal sequences --

8 MR. DAMON: Well --

9 MEMBER POWERS: -- then is there an
10 inadequacy in the accident analysis?

11 MR. DAMON: No, I don't think so. I think
12 it's the situation is as I described it. Most
13 situations you will identify, yes, a leak could happen
14 here. And there would be this spectrum of things that
15 would happen. And some of them would be only
16 injurious. And some would be fatal. And so once that
17 happens, what happens, is the license, some of them
18 are fatal. It makes them, the sequence, the
19 occurrence of the leak, a high consequence event.
20 Which must be then highly unlikely. So what's
21 happening is that for most sequences the injurious
22 exposures are being bounded by, and having to be
23 prevented by, because of the possibility that it could
24 be fatal.

25 You know, it's only a small subset of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 things where -- and they are probably identifying
2 these things. Where yes, you could have a leak here.

3 But there's no way it could ever reach fatal
4 consequences --

5 MEMBER POWERS: But that's what I was
6 concerned about is that, all the injurious but non-
7 fatal accident sequences are getting blown away
8 because of the higher profile of the one, the few that
9 are fatal. And I --

10 MR. TSCHILTZ: Let me try to address that,
11 Dr. Powers.

12 The regulations require that licensees
13 identify and put in place controls to prevent
14 sequences that have potentially long lasting health
15 effects to the worker. So those, that's a regulatory
16 requirement that they do that as well. So they're not
17 out there just identifying the lethal sequences --

18 MEMBER POWERS: Well that's the question
19 I'm asking. Are they, in fact, doing that? If he
20 says, that most of the sequences they identify are
21 fatalities it would seem to me that most of the
22 sequences would be injurious and not fatal. And so
23 when I hear the words that most of them are
24 fatalities, I argue and I think I got a pretty good
25 case here, that they're not identifying all the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 accident sequences. And they are focusing on the
2 fatalities to the detriment of looking at just
3 injurious sequences.

4 MR. TSCHILTZ: Well I --

5 MEMBER POWERS: And then I'm asking, why
6 is that? And I'm saying, perhaps because the guidance
7 is inadequate.

8 MR. TSCHILTZ: Right. Well I understood
9 his, Dennis's explanation, to be somewhat a little bit
10 different. I think what I understood him to say was
11 that, when they look at identifying the sequences if
12 you look at the worst case scenario for the sequence
13 of where the worker would be located, it would
14 encompass a lethal exposure to a chemical. As opposed
15 to, you know, if the worker is standing further away
16 it would be a non-lethally --

17 MEMBER POWERS: Then he said, yes, but if
18 there's a sequence that they say there is no way that
19 can cause a fatality we blow that one off. And I
20 think that's, I think they're getting some bad
21 guidance here.

22 MR. MORRISSEY: Actually, let me give you
23 a real life, we had a situation where HF was leaking
24 at a basically non --

25 MEMBER POWERS: Well let me interrupt you.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And say, I can imagine there are sequences anywhere.
2 I'm trying to understand why he would say what he
3 said.

4 It seems to say that most of the sequences
5 are worker fatalities. And I would think that most of
6 the sequences would be worker injuries.

7 MR. MORRISSEY: We've have had worker
8 injuries. And lots of times I think the --

9 MEMBER POWERS: We've had worker injuries
10 that included your safety analysis has been
11 inadequate.

12 MR. MORRISSEY: We've had worker injuries
13 where sequences have not been identified. And
14 generally because, oh, I'm sorry, generally because
15 the licensee has estimated that the consequences would
16 be below a certain threshold. And in these cases the
17 remedy has basically been that they've added those
18 sequences.

19 Other licensees have also added those
20 sequences as we've learned through the process. And -
21 -

22 MEMBER POWERS: Talk about a painful way
23 to learn.

24 MR. MORRISSEY: It is a painful way to
25 learn.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER POWERS: And in fact, it sounds to
2 me like they need to go back and rethink their whole
3 HAZOP op.

4 If they are coming up with sequences that
5 were not anticipated then it sounds to me like the
6 structure is somehow inadequate and deficient.

7 DR. BLEY: Or there's this criteria that's
8 allowing them to limit the consequences. I do infer
9 it further than Dr. Powers. And say, I think most of
10 the scenarios that a HAZOP would identify would lead
11 to actually no injuries. And just, some kind of
12 material damage and maintenance expense.

13 But if somebody is unfortunate enough to be right
14 there it could be the other.

15 It's sounding rather like they're using
16 some criteria to say nobody is near the spot. And
17 then dismiss these. That's what I think I'm hearing.

18 But I'm not sure.

19 MR. DAMON: Well, my experience, and I
20 haven't looked at all these ISAs, is that the
21 licensees do not, they're not eliminating anything.
22 What they're doing is they're including everything.
23 And they're and they're assessing it as potentially
24 having higher consequences.

25 So nothing is being screened out. In

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 other words, there's not, I haven't found a case where
2 licensees are attempting to screen out based on the
3 magnitude of the consequences.

4 MR. TSCHILTZ: Yes.

5 MR. DAMON: They basically typically take
6 the conservative approach. And I'll give you a
7 concrete example which I think Kevin was leading to.

8 There was an incident where there was an
9 HF leak from a tank due to a weld failure. Well it
10 happened at the magnitude of the weld failure was very
11 small. The amount of the leakage was small. When
12 the, when personnel came in to the room they smelled
13 the toxic chemical. And they reacted to it. Took
14 appropriate action. And nobody got killed.

15 But supposing that weld failure had been
16 catastrophic. It had blown a great big hole in the in
17 the in the tank. And a huge amount of stuff had come
18 out. Then somebody might have gotten killed.

19 But it's the same accident sequence in the
20 ISA. They just simply would say a, you know, "A leak
21 in this tank."

22 MR. TSCHILTZ: Right. And ultimately that
23 leads to more controls in place or more robust
24 controls in place than the case where they would just
25 conclude that there were intermediate consequences.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN RYAN: But I think, I think the
2 idea to think about is that the weld failure and a HF
3 tank is not one sequence. It's probably 10. How does
4 it fail? You know, is it a small leak, a big leak?
5 Is it at night? Is it during the day? I mean there's
6 lots of sequences where they could be more people,
7 less people, more people, more HF, less HF. So it's
8 really not one sequence. It's probably 10 different
9 sequences.

10 And I think that's maybe what Dr. Powers
11 is getting at. Is that you can have the exact same
12 system behave in a bunch of different ways. It would,
13 you know, go from zero to death. And lots of
14 intermediate stops between the two.

15 So, and with all that being a preamble,
16 have you ever taken a look systematically at all the
17 sequences at all the facilities and tried to do an
18 assessment of, you know, what's the range of
19 scenarios? And outcomes you can see in all these
20 assessments?

21 MR. DAMON: No. I mean, I probably, I
22 don't know, maybe I'm the only one that tries to do
23 that. It's a massive task. These facilities are very
24 complex. They have a large numbers of processes. And
25 so they're, the ISAs are voluminous. And just simply

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 understanding what the process is like --

2 CHAIRMAN RYAN: I appreciate that. Yes.

3 MR. DAMON: So it's very difficult to
4 collate all this material.

5 CHAIRMAN RYAN: Okay. Any questions or
6 comments at the moment?

7 MR. DAMON: So I might mention that crit
8 safety has this same thing. You have a, if you have a
9 nuclear criticality accident the worker may be
10 standing close enough to it to get a fatal dose. Or
11 he may be far enough away that he does not get a fatal
12 dose.

13 The statistics are, there have been 22
14 inadvertent criticalities in process facilities. Most
15 of them were back in the 60s and 50s. Out of the 22,
16 there were 11 fatalities. And there were about five
17 individuals who got extremely serious damage. And by
18 that I mean, they lost both arms, both legs or went
19 blind. You know.

20 So, what I'm saying is that that's about
21 the statistics is it's, a majority of the time
22 somebody dies or gets very seriously injured. But
23 it's possible to have a criticality and nobody gets a
24 serious dose. And that's happened.

25 MEMBER ARMIJO: Have there been any

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 criticality incidents that have led to a worker
2 exposure, serious worker exposure in the last 20
3 years? 30 years? You said `60s and `70s.

4 MR. DAMON: Not in the United States. The
5 last one in the United States --

6 MEMBER ARMIJO: Japan. Yes, I know that
7 one.

8 MR. DAMON: -- the last one in the United
9 States was in the late `70s. But it was in a
10 reprocessing facility in Idaho. Which is shielded.
11 So the exposures were moderate.

12 MEMBER ARMIJO: Mm-hmm.

13 MR. DAMON: And then what -- foreign yes.
14 We had Tokaimura where there were --

15 MEMBER ARMIJO: Right.

16 MR. DAMON: -- two fatalities.

17 So I just, I'm just going to stow in the
18 background here. What we get out of the ISA at the
19 NRC is an ISA Summary which is submitted to the NRC.
20 And this is updated annually.

21 This, and this product really was a major
22 reason for the rule. The NRC wanted this ISA Summary
23 to provide more information on a current basis at the
24 NRC.

25 When these ISAs are reviewed by the staff

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 only a selected subset of the process designs and
2 analyses are reviewed in detail. We call this a
3 vertical slice. So when the reviews are done we do
4 not review every single process design in the ISA
5 analysis of that design.

6 And if you saw the magnitude of the ISAs,
7 even the ISA Summaries are big documents like this.
8 You know, three big volumes or something. The actual
9 full documentation of the ISAs fills the whole room
10 with filing cabinets.

11 So that's why, the point is, the staff
12 doesn't have the time to review, in detail,
13 everything. They take vertical slice, horizontal
14 slice to see if the ISAs are being executed
15 competently.

16 CHAIRMAN RYAN: So that's really a process
17 of verification rather than --

18 MR. DAMON: Right. And I'll get to that
19 later.

20 The ISA, I'll remind everybody, the ISAs
21 are not peer reviewed. Because they are talking about
22 proprietary information about their process design.
23 So nobody else outside is going to look at these
24 except the NRC staff.

25 And not only that, I didn't mention it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 here, the NRC staff policy is that is that information
2 about accident sequences like this is really SUNSI for
3 security reasons. We don't want the general, it
4 available to the general, the general public.

5 So for these, for these reasons these are
6 not like PRAs where everything is out in the open.
7 And they've been reviewed from top to bottom by the
8 staff and peer reviewed and so on. It's not like
9 that.

10 DR. BLEY: You just brought up something
11 that I wanted to ask about. I'm, I know all the ones
12 you've applied and the rule was written some time ago.

13 And the cases have been done, were done some time
14 ago. But in the last year or two years the Commission
15 has issued a couple of SRMs, I think, directing the
16 people to try to integrate safety and security as you
17 go. And I don't see anything in this SRP leaning that
18 way.

19 And if it's applied to a new plant it
20 would seem that's the place you want to do it. So
21 that those things did get integrated through the
22 design stages and not be tacked on after the fact.

23 Is NMSS somehow immune from that guidance?

24 MR. DAMON: No. I've seen a lot of
25 information around about idea of integrating security

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and safety. I I'm not, I haven't been involved in
2 that for a number of years. So I'm not really current
3 on it.

4 MEMBER ARMIJO: This SRP doesn't actually
5 mention security.

6 DR. BLEY: Anywhere.

7 MEMBER ARMIJO: And --

8 DR. BLEY: That's why I bring it up.
9 Given that guidance is there, why isn't this new SRP
10 talking about trying to do that integration? Or at
11 least referring to other types just to make sure it's
12 done during the design.

13 MEMBER ARMIJO: These facilities have
14 their own safety, I mean, security plans.

15 And the question is, should they be
16 integrated or at least referred to in this document?
17 I guess that's where you are headed Dennis.

18 DR. BLEY: That's where I'm heading. And
19 also that the idea behind integrating them is so that
20 in new designs, instead of security just being guns,
21 guards, and gates, you could look for ways to build it
22 in to the design process. So that you don't need as
23 much extrinsic kind of security support.

24 But I don't see anything even hinting that
25 people ought to be thinking about that. And I'm

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 wondering why.

2 MR. TSCHILTZ: It is an interesting
3 question. I don't think it's something that we
4 considered specifically in this revision.

