

NUCLEAR REGULATORY COMMISSION

ORIGINAL

Title: Advisory Committee on Reactor Safeguards
Reactor Fuels Subcommittee
MOX Fuel Fabrication Facility

Docket Number: (not applicable)

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

Location: Rockville, Maryland

Date: Friday, November 16, 2001

Work Order No.: NRC-113

Pages 1-202

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

**ACRS Office Copy - Retain
for the Life of the Committee**

TROY

DISCLAIMER

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

November 16, 2001

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

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 (ACRS)

5 REACTOR FUELS SUBCOMMITTEE

6 MIXED OXIDE (MOX) FUEL FABRICATION FACILITY (FFF)

7 + + + + +

8 FRIDAY,

9 NOVEMBER 16, 2001

10 + + + + +

11 ROCKVILLE, MARYLAND

12 + + + + +

13
14 The subcommittee met at the Nuclear
15 Regulatory Commission, Two White Flint North,
16 Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Dana A.
17 Powers, Chairman, presiding.

18
19 COMMITTEE MEMBERS PRESENT:

20 DANA A. POWERS Chairman

21 MARIO V. BONACA Member

22 THOMAS S. KRESS Member

23 GRAHAM M. LEITCH Member

24 WILLIAM J. SHACK Member

25 JOHN D. SIEBER Member

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 ACRS STAFF PRESENT:

2 MAGGALEAN W. WESTON, ACRS Staff Engineer

3
4 ALSO PRESENT:

5 DAVID BROWN

6 FRED BURROWS

7 JOHN CALVERT

8 NANCY FRAGOYANNIS

9 JOSEPH GIITTER

10 TIM JOHNSON

11 ED LYMAN

12 ALEX MURRAY

13 ANDREW PERSINKO

14 TOM PHAM

15 JOHN STAMATOKOS

16 SHARON STEELE

17 CHRISTOPHER TRIPP

18 REX WESCOTT

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

(202) 234-4433

www.nealrgross.com

I N D E X

	<u>AGENDA ITEM</u>	<u>PAGE</u>
1	Introductory Remarks	4
2	MOX FFF Presentation	
3	Introduction	8
4	Safety Analysis	23
5	Radiological Consequences	51
6	Chemical Process and Products	66
7	Nuclear Criticality Safety	82
8	Fire Safety	99
9	Confinement Ventilation	115
10	Electrical	131
11	I&C	143
12	Seismic	155
13	Material Control and Accountability	164
14	Physical Security	172
15	Summary	183
16	Presentation by Ed Lyman, Nuclear Control	187
17	Institute	
18	Discussion and Adjournment	197
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

(202) 234-4433

www.nealrgross.com

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

(8:38 a.m.)

CHAIRMAN POWERS: Let's bring the meeting to order. I apologize for delaying people. We have little administrative matters that have to be taken care of while we have a chance here.

This is a meeting of the ACRS Subcommittee on Reactor Fuels. I'm Dana Powers, Chairman of the subcommittee.

The ACRS members in attendance are: Dr. Bonaca, Dr. Kress will be with us after he does his little administrative chore this morning, Graham Leitch, Jack Sieber, and Bill Shack.

The purpose of the meeting is to discuss the mixed oxide fuel fabrication facility construction authorization. The subcommittee will be gathering information, analyzing relative end issues and facts, and formulating proposed positions and actions as appropriate for deliberation by the full committee.

Maggalean Weston is the cognizant staff engineer for this meeting and the person whose office will be overflowing with paper generated by this project.

(Laughter.)

The rules for participation in today's

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 meeting have been announced as part of the notice for
2 the meeting previously published in the Federal
3 Register on November 2, 2001.

4 A transcript of the meeting is being kept
5 and will be made available as stated in the Federal
6 Register notice. It is requested that speakers first
7 identify themselves and speak with sufficient clarity
8 and volume so they can be readily heard. And I assure
9 you our reporter, in her charming way, will let you
10 know when you fail to comply with those requirements.

11 We have received a request from Mr. Ed
12 Lyman from the Nuclear Control Institute to make an
13 oral statement at today's meeting. We have also
14 received written comments from Georgians Against
15 Nuclear Energy, Atlanta, Georgia. These comments have
16 been distributed to the ACRS members here today, and
17 I encourage the members to examine it. They raise 13
18 issues. It's a fairly quick and interesting read.

19 If members look at the agenda, the
20 statement by Mr. Lyman is not culled out on the
21 agenda. My intention is to call a break at 3:00 and
22 do his statement at the conclusion of that break. Mr.
23 Lyman has spoken to us before, and I think we'll all
24 agree he usually has interesting things to say.

25 We're embarking on looking at a plutonium

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 process facility. This is not the first process
2 facility that's ever been constructed in this country.
3 My own involvement has been with three of them --
4 Rocky Flats, PUREX, and the plutonium finishing plant.
5 I wish I could assure the members that the smooth,
6 non-controversial functioning of these facilities
7 should give us confidence in the ability to prepare a
8 new facility.

9 There are some differences that we do need
10 to recognize. This is going to be a new facility.
11 Whereas the older facilities were designed with short
12 lifetimes and the technology was evolving as they were
13 being operated, this new facility is going to be
14 designed with a 50-year lifetime and a fairly well-
15 established technology.

16 Members are going to find that the safety
17 analyses for facilities are substantially different
18 than what we're familiar with in the reactor world.
19 Members may want to reexamine Part 70 of Chapter 10 in
20 the Code of Federal Regulations. They also might find
21 it of interest to look at the Parts 800 and above that
22 are the codification of some of the DOE orders that
23 give you some insight on how facilities within the DOE
24 world are operated.

25 The committee historically has been very

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 comfortable with the quantification of risk -- going
2 to enter into a less familiar world of safety analyses
3 that are done for process facilities. And these are
4 process facilities that are fairly unusual. It's
5 located on a large government-controlled reservation.

6 That means that risks to the public, as we
7 generally define them, are going to be low because --
8 just because of the distance. On the other hand,
9 there are large populations of people on these
10 government reservations. The last time I looked at
11 the Savannah River site there were 25,000 people
12 working on that site, most of whom will have only the
13 vaguest familiarity with any hazards posed by the
14 mixed oxide fuel fabrication facility.

15 And, consequently, the definition of what
16 we mean by "public" in looking at this facility
17 becomes interesting.

18 Well, with that brief introduction, I
19 think we can proceed with the meeting, unless other
20 members have opening comments they'd like to make. I
21 will begin, and I believe Drew Persinko is going to
22 start us off on this?

23 MR. PERSINKO: Yes.

24 CHAIRMAN POWERS: Drew, the floor is
25 yours.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 MR. PERSINKO: Thank you. My name is Drew
2 Persinko. I am the MOX Project Manager at NRC. I
3 will try -- I will give a brief introduction and will
4 try to move through it quickly, so we can get on to
5 more technical matters.

6 Today we will be speaking about many
7 different topics as we were requested to do -- a
8 little bit about many areas. We will not be speaking
9 about any classified information, nor will we be
10 speaking about any proprietary information. If a
11 question is asked that contains proprietary
12 information as an answer, we will decline to answer.

13 So we have a tight schedule today. We've
14 tried to pack in a lot of information into this
15 schedule. So if we extend in one area, we're going to
16 steal from another area.

17 CHAIRMAN POWERS: Yes. I think you use
18 your judgment on this. This is -- I mean, we're
19 looking at this mostly as an introduction to the
20 subject. One of the things that the committee is
21 going to have to do at the end of the meeting is try
22 to decide when we bring the -- what and how much
23 material when we bring to the full committee.

24 You've got a substantial fraction of us
25 here, so you can tell there's a lot of interest in

NEAL R. GROSS

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

1 this new activity.

2 MR. PERSINKO: Okay. Next slide, please.

3 Start off with a brief history. I'll go
4 through it quickly. You've heard some of this before
5 in an earlier presentation that we made, I think it
6 was last February.