5 It is, I mean, security at these
6 facilities is somewhat different than at reactor
7 facilities. So it, I don't think it's as complex an
8 issue here as it would be at other facilities.

9 But I think it's something that we can
10 take away, and go back, and look at. And look at the
11 Standard Review Plan for conducting the security
12 reviews to see if that's --

13 MEMBER ARMIJO: Well even the issue of
14 cyber-security. You know, not just physical type
15 things. But electronics --

16 MEMBER POWERS: The only place I've ever
17 seen catastrophic conflicts between security and
18 safety have been at process facilities. And you can
19 understand. Because you're restricting access. And
20 consequently restricting egress.

21 And that's how workers protect themselves.
22 Is largely get away from it. Rocky Flats we had
23 just disastrous on criticality safety. Because of the
24 security requirements.

25 MR. MORRISSEY: In general though, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 review of security is provided outside of NMSS. And
2 the guidance, I think in 1520, is sort of in NMSS by
3 nature of the guidance for the review is in that
4 department, is in 1520. And the security is done
5 separately by NSIR. And is actually integrated
6 separately.

7 DR. BLEY: Well I guess that's the point.

8 I think that's what the Commission is urging people
9 to move away from. And try to get this done in an
10 integrated fashion. NSIR comes in and says, "Well,
11 they're integrated." But when they try to talk about
12 it they don't know anything about the operation of the
13 facility.

14 MR. TSCHILTZ: I understand, I understand
15 the point of these, a valid point, is something we can
16 go back and look at.

17 DR. BLEY: Okay.

18 CHAIRMAN RYAN: Thanks.

19 MEMBER POWERS: I want to go back to the
20 vertical slice approach to review. You get, you get
21 the summary each annually. I would assume that when
22 you get an annual update you look at the delta.

23 If you -- when do you decide I'm going to
24 do another complete vertical slice?

25 MR. DAMON: Well I think that's part of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the inspection process for one thing.

2 For another thing, the license review
3 staff I do that kind of thing. Or I try to instigate
4 it by observing patterns of things that are happening
5 in qualitative categories of things that are going on
6 that lead me to think a closer look needs to be taken
7 of things. And so then I will try to motivate a study
8 to be done of some --

9 MEMBER POWERS: So you sort of event
10 driven, sort of, sort of thing in a delta when they
11 come in.

12 MR. DAMON: Right. Yes.

13 MEMBER POWERS: But I was fishing around,
14 of course, was for to say well, do you always look at
15 the same vertical slice? Well, no, it's a different
16 dynamic here. And I understand. Okay.

17 MR. DAMON: Right. Yes. Right. The
18 vertical slice is done at the time of say a submittal
19 for a new facility or a new part of an existing
20 facility. There the idea is to do it in a risk
21 informed manner. Look at the important stuff. And
22 also look across qualitatively all the different kinds
23 of things that are in the plant. Because what you're
24 fishing for is to see whether the licensee's methods
25 are adequate. In that they're, that you think that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 they're doing a good job of analyzing it. Because
2 you're really making a programmatic decision.

3 MEMBER SIEBER: When the licensees submits
4 a summary I take it you go and review the actual full
5 ISA documents.

6 MR. DAMON: Yes.

7 MEMBER SIEBER: Rather than make judgments
8 from the summary. So this is sort of audit type
9 function that the staff does?

10 MR. DAMON: Yes. Exactly. That's
11 exactly, at the vertical slice thing, the staff, based
12 on an ISA Summary, they'll pick a few things. They'll
13 go to the plant. They'll physically go there. Spend,
14 I don't know what length of time. At least a week I
15 would think. You know, and they would look. When
16 they do the vertical they're there, have access to all
17 the full documentation. And also look at the process.

18 And talk to the engineers and operators and so on and
19 so forth.

20 So it's vertical in that sense is that you
21 can go top to bottom, ask any question you want.

22 MEMBER SIEBER: Now what the licensee
23 analyzes and what the summary presents is what the
24 licensee has figured out are the safety issues. Would
25 you be able to identify issues that the licensee

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 didn't identify and say, "This is an area of concern.
2 We should do an analysis on that." And what's the,
3 what's the rule basis for your ability to do something
4 like that?

5 MR. DAMON: Well the rule basis is,
6 they're required to identify all accident sequences
7 that could lead to higher or intermediate
8 consequences.

9 And there's the other the companion piece
10 to the vertical slice is called horizontal slice. A
11 horizontal slice that that's an attempt to verify
12 completeness. So there's where you're looking to see
13 if all areas of the plant have been addressed, all
14 types of accidents, anything of that of that nature
15 where there may have been a systematic overlooking of
16 some of things.

17 MEMBER SIEBER: And now is there things
18 that are beyond the scope of action in consideration?
19 For example, in a reactor plant the rupture of a
20 vessel is outside the realm of analysis --

21 MEMBER ARMIJO: Beyond design basis.

22 MEMBER SIEBER: -- but the breaking of
23 the largest pipe is inside the analysis framework. Do
24 you have similar kinds of inside and outside --

25 MR. DAMON: Not --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER SIEBER: -- in the process --

2 MR. DAMON: -- not really. Other than the
3 consequence levels that are in the rule. The
4 consequence levels give you a mechanism for bounding
5 things on the low, on the low side. In other words,
6 the consequence levels for intermediate, the lower
7 boundary of intermediate consequences are things like
8 mild transient health effects to the public. Or
9 serious or long lasting chemical consequences to the
10 worker.

11 Well if you fall below those, those are
12 words that come from like I think the definition of
13 something the ERPGs or something. They're actually
14 tied to quantitative numbers. And so a chemical
15 exposure below those it's just not part of the rule.

16 MEMBER SIEBER: So the probability that a
17 tank would rupture plus the probability that you get
18 an excess exposure would be multiplied together to
19 determine whether it's significant or not significant.
20 Is that correct?

21 CHAIRMAN RYAN: I'm not sure they're
22 multiplied together or tested by the individual rule.
23 It's the dose rule and the chemical condition. And
24 you have to measure --

25 MEMBER SIEBER: Well but there's a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 probability of failure. And you either are going to
2 get a chemical reaction or a dose reaction from that.

3 CHAIRMAN RYAN: Right. But multiply that
4 --

5 MEMBER SIEBER: The dose --

6 CHAIRMAN RYAN: -- you track them both.
7 But I don't know if you multiply that.

8 MEMBER SIEBER: Well, the --

9 CHAIRMAN RYAN: As I understand it though
10 you have to meet both obligations.

11 MEMBER SIEBER: The probability of failure
12 is the component plus the probability that you're
13 going to get an injury out of that failure.

14 CHAIRMAN RYAN: Right.

15 MEMBER SIEBER: Is what you multiply
16 together.

17 CHAIRMAN RYAN: I got you.

18 MR. MORRISSEY: That's how the risk, the
19 risk matrix works for all the facilities. Risk being
20 consequences and likelihood. So they would have to
21 evaluate both.

22 MR. TSCHILTZ: But to answer your question
23 I think there are certain things, certain sequences
24 that could be screened as being incredible. Natural
25 sequences that have a frequency of less than one in a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 million. If there is other sequences that are highly
2 unlikely in amongst themselves they're not required to
3 have any additional items relied on for safety to
4 guard against them or protect the worker.

5 MEMBER SIEBER: The probability alone
6 which is incredible is 10 to the minus 5th.

7 MR. TSCHILTZ: Incredible is 10 to the
8 minus 6th. And then highly unlikely is 10 to the
9 minus 5th.

10 MEMBER SIEBER: I think, I think there is
11 a number defined in here.

12 MR. DAMON: Yes. It's not in the rule.
13 It's in the Standard Review Plan.

14 MEMBER SIEBER: Right. That's where I saw
15 it.

16 MEMBER ARMIJO: In your ISA Summary,
17 they're submitted once a year for your review. What
18 happens if a licensee is making a major process change
19 in between this time? Is that a separate application?

20 Let's say, years ago GE instituted a major change in
21 their conversion process. Now, would that have been,
22 would you, what would they do in that case? Did they
23 submit that as a new application or an amendment to
24 this --

25 MR. TSCHILTZ: Right. Under Part 70,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 there's 70.72 which is the equivalent of 50.59 in the
2 reactor world. Basically, it has criteria the
3 licensee can go through to determine which changes
4 they can make without prior NRC approval. One of the
5 screens in there is that it creates new different
6 accident sequences of a different type. New processes
7 often trip that screen.

8 CHAIRMAN RYAN: Sure.

9 MR. TSCHILTZ: That we require an
10 amendment and prior approval prior to implementing the
11 change.

12 MR. MORRISSEY: New technologies is in
13 there too.

14 MEMBER ARMIJO: So, in that case they were
15 referring to the change in the technology --

16 MR. TSCHILTZ: Right.

17 MEMBER ARMIJO: -- so that would trigger
18 an amendment.

19 MEMBER SIEBER: And that is different from
20 50.59.

21 MEMBER ARMIJO: 50.59 is really small
22 stuff.

23 MEMBER POWERS: What if the new steam
24 generators turns out under 50.59?

25 MR. DAMON: So continuing, the last bullet

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 here I just want, thought I'd mention that the way the
2 rule is structured, it requires that safety controls
3 that are used to demonstrate compliance with the
4 performance requirements be declared as IROFS.

5 But that does not mean that all safety
6 controls need be IROFS. So there are, there are
7 safety controls that are beyond that. You only need
8 to declare a minimal subset sufficient to demonstrate
9 the accident sequence is highly unlikely. But there
10 often are additional safety controls that are not then
11 listed as IROFS. So this is another difference with
12 the PRA.

13 The ISA, when you look at it, it may or
14 may not have all the safety controls involved. So you
15 don't have an accurate picture of the risk from the,
16 from an ISA necessarily. In some cases licensees do
17 include everything. But there's no requirement to do
18 so.

19 MEMBER POWERS: It has all the IROFS in
20 there. It could not have all the safety controls in
21 there.

22 MR. DAMON: Right. Correct.

23 Next slide, the revision. So this is now
24 I'm talking, getting, that was all background. This
25 is getting to the actual what we're, how we're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 revising Chapter 3.

2 As Mike Tschiltz mentioned, a major reason
3 for this rewrite is that, at the time of the original
4 Standard Review Plan was written we were thinking
5 almost exclusively of the existing facilities. So the
6 language was somewhat clumsy and really wasn't talking
7 to the how to review new facilities. So the language
8 of the chapter was revised to address that important
9 point.

10 A second point, and this was a point that
11 was raised in the different professional opinion, we
12 were directed to address this in the rewrite. And
13 that is, provide additional guidance on the extent to
14 which the review and approval process of the ISA and
15 ISA Summary is programmatic, as opposed to a design
16 review. And I've just been speaking, we really have
17 already talked about that. Is that, the, we do not
18 review and approve the design of these facilities.
19 That's basically the bottom line. We review and --

20 PARTICIPANT: I think you --

21 MR. DAMON: -- we will review and approve
22 their safety program. And in this case, in the
23 Chapter 3, what you're reviewing and approving is the
24 ISA program of the licensee. And you're trying to
25 make a determination that they've executed this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 program correctly. And you're relying them, on them
2 to do the analysis and make the plant safe. So it's a
3 different paradigm.

4 I'm just mentioning that, it's in the
5 document you may have been handed. There was a type
6 over. There was a 10 to the minus 4 in a few places
7 that was not in the intended number.

8 MEMBER ARMIJO: What was the number
9 supposed to be?

10 MR. DAMON: It was 10 to the minus 5. It
11 was --

12 MEMBER ARMIJO: Okay.

13 MR. DAMON: -- somehow it got changed from
14 the original draft. And there was no intent to change
15 it.

16 Let's see. And another, this point
17 on this next slide is, this was another thing we were
18 directed to do address was, is to provide additional
19 guidance on what constitutes an acceptable level of
20 detail for descriptions of facility processes and
21 items relied on for safety sufficient for licensing
22 approval.

23 And below that is a quote from the revised
24 chapter on what, our thoughts on what level of detail
25 is sufficient.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 The point being that we had to clarify
2 that the staff cannot expect the same level of detail
3 to exist for a facility that has not yet been built
4 compared to one that has been built and already is
5 operating.

6 CHAIRMAN RYAN: With that in mind, that
7 point in mind, how do you gather around all the
8 operational and maintenance experience and all that
9 kind of thing that comes over time? I mean, that's
10 very important in nuclear power. Obviously you all
11 know that. But do you do the same kind of thing that,
12 you know, talk to the operators or gain the
13 operational experience information and all of that as
14 time goes on? A lot of times the maintenance guys can
15 tell you, these are the top 20 headaches in this
16 plant. How does the ISA work to gather that in?

17 MR. DAMON: Well, certainly the licensees
18 should be doing that. I mean the team that, the ISA
19 analyses are done as a team exercise that is supposed
20 to involve someone knowledgeable in ISA techniques,
21 someone knowledgeable about, say an engineer, the
22 process engineer, and the process operators.

23 CHAIRMAN RYAN: I've got that part. How
24 does the NRC and its process of using this guidance
25 and its inspection program gather that? How do you

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 make a judgement that they're doing all those things?

2 What information do you collect and when do you say
3 you are satisfied?

4 MR. DAMON: Well, we have the whole
5 oversight program. You know, inspecture --

6 CHAIRMAN RYAN: Right.

7 MR. DAMON: -- inspectors, event
8 reporting.

9 CHAIRMAN RYAN: I'm asking that
10 specifically. How do you pick the brains of the
11 people that really are close to the problems? I know
12 all about paper and pencil. You know, sitting at a
13 desk and reviewing stuff. How do you --

14 MR. TSCHILTZ: Yes. I mean we have people
15 who are involved in the inspections on the headquarter
16 staff and interface directly with people doing the
17 licensing reviews.

18 When we have instances where we find IROFS
19 have failed, that the licensee have assumed a greater
20 reliability than in their analysis, than what's
21 actually being seen in practice, I mean, that
22 knowledge is known and shared amongst the people at
23 headquarters.

24 Beyond that, incorporating it back in to
25 the licensing reviews I think that's what we do. I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 mean that's --

2 CHAIRMAN RYAN: So the work is really
3 between what you're doing in the ISA process in
4 feeding it back in to the ongoing and, I assume the
5 updated license inspection programs for facilities, as
6 they march through life.

7 MEMBER ARMIJO: I'm not familiar with
8 everybody's, lots of ISAs, but I know in some, one
9 manufacturer that, those kings of, that kind of
10 information about, of failure of a safety system or,
11 would come up through a Corrective Action Program.
12 Get analyzed. And see if it's compromising the IROFS.
13 And that's part of the program plan.

14 And you, your inspection would see if that
15 part of the program plan is working as opposed to them
16 reporting it directly to the NRC. I don't know if
17 that's --

18 CHAIRMAN RYAN: Yes, that's what --

19 MEMBER ARMIJO: Yes. Well that
20 information is getting into the -- so these program
21 plans are living documents. They're not just put on
22 the shelf and the NRC signed them off and never look
23 at them again.

24 Like I don't know if that's general,
25 generally true.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. DAMON: No. Yes. That's the idea.
2 That is supposed to say the reactor industry, the fuel
3 cycle industry is much more, the role of the NRC is
4 much more oversight of the program, of their structure
5 of the programs, their methods, how well the licensees
6 are doing executing the program.

7 And the actual execution of the program
8 and looking at things that go wrong and fixing them,
9 so that's the licensees that are doing that.

10 Now we do have inspectors that go out and
11 over, you know, second guess that. You know, they go
12 out and see if they can find more than the licensees
13 do. But most of the stuff, the licensees are the ones
14 that are identifying the problems and fixing them.

15 MR. MORRISSEY: And I believe that the
16 reviewer criteria is a function of what's available.
17 For instance, LES has, you know, three plants in
18 Europe. So they have operating experience which isn't
19 directly LES but is LES.

20 MOX has, you know, sister facilities in
21 France which you can base some of it.

22 If you're talking about laser technology,
23 the criteria would be higher because you have no
24 experience and operating base, to base your
25 judgements. So you would expect a more conservative

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 "review determination".

2 MR. DAMON: So getting back to the, what
3 level of detail is sufficient. Another point to be
4 made is that, there's no legal distinction made in the
5 rule between a new and existing facility. And
6 consequently, the level of detail that is acceptable
7 in a license application and an ISA Summary does not
8 differ between the existing and new. Even though the
9 actual level of detail that's available to the
10 reviewer may differ. The requirement as to what has
11 to be in the license application does not.

12 The next is actually a quote from the
13 rule. The level of detail is, this is describing what
14 has to be provided in the ISA's Summary submitted to
15 the NRC. It's a list briefly describing each item
16 write on for safety which is identified pursuant to
17 70.61(e). "In sufficient detail to understand their
18 functions in relation to the performance requirements
19 of 70.61."

20 So the rule already has a sufficiency of
21 detail statement in it. It's sufficient so the
22 reviewer can understand how, basically, it's to
23 understand how the item relied on for safety is
24 performing its safety function. Which usually is, to
25 prevent the accident by preventing some kind of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 parameter from exceeding a limit. So that's the level
2 of detail that's sufficient.

3 And we don't need to understand all the
4 details of the hardware and their specifications and
5 so and so forth. But just the function, how the
6 function is being performed, and why it's feasible
7 that something of that type could have the reliability
8 that's being ascribed to it in the ISA.

9 And I added the following guidance to this
10 to this chapter on this, on this subject. The
11 requisite level of detail achieve reasonable assurance
12 may vary among processes depending on factors such as;
13 use of established technology, commitment to
14 standards, applicant expertise, safety margins, and
15 adherent difficulty in achieving the safety function.

16 So the point here is just to allude,
17 basically, to the fact that the level of detail is not
18 a constant. It varies, the level of detail and the
19 things the reviewer should be entitled to know about
20 something is going to depend upon things such as this.

21 So for example, applicant expertise. If
22 an applicant has operated a processes like this before
23 in another context or so on, and they come in and they
24 refer to what they're going to do here. Okay. That's
25 sufficient. Somebody else comes in and you look at

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 them. And you say, "Gee, this licensee has never done
2 anything like this before." Then it might cause you
3 to, more detail to be convinced that they understand
4 how to actually make such a thing work.

5 MEMBER SIEBER: Let me ask you this
6 question with regard to IROFS, is the acronym. A
7 simple one would be a shutoff valve that trips when a
8 process is getting out of hand so it stops the
9 process. Would you consider the geometry of a certain
10 vessel, for example, in a criticality situation as an
11 IROFS? Does that appear in the ISA?

12 MR. DAMON: I would.

13 MEMBER SIEBER: Would you consider, for
14 example, let's say there's a process, a chemical
15 reaction that's occurring in a tank. And the rate of
16 reaction is dependent on the temperature in the tank.
17 Would you consider, what would you consider to be the
18 IROFS for the prevention of, for example, an
19 explosion in that tank? The cooling water source?
20 Would a back-up be implied? Would there be extra
21 measures that, different than what you would find in
22 an oil refinery, for example? Where they just have
23 one pump and perhaps a trip valve or dump valve or
24 something like that? Maybe you can get, put a little
25 more flesh for me around what an IROFS really is.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. DAMON: Well, in the example you give,
2 say a process that perhaps an undesired event is,
3 requires you to control the temperature. And you may,
4 you perhaps have cooling and you perhaps have a
5 temperature sensing and maybe an automatic control to
6 react to high temperature or something. It's up to
7 the applicant to decide to construct the logic of the
8 argument. And to specify which of those things are
9 going to be items relied on for safety.

10 Because there's different ways of doing
11 it. They can they can make bounding assumptions about
12 something and then rely only on one control. Or they
13 can they can say all these things are IROFS. It's up
14 to the applicant to structure the logic. All they
15 have to do is demonstrate that every accident sequence
16 is made highly unlikely. And usually that involves
17 specifying certain things to be IROFS.

18 MEMBER SIEBER: Yes. Does that does that
19 ever come to as, like a defense in depth process?
20 Where you have an IROFS, that the probability of its
21 being able to function properly says, perhaps I either
22 build a shield building, or a shield tank, or some
23 other mechanism, relief valves, or something like
24 that, as additional assurance that I'm not going to
25 get in to that sequence.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. DAMON: It's usually true that the
2 system, the system, the sequence of events or set of
3 IROFS protecting against an accident sequence is
4 usually redundant. But it's --

5 MEMBER SIEBER: Okay. Does it have to be?

6 MR. DAMON: No. It, accept that for a
7 new facility there is a, what's called a baseline
8 design requirement, to have defense in depth, and to
9 have double contingency. Which puts a burden on the
10 licensee, basically, to say, why they couldn't make it
11 --

12 MEMBER SIEBER: Okay.

13 MR. DAMON: -- redundant and have defense
14 in depth.

15 But there's no requirement in the in the
16 basic rule itself. It simply has to be highly
17 unlikely.

18 MEMBER SIEBER: Okay. So that goes a step
19 beyond, for example, what would be required in a
20 refinery. Where you would have safety devices, for
21 example, safety valves. But nothing beyond that. You
22 know, you just have one requirement in one device that
23 satisfies that requirement.

24 MR. DAMON: Yes.

25 MEMBER SIEBER: Or a coal fired power

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 plant is another example.

2 MR. DAMON: Yes. But the thought of the
3 staff was, at the time of the rule for example, is
4 that, we were striving for the same level of
5 prevention as, because most like I say, most of the
6 sequences have embedded in them at least the potential
7 fatality to a worker. We were striving for the same
8 level of prevention as the double contingency in
9 criticality safety. Which is a quite a high level.
10 We haven't had a criticality in the United States in
11 an NRC facility.

12 MEMBER SIEBER: The requirement for double
13 contingency is only on criticality. Right? And not
14 for chemical explosions or what have you. Or leaks of
15 radioactive materials that don't involve criticality,
16 but do involve exposure.

17 MR. TSCHILTZ: Right. I can I can think
18 of an example that may help. That's a fire sequence
19 that leads to a chemical release. License say the
20 fire frequency for the given area is assumed to be 10
21 to the minus 2.

22 MEMBER SIEBER: Okay.

23 MR. TSCHILTZ: And they have controls in
24 place to reduce the likelihood to 10 to the minus 5.
25 High unlikely.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER SIEBER: Okay.

2 MR. TSCHILTZ: But then they have other
3 controls beyond those that are not credited as IROFS.
4 Say, fire boundaries, sprinkler systems, that are not
5 credited specifically in their safety analysis because
6 they meet the performance criteria of 10 to the minus
7 5th. But they're still there in place.

8 There's different philosophies amongst the
9 licensees on how to treat those systems. Some people
10 treat them as IROFS. The same as the other things.
11 Other people treat them as just defense in depth
12 measures that don't specifically credit them as items
13 relied on for safety.

14 MEMBER ARMIJO: What's the reason for
15 that? Is there is there additional regulatory burden
16 if you identify something as an IROFS when you didn't
17 have to?

18 MEMBER SIEBER: It has to work.

19 MR. TSCHILTZ: Yes.

20 MEMBER ARMIJO: There's incentive not to
21 identify certain things as IROFS unless you're
22 convinced they have to be.

23 MR. TSCHILTZ: There's additional
24 regulatory oversight of IROFS than other measures. I
25 would say that to be the --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER ARMIJO: Okay. I understand.

2 MR. TSCHILTZ: But there's different
3 philosophies amongst licensees how that's approached.

4 So.

5 MEMBER SIEBER: Well in the case of fire
6 protection, for example, the national, the commercial
7 regulations for fire protection require suppression
8 systems and so forth for industrial facilities. You
9 could, or you need not, take credit for those as
10 IROFS. Is that what you're saying?

11 MR. TSCHILTZ: Yes. Yes. And --

12 MEMBER SIEBER: And if you don't, then
13 you're designated official for the fire protection is
14 probably some insurance company someplace. Right?

15 MR. TSCHILTZ: I'm sorry?

16 MEMBER SIEBER: It's either the state
17 where you're located or some insurance company
18 inspector. The designated official.

19 MR. TSCHILTZ: Right. I mean, that gets
20 to the issue of the --

21 MEMBER SIEBER: The jurisdiction.

22 MR. TSCHILTZ: -- yes, the jurisdiction
23 that was raised during the industry's comments. That
24 there's certain aspects of fire systems where the NRC
25 is not the adjudicative authority on it because, in

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 fact, it doesn't involve nuclear materials. It
2 involves other fire concerns that don't directly
3 involve nuclear materials.