7 The reason for the facility is a U.S.
8 agreement with Russia, whereby each party, each
9 country has agreed to dispose of 34 metric tons of
10 plutonium. The policy is being implemented through
11 the Department of Energy. The Department of Energy
12 has decided to convert some of the excess plutonium to
13 MOX fuel; 25 metric tons will be converted to MOX
14 fuel.

15 The DOE has contracted with Duke Cogema,
16 Stone & Webster, whom we will -- we use the acronym
17 DCS -- to build and construct and operate the facility
18 located at the Savannah River site in Aiken.

19 I'd also like to state that at the current
20 time the Bush administration is currently reviewing
21 all of the plutonium disposition programs within the
22 Department of Energy. And it's possible at the
23 conclusion that some elements of the program may
24 change. But at the current time, staff -- the NRC
25 staff is continuing to review the project at the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 current schedule.

2 Next slide, please.

3 This is an overview, high-level depiction
4 of the flow of material, weapons-grade plutonium
5 coming into the Savannah River site, first coming to
6 a pit disassembly and conversion facility, which will
7 be under the jurisdiction of the Department of Energy
8 and not NRC.

9 From there, the plutonium oxide powder
10 goes to the MOX fuel fabrication facility, and then to
11 the reactors. The plan is that the MOX fuel fab
12 facility will process approximately -- assuming staff
13 approval, will process approximately 70 metric tons of
14 heavy metal per year.

15 Next slide, please.

16 This is an artist's depiction of the
17 proposed facility from the applicant's construction
18 authorization request. The main building is
19 approximately -- the footprint is about 400 by 400 by
20 about 65 feet above grade. The main building
21 comprises of three areas within the building, one
22 being the aqueous polishing area, one is the
23 shipping/receiving area, and one is the MOX processing
24 area, which we'll get into a little bit here.

25 CHAIRMAN POWERS: And this is all in F

NEAL R. GROSS

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

1 area?

2 MR. PERSINKO: All in F area. Next slide,
3 please.

4 This is a map of the Savannah River site.
5 You can see that the MOX fuel fabrication facility is
6 shown in F area. This is the -- the red line around
7 the outside is what the applicant has proposed to be
8 the controlled area boundary. You mentioned earlier
9 about there is a significant amount of Department of
10 Energy personnel on site, which there are.

11 The Part 70 regulation allows the
12 applicant to choose the controlled area boundary at a
13 location between the restricted area and the site
14 boundary, and the applicant in this case has chosen
15 Savannah River site boundary as its controlled area.
16 The Part 70 regulation does have provisions in it you
17 may have read about how the Department of Energy
18 personnel should be treated with respect to the
19 performance requirements in 70.61.

20 It has to do with training, so that they
21 do become aware of the hazards associated with the MOX
22 facility. But we can go into that in much more detail
23 if you'd like at --

24 CHAIRMAN POWERS: It's quite a question to
25 my mind how much this committee really wants to get

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 into that argument. I have endured those arguments
2 within the Department of Energy itself for worker
3 protection. There's a real question in my mind,
4 though, whether that's a useful use of this
5 committee's time. I think it's an interpretation of
6 the regulations.

7 I have my interpretation. It's
8 undoubtedly different than the applicant's. But I'm
9 not sure I have -- I'm not sure the Commission is
10 looking to me to get advice in that area.

11 What you might want to point out is
12 there's a public road going through this.

13 MR. PERSINKO: Yes. There are public
14 roads running in that area, and I believe that area
15 right there is a public road. There are public roads
16 that transverse the site.

17 I guess I'll have to point out, too, that
18 the MOX fuel fab facility is approximately five to six
19 miles to the nearest controlled area boundary site.

20 Next slide, please.

21 This is a high-level view of the process.
22 Alex Murray will get into the chemical process in more
23 detail when he speaks, but this is a high-level view
24 of it. This is the part known as the aqueous
25 polishing part of the process. It's based on various

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 processes that are in place at the LaHague facility in
2 France. It's similar to the PUREX process in many
3 ways.

4 It consists of a dissolution phase where
5 the plutonium oxide is dissolved in nitric acid, a
6 purification stage whereby Americium and gallium and
7 other impurities are removed via pulse columns and
8 solvent extraction. And then it's converted back to
9 a plutonium oxide and transferred to the next phase of
10 the process.

11 Next slide, please.

12 CHAIRMAN POWERS: I'll learn lots about
13 red oil here.

14 (Laughter.)

15 MR. PERSINKO: And Alex will be happy to
16 talk to you about that.

17 (Laughter.)

18 Okay. The next phase is the actual -- the
19 fuel fabrication process. This is based on the
20 process that's currently in use at the MELOX facility
21 in Marcoule, France. Both, like I said, the aqueous
22 polishing and this are based on processes in France.
23 Some of the components will be exactly the same, some
24 will be different, but the basic processes are
25 involved -- are similar.

NEAL R. GROSS

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

1 The applicant is doing what it has called
2 Americanization, which means trying to take the
3 designs that are in France and showing that it meets
4 U.S. codes and standards.

5 CHAIRMAN POWERS: Excuse me. A couple of
6 things here that pop immediately to mind is that there
7 is an accumulation, it seems to me, at some point in
8 the 20 percent blend here before we get into the
9 blending to form the pellets. So there is -- I mean,
10 there is more complexity in this step here.

11 The other thing is that some of the
12 technology that's just recently come to the fore is
13 being applied in this. It's the ultramicroization
14 and things like that to get a little -- a better
15 distribution in the fuel.

16 MR. PERSINKO: Yes. As you were saying,
17 the first process is a blending. It's a two-step
18 blending process. After each phase there is ball
19 milling, homogenization of the material, and it uses
20 what's known as -- you referred to the MIMAS process
21 in France.

22 It's pressed into pellets, sintered in
23 ovens, and assembled into rods and assemblies, similar
24 to -- the process is -- that part of it is similar to
25 the uranium processing facilities.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Next slide, please.

2 This is just an overview of all of the
3 regulations that apply to the facility, just to let
4 you know that there's more than just Part 70. But
5 today we'll be speaking primarily about Part 70.
6 We'll get into some others when we talk about
7 safeguards and security, but --

8 CHAIRMAN POWERS: You've left Part 20 off.

9 MR. PERSINKO: You're absolutely right.

10 (Laughter.)

11 Part 20 should be added. It's a very
12 important one.

13 Okay. Next slide, please.

14 Yes, we put a lot of pictures onto the
15 slides. They didn't quite fit onto one floppy, so we
16 had to split it up.

17 Okay. So the primary regulation that we
18 will be discussing today is 10 CFR Part 70. Part 70
19 allows a two-step process to be -- a two-step
20 licensing process, one for construction and one for
21 operation. We are currently reviewing the
22 construction application that was provided to us that
23 was submitted by Duke Cogema, Stone & Webster, the
24 applicant.

25 Next slide.

NEAL R. GROSS

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

1 Concerning construction, Part 70 requires
2 that the design -- that in order for the applicant to
3 move forward with construction, the NRC must approve
4 the design bases of the principal structures, systems,
5 and components, the quality assurance plan, and also
6 complete an environmental impact statement.

7 We are in the process of working on the
8 environmental impact statement. We have issued a
9 quality assurance -- a safety evaluation report
10 concerning the quality assurance plan.

11 Next slide, please.

12 We are using the definition of design
13 bases from 50.2, which consists of functions and
14 values primarily.

15 Next slide.

16 With respect to operation, you had quite
17 a presentation on this on Wednesday. But, once again,
18 with respect to operation, the applicant will be
19 required to submit an integrated safety analysis.
20 Part 70 requires that an ISA be submitted, that the
21 NRC approve the ISA summaries. It also has provisions
22 to identify the items relied on for safety, and I
23 think you're familiar with that term, commonly
24 referred to as IROFS, and then management measures to
25 assure that the IROFS are available and reliable.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Those are the three main ones, but there
2 is a host of other items that must be also submitted
3 with the operational application, such things as
4 physical protection plan, material accounting plan.

5 One thing I'd like to say at this point,
6 though, is for the construction phase the regulations
7 talk about principal structures, systems, and
8 components, and safety analysis. At the operations
9 stage, it talks about integrated safety analysis and
10 the IROFS, items relied on for safety.