4 CHAIRMAN RYAN: Well, I think too, there
5 are, I mean, there's American Nuclear Insurers and I'm
6 sure some kind of, you know, comprehensive insurance
7 facility to investigate --

8 MR. TSCHILTZ: Yes.

9 MR. DAMON: But there are additional
10 things that constrain the applicants, like with
11 respect to fire protection. If it's a new facility,
12 base line design criteria include defense in depth.

13 And there's also a statement in there
14 where I can't recall the details of. But it's a
15 preference for passive over active controls and active
16 controls over administrative controls.

17 MR. TSCHILTZ: Right.

18 MR. DAMON: So if an applicant comes in
19 and says, "Well, I'm only going to use this admin
20 control." The reviewer is perfectly entitled to say,
21 "Why aren't you going to use this active control?"
22 And consequently, "Why don't you have defense in
23 depth?" So it's not, the applicant doesn't have
24 complete discretion for a new facility.

25 MEMBER SIEBER: Yes. But you don't have

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the authority to make them use a passive control when
2 they intended to use an active control. Passive
3 controls are presumably safer because they don't have
4 --

5 MR. DAMON: Well, I would, I would suggest
6 you read, I think, it's 7, Section 70.64. To read the
7 exact words of the requirement. There is a
8 requirement. There are requirements in that section.
9 And so there is a regulatory basis for, you know,
10 requiring these preferences.

11 MR. TSCHILTZ: Yes. It's basically, says
12 where you have a preference towards the engineered
13 features or unless it's impractical. So it's not,
14 that's the threshold the licensee would have to prove
15 it's impractical to put those in place.

16 MEMBER SIEBER: It's sort of hard to pin
17 down.

18 MR. TSCHILTZ: It's a challenge sometimes
19 to do that. Yes.

20 MEMBER SIEBER: Okay. Thank you.

21 MR. DAMON: So if we get to the, the next
22 slide addresses this issue that we were required to
23 clarify. And that is the extent to which the review
24 is programmatic.

25 And I think I've already basically covered

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that. In that the basic finding that we're attempting
2 to make is that the applicant's ISA program, as
3 described, provides reasonable assurance that
4 compliance will be achieved. But of course, as part
5 of that you're going to do these horizontal/vertical
6 slices. You are going to look at the design, but not
7 the entire design. So the reviews are, have a design
8 review part.

9 And a -- but the fundamental conclusion
10 you're trying to draw is that the applicant's program
11 is a good program.

12 And as part of this issue about the level
13 of detail. This is probably out of place. One of the
14 conclusions that was drawn, as a result of us
15 considering what has gone on, is that, the -- because
16 the question was raised. That even though this
17 facility is a new facility and they are submitting a
18 design at a preconstruction stage, the list of IROFS
19 must be complete. Because if you read the rule that's
20 what it says.

21 MEMBER SIEBER: Only if you rely on the
22 IROFS for its function.

23 MR. DAMON: Right.

24 MEMBER SIEBER: You can have it and not
25 list it, and then you don't rely on it in your --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. DAMON: Right.

2 MEMBER SIEBER: -- Integrated Safety
3 Analysis.

4 MR. DAMON: If you don't rely on it -- and
5 many applicant, one applicant initially came in and
6 they basically were assuming that certain items that
7 were there that actually were, had a preventive nature
8 to them, were not functioning. You know, they made
9 that assumption. And so they weren't relying on it.
10 And so that's perfectly acceptable if they have other
11 things and that, those are the things they rely on.
12 Their, that's within their discretion.

13 MEMBER SIEBER: Right.

14 MR. DAMON: And finally, I would mention
15 as I did before, point out there we, there are, the,
16 what used to be Interim Staff Guidance Documents,
17 which really were a result of lessons learned through
18 the whole process of the applicants doing the ISAs and
19 the staff interacted with the licensees during the
20 time frame when the applicants were doing the ISAs.
21 There were workshops held. Questions were asked and
22 discussions were held. And then when ISAs came in, of
23 course, there were reviews of the ISAs and lessons
24 from those. And these Interim Staff Guidance
25 Documents are really, have all the meat and content of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 all that long process of interaction.

2 So the first one is an amplification of
3 the risk index methodology that's, is one method of
4 evaluating likelihood that's in the Standard Review
5 Plan. So this is an annex supplement to that to
6 clarify a number of points.

7 Appendix B is one where I did the original
8 draft of this. And then it was improved on. It was
9 a, I attempted to do a purely qualitative criteria for
10 evaluating likelihoods.

11 And Appendix C discusses the concept of
12 initiating event frequency. And how that can be used
13 in compliance with the rule to demonstrate compliance
14 with the performance requirements.

15 And then in addition, on the next slide
16 there's a nice appendix on natural phenomena hazards.

17 Which at the time of the drafting of the original
18 Standard Review Plan, we really had difficulty
19 figuring out what the applicants could do on this
20 because we were thinking of existing facilities. So
21 members of staff drafted this guidance and an annex to
22 it. And it's a very nice descriptive of how to
23 analyze natural phenomena hazards.

24 MEMBER ARMIJO: So all of these
25 appendices, the current licensees are familiar with

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 them, understand them, and have been using them? I
2 mean, if there's already been ISGs and --

3 MR. DAMON: Yes. But I would say is,
4 there was a very -- a typical workshop would have a
5 hundred people attending. I would say there would be
6 a representative, at least one, from every licensee
7 plus other interested parties in NEI. And they were
8 quite well attended and very participatory process
9 that went on over many years. So I think the, there
10 are people at the -- of course, the problem, I'll tell
11 you one thing that happens is a process that goes
12 like, as long as this one did, because it started in
13 1991, a lot of the people involved are gone. They're
14 retired.

15 CHAIRMAN RYAN: Dennis, if you get a
16 stopping point, it's, we're scheduled to take a break
17 at 3:15. Is this a good break point? You want to go
18 on?

19 MR. DAMON: That's it.

20 CHAIRMAN RYAN: Okay. Just before we
21 leave in the last couple minutes. The appendix there
22 and the annex to it, are really pretty substantive, I
23 thought. I mean, they really do go on in a in a lot
24 of detail. And I think in a lot of insight as well as
25 guidance to the person who is trying to prepare

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 materials that's going to -- so I think, you know, I
2 mean, I want to compliment you on the depth of the
3 material in the appendices. It really is pretty
4 helpful.

5 And I think, you know, the reactor guys
6 would feel comfortable with a lot of the terminology
7 and detail that they're used to seeing is in here.

8 Now we'll take a 15 minute break. We're
9 scheduled to come back at 3:15, which we'll do.

10 Dennis, are you on the line?

11 I'm sorry. 3:30. Yes.

12 DR. BLEY: Yes, I am.

13 CHAIRMAN RYAN: Okay. Now we're going to
14 take a break until 3:15. I'm sorry. 3:30. We'll
15 stop at 3:15.

16 And we'll look for you to call back.
17 Okay?

18 DR. BLEY: Okay.

19 CHAIRMAN RYAN: Thanks.

20 (Whereupon, the above-entitled matter
21 went off the record at 3:12 p.m.
22 and resumed at 3:29 p.m.)

23 CHAIRMAN RYAN: Okay. I guess we can go
24 ahead and resume.

25 Dennis, I'm turning the microphone back to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you for NRC experiences with Integrated Safety
2 Analysis.

3 MR. DAMON: Well I think I can quickly go
4 through this. This first part of this not actually on
5 the experience with the ISAs. It's just background on
6 the process. You know, just reminding us the fuel,
7 like for example, a fuel manufacturing process has a
8 large number of diverse processes.

9 And then that, the next slide that the
10 purpose of the review of the ISA is not a design
11 review. It's for compliance with Subpart H.

12 And Subpart H requires a safety program
13 that has many elements that the ISA is one element.
14 And that, of the ISA, only the ISA Summary is actually
15 submitted to the NRC.

16 And the next slide. And what one is, this
17 slides just talks about the fact that there are things
18 you're trying to achieve in the review for new
19 facilities. And these are reminding us of these
20 issues that have come up and why we did the Standard
21 Review Plan.

22 Next slide. This was a slide reminding us
23 of what the requirement is, what are IROFS. IROFS are
24 those things, those controls, or control systems
25 necessary to comply with (b), (c), and (d). And (b),

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 (c), and (d) are the places where they talk about high
2 consequence being highly unlikely and so on.

3 Now we're getting, now we're getting in
4 some of the experiences with ISA reviews. Some
5 claims, one experience is, is that there are, have
6 been accident sequences screened as not credible that
7 the staff is questioning that, questioning that. And
8 in some cases there, these are, the screening of not
9 credible is based on controls which doesn't seem to be
10 appropriate. In other cases, it's based on other
11 rationales.

12 And then I'm mentioning here some of the
13 credible sequences that are not identified in ISAs.
14 One of them is chemical exposures other than
15 inhalation. That's possibly, and we're possibly
16 guilty there in that the staff didn't explicitly
17 identify that there are exposure pathways other than
18 inhalation in any of the guidance. So it really
19 wasn't considered in most cases.

20 Another problem with completeness is whole
21 areas of the plant being screened out on some
22 rationale that later turns out not to be a good one.

23 And then another issue that's sort of
24 related to completeness is IROFS boundaries at some
25 point need to be defined.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 DR. BLEY: Have you anywhere defined "not
2 credible"?

3 MR. DAMON: Yes. There's as, the rule, in
4 fact --

5 DR. BLEY: I looked there. I couldn't
6 find it.

7 MR. DAMON: No, no. It's not in the rule.
8 The rule says, "The applicant shall define it." The
9 Standard Review Plan has a paragraph that is the
10 staff's interpretation of what was intended in the
11 rule by that word.

12 DR. BLEY: Okay. Can you point me to
13 where that is? I want to read it. Because I skipped
14 it over somehow.

15 MR. DAMON: Yes, I can't right here. But
16 I'll --

17 DR. BLEY: Okay. Well, if somebody could
18 do that, I would appreciate it.

19 MS. ROMAN: I think that is page 325.

20 CHAIRMAN RYAN: If you give it to John,
21 he'll send it out to everybody.

22 MEMBER ARMIJO: Dennis, what does it say?
23 What is not credible according to the staff?

24 MR. DAMON: It says there are three ways
25 of not being credible. One of them is, you identify

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 something and then you determine that it's not
2 physically possible for that thing to happen.

3 DR. BLEY: Okay. That's a good one. I
4 like that.

5 MR. DAMON: Another one was a long
6 sequence of human actions for which there's no motive
7 can be identified.

8 And the concept behind that is, I don't
9 care what set of controls you have, some operator can
10 always go in there. Disable this. Disable that.
11 Turn this on. Break something. And suddenly you've
12 got an accident. And we were not looking for things
13 like that.

14 We're looking for okay, why would he ever
15 do such a thing? You know, we're looking for credible
16 things that are just clearly a rationale for why
17 someone would do something.

18 DR. BLEY: Yes. That's a kind of hard one
19 to pin down. Because there are other than what an
20 analyst would first see as a good rationale that can
21 lead people to do those thing.

22 MR. DAMON: Well, yes.

23 DR. BLEY: That's a pretty tough one to
24 do. But I like it if it's done right. Go ahead.

25 MR. DAMON: Yes. I agree with that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 There have been about eight events that
2 have occurred since the ISAs went in to place that
3 caused us to question, you know, the methods for
4 identifying things because of pure like, this is
5 something that hadn't been identified. A number of
6 them were of that nature.

7 Once a group of operators start to diverge
8 from a controlled set of operating procedures and
9 starts to do things, yes, some funny things can
10 happen.

11 But what we're not fishing for is just a
12 just a plain straight forward, you know, no matter
13 what you say you've got as controls I can I can wreck
14 it. And we're not looking for that, you know.

15 We're looking for credible things that,
16 you know, you, if you evaluated them with a human
17 reliability analysis you would come up with something
18 that, that this is something that could credibly
19 happen.

20 And let's see. And then the, let's see,
21 what was the other? The other one is external events.

22 External events, and this is really the primary one.

23 The idea was, the word "credible" appears in the rule
24 in a sentence that says, "For all credible sequences
25 that could lead to high consequences shall apply as

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 administrative controls," or something like that, "to
2 make them highly unlikely."

3 And the question is, why would you put the
4 word credible in there? Why not leave it out? And
5 the rationale was, we were saying, "You had to apply
6 controls." Well maybe you don't have to apply
7 controls. Maybe there's an external event that's
8 sufficiently infrequent that you, you simply,
9 if that happens, all right, we're just admitting,
10 we're just accepting the consequences of that. And so
11 that's where, that's what we interpret the word
12 credible. Is an external event, you know, beyond, way
13 beyond design basis, earthquake, whole plant falls
14 down. You don't have to consider that. You don't
15 have to apply controls to prevent that.

16 DR. BLEY: No matter what the consequences
17 are.

18 MR. DAMON: Right. No matter what the
19 consequences are.

20 And so that was in there.

21 Then the other, but the other point was
22 made. And that was, there's a statement in the
23 Standard Review Plan that says that, "One cannot rely
24 on any feature for, of the plant, as a as a rationale,
25 that could credibly be changed by the licensee as a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 rationale for why it's not credible." Because the
2 purpose of the rule was to control changes to the
3 plant by the licensee.

4 So if you rely on something, say, "I got
5 this thing." And that makes the accident not
6 credible. Well it still may be an, it still may be
7 credible that could be changed. So that's, it's
8 that's a pretty stringent requirement. Anything that
9 could be changed by, credibly changed by the licensee.

10 DR. BLEY: I assume that means credibly
11 changed without some notice to you.

12 MR. DAMON: You know, this is just simply
13 --

14 DR. BLEY: Just could be changed --

15 MR. DAMON: -- do I believe that it's
16 possible, that it's credible that the licensee is
17 going to change this aspect of the plan? Because if
18 you if you say, if you if you don't say it that way
19 then everything you've got is there. You know.

20 MEMBER POWERS: Well you're running in to
21 a self identification paradox. You know. It's in
22 there, so I don't need it, so I take it out, and now I
23 need it.

24 MR. DAMON: Yes. Yes. It's because
25 that's what it was in there for. Is to prevent a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 circular logic argument.

2 MEMBER POWERS: Right.

3 MR. DAMON: I've got this thing so
4 therefore I don't need any controls. No, no. That
5 was the control.

6 MEMBER ARMIJO: Yes. Just to understand a
7 little bit better. Would the events leading to the
8 Tokaimura criticality incident, would that fall in to
9 credible or not credible by this definition?

10 MEMBER POWERS: It's a long sequence of --

11 DR. BLEY: It was possible --

12 MEMBER ARMIJO: It was possible because
13 somebody did it. But in, it was way out of, the way I
14 understood it, way out of their program controls, you
15 know. Just --

16 DR. BLEY: -- a procedure to control how
17 much of things they put together. And they --

18 MEMBER ARMIJO: It was done in a very
19 bizarre way. And the question is, you know, it wasn't
20 done maliciously to destroy the plant or anything like
21 that. But it was an accident caused by supposedly
22 trained workers. Would that fall in to our, your
23 current definition of credible?

24 MR. DAMON: I would I would say so. That
25 it's credible.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 There are other additional words in some
2 of the guidance. And I'm trying to remember where.
3 But the words are, "If the event has actually occurred
4 at any facility it's credible."

5 DR. BLEY: Yes. But back to this, the
6 question, this would only be protected by the, I mean,
7 would only be not credible if you could say, there's
8 no reason or motive for those kinds of actions. And
9 if missing this step or a couple steps in a procedure
10 is a reason, that would seem to me that --

11 MR. DAMON: Okay.

12 DR. BLEY: -- you shouldn't need a logical
13 reason to skip a step. Just skipping a step should be
14 reason enough. And I'm wondering if that's true. Or
15 did you mean that there had to be a logic? Because
16 people do slip and miss steps and procedures or jump
17 ahead and that sort of thing.

18 MR. DAMON: No. No. That's a reason. I
19 would regard that, you know, yes. In other words,
20 it's credible to me that a person makes a slip or a
21 mistake, you know.

22 DR. BLEY: And then you add on being tired
23 or whatever in the procedure. Okay.

24 MR. DAMON: Yes. I mean, I won't, would
25 suspect, it's not so much a question of someone some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 applicant screening out something of this type. It's
2 more the problem is identifying that someone might try
3 to do such a thing. But in a way it's --

4 DR. BLEY: But if you've really get a
5 HAZOP you'd say, "Too much." And -- yes. I put too
6 much in. I've got criticality. So it ought to pop up
7 if you really did a HAZOP.

8 MR. DAMON: Well, yes. Certainly if
9 someone at one of our facilities came in and they
10 proposed a design change, an operating change, such
11 that they were going to now operate and do what they
12 did at Tokaimura. Then they would be required, of
13 course, to do an ISA analysis of it. Identify what
14 could go wrong here and so on and so forth. Okay.

15 Actually, that's why they had the
16 accident. They didn't do any such design analysis.
17 They didn't have a crit specialist look at it or any
18 kind of a safety assessment of that type. Otherwise,
19 somebody would have surely recognized that you can't,
20 that you do this and you pour that amount of material
21 in, it's going to go critical.

22 DR. BLEY: Let me link this to that
23 statement you talked about that says, you can't rely
24 on controls or features of the plant that could be
25 changed. Now if they declare that feature to be an

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 IROFS, then it okay because they can't change an IROFS
2 without some kind of review I assume. Is that a
3 correct interpretation?

4 MR. DAMON: Well, the point of the thing
5 is, is not to screen out a failure of a control, you
6 know. Say, "Well this, I got this control and as long
7 as it doesn't fail I can't have an accident. So
8 therefore the accident is not credible." The idea is
9 not to screen, do that kind of screening. But to say,
10 "Yes, the failure of this control is credible. Now
11 let's look at the sequence and what other things have
12 to go wrong. And see if I get the highly unlikely.
13 And what things I have to credit to make it highly
14 unlikely." And then those things are IROFS. So --

15 DR. BLEY: And once they're IROFS they are
16 controlled and can't be changed, I assume, without
17 approval. Is that right?

18 MR. TSCHILTZ: Not totally. This is Mike
19 Tschiltz. The way it's worded in 70.72 if it's a sole
20 IROFS it can't be changed without prior NRC approval.
21 If it's not a sole IROFS the licensee can use 70.72
22 process to make changes to the IROFS without prior
23 approval.

24 DR. BLEY: Okay. But then can I just walk
25 it through a little bit. Say this is, there's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 something new with criticality. So now if this IROFS
2 was one of your double contingency items, I assume 72
3 then would force you to identify some other one by the
4 time you're finished. Is that right? And notify or
5 add it to the list. How does that work? If you
6 change and IROFS and it's one of the things you have
7 to have there --

8 MR. MORRISSEY: It has a --

9 DR. BLEY: -- some way to track it.

10 MR. MORRISSEY: -- it has an equivalent
11 replacement criteria.

12 DR. BLEY: Okay. And then do they report
13 those replacements to you? Or how do they, who
14 tracks, do they track all of the IROFS or do you have
15 them as well?

16 MR. MORRISSEY: They are required to
17 provide to us all changes to the ISA Summary on an
18 annual basis.

19 DR. BLEY: Mm-hmm.

20 MR. MORRISSEY: And some changes they need
21 to come in for "amendment" if they don't meet the
22 criteria. And, you know, something like, is this an
23 equivalent control?

24 DR. BLEY: Mm-hmm.

25 MR. MORRISSEY: They need to evaluate, and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 demonstrate, and document that. And that would be
2 subject, that determination would determine whether or
3 not they would have to come in to us first.

4 DR. BLEY: Okay. But if they thought it
5 was good enough then you would still see it on the
6 annual summary.

7 MR. MORRISSEY: Yes. And in that case we
8 would probably review something like that.

9 DR. BLEY: Okay.

10 MR. DAMON: So we're on the next slide.
11 Other lessons from the ISA reviews. In some cases we
12 were seeing dependent administrative controls treated
13 as independent. Like the --

14 DR. BLEY: Could you give us some
15 examples?

16 MR. DAMON: -- the same mistake by the
17 same operator at the same time. You know, not
18 independent.

19 DR. BLEY: How about the same mistake by
20 the same operator ten minutes later?

21 MR. DAMON: He makes essentially the same
22 mistake twice and that's enough to get you to the
23 accident. Then you, that's not, you know, what we're
24 saying is that's not independent.

25 DR. BLEY: Okay. So that would still be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 dependent?

2 MR. DAMON: Yes.

3 Then there was a considerable discussion,
4 as Kevin mentioned, about IROFS with shared
5 components. And he mentioned the context of digital
6 control systems, for example. The shared component
7 being the a controller. So that's, that arose and
8 that was a long discussion.

9 Then there's the question of, how to treat
10 failure of electrical power that's required for IROFS.

11 And it, it's not always addressed. And it's not
12 addressed in the way you would probably address it
13 for, if you were doing a PRA where loss of, loss of
14 power would be a whole, it would be treated plant-
15 wide. You'd look at loss of offsite power and then
16 loss of onsite. And see what, all the things that
17 were effected simultaneously. That kind of thing is
18 not analyzed that way in ISAs. And so it's not clear
19 that loss of power has been treated adequately
20 everywhere.

21 However, as I mentioned in the last
22 bullet, almost everything I can think of in these
23 plants that uses electrical power as an IROFS is
24 failsafe on loss of power. So it really isn't the
25 kind of problem it is for a reactor. Where reactors

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 have to have active heat removal systems dependent on
2 power.

3 These plants don't, almost all of the
4 things that, in fact, require automatic controls to
5 react to. Once the thing have been identified as a
6 problem, typically, the processes can be shut down.
7 You know, stop and you're and you're safe. And, so
8 it's quite different from the reactor system where you
9 really do have to have these active safety systems.
10 And they have to function. And they have to function
11 adequately. It's more of a passive kind of reaction
12 to making these things safe is just stop what you're
13 doing and you're going to be okay.

14 DR. BLEY: Then just like me. Then you
15 can argue you're not dependent on the electric power
16 or whatever the supporting system is.

17 Earlier you talked about how you convinced
18 yourselves things are independent through an
19 argumentative process to make sure people have dug
20 deeply enough. It seems like things like electric
21 power, or if there should happen to be a control air
22 system or something like that, are obvious things one
23 would have to question and dig in to see if they
24 mattered and if they could tie your IROFS together.
25 Now it's sounding a little softer than that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. DAMON: Well, yes. I'm softening it
2 up because like I say, I think, what the staff feeling
3 was because the thing wasn't analyzed systematically
4 the way I described, we had this, there is this
5 concern that maybe there's something that's being
6 overlooked. But the flip side of that is, the things
7 you do or you look specifically at things, most
8 things, most, you know, things that need power. They
9 often are failsafe.

10 Now, it's not always true. And like you
11 say there's like ventilation systems and things like
12 that. Those are active. There are stirrers, for
13 example, you know, that keep stuff stirred up. Some
14 of them, I believe, there are some mechanical stirrers
15 in the plants. And so there are some active systems.

16 There might be, there might in some of the
17 new newer facilities there might be active cooling
18 systems in some cases. I can't think of any in the
19 old, the old manufacturing plants. I can't recall the
20 need for a cooling system anywhere.

21 MEMBER SIEBER: Well, let me ask a
22 question about that. And I may be wrong based on what
23 you're saying. But it seemed to me in the Purex
24 plants the red oil tanks needed to be cooled. Because
25 red oil's propensity to explode or burn increases as

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the temperature goes up. And there's some kind of
2 exothermic reaction that goes on that --

3 MR. DAMON: Yes. That's why I say, I
4 think the MOX plant which I'm not all that familiar
5 with, the red oil was a thing that was considered
6 there. And there may be processes there that where
7 cooling is an issue.