11 There's an analogy there, but there are
12 different terms that apply to it. We sometimes forget
13 ourselves and use the terms interchangeably. But I
14 would like to state that when we talk about
15 construction we are really meaning principal
16 structures, systems, and components.

17 CHAIRMAN POWERS: We will be equally
18 sloppy.

19 (Laughter.)

20 MR. PERSINKO: Next slide, please.

21 This is a depiction of the performance
22 requirements, which is the -- in 70.61. You heard
23 about them on Wednesday. This is shown -- the
24 performance requirements are shown in matrix form.
25 Basically, if you have unmitigated doses to the public

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 or the workers that fall into different consequence
2 bins, you have to have associated likelihoods with it.

3 These areas -- for example, if an
4 unmitigated consequence and a certain likelihood fall
5 in this bin, you either have to provide -- the
6 applicant must provide -- must identify items,
7 principal SSCs or items relied on for safety,
8 preventive IROFS, which would take it into this
9 direction, or mitigative IROFS, which would lower it
10 into this direction. But, basically, the regulations
11 require that you -- after application of the IROFS,
12 you do not exist in those bins.

13 CHAIRMAN POWERS: One of the challenges
14 I'm sure we're going to come up with is understanding
15 the role or the application of defense-in-depth
16 philosophies to this, which may well be interpreted by
17 at least some as a balance between preventive and
18 mitigative activities. Can you comment on that?

19 MR. PERSINKO: Well, the applicant, for
20 certain scenarios such as criticality, has committed
21 to prevention rather -- as opposed to mitigation. In
22 other cases, it has relied on mitigative features.
23 Rex Wescott, when he speaks about the safety analysis
24 part, will get into more of this.

25 What I'd just like to say also -- the

NEAL R. GROSS

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

1 performance requirements that are shown up here really
2 apply to the operations phase. When Part 70 was
3 formulated, it was -- we were thinking operations
4 phase at this point. So they really applied to
5 operations. However, they are also being used by the
6 applicant in identifying principal structures,
7 systems, and components at the construction phase,
8 although the regulations do not require that.

9 At the construction phase, the applicant
10 is identifying the principal SSCs at a systems level,
11 and then at the operations phase the applicant intends
12 to identify IROFS at a component level.

13 Next slide, please.

14 This is a quick overview of the activities
15 that the staff has done to date, has completed to
16 date, or is in progress. Has completed to date -- we
17 issued a standard review plan, NUREG-1718. We've
18 established a website, although I don't think it is
19 currently -- because of the -- I don't think it's
20 currently usable right now, but it was a very good
21 website.

22 (Laughter.)

23 And hopefully we'll have it back online at
24 some point.

25 We've had numerous technical meetings on

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the subject, some of which were in Aiken, in South
2 Carolina near the site. We have had also public
3 meetings with members of the public, especially in the
4 EIS -- in the environmental area, both in South
5 Carolina and North Carolina. We had environmental
6 scoping meetings down there in Charlotte as well as
7 the Aiken area.

8 CHAIRMAN POWERS: None in Georgia.

9 MR. PERSINKO: We had them in -- well, we
10 had them near Aiken, North Augusta, South Carolina,
11 which is just across the border from Georgia.

12 MR. GIITTER: And one in Savannah.

13 MR. PERSINKO: Oh, one in Savannah.
14 That's right. That's right. Thank you. We did have
15 one in Savannah. That's right. Savannah being
16 downstream of the plant along the Savannah River.

17 And we have issued a request for
18 additional information. We issued that last June.
19 The applicant has responded to our 239-question RAI,
20 a very interesting number.

21 CHAIRMAN POWERS: That's why Mag is
22 applying for a bigger office.

23 (Laughter.)

24 MR. PERSINKO: And the applicant has
25 responded to that -- to those 239 questions. We are

NEAL R. GROSS

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

1 currently discussing some of those responses with the
2 applicant because of additional or clarifications as
3 well. We are currently in that process right now.

4 We've had public meetings on this -- on
5 certain RAIs, and we have visited the offices to
6 review certain in-house -- in-office supporting
7 documents that the applicant has. That's where we
8 currently are.

9 Next slide, please.

10 A high-level view of our schedule up
11 through -- near-term schedule, I should say. The
12 environmental report was received in December of 2000.
13 The application for construction -- the construction
14 authorization request -- was submitted in February of
15 '01. We intend to issue a draft EIS in February of
16 '02 and a draft construction SER in April of '02.

17 The applicant has indicated that it will
18 submit an application for operation of the fuel fab
19 facility in July of '02, and our plans are to issue a
20 final EIS and construction SER in October of '02.

21 Next slide, please.

22 These are just some of the considerations
23 that we are currently dealing with within the staff.
24 We're using 10 CFR Part 70. It was revised fairly
25 recently, about a year ago. And it's the first time

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 it's being applied in total from start to finish for
2 our new facility.

3 We also have -- since this is a two-step
4 licensing process, we are working on design bases. So
5 we have many interesting discussions concerning what
6 is the appropriate level of detail with respect to
7 design bases.

8 Another issue -- another consideration is
9 that this is a plutonium facility. It's been quite
10 some time, maybe about 25 years, since the staff has
11 reviewed such an application. We are also -- let's
12 not -- in addition to the technical safety analyses
13 being performed, we are also in the process of writing
14 an environmental impact statement. And there are also
15 public hearing -- requests for public hearing, and the
16 technical staff is supporting the Office of General
17 Counsel in that respect.

18 And that completes my presentation. With
19 that, I would like to turn it over to Rex Wescott, who
20 will talk about the safety analysis portions.

21 CHAIRMAN POWERS: Well, I'll just
22 interject we'll -- I think we could have an
23 interesting discussion on this issue of design bases
24 and design alternatives, because it's a -- it's
25 remarkable how many of these processes I've actually

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 seen before. I mean, these are fairly geriatric
2 approaches to mark what little progress has been made
3 in the last 20 years.

4 MR. WESCOTT: Good morning. My name is
5 Rex Wescott, and I'm the safety analysis reviewer, and
6 I'll be describing the safety analysis review which is
7 primarily the review of Chapter 5 of the construction
8 authorization request for the MOX fuel fabrication
9 facility.

10 Next slide?

11 The purpose of this slide is to give you
12 an idea of the scope and organization of my
13 presentation. I want to note that the applicant
14 refers to the safety analysis provided in Chapter 5 as
15 the safety assessment of the design basis, which is
16 also the terminology from our SRP. And this is the
17 terminology which I will use in referring to the
18 applicant's analysis.

19 I wish to note that the objectives of the
20 safety assessment and the tasks listed to meet those
21 objectives were developed by the applicant and are
22 presented here to better describe what is being
23 reviewed by the staff.

24 I will also talk about the NRC's safety
25 analysis review responsibilities, which include a

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 little bit more than just Chapter 5 review, an
2 overview of the MOX safety assessment, a little bit of
3 quantitative information about what it all entails,
4 and the status of the MOX safety assessment review to
5 date.

6 Next slide?

7 The major objectives of the safety
8 assessment are as follows: to identify the hazards
9 and events associated with the MOX fuel fabrication
10 facility design and operations. That's the first step
11 to figure out what the hazard and events are. The
12 second objective is to identify the principal SSCs
13 required to mitigate or prevent these events and their
14 specific design bases.

15 MEMBER KRESS: Are those the same as
16 IROFS?

17 MR. WESCOTT: At this point, no. This is
18 at the systems level, and I'll get into IROFS a little
19 bit later. Right now we're primarily dealing with
20 principal structures, systems, and components. I
21 guess that's consistent with Drew's explanation.

22 And the third objective is to provide
23 reasonable assurance that the identified principal
24 structures, systems, and components can reduce the
25 risk to a level consistent with 10 CFR 70.61, through

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 the adoption of a general design philosophy, design
2 bases, system designs, and a commitment to appropriate
3 management measures.