8 But I'm just saying in most of the other
9 plants I can't recall anything that requires active
10 cooling.

11 MEMBER SIEBER: Enrichment is not the
12 case. Fabrication is not the case.

13 MR. DAMON: Right. We don't have --

14 MEMBER SIEBER: UF6 is not the case.

15 MR. DAMON: -- we don't have a
16 reprocessing plant. We don't regulate any
17 reprocessing.

18 MEMBER POWERS: It speaks of electrical
19 power in terms of either being available or non-
20 available. When you add in to the mix the possibility
21 as fire as an issue, now you have the possibility of
22 not just on or off, but on and working badly. Is that
23 a problem? That's the hot short issue.

24 MR. DAMON: That's, you got me.

25 MR. TSCHILTZ: Rex is here to answer fire

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 protection.

2 MR. WESCOTT: Yes, I'm sorry. Could you
3 repeat that question? I was kind of around the corner
4 there.

5 MEMBER POWERS: Yes, I'm basically asking
6 a fire induced hot short issue, is that an issue that
7 has to be addressed here? They were talking about
8 electric powers that were either ability that were
9 available or not available. Where at the hot short
10 issue you have electrical power, but the systems is
11 behaving badly because of the hot shorts.

12 MR. WESCOTT: We have not --

13 DR. BLEY: -- when you don't expect it,
14 having to change at intervals instead of all at one
15 time. That --

16 MR. WESCOTT: To the best of my knowledge,
17 we have not looked at spurious actuations as a result
18 of hot shorts in any of the facilities. And I believe
19 that includes MOX.

20 Now one thing about MOX, MOX does need
21 electrical power for its IROFS. Because it relies on
22 dynamic confinement as part of its, you know, safety
23 system.

24 MEMBER POWERS: The history of hot shorts
25 is a checkered one that has with every test that we do

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 it seems to be a more pandemic issue. So you might
2 want to look at that hot short issue.

3 MR. WESCOTT: By the way, my name is Rex
4 Wescott.

5 MEMBER POWERS: Yes.

6 MEMBER SIEBER: Since you brought up the
7 MOX plant, that is a Purex type process. Right?

8 MEMBER POWERS: Not covered by this
9 regulation.

10 MEMBER SIEBER: Okay. And that's why
11 where the red oil issue comes up?

12 CHAIRMAN RYAN: MOX is where it comes.
13 Yes.

14 MR. WESCOTT: Yes. I'm not sure about how
15 red oil --

16 MEMBER SIEBER: And that's a NRC licensee?

17 CHAIRMAN RYAN: If I recall, Jack, I sat
18 in on those briefings. I'm not sure that red oil is a
19 problem at the MOX facility in Aiken because it takes
20 temperature, pressure, and some other conditions, and
21 they weren't going to have high pressure. So I'm not
22 sure --

23 MEMBER SIEBER: Yes. I never, I just went
24 to the preliminary meeting. So I didn't know what
25 they were. But the red oil explosion in Russia --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN RYAN: They had high temperature
2 and high pressure.

3 MEMBER SIEBER: That's right.

4 CHAIRMAN RYAN: So, but I think they kind
5 of engineered some conditions in that it may be an
6 error. But --

7 MEMBER SIEBER: Yes. When I thought about
8 it, the only way I could think to solve it was to cool
9 it. And so that's why I asked the question.

10 MEMBER POWERS: Well red oil is a
11 consideration, but it's not covered by this
12 regulation.

13 MR. DAMON: The MOX plant is subject to
14 this regulation. It has, it's, the standard, but it
15 has its own Standard Review Plan separate from this.

16 MEMBER SIEBER: Okay. I'll read that.

17 MR. DAMON: So other lessons, there's a
18 concept of duration index. And that some licensees
19 had trouble with.

20 Duration has to do with the idea that when
21 a control fails, goes in to a failed condition, it's
22 in that failed condition for a finite period of time.

23 And that's a period of vulnerability to perhaps
24 failure of a second control that would then lead you
25 to then having an accident.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And there was there was a problem with
2 licensees properly understanding how to use that.
3 This concept is referred to in the Appendix A to
4 Chapter 3. This risk index method.

5 And some license, it's simply,
6 we had a problem with people who were applying it and
7 not understanding the meaning of the concept. And
8 therefore they would miss misapply it.

9 Interim Staff Guidance, documents 1 and 9,
10 which have been converted in to appendices to this
11 chapter address many of these issues that I've just
12 mentioned as being things learned from the ISA
13 reviews.

14 And then next ext slide, this is a, this
15 is a point relating to the fact that the rule the rule
16 was silent on this subject of soluble uranium
17 toxicity. Except the statement that, "Public high
18 consequences consist of 30 milligrams of solid
19 uranium." So consequently, there's a there's a
20 process going forward to work on this issue.

21 CHAIRMAN RYAN: Just for clarity Dennis,
22 30 milligrams soluble uranium what? Is it intake?

23 PARTICIPANT: Ingested.

24 CHAIRMAN RYAN: Ingested? Inhaled?

25 MR. DAMON: That's a good question.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Intake, I think it says.

2 MR. TSCHILTZ: We're looking at, we have
3 work on developing a reg guide dermal exposure to --

4 CHAIRMAN RYAN: Dermal exposure?

5 MR. TSCHILTZ: -- dermal exposure to
6 soluble uranium. And this is part of that issue, I
7 think. Is that we're having --

8 CHAIRMAN RYAN: 30 milligrams won't get
9 you much dermal exposure.

10 MR. TSCHILTZ: Well, the issue, I think,
11 has to deal with the exposure to uranium. Okay. And
12 the standards for what constitutes immediate or high
13 consequence for uranium exposures. And there's this
14 specific requirement out there in the regulation. But
15 there isn't specific standards developed for these
16 other type of exposures. And when that's the
17 situation, it's left to the licensee to use what's out
18 there as developed standards in the medical community.
19 And we're looking at enhancing our guidance in that
20 area.

21 CHAIRMAN RYAN: The soluble uranium, if
22 it's taken internally is a chemical poison.

23 MR. TSCHILTZ: Yes.

24 CHAIRMAN RYAN: Rather than a radiological
25 issues. So rems of the something or other really

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 isn't all that meaningful.

2 So are you going on a, you know, chemical
3 hazard kind of approach here? Or --

4 MR. TSCHILTZ: Yes. Yes.

5 CHAIRMAN RYAN: So that's where the
6 clarifying point is. That this is not a radiological
7 --

8 MR. TSCHILTZ: Right.

9 CHAIRMAN RYAN: -- so it's a public high
10 consequence which makes somebody sick. Kind of real
11 sick --

12 MR. DAMON: Right. And --

13 CHAIRMAN RYAN: -- as opposed to killing
14 them.

15 MR. DAMON: I mean, my understanding is
16 that, and don't take my this as, you know, this is
17 just my understanding. I'm not a, very expert on it.

18 But my understanding was that there was quite a
19 question about really what levels of intake of soluble
20 uranium or even other forms of uranium were, in fact,
21 toxic. And I remember looking at it something came
22 across my desk, a big Army U.S. Army report about yag
23 thick.

24 CHAIRMAN RYAN: Yes.

25 MR. DAMON: Because they get concern about

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that because they use depleted uranium ammunition in
2 their tanks. And --

3 CHAIRMAN RYAN: Embedded embedded DU
4 fragments are not nearly as important as soluble
5 uranium nitrate or uranium oxide.

6 MEMBER ARMIJO: The O2 is not very
7 soluble.

8 CHAIRMAN RYAN: Huh?

9 MEMBER ARMIJO: The O2 is not very
10 soluble.

11 MEMBER POWERS: Yes but, uranium nitrate
12 is very soluble.

13 CHAIRMAN RYAN: Uranium nitrate is --

14 MEMBER ARMIJO: Nitrate is, but not UO2.
15 The factories that --

16 CHAIRMAN RYAN: So, so I think I've run in
17 to an interesting set of questions there. You might
18 want to spend a little time trying to frame that
19 problem. Because it's not it's not real simple.
20 That's why the Army has one --

21 MEMBER SIEBER: It's also radioactive
22 though too. And 30 milligrams in a single person is a
23 lot of --

24 CHAIRMAN RYAN: Actually it turns out Jack
25 that the toxicity chemically is more important than

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 radio-toxicity.

2 MEMBER SIEBER: But both --

3 CHAIRMAN RYAN: -- one on the other. But
4 in terms of health hazard, not dose against the
5 criteria for a dose limit at NRC, but the health
6 hazard issue you can have a chemical toxicity driving
7 a bus.

8 MEMBER SIEBER: Right.

9 CHAIRMAN RYAN: So, and I would I would,
10 at least, have to think about whether a skin dose is
11 or a skin toxicity question is more important than an
12 internal intact.

13 MEMBER SIEBER: Inhaled.

14 CHAIRMAN RYAN: Inhaled or ingested is
15 probably more important. At least I think it is --

16 MEMBER SIEBER: Because of the --

17 CHAIRMAN RYAN: -- anyway --

18 MEMBER SIEBER: -- unshielded.

19 MEMBER ARMIJO: So that's a work in
20 progress.

21 CHAIRMAN RYAN: Yes.

22 DR. BLEY: It depends on how heavy you
23 are.

24 MR. DAMON: The next slide just says, you
25 know, many of these lessons are learned have been

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 incorporated here at, in to this revision. Especially
2 in to the appendices.

3 And there's a Soluble Uranium Working
4 Group that's leaning to some kind of guidance, a reg
5 guide, or something, to address that issue.

6 There's also a project to revise the
7 oversight program. The fuel cycle. They make use of
8 risk insights from ISAs. And the staff has this
9 concept of, that we're beginning to recognize that
10 ISAs, we need we need to emphasize that there needs to
11 be more, basically, a continuous improvement process
12 based on experience as we move forward here. Because
13 these ISAs really are not perfect. And we're hoping
14 that over time we'll learn how to make them better.

15 MEMBER ARMIJO: But the, only the NRC
16 staff has, gets the information, experience
17 information. Certainly the licensees don't share
18 their problems like the utilities and power plants.

19 MR. DAMON: Well, they don't, they don't
20 share everything. But certain things become public.
21 You know, it becomes a matter of public record when
22 something goes wrong. So there is a certain amount of
23 sharing of experiences that goes on due to that.

24 MR. TSCHILTZ: I'd just like to correct
25 something I said because I cross wired on the dermal

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 exposure versus the soluble uranium uptake by the
2 workers as opposed to the public. Those are the
3 thresholds we're working on developing some specific
4 worker thresholds versus public.

5 CHAIRMAN RYAN: Well I --

6 MR. TSCHILTZ: And the dermal exposure is
7 a different issue to the uranium hexafluoride in
8 development guidance on what's an immediate
9 consequence and issues.

10 CHAIRMAN RYAN: Fair enough. I can see a
11 nice table developing to have that out.

12 MR. DAMON: So this is sort of a synopsis
13 of the comments we got back on this revision. The
14 industry supported the corporation and the Interim
15 Staff Guidance documents. And that may have been in
16 part because the industry participated heavily in
17 reviewing and reviewing those documents. NEI
18 supported the effort to remove the vague guidance, the
19 language that is not based on the existing rule.

20 And that is something I didn't mention
21 because it's really my fault. The original draft had,
22 I wasn't as scrupulous as one could be in adhering to
23 making statements about what is required and what is
24 not required. And you have to be very careful in
25 writing a Standard Review Plan. And say only what is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 based on the rule.

2 And then the industry have commented on
3 the following topics. And this is the first one
4 design features versus IROFS has the question of
5 whether there are features of the design that can be
6 relied upon that do not, that have a safety function
7 that do not need to be items relied on for safety.

8 Then there's this issue of chemical
9 standards is the is the stuff we've just been talking
10 about. That whole set, whole set of, there are other
11 issues that even beyond the ones we just talked about.

12 Relating to interpreting the rule related to setting
13 of chemical standards. So there's a bunch of issues
14 in that in that area.

15 And then, well there's a question of
16 operating versus safety limits. And that's an
17 interesting subject. We did revise the rule to try to
18 clarify some statements that were made in that area
19 that, one of them had to do with whether operating
20 safety limits had to be provided as part of the
21 description on the item for safety. And no, the
22 answer is, no. They do not necessarily have to be
23 provided and might, in some cases, be part of the
24 argument for why the thing is reliable. In which case
25 you might have to provide information about that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And then there's concern from the industry
2 about addition of IROFS Boundary Package definition.
3 And I think there's, hopefully, there's adequate
4 language now in this document to clarify what the
5 staff is saying about the concept of IROFS Boundary
6 Packages.