4 The significance of that is that the need
5 to consider the design philosophy and commitment to
6 management measures is a reflection of the early state
7 of the design at the construction authorization stage.
8 At this point, we really don't have the quantitative
9 reliabilities or the procedures to assure them that
10 could allow us to be more quantitative.

11 MEMBER SHACK: On 70.61, this matrix that
12 we were shown earlier is from 70.61?

13 MR. WESCOTT: That is correct. That
14 reflects the requirements of 70.61.

15 MEMBER SHACK: So that is the codified --

16 MR. PERSINKO: You won't see the matrix
17 itself in 10 CFR --

18 MEMBER SHACK: No. But I will see the --
19 these numbers --

20 MR. PERSINKO: Yes.

21 MEMBER SHACK: -- the low consequence
22 doses is --

23 MR. PERSINKO: Yes.

24 MEMBER SHACK: -- 25 rem for the worker.

25 CHAIRMAN POWERS: Yes. You can construct

NEAL R. GROSS

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

1 the matrix from that.

2 MR. PERSINKO: Right.

3 MEMBER SHACK: Is there a numerical value
4 associated with highly unlikely and likely?

5 MR. WESCOTT: At this point, what the
6 applicant has done, basically, in response to one of
7 our RAIs, has committed to an index as we've described
8 indexes in Appendix A of the SRP, an index of minus
9 five, which we -- and this is, incidentally, just for
10 the public and the site workers. It is not for the
11 facility workers.

12 He has committed to an index of minus
13 five, which we take as approximately a probability of
14 10^{-5} per year, not exactly, you know, in a sharp
15 regulatory sense, but kind of a neighborhood
16 approximate goal.

17 MR. PERSINKO: The regulations themselves,
18 though, Part 70, do not specify a numerical number
19 with the likelihoods.

20 MR. WESCOTT: For the facility worker, the
21 licensee has committed to more or less qualitative
22 descriptions that should ensure a likelihood of -- we
23 would estimate in that neighborhood, such as defense-
24 in-depth and a commitment to quality assurance. I
25 can't remember all the commitments, but they are

NEAL R. GROSS

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

1 basically qualitative commitments that followed in the
2 nuclear industry that should provide for a very high
3 level of protection.

4 MEMBER SHACK: It just seems like a worker
5 dose of 25 rem is not being unlikely is acceptable
6 just --

7 (Laughter.)

8 If I walked into a national lab and told
9 them that I was going to, you know, give my hot cell
10 worker a 25 rem dose --

11 CHAIRMAN POWERS: You'd walk right back
12 out again.

13 (Laughter.)

14 MR. WESCOTT: Well, certainly, it's
15 attempting to make it very -- you know, highly
16 unlikely.

17 MEMBER SHACK: But it says not unlikely is
18 acceptable.

19 MR. WESCOTT: Not unlikely is acceptable.

20 MEMBER SHACK: Yes. It says low
21 consequence, worker dose --

22 MR. WESCOTT: Oh.

23 MEMBER SHACK: -- I guess he can have
24 24.9 --

25 MR. WESCOTT: I see what you're talking

NEAL R. GROSS

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

1 about. Well --

2 MR. PERSINKO: One thing to remember I
3 think is that those doses are with respect to the
4 performance requirements in 70.61. They're not with
5 respect to Part 20. The applicant still must meet the
6 Part 20 dose requirements.

7 MR. WESCOTT: Right. But you're
8 absolutely right. From the performance requirements
9 that is the regulation. But Part 20 and ALARA we feel
10 will come in to kind of make that particular --

11 MEMBER SHACK: Less acceptable.

12 (Laughter.)

13 MR. WESCOTT: Yes, less likely.

14 CHAIRMAN POWERS: There may be a question
15 that has no answer right now, because of timing, but
16 I'll ask it anyway just because it pops into my mind.
17 Suppose the NRC indeed grants both the applicant's
18 request for construction and operation. What kind of
19 monitoring and enforcement regime would the NRC
20 anticipate at this facility? Episodic or continuous?

21 MR. PERSINKO: That decision has not been
22 made yet. It's very possible we would have a resident
23 inspector on site, but that decision has not been
24 made.

25 MR. WESCOTT: Okay. Slide 4, next slide.

NEAL R. GROSS

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

1 Okay. Now here are the tasks which have
2 been developed to meet these objectives. First is the
3 identification of hazards and events which was
4 accomplished in the applicant's primary hazard
5 analysis, which is kept at his office. It wasn't
6 supplied to this.

7 And in this he's gone through procedures
8 like what-if checklists, hazard interaction, matrices,
9 and similar basic tools to determine what the events
10 are.

11 The determination of unmitigated
12 consequences, of course, identifies events which will
13 have to be prevented or mitigated. The identification
14 of bounding events is part of our SRP guidance. In
15 other words, we don't require that every event be
16 dealt with in terms of principal SSCs, but the
17 bounding events at this point.

18 And the formulation of a safety strategy
19 and identification of principal SSCs and their
20 associated design bases -- the last two elements there
21 -- is directed toward getting the event to be in
22 compliance with 10 CFR 70.61 performance requirements.
23 We will --

24 CHAIRMAN POWERS: Looking and reviewing
25 these things, how much access has the staff had to the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 historical record of the DOE facilities that in many
2 cases have used similar SSCs to mitigate events?

3 MR. WESCOTT: Well, we have looked at some
4 facilities. I mean, we were out at Los Alamos a
5 couple of --

6 CHAIRMAN POWERS: EA-55.

7 MR. WESCOTT: -- ago and looking at their
8 experience and what they did, and so on. Primarily,
9 at this point, we are looking at trying to make sure
10 we've got all of the events covered. And as I'll
11 mention later, of course, in determining the
12 strategies we are looking at the basic nuclear
13 experience, including reactors.

14 If something is normally done to prevent
15 an accident or prevent a dose in a reactor as a
16 strategy, say, as a -- let's say, an entry control or
17 interlock, you know, we -- we tend to accept that as
18 probably an acceptable strategy here. And, yes, we
19 are trying to base our review, to the extent possible,
20 on historical precedent.

21 CHAIRMAN POWERS: Okay.

22 MEMBER KRESS: How will you decide what an
23 SSC is? If they're not IROFS, what are they?

24 MR. WESCOTT: Well, right now, principal
25 SSCs -- I'm trying to be consistent with Drew, because

NEAL R. GROSS

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

1 I think that is generally the way we're going -- is
2 primarily systems, the principal SSCs. We're up at
3 the system level.

4 Now, in some places, a component can, of
5 course, be a system. And that would be a principal
6 SSC. But right now, we're at the systems level. The
7 strategy is still in the conceptual design stage, I
8 guess would be a proper way to characterize the
9 design, and we're looking at systems as opposed to the
10 actual design of these systems themselves.

11 Where we get into the IROFS, the
12 components, would be -- be -- some components maybe
13 IROFS, some components may not be, depending on the
14 design of the system.

15 MEMBER KRESS: But you don't have the
16 equivalent of an importance measure that you'd have
17 with the PRA. So I'm not quite sure what the criteria
18 is going to be for saying this is an SSC.

19 MR. WESCOTT: Do you mean this is a proper
20 SSC?

21 MEMBER KRESS: Yes.

22 MR. WESCOTT: I'll get into that a little
23 later.

24 MEMBER KRESS: Okay.

25 MR. WESCOTT: But I guess maybe to answer

NEAL R. GROSS

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

1 your question right now, as I said before to Dr.
2 Powers, one of the criteria is, is it being used in
3 the industry? I mean, is it a normally applied
4 strategy?

5 The other thing we're using is we have a
6 table in Appendix A, Table A-5, which is a description
7 of various types of measures -- in other words, robust
8 passive control or active control, that type of thing,
9 and it assigns an approximate probability of
10 unavailability.

11 And so we're kind of doing a semi-
12 qualitative/quantitative approach at this stage to get
13 an idea of whether this appears to be an appropriate
14 strategy, whether it's going to work at the OL stage.
15 That's what we're trying to do right now. We're
16 trying to have reasonable assurance that they're going
17 to have a design that when they actually design the
18 components and determine the surveillance requirements
19 and go into all of these different measures that
20 narrow down what the exact reliability is, they are
21 starting with something that will work, that they can
22 get there from where they're starting. That's our
23 concern at this point.

24 MR. GIITTER: Just to make it clear that
25 the approach they're taking is deterministic at this

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 point.

2 MR. WESCOTT: I'm sorry. I guess slide 5,
3 next slide.

4 Okay. Determining the mitigated
5 consequences checks for the actual quantitative
6 compliance with the performance requirements. In
7 other words, doing a calculation with mitigative
8 measures; that is, for those that are not -- those
9 events that are not prevented, we determine whether
10 the dose to the public, the dose to the site worker,
11 or the dose to the facility worker, and so on, has
12 dropped below the threshold value and then is in
13 compliance. You've got to do that check or you don't
14 really know if your mitigative measure is proper yet.

15 Support systems, such as power supplies
16 and other supporting systems have to be identified
17 when you're looking at these principal SSCs. Natural
18 phenomena hazards were treated as events whose
19 consequences are normally prevented through the use of
20 proper design of SSCs. Natural phenomena, of course,
21 include things like tornadoes, earthquakes, floods,
22 that type of thing.

23 And one of their last tasks here was
24 provide a general description of the principal SSCs,
25 and that's required so the reviewers can -- the other

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 reviewers, the discipline reviewers, can determine
2 whether the design bases for these principal SSCs has
3 been properly reflected.

4 Next slide?

5 Now, to kind of show you where they are
6 going, I thought it was also a good idea to show what
7 is required at the operating license stage, so you can
8 see how what's being done at this stage goes into what
9 we'll be reviewing next.

10 First is the identification of items
11 relied upon for safety will drop down from the systems
12 level to the components level. That's when we start
13 being concerned about pumps and valves and circuits
14 and that type of thing in certain --

15 CHAIRMAN POWERS: HEPA filters.

16 MR. WESCOTT: -- yes, in certain systems.
17 There will have to be a demonstration that those
18 IROFS, items relied upon for safety, have the right
19 characteristics to meet the regulatory performance
20 requirements. In other words, do they have the right
21 reliability, right pedigree, QA, that type of thing.

22 And often this is accomplished through a
23 preparation of likelihood analyses, criticality
24 analyses, shielding analyses, structural analyses,
25 fire hazard analyses, etcetera. In other words, this

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 is where we expect to be a lot more quantitative, to
2 have a lot more quantitative information to base our
3 review on.

4 And specific operating requirements will
5 be identified with many of these operating
6 requirements supporting the demonstration of
7 regulatory compliance, such as, as I mentioned before,
8 surveillance frequencies, testing frequencies, that
9 type of thing, which really can't be developed at this
10 point.

11 MEMBER BONACA: So at this stage, you
12 would expect to have a more quantitative assessment of
13 all these issues.

14 MR. WESCOTT: That is correct.

15 MEMBER BONACA: Do you expect those to
16 have -- you know, the question that Dr. Shack posed
17 before, a better or a quantitative classification of
18 the categories here, what is acceptable, unacceptable,
19 and so on, insofar as the categories of accidents?

20 MR. WESCOTT: I'm not sure exactly --

21 MR. PERSINKO: You're talking about the
22 likelihoods, I guess? Is that what you're referring
23 to?

24 MEMBER BONACA: Yes.

25 MR. PERSINKO: Yes. Well, I --

NEAL R. GROSS

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

1 MEMBER BONACA: I'm trying to understand
2 how you go from --

3 MR. PERSINKO: Yes.

4 MEMBER BONACA: I mean, for the
5 construction, clearly, you cannot be overly
6 quantitative.

7 MR. PERSINKO: Right.

8 MEMBER BONACA: Because -- but at some
9 point you will have to become more quantitative. And
10 I guess my point is, you know, what flexibility you
11 have during the operation, the phase from construction
12 to operation to adjust and modify, because you may
13 discover that some systems that you now classify it as
14 safety-related become safety-related or vice versa
15 or --

16 MR. PERSINKO: Let me -- well, first of
17 all, there is if you go look at the standard review
18 plan -- to answer your last question, there is a
19 flowchart in there about how the construction phase
20 interfaces with the operations stage, and there are
21 feedback loops in there so that if you learn something
22 later you can feed it back into the process and
23 properly characterize the SSCs.

24 As far as the quantitative/qualitative
25 aspects on the highly -- on the likelihoods, the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 applicant has currently proposed qualitative terms for
2 its likelihoods, which it intends to follow, and it
3 still intends to follow that in a qualitative manner.

4 I'd like to point out that during the
5 Part 70 rulemaking, too, the Commission did say that
6 qualitative analyses were acceptable. PRAs are
7 optional.

8 But, so anyway, but in our -- one of the
9 responses to our request for additional information,
10 it was response number 39, as Rex had said, the
11 applicant has committed to doing an index approach as
12 we propose in our standard review plan, and I think
13 also the Part 70 standard review plan has the same
14 option.

15 So in our -- in response to our question
16 number 39, at the OL stage the applicant has committed
17 to showing that for the site workers and the public
18 that they will meet a certain index.

19 MR. WESCOTT: Next slide, please?

20 Okay. This slide --

21 MEMBER BONACA: I just would like to
22 pose --

23 MR. WESCOTT: I'm sorry.

24 MEMBER BONACA: -- to you just one more
25 question, just for clarification. You don't have to

NEAL R. GROSS

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

1 have a PRA to be somewhat quantitative. I mean, core
2 powerplants had ranges which were based on projections
3 even when, you know, at the beginning it was somewhat
4 guesswork.

5 MR. PERSINKO: That's correct.

6 MEMBER BONACA: If you go back to the ANSI
7 standards, you know, that's -- if you look at the
8 1970s, the 1960s, and so -- so, you know, that's not
9 requiring such an effort. I mean, that's more like
10 giving some ranges of classification. Would you
11 expect that?

12 MR. WESCOTT: Well, I think we expect
13 whatever is required to give us a good idea of what
14 the reliability or availability is. If it really
15 takes a PRA, then I guess we would expect a PRA. But
16 we would expect this to be maybe for very few -- maybe
17 the ventilation system, the C4 confinement system, for
18 example, may be the only thing requiring a PRA. And
19 maybe not. But we wouldn't expect to see a lot of
20 PRAs, if any, I guess would be the best way to answer
21 that question.

22 MR. PERSINKO: I think you will get some
23 quantification when the index approach is performed at
24 the next stage.

25 MR. WESCOTT: This slide is to show the

NEAL R. GROSS

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

1 NRC review responsibilities at the construction
2 authorization stage. The first one I think we've
3 already gone through -- the necessity of evaluating
4 completeness of the hazard evaluation. We're doing
5 this as a team approach. We're doing this by going
6 down and looking at their preliminary hazard
7 evaluation onsite. We're doing onsite reviews.

8 We're reviewing the methodology that was
9 actually used. And, of course, the detailed review of
10 the CAR in-house we expect to have some questions
11 regarding actual completeness of the hazard
12 evaluation.

13 The appropriateness of the selected safety
14 strategies is, in my opinion, primarily a safety
15 analysis responsibility, along with team input. And
16 that's where our evaluation is based on standard
17 nuclear practices, an awareness and knowledge of
18 what's gone on in similar facilities, and our somewhat
19 of a reliance on the qualitative criteria from
20 Appendix A of the SRP. That's where we're trying to
21 make sure at least they're starting with the right
22 approach.

23 Evaluation of the design basis. And the
24 question here is: do the design bases support the
25 strategy in terms of assuring compliance with the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 regulation? Some design bases at this point consists
2 of commitments to standards. Some design bases
3 actually will require numerical design bases. It
4 depends on the SSC, and it depends on the standard.
5 If it's a standard commitment -- if it's a commitment
6 to a standard, how specific it is, that type of thing,
7 as to what's an acceptable design bases.

8 And the final -- well, I shouldn't say the
9 final, maybe one of the most important aspects of the
10 safety analysis review is to coordinate the resolution
11 of multidisciplinary conflicts. In other words,
12 that's the integrated part of the integrated safety
13 analysis, and that's when we'd look to -- the classic
14 conflict is fire and criticality.