7 And this, finally there's a summary there.
8 Actually, this is this is Cinthya's summary.

9 MS. ROMAN: Basically, we updated the SRP
10 without having a new technical position. No new staff
11 position. In general, we just improved the linkage
12 between sections that we reviewed in the regulations.

13 And we incorporated Interim Staff Guidance positions.

14 In terms of the schedule, the comment
15 period ended on October 24. We received comments from
16 NEI. We are working to resolve those comments. We
17 are expecting to resolve them by November 24. Then
18 we'll publish those in the in the website.

19 Then we are planning to brief the full
20 committee on, if necessary, on December 2009 or
21 February.

22 And then we are planning to publish the
23 SRP on April 2010. Here --

24 CHAIRMAN RYAN: Sorry. Go ahead.

25 MS. ROMAN: -- here I'm just providing the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 summary of the webpages where you can find information
2 about the proposed revision and the graph is also
3 available on the public website and in ADAMS.

4 CHAIRMAN RYAN: Great. Thank you very
5 much.

6 Jack, any questions?

7 MEMBER SIEBER: No questions.

8 CHAIRMAN RYAN: Okay. Any additional
9 questions, comments, observations?

10 MEMBER POWERS: I believe they put
11 together a very useful document. I think there's some
12 areas that we can effectively comment on.

13 And I hearken back because I think the
14 issue of hot short during fires can not be neglected.

15 There needs to be, I think, the reviewers and the
16 licensees need to be alerted to that issue.

17 I remain a little concerned about how
18 we're going about identifying accident sequences.
19 Because I think the Agency has a rule, whether it be
20 facilities or reactor, tends to downplay injuries
21 relative to fatalities. And I think that's unwise to
22 do.

23 CHAIRMAN RYAN: Okay. Thank you.

24 Dr. Bley, are you still on the phone?
25 Dennis?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 DR. BLEY: I am. But I was muted. I
2 started talking. You couldn't hear me.

3 Yes. Just a couple of things. Kind of
4 general comment.

5 As I read through the document there's ,
6 the responsibility for review sections don't tell
7 whose whose got to review it. And it's licensing not
8 PMs, and various engineers, and health physicists, and
9 inspectors. I don't see anything about operators and
10 maintenance, people with maintenance experience. And
11 it seems to me that's a bit of a gap.

12 Because it's hurt us in other areas when
13 that kind of expertise isn't involved in the review.
14 And you get surprised. And, you know, one says, "Well
15 the designers will certainly do that." And well they
16 don't always do that either. And many incidents of
17 various sorts we've seen in many facilities are
18 facilitated because you didn't have that kind of
19 knowledge input in to the design and in to the
20 reviews. So I think that's a bit of a gap.

21 I go along with Dana but I think is
22 broader than just the hot short issue.

23 The issue of dependency bothers me a bit.
24 And the fact that there's not a systematic way to
25 chase them is troublesome. And well designed

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 facilities of all sorts, once you make yourself fairly
2 immune to single failures of one sort of another, the
3 things that get you in trouble tend to be the things
4 that create dependencies and wipe out some of the
5 protection you thought you had in place.

6 And it just seems, as we go forward
7 looking at new facilities, you ought to give some
8 thought to building a structured way to address that.

9 I know it's a tough problem and I know having the ISA
10 instead of a PRA, you know, several of those folks
11 talked about how complex it is and you have to do
12 these horizontal and vertical cuts to do any review.

13 I think back to when WASH-1400 was in
14 progress. And partly through they had a massive fault
15 tree. One fault tree for all of risk. And you
16 couldn't find anything. It was, it may have been
17 right, but you couldn't prove it was right. You
18 couldn't find the things you wanted to check. And
19 Saul Levine, Norm Rassmussen, after talking to the
20 folks who did decision analysis, came up with the idea
21 that of the event trees to help organize it.

22 Seems to me, one thing we're missing here
23 is some structure to facilitate understanding and
24 review. And that's not something you'll do in this
25 revision. But it's something that deserves some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 thought.

2 On top of that, not having an integrated
3 quantification. Even when people do quantification
4 means you can't use an overall quantification to help
5 you look for things that are important. So that kind
6 of structure could be much more helpful.

7 And finally, that note I made earlier.
8 There's no effort here to integrate safety and
9 security. When you come back for your final, even if
10 you don't do it, if there's some lip service to it I
11 think it would be helpful. Because otherwise, it's
12 never going to make it in to the process.

13 That's my summary. Oh, except for saying
14 it's a great document. There's a lot of good
15 information. And the appendices are very rich. And I
16 think that's going to be helpful. And I think it's a
17 great job.

18 CHAIRMAN RYAN: Sam.

19 MEMBER ARMIJO: I think it's a great job
20 as well.

21 I think, having worked in a regulated
22 facility in the past, I think, the issue that I take
23 exception to what Dana said about injuries. There,
24 all of facilities, unless I'm wrong, but, are subject
25 to all the conventional industrial safety requirements

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and have active industrial safety programs. And those
2 things are really address minor injuries. Anything
3 form paper cuts to safety shoes to you name it. I
4 think this focuses properly on the big ticket issues.
5 Criticality safety and chemical safety.

6 MEMBER POWERS: So you don't mind somebody
7 being blinded by a chemical accident.

8 MEMBER ARMIJO: No.

9 MEMBER POWERS: Well, that's what you're
10 saying. Is that, it's not a big ticket item.

11 MEMBER ARMIJO: No. I think blindness is
12 a big ticket item. I don't want anybody to think
13 that.

14 MEMBER POWERS: It's an injury.

15 MEMBER ARMIJO: It's an injury. It's an
16 injury that is that is addressed in, separate from
17 this program, in the industrial safety programs that
18 all of these facilities have. At least the ones I'm
19 familiar with. And so, you know, you, it's, I think,
20 those things are not the focus of this program. And I
21 don't think they should be.

22 That's all I have.

23 CHAIRMAN RYAN: Okay. Anyone else?

24 John.

25 MR. FLACK: Well the only question we had,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 I guess, left on the table is, where is it going to go
2 with respect to reprocessing facilities? And that's
3 going to be a separate regulation. That's our
4 understanding. And whether or not the same methods
5 apply. It's still being questioned at this point. Is
6 that correct?

7 MR. TSCHILTZ: Yes. Separate regulations.
8 Separate regulatory guidance that goes along with
9 that.

10 CHAIRMAN RYAN: That will be the next
11 chapter.

12 MEMBER ARMIJO: A new SRP?

13 CHAIRMAN RYAN: I think that's important
14 for us to recognize that whatever we put together up
15 to, you know, that is recognized, that's separate.

16 Well Cinthya, and Dennis, and Michael, and
17 everybody, thank you very much for a very rich
18 afternoon. We really appreciate the detail you
19 provided to us. We think it's been very helpful.

20 I'd ask all the members to write up a
21 couple paragraphs on their thoughts, and observations,
22 and any recommendations you can see. And send them to
23 me. And we'll start turning them in to a report for
24 the full committee. And it's been a -- turning all of
25 that in to -- so, I'm not sure we'll end up on

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 schedule. I'm going to guess because of the compact
2 schedule we have in December already that it might be
3 February. But we'll keep you up to date as that as
4 that evolves. All right.

5 Again, thanks very much.

6 Any other questions or comments from the
7 members of the public members or others in the
8 audience that wish to make any comments or statements
9 at this time?

10 Hearing none, we're adjourned for the
11 afternoon.

12 Thank you very much for your time and your
13 work.

14 (Whereupon, the above-entitled matter
15 was concluded at 4:16 p.m.)

16
17
18
19
20
21
22
23
24
25

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

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



Advisory Committee on Reactor Safeguards Meeting of the Subcommittee on Radiation Protection and Nuclear Materials
Wednesday, November 4, 2009

Presenters:
Michael Tschitzl
Dennis Damon
Cinthya Román

Agenda

- Opening Remarks
- Overview of changes to NUREG-1520
- Changes to Chapter 3, Integrated Safety Analysis (ISA) and ISA Summary
- Regulatory Experience with ISA & ISA Summary
- Comments from the Industry
- Summary
- Questions/Comments

Opening Remarks

Michael Tschiltz



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

Overview of Changes to NUREG-1520

- Improve linkage of review content to regulatory requirements
- Incorporate Interim Staff Guidance positions and update references
- Incorporate Lessons Learned from licensing experience and provide technical clarifications
- Added a new subsection: "Review Interfaces"
- Reformatting of chapters for consistency with NUREG format
- Added additional guidance, clarification, and references for meeting regulatory requirements
- Removal of redundant and vague guidance, non-requirements and commitments to follow the regulations



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



United States Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards

Introduction

- NUREG-1520 Applicability 
 - Title 10 of the Code of Federal Regulations Part 70
 - Critical mass of special nuclear material
 - This guidance does not apply to:
 - Conversion facilities
 - Gaseous diffusion plants
 - Reprocessing facilities
 - Plutonium processing facilities
- IROFS Boundary Package Definition 
 - To facilitate the planning and accomplishment of a risk-informed ORR
 - Not required to be submitted with the license application or the ISA Summary
- Level of Detail 
 - The design doesn't have to be final
 - Identification of all IROFS is necessary



Chapter 4: Radiation Safety

- Revisions to Chapter 4 include:
 - Addition of Section 4.4.8 “Control of Radiological Risk Resulting from Accidents”
 - Addresses the need for additional clarification regarding ISA Summary review
 - Formally incorporate draft ISG-2 (Accident Sequences That Result in Consequences Below 10 CFR 70.61 Performance Requirements) relevant to RP



Chapter 5: Criticality

- Revisions to Chapter 5 include
 - Expanded discussions of Nuclear Criticality Safety Program, code validation, technical practices and use of standards
 - Provided additional guidance for Safety Program review
 - Provided additional pointers to other SRP chapters for guidance for interacting with other technical disciplines
 - Provided reference to discussions on level of detail, (Chapter 3) and the reasonable assurance standard and the role of the ORR. (introduction)
 - Incorporated ISG-03: Nuclear Criticality Safety Performance Requirements, and description of Double Contingency Principle



Chapter 6: Chemical Safety

- Revisions to Chapter 6 include:
 - Clarification/reference of regulatory requirements to review content.
 - The areas of review were divided in the following subsections:
 - Chemical process description
 - Chemical accident sequences
 - Chemical accident consequences
 - Chemical process IROFS and sole IROFS
 - Chemical process management measures



Chapter 7: Fire Safety

- Revisions to Chapter 7 include:
 - Addition of a subsection to section 7.4.3.2 regarding deviations from NFPA codes and standards and added clarification concerning the “authority having jurisdiction” (AHJ).
 - Section 7.4.3.3 rewritten to incorporate a listing of specific information likely to be required for the staff to review the fire safety aspects of the facility design.
 - Section 7.4.3.4 modified to include criteria for ISA review of fire initiated accident sequences and associated IROFS and management measures.
 - Added wording to provide example findings to reflect wording of recent staff SERs.

Chapter 9: Environmental Protection

- Revisions to Chapter 9 include:
 - Removal of almost all details about NEPA reviews and preparation of EAs and EISs since they are addressed in detail in NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.
 - Added more detailed language for different categorical exclusions that we use most often.



Chapter 11: Management Measures

- Revisions to Chapter 11 were minor:
 - Section 11.2 was updated to reflect current practices for assignment of responsibility for review.
 - Sections 11.3 and 11.4 were updated for internal consistency
 - Added additional information for new facilities.

Chapter 3, ISA & ISA Summary

Dennis Damon



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

Background

- 10 CFR Part 70, Subpart H required ISA
 - Joint consideration of chemical, nuclear criticality and fire safety.
- Process Hazard Analysis (PHA)—systematic identification of accident that could lead to high or intermediate consequences to workers or the public.
 - high consequences: > 100 rem to worker, > 25 rem to public, chemical accident that could “endanger the life of a worker”, serious chemical effects to public.
 - intermediate consequences: > 25 rem to worker, >5 rem to public, serious chemical consequences to worker, mild transient health effects to public.
- Most licensees use structured PHA method such as HAZOP. 1 uses fault trees, 1 event trees.