15 But we're also finding other conflicts in
16 this particular project that also require a
17 multidisciplinary approach, and the SA responsibility
18 is to try to oversee this and make sure that it's
19 being coordinated properly.

20 MEMBER BONACA: Now, one question I have
21 again. I guess just coming from qualitative, one of
22 the issues that you have when you look at defense-in-
23 depth, you look at not excessive reliance on
24 procedural requirements.

25 MR. WESCOTT: Right.

NEAL R. GROSS

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

1 MEMBER BONACA: But if you have a
2 qualitative -- you know, a heavily qualitative
3 application, you know, like we saw in the early
4 designs of powerplants, there is a lot of reliance on
5 the operator action, who will take care of it at some
6 point.

7 MR. WESCOTT: Well, right now, in the CAR,
8 the licensee has an area entitled their hierarchy of
9 controls, and that's where basically they've made a
10 commitment to, wherever possible, use a robust passive
11 engineered control first and then an active engineered
12 control second, and then maybe enhanced administrative
13 controls, and finally a simple administrative control.

14 So even though they haven't told us in all
15 cases what the control might be, there is a commitment
16 to start with the higher level of control.

17 Now, we have found some cases where
18 there's a commitment to a standard and the standard
19 maybe says, "Well, you can use almost any type of
20 control," and then we might want, you know, a little
21 more of a commitment there. But, yes, the applicant
22 has provided a hierarchy, and our understanding is he
23 is committed to that hierarchy and we expect it will
24 be followed.

25 MEMBER BONACA: Would you want to set, for

NEAL R. GROSS

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

1 your review, a set of defense-in-depth criteria that
2 you are going to consistently apply to your review?
3 I think it would be appropriate.

4 MR. WESCOTT: Well, we've tried.
5 Unfortunately, there are so many different types of
6 events that what seems to work well in one event can't
7 -- I think a facility worker's safety is an area -- is
8 a problematic area right now, because, first of all,
9 there's not a lot of history there, or, you know,
10 other examples where we're actually designed to try to
11 keep facility worker safety to within a certain
12 probability and within a certain -- below a certain
13 threshold. So --

14 MEMBER BONACA: But wouldn't that be a way
15 to bring the, you know, 40 or 50 years of experience
16 in operating reactors to better experience on what in
17 defense-in-depth really paid off and what it didn't,
18 into the review of a new application. That would
19 help, I think. That would also help the review on
20 your part and on our part.

21 MR. WESCOTT: Oh, yes. We are certainly
22 not ignoring, you know, regular nuclear engineering
23 practice. That weighs very highly in our review.

24 MR. PERSINKO: I'd like to say, while
25 we're on this subject, it's a Part 70 regulation.

NEAL R. GROSS

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

1 When it talks about items relied on for safety, the
2 item itself can be an operator action, because it does
3 -- human action is defined as also an item relied on
4 for safety.

5 So an admin procedure, an admin control --
6 human action would be the item relied on for safety.
7 The admin control or the procedure would be the
8 management measure that supports the reliability of
9 the human action. So it's analogous to a component
10 and a procedure.

11 Also, the regulation does specify a
12 preference for engineered controls over admin controls
13 right in the regulation for new facilities.

14 MEMBER BONACA: Yes. The reason why I
15 insisted on this point was because there is quite an
16 amount of qualitative bases to this application
17 evidently. And, you know, in the context, at least
18 the experience of the past has been, you know, when we
19 had early PSARs and FSARs there was heavy overreliance
20 on operator actions without definition of what that
21 will be and what it will accomplish.

22 And then later over time we found that we
23 had to refine them or substitute, you know, equipment
24 for those. So that was the reason why I brought up
25 this issue.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. WESCOTT: One thing I'd like to
2 mention is some places where we're really having
3 doubts as to whether actions or administrative
4 controls are sufficient -- at the strategy level, we
5 are asking for calculations, so we'll have some
6 numeric -- these are primarily in one aspect. Like in
7 the load drop, we're asking for some dose calculations
8 to see -- just to give us kind of a baseline or a --
9 let's say a data point so we can determine with some
10 degree of confidence whether this is a -- whether this
11 is a viable strategy or not.

12 MEMBER BONACA: Okay. Thank you.

13 MR. PERSINKO: One thing also, the
14 process, if you've seen the MELOX process, it's a
15 highly automated process. So it -- not to say there
16 are no admin controls or operator actions, but it is
17 a highly automated process.

18 The admin control is one of the areas they
19 do come into play, like Rex has been saying, is -- is
20 with respect to the worker safety and worker actions
21 and that kind of thing.

22 MR. WESCOTT: Next slide?

23 Okay. I'm not going to go through these
24 slides in detail. I just prepared them more or less
25 for information for the committee and to give you an

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 insight into the extent of the safety assessment at
2 this stage.

3 And I'd like to mention that the
4 applicants valuated natural phenomena, external
5 manmade events, loss of confinement events, fire
6 events, load handling events, explosion events,
7 chemical events, and criticality events. And these
8 seem to be pretty much similar to events that are the
9 types of events evaluated at other --

10 MEMBER SHACK: When it says 19 hazards
11 evaluated out of 32 considered, it means the others
12 were somehow ruled out as being too unlikely or --

13 MR. WESCOTT: Yes, that's correct. In
14 other words, you know, the -- yes, too unlikely. That
15 would be -- actually, I think almost more in terms of
16 credibility. I don't -- I think the ones that were
17 ruled out were really considered incredible rather
18 than just highly unlikely.

19 MEMBER KRESS: Was there a criterion for
20 what was meant by "incredible"?

21 MR. WESCOTT: Well, the criteria for
22 credible in our SRP is 10^{-6} . And from my review of
23 what they did, that seemed to be quite similar to --

24 MEMBER KRESS: So they had some sort of a
25 SIMAC quantitative --

NEAL R. GROSS

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

1 MR. WESCOTT: Yes, they didn't state their
2 criteria --

3 MEMBER KRESS: Yes.

4 MR. WESCOTT: -- for credible. But they
5 did use a lot of existing NRC Reg. Guide criteria,
6 which is in that neighborhood. So I would say --

7 MEMBER KRESS: Yes. You know, for
8 example, in the past I have seen things like if you
9 have two independent highly unlikely things that have
10 to go wrong to get you any kind of consequence, that's
11 -- that was sometimes viewed as incredible. I
12 wondered if they did something like that or --

13 MR. WESCOTT: For the external events, I
14 don't believe -- I'm not absolutely sure, but I don't
15 recall any in that category.

16 MEMBER KRESS: Oh, the external -- seismic
17 would be easy. You just pick the frequency above
18 which you don't -- the 10^{-6} and above, you just forget
19 about them I guess.

20 MR. WESCOTT: Well, it's -- I'm going to
21 let --

22 CHAIRMAN POWERS: Seismic is not easy at
23 this --

24 MEMBER KRESS: I know. The selection of
25 which ones not to worry about is --

NEAL R. GROSS

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

1 CHAIRMAN POWERS: I mean, I think you see
2 -- I think the speakers characterize it correctly.
3 What I see is a lot of things get screened out just on
4 plausibility. For instance, you don't really have to
5 worry about seepage as an external event, because
6 there is no lake or body of water there.

7 (Laughter.)

8 And, interestingly enough, I think they're
9 wrong about the tsunamis, because there is -- an
10 authority has looked at the Sea Mount collapse at the
11 Medeira Islands and concluded that once every 5,000
12 years there is a possibility of a tsunami that reaches
13 that part.

14 I don't fault him for ruling it out,
15 because I think a tsunami created by a Sea Mount
16 collapse in the Medeira Islands would give us things
17 to worry about other than the MOX facility.

18 MR. PERSINKO: The applicant's qualitative
19 definitions of highly unlikely are essentially a
20 single failure criterion.

21 CHAIRMAN POWERS: Yes. I think -- but, I
22 mean, he's been encyclopedic in listing what are the
23 possibilities, and most of them get ruled out just on
24 plausibility grounds.

25 MR. PERSINKO: Yes.

NEAL R. GROSS

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

1 CHAIRMAN POWERS: He includes meteorites
2 in his external events list.

3 (Laughter.)

4 I'm going to apologize to you. Three of
5 our members have had to go off and help former
6 Commissioner Rogers with an activity, and they will be
7 back as quickly as they can.

8 MR. WESCOTT: Okay. I think this is
9 coming up to the last slide?

10 Okay. The status of the MOX review at
11 this point, the safety analysis review. The staff is
12 still reviewing the hazards analysis for completeness.
13 I really can't give you a status on that -- in other
14 words, how many potential open items there are. There
15 is a couple of potentials, but we want to get more of
16 a consensus in-house before we go down --

17 CHAIRMAN POWERS: Just for your
18 information, I have already sent a note to our Fire
19 Protection Subcommittee that we're going to ask for
20 their assistance in reviewing this material. So as we
21 progress forward, we'll probably have some focus on
22 the fire protection issues here.

23 MR. WESCOTT: Okay.

24 CHAIRMAN POWERS: With people expert in
25 that facility, in that area. Fortunately, you have

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 most of the members of the Fire Protection
2 Subcommittee already here, just not the chairman.

3 MR. WESCOTT: Right. Okay. We are going
4 to be talking about fire protection later. We've got
5 requests for additional information pending in areas
6 of fire protection, load handling, confinement to
7 define adequacy of proposed safety strategies.

8 I think I mentioned the load handling
9 information request. We've also got some in fire
10 protection where we're trying to determine whether
11 combustible loading controls by themselves will be a
12 sufficient strategy for preventing some type of fire
13 events, and we're looking for some quantitative
14 analyses there.

15 CHAIRMAN POWERS: The problem at the
16 Savannah River site, as a whole, in the area of fire
17 protection analyses has always been transient
18 combustibles.

19 MR. WESCOTT: Right. That's exactly what
20 we're concerned about.

21 CHAIRMAN POWERS: Yes.

22 MR. WESCOTT: But we think that other
23 areas -- but certain areas we feel are going to have
24 different transient combustibles than others. So
25 rather than just having them pile up the combustibles

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 until we know, you know, that there is going to be --
2 I think we'd want to have them to take a look at just
3 exactly what they might possibly bring into a certain
4 area, say with fuel rods or something, where there's
5 no type of suppression, and, you know, what might
6 likely be left there, try to get an idea just how good
7 a combustible loading control by itself is.

8 CHAIRMAN POWERS: How do you -- well, this
9 may be jumping ahead of even where you are in your
10 review right now. But I think we're going to be real
11 interested in electrical circuit damage in fire
12 events. Have you given any thought to that?

13 MR. WESCOTT: Well, no, not specifically.
14 I know there's a possibility of chloride damage, and
15 so on, from, you know, burning of cable trays type of
16 thing. Sharon may have. I think I'm going to pass on
17 this. Incidentally, I'm a fire protection engineer,
18 but Sharon is our expert on --

19 (Laughter.)

20 -- so I'm going to keep my mouth shut on
21 fire protection stuff.

22 CHAIRMAN POWERS: I think we'll also be
23 very interested in filtration strategies, because
24 there is an awful lot of reliance on filters in this
25 system.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. WESCOTT: Yes, there definitely is.
2 And we are very concerned about aspects of the
3 filtration system.

4 CHAIRMAN POWERS: And we're going to be
5 interested in discussing knock along and knock
6 through, and things like that.

7 MR. WESCOTT: Well, and, of course, design
8 basis concerns are still being evaluated and may
9 result in additional questions. So that's primarily
10 -- that's my presentation.

11 CHAIRMAN POWERS: Sure.

12 MR. BROWN: Good morning. My name is
13 David Brown. I'm the health physics or radiation
14 safety reviewer for the MOX project. I'm going to
15 talk specifically this morning about how the applicant
16 derived radiological consequences for specific events.

17 Next slide, please.

18 And specifically, I'll talk about how
19 source terms were derived, the major pathways for
20 release from a plutonium facility, and specifically,
21 once the material reaches its receptor, how we
22 calculated doses or concentrations in the environment.

23 Next slide, please.

24 The approaches, you know, of what has come
25 to be known as the five factor formula, it's described

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 in the nuclear fuel cycle facility accident analysis
2 handbook. It's a product of the five independent
3 factors I've shown here. On the next slide I'll get
4 into that a little more.

5 Next slide, please.

6 The first factor, of course, being the
7 material at risk, the applicant has looked at the
8 amount of material they may have in I think something
9 more than 200 individual process units throughout the
10 plant. That gives you a feel for the resolution of
11 the safety assessment at this point.

12 The damage ratio or the fraction of that
13 material at risk for any given process unit is
14 generally one, just conservatively. They're assuming
15 it all gets involved in the event. Both the
16 atmospheric release fractions and respirable fraction,
17 which are, of course, additional reduction factors on
18 the material at risk, are from the handbook 6410.

19 And the final, of course, factor, another
20 reduction factor, is the leak path factor, generally
21 that which would be used for two HEPA filters in
22 series. I'll talk about that a little bit more on the
23 next slide.

24 With regard to that approach, the staff
25 just has two issues. There is the -- what we call the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 intermediate consequence performance requirement to
2 keep concentrations at the restricted area boundary
3 below 5,000 times the values that appear in Appendix B
4 to Part 20.

5 It's release of material to the
6 environment, not intended to be a human dose, so the
7 application of the respirable fraction to reduce
8 emissions would not have been appropriate. We've
9 pointed that out, and that will be resolved.

10 We've also questioned the use of 99
11 percent efficiency for two consecutive stages of HEPA
12 filter for all events. I was particularly interested
13 in how that might be degraded during a fire event or,
14 say, an explosion event, that type of thing.

15 CHAIRMAN POWERS: It seems to me the issue
16 of HEPA filters is on whether you can stack -- I mean,
17 they are advertised as being 99 percent efficient
18 devices, or sometimes 98 efficient devices. But the
19 second stage is filtering material that was not
20 filtered, and it's difficult -- it's challenging to
21 believe that they retain that high level of efficiency
22 for material that has already passed through.

23 The second one is that you have presumably
24 some accumulation on these filtration devices during
25 normal operation, and you have a phenomena

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 colloquially known as knock along and knock through
2 from the particles that in an accident maybe it makes
3 more material available on the back side of the first
4 stage than you thought.

5 MR. BROWN: I think in the Department of
6 Energy, for example, I've heard that 99.9 percent may
7 be credited for the first stage, 99.8 -- marginally
8 lower efficiency -- for the second stage, perhaps to
9 account for the phenomena you described first.

10 With regard to the second phenomena, I
11 don't think that's a consideration at this point. You
12 know, but the applicant has pointed out 99 percent,
13 you know, is the efficiency they choose to use rather
14 than 99.9, for example.

15 Tim Johnson will provide a presentation on
16 the confinement system, including the ventilation
17 system, later. And he may shed some more light on
18 some of those questions.

19 CHAIRMAN POWERS: It's interesting, it
20 seems to me, that some of the facilities at Savannah
21 River have chosen to use sand filters rather than
22 HEPAs for their operations.

23 MR. BROWN: Yes.

24 CHAIRMAN POWERS: And it's interesting
25 they go back to the HEPAs here. Same filters, though.

NEAL R. GROSS

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

1 MR. BROWN: It is something we have
2 discussed with the applicant. It's a consideration in
3 our current draft EIS as an alternative.

4 CHAIRMAN POWERS: Oh, okay.

5 MR. BROWN: Or what we call a technical
6 option. My understanding is it's both a fire
7 protection issue and, of course, a confinement
8 ventilation issue. I think, again, Tim Johnson and
9 Sharon may touch on that in their presentations.

10 CHAIRMAN POWERS: Good.

11 MR. BROWN: Next slide, please.

12 Again, as may be expected for a plutonium
13 facility, the pathway of most concern to the in-
14 facility worker would be the inhalation of plutonium
15 oxide or other plutonium compounds resulting from a
16 breach of confinement. Of course, the notable
17 exception to that would be a criticality event
18 involving direct radiation dose.