Background (cont'd)

- Identification of Items Relied On For Safety (IROFS) used to prevent or mitigate these accidents so that each “high consequence” event is “highly unlikely”, and each “intermediate consequence” event is “unlikely”.
- Licensees define “highly unlikely” and “unlikely”. Some facilities define these quantitatively or semi-quantitatively. Typical values: 10⁻⁴ to 10⁻⁵ per year per accident sequence.
- For uranium facilities (not MOX) main accident types are: For workers - inadvertent nuclear criticality, hazardous chemical exposure – inhalation or skin exposure. Typical accident: 1 or 2 worker fatalities. For public – large hazardous chemical release.

Background (cont'd)

- ISA Summary submitted to NRC, updated annually. Only a selected subset of process designs and ISA analyses are reviewed in detail by NRC staff. ISAs are not peer reviewed. Process designs are proprietary.
- Risk to individuals is not summed over accident sequences.
- Not all formal safety controls are declared as IROFS, hence would not be listed in the ISA Summary.



Chapter 3: ISA & ISA Summary

- Revisions to Chapter 3 include:
 - Provided additional guidance more directly applicable for licensing of new facilities, as opposed to facilities that were constructed/licensed prior to the Subpart H revision of 10 CFR 70 requiring ISAs (current version of NUREG-1520 is focused primarily on existing facilities).
 - Provided additional guidance on the extent to which the review and approval is programmatic, as opposed to a design review.
 - 10^{-4} in a few places was a typographical error.



Chapter 3: ISA & ISA Summary (cont'd)

- Provided additional guidance on what constitutes an acceptable “level-of-detail” for descriptions of facility processes and Items Relied on for Safety, sufficient for licensing approval.

“For an applicant seeking a license before commencing construction of a facility, full details concerning hardware, procedures, and programs usually would not exist. However, at the time of the operational readiness review [\[1\]](#) for a new facility, or major modifications to an existing facility, such details must exist to comply with the safety program requirements of 10 CFR 70 Subpart H,The level of detail that is acceptable in a license application and ISA Summary does not differ between existing and new facilities.”



Chap. 3 ISA (cont'd)

- Level-of-detail (cont'd)

“10 CFR 70.65(b) ..integrated safety analysis summary...

(6) A list briefly describing each item relied on for safety which is identified pursuant to §70.61(e) in sufficient detail to understand their functions in relation to the performance requirements of §70.61.”

SRP page 3-8: “The requisite level of detail to achieve reasonable assurance may vary among processes depending on factors such as: use of established technology, commitment to standards, applicant expertise, safety margins, and inherent difficulty in achieving the safety function.”

Chap. 3 ISA (cont'd)

- Extent to which review is programmatic
- SRP page 3-8: “It should be noted that the purpose of the review, and its acceptance criteria, for most facilities, is primarily to permit a finding that the applicant’s safety program, including the ISA program as described, provide reasonable assurance that compliance will be achieved.”

Chap. 3 ISA

- Programmatic Review

However, see p. 3-32 on vertical slice reviews. These necessarily examine compliance for particular processes and IROFS in detail.

List of IROFS must be complete.

Chapter 3: ISA (cont'd)

- Provide additional guidance on acceptable methods of evaluating likelihood. Consists of previously developed Interim Staff Guidance:
 - Annex to Appendix A: Use of Appendix A Risk Index Methodology
 - Appendix B: Qualitative Criteria for Evaluation of Likelihood (ISG-1)
 - Appendix C: Initiating Event Frequency (ISG-9)



Chapter 3: ISA & ISA Summary (cont'd)

- New Appendices incorporate ISGs exactly as previously published:
 - Annex to Appendix A: Use of Appendix A Risk Index Methodology
 - Appendix B: Qualitative Criteria for Evaluation of Likelihood (ISG-1)
 - Appendix C: Initiating Event Frequency (ISG-9)
 - Appendix D: Natural Phenomena Hazards (ISG-8)
 - Annex to Appendix D: Example of Natural Phenomena Hazard Review for Compliance with 10 CFR 70.61.

NRC Experiences with Integrated Safety Analyses



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

Fuel Manufacturing Plants

- Large number diverse unit process
 - UF₆ hydrolysis to uranyl fluoride
 - Calcining to UO₂
 - Additive blender
 - Ball milling
 - Pellet press
 - Sintering furnace
 - Pellet grinding
 - Fuel pin loading
 - Gas load and welding
 - Assembly
 - Scrap recovery
 - CaF₂

License Review and ISA

- Review purpose: compliance with 10 CFR 70 Subpart H
- Subpart H requires safety program with many elements
- Integrated Safety Analysis (ISA) is one element
- ISA Summary is just what is submitted to the NRC

ISA Licensing Issues: New Facilities

- Completeness – all Items Relied On For Safety (IROFS)
- Level of Detail – in IROFS descriptions
- Review of the ISA element of the safety program
- Above issues being addressed in proposed revisions to NUREG-1520, Standard Review Plan.

10 CFR 70.61(e)

- “Each engineered or administrative control or control system necessary to comply with paragraphs (b), (c), or (d) of this section shall be designated items relied on for safety. ...”

Completeness of ISA Reviews

- Accidents screened as not credible:
 - based on controls - see 10 CFR 70.61(e)
 - Based on other rationale
- Credible accidents not identified in ISA
 - Chemical exposures other than inhalation
 - Screening out whole process areas
- IROFS boundaries need to be defined

Other Lessons from ISA Reviews

- Dependent administrative controls treated as independent
- IROFS with shared components – accident sequence with failure of shared component
- Failure of electrical power required for IROFS not always addressed
- But many such IROFS are fail safe

Other Lessons from ISA Reviews

- Duration Index – should be used for duration of vulnerability to further events leading to an accident due to failure or unavailability of an IROFS.
- Interim Staff Guidance (ISG) 1 and 9 address some of these ISA-related lessons

Other Lessons from ISA Reviews

- Need for guidance on high and intermediate consequence levels for soluble uranium toxicity
 - Public high consequence: 30 mg soluble U

Paths Forward

- Proposed revisions to NUREG-1520 incorporate many ISA lessons
- Soluble U Working Group – Reg. Guide
- Project to revise oversight program to make use of risk insights from ISAs
- Continuous improvement of ISAs based on experience as updates occur

Feedback and Comments from the Public

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

Reference:

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



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

Summary

- No new technical positions
- No new staff positions
- Better linkage between review sections and the regulations
- Incorporates previously established Interim Staff Guidance positions

Schedule

- Comment Period Ends: October 24, 2009.
- Comment Resolution: December 2009
- ACRS Briefings: November & December 2009/February 2010.
- Final SRP Publication: April 2010

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/>

Questions?



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

Appendix



*Office of Nuclear Material Safety and Safeguards
Division of Fuel Cycle Safety and Safeguards*

IROFS Boundary Packages Definition

- Documents that contain the physical descriptions and parameters of structures, systems, components which are used to meet the performance requirements of 10 CFR 70.61. Boundary packages are also prepared for administrative procedures or worker actions which are defined as IROFS. The boundary packages identify the specific functions to be performed by an IROFS and identify any items that may affect the function of the IROFS. The boundary packages also identify the facility areas in which the IROFS is used, design and functional attributes, management measures, any open items, and supporting documentation (i.e., P&IDs, schematics, etc.).
- Design and functional attributes should include safety functions such as separation from other IROFS; redundancy and diversity; fail-safe design; setpoints; environmental qualification; seismic qualification; and fire protection. Also included under design and functional attributes should be system interfaces such as instrumentation, electrical, cooling, and lubrication requirements.
- Management measures should address all of the management measures required to be applied to IROFS as per 10 CFR 70.4 and include summary descriptions and/or references to maintenance, training, and procedures documents as appropriate for the IROFS. The references should be adequate to identify the actual working level training or procedures document.
- Open items which affect reliability and/or effectiveness of the IROFS should be closed by the time of the ORR. The open items section should identify open items associated with the IROFS during the review and describe how the open items were resolved.



Level of Detail

- Level of Detail
 - The level of detail required for a licensing decision does not require a final facility design, however identification of all items relied on for safety (IROFS) and possible accident sequences is necessary to make a licensing decision
 - Even though detailed information about each IROFS is not required, sufficient information has to be provided to understand the process, theory of operation, and functions of each IROFS and reasonable assurance that the integrated safety analysis summary is complete.



Applicability of the SRP

- This guidance does not apply to:
 - Conversion facilities (10 CFR 40, Domestic Licensing of Source Material)
 - Gaseous diffusion plants (GDPs) (10 CFR Part 76, Certification of Gaseous Diffusion Plants)
 - Reprocessing facilities
 - Plutonium processing facilities (e.g. MOX Fuel Fabrication Facility)





Chapter 1, General Information, & Chapter 2, Organization and Administration

- Revisions to Chapter 1 and Chapter 2 were minor
 - Information regarding supporting organizations in the review of Section 1.2 was updated.
 - Added language under “financial qualifications” clarifying the acceptance criteria for applications for new facilities.





Chapter 10: Decommissioning

- Revisions to Chapter 10 include:
 - Addition of information regarding conceptual decontamination plan, decommissioning costs and financial assurance.
 - Addition of information regarding record keeping requirements.



Section 4.4.8

- In addition to participating in the integrated review of the ISA summary performed in accordance with Chapter 3 of the SRP, the reviewer should also examine in detail the radiological exposure and/or release accident sequences provided in the ISA summary to demonstrate compliance with 10 CFR 70.61. This review should include an evaluation of sequences involving radiological releases or exposures with respect to the initiators and their frequency, radiological consequences, and IROFS chosen to prevent or mitigate those consequences.
- The reviewer should also identify and note any items or issues that should be inspected during an operational readiness review, if such will be performed. These items may include confirming that engineered controls meet performance specifications described in the ISA summary and that administrative controls are implemented through procedures and operator training.
- The reviewer should ensure that the emergency plan, if one is required, adequately addresses the licensee response to a release of radioactive materials or else that proper justification is present to preclude development of an emergency plan.
- Finally, the reviewer should be aware that accident sequences considered “not unlikely” in the ISA summary are constricted under the 10 CFR Part 20 ALARA requirement to minimize exposure to personnel and the public.



Section 4.4.8 Acceptance Criteria

The factors listed below should be considered in determining the acceptability of the applicant's descriptions of radiological exposure or release accident sequences. The checklist in Appendix 4 has been developed to provide guidance on those items that reviewers should consider when evaluating the completeness of the ISA for radiological risks.

- Accident sequences should be sufficiently described and detailed to allow an understanding of the radiological hazards (e.g., radioactive materials at risk) and the release mechanism.
- The applicant should provide adequate descriptions of the radiological consequences (i.e., exposure estimates) identified in the ISA summary. The reviewer should verify that exposures are reasonable based on the sequence description and the radioactive materials involved and use a methodology consistent with regulatory guidance (10 CFR 70.61).
- The applicant should justify the likelihood of the initiating event, its prevention, or consequence mitigation of an accident sequence with high or intermediate consequences if credited in a questionable or nonconservative manner. If controls are relied on to reduce the likelihood or severity of a high- or intermediate-consequence accident sequence, they should be identified as IROFS (10 CFR 70.61).
- Analyses that the applicant has performed as part of the ISA process should be referenced or identified for potential further review (vertical slice) by the NRC staff (10 CFR 70.61).
- The application should demonstrate the management measures proposed to ensure that IROFS are available and reliable when required by briefly describing both of the following:
 - procedures to ensure the reliable operation of engineered controls (e.g., inspection and testing procedures and frequencies, calibration programs, functional tests, corrective and preventive maintenance programs, and criteria for acceptable test results) [10 CFR 70.62(d)]
 - procedures to ensure that administrative controls will be correctly implemented when required (e.g., employee training and qualification in operating procedures, refresher training, safe work practices, development of standard operating procedures, and training program evaluations) [10 CFR 70.62(d)]
- The application shall include either of the following:
 - an evaluation that demonstrates public exposures resulting from offsite releases of material are less than 1 rem or 2 milligrams soluble uranium intake
 - an emergency plan that includes sufficient detail for responding appropriately to an offsite release of radioactive materials (10 CFR 70.22(i)(1))