19 The strategy is to assume that the -- an
20 event affecting a facility worker is unacceptable. We
21 don't have, for example, quantitative unmitigated
22 doses in the construction authorization request for
23 facility workers. The safety strategies assume that
24 they will be unacceptably exposed and that we'll apply
25 principal SSCs to either prevent or mitigate the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 event.

2 The pathways are similar for SRS employees
3 immediately offsite and members of the public off the
4 Savannah River site. Inhalation is the predominant
5 pathway for accidents, and immersion becomes the
6 pathway for criticality. The staff will also take a
7 quick look at whatever marginal increase may be
8 attributable to Groundshine. We would expect that to
9 be pretty small.

10 Listed up there are the two codes we've
11 used for estimating the atmospheric dispersion of
12 contaminants moving downwind -- MACCS2 for members of
13 the public and ARCON96 for the worker.

14 Next slide, please.

15 Issues that were identified with respect
16 to pathway analysis were the so-called intermediate
17 consequence environmental performance requirement that
18 -- 5,000 times the Appendix B values is intended to be
19 calculated at the restricted area boundary, which for
20 this plant is just a little over 100 meters away.

21 The applicant calculated it at the
22 controlled area boundary, which they assume is five
23 miles away, and they will correct that. The
24 implication of that is that, as one might expect, that
25 this -- really, this is the bounding intermediate

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 consequence performance requirement. This is the
2 toughest one to meet. And I'll give you the results
3 at the end of my presentation for where they are in
4 meeting that performance requirement.

5 The second issue is one you touched on
6 earlier, and it's our resolution of the problem here.
7 Certainly, Part 70 has provisions for allowing members
8 of the public within the controlled area to be treated
9 as workers for the purposes of meeting their
10 performance requirements.

11 The applicant has decided to meet the
12 provisions of the -- you know, the requirements of
13 those provisions in the rule. But it doesn't change
14 the status of these individuals with respect to
15 Part 20, and that was a point we needed to clarify
16 with the applicant. So --

17 CHAIRMAN POWERS: That's cute. Finesse
18 that one right there. Nice.

19 (Laughter.)

20 MR. BROWN: Moving on to the final stage
21 of the assessment, there are just some general, you
22 know, what I'll call issues specific to the plutonium
23 facility. We didn't identify any issues with the
24 applicant's calculation. Just that we may -- when
25 you're doing something like this, we will be looking

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 at both soluble and insoluble forms of the plutonium
2 compounds. That will have some bearing on how you
3 would calculate inhalation doses.

4 We'll also be looking at material that's
5 been purified and material that has not yet been
6 purified, the impure material having a slightly higher
7 dose consequence per gram.

8 CHAIRMAN POWERS: I am confused about the
9 status of our database on dose effectiveness for the
10 239 Plutonium isotope and completely ignorant as far
11 as the dose effectiveness for the Americium isotopes.
12 Can you give me -- I mean, what is it that we know?
13 What is it we don't know? And what is it we think we
14 know?

15 MR. BROWN: Well, I think --

16 CHAIRMAN POWERS: A lot of the data comes
17 from -- a lot of the data comes, it seems to me, comes
18 from 238, which I wouldn't think would be directly
19 applicable but maybe it works okay for like what the
20 soluble fraction is. I don't know.

21 MR. BROWN: You're touching on an issue we
22 looked at very early on, which had to do with, you
23 know -- well, to do with some proposed research to
24 study could there be, for example, a super Class Y
25 plutonium compound, that type of thing. But for the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 most part, for the purpose of this application, we're
2 using dose conversion factors that are provided in the
3 Federal Guidance Report Number 11.

4 And, for example, a Plutonium 239 nitrate
5 compound would be a Class W compound, and that is the
6 dose conversion factor we would use.

7 I think I understand what you mean. Many
8 of the earlier -- some of the studies were involving
9 Plutonium 238 oxide, which has a tendency to fragment
10 within the tissue of the lung and can actually lead to
11 I'll say unpredictable dose consequences, plus you're
12 doing bioassay and actually tracking how much is being
13 retained.

14 CHAIRMAN POWERS: You got highly variable
15 results as I recall.

16 MR. BROWN: Yes.

17 CHAIRMAN POWERS: I mean, in some cases no
18 effect. I mean, literally no effect. And in some
19 cases very severe effects.

20 MR. BROWN: I think we'll be dealing with
21 oxides that are created and temperatures that are
22 routinely encountered at other -- at similar plants
23 worldwide and even in the history of the U.S. Nothing
24 that should be really exceptional.

25 Next slide, please.

NEAL R. GROSS

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

1 These are the applicant's calculations of
2 mitigated doses to both the Savannah River site
3 employee who is assumed to be 100 meters downwind and
4 a member of the public who is five miles downwind. If
5 you compare the -- this employee doses to the 25
6 millirem intermediate consequence criteria, you'll see
7 that they've met that with some considerable margin.
8 And the same is true for the public.

9 Next slide, please.

10 The other -- you know, and again, I've
11 mentioned it a couple of times -- the intermediate
12 consequence criterion of meeting the 5,000 times the
13 Appendix B concentrations, these are their
14 calculations.

15 I should point out that there's a footnote
16 at the bottom of the screen. I hope most of you can
17 see it. Once we've resolved the issue of making sure
18 they've done this calculation at the correct
19 compliance point, which is not at the Savannah River
20 site boundary but at the -- essentially the protected
21 area fence of the facility, that they've not used the
22 respirable fraction to further reduce the source term.

23 Once we've resolved issues pertaining to
24 the actual rated removal efficiency of HEPAs, it may
25 be challenged by certain events. These numbers could

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 go up considerably. It wouldn't be a stretch to say
2 they could go up a factor of 1,000. So --

3 CHAIRMAN POWERS: The change in -- from
4 respirable fraction to actual release fraction will be
5 a big one.

6 MR. BROWN: It's typically about, I would
7 say, a factor of 10, perhaps a factor of 100. Moving
8 the boundary is about a factor of 100. Therein you
9 have anywhere from 1,000 to 10,000. So the meaning of
10 that, then, is that the -- they may come right up
11 against this particular performance requirement,
12 which, again, is an intermediate consequence event.
13 They need only show that this event is unlikely or
14 further mitigated. We're working on that now.

15 Last slide, please.

16 Now, this is just a summary of the issues
17 that are identified in deriving radiological
18 consequences. We talked about the fact that they use
19 a respirable fraction when perhaps they shouldn't
20 have. We may need to consider a leak path factor for
21 degraded HEPA filters, the fact that the environmental
22 performance requirement was calculated at the boundary
23 and not the restricted area boundary, and that the so-
24 called issue of the co-located worker I think we've
25 satisfactorily resolved.

NEAL R. GROSS

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

1 Are there any other questions?

2 CHAIRMAN POWERS: I come to the -- also to
3 the airborne release fractions and took them out of
4 6410 -- I think they came from.

5 MR. BROWN: That's right.

6 CHAIRMAN POWERS: Is that the Meshima
7 database essentially?

8 MR. BROWN: Essentially, yes.

9 CHAIRMAN POWERS: So the applicability is
10 always going to be a question on that, isn't it?

11 MR. BROWN: Yes. I mean, given the P
12 value may not specifically match the experiment.

13 CHAIRMAN POWERS: Yes. Yes. He put in
14 that collection what he had, and he may not have the
15 exact thing that -- that's really wanted there. It's
16 like Perry's Handbook of Chemical Engineering. It
17 will give you an answer. Doesn't tell you whether
18 it's a good answer or not; it will give you an answer.

19 And so are we looking at -- with any care
20 at the applicability of the airborne release
21 fractions?

22 MR. BROWN: We will. At this time, we
23 have not studied that in detail.

24 CHAIRMAN POWERS: I mean, I -- there may
25 not be much you can do, but you can certainly see how

NEAL R. GROSS

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

1 bounding they were on those.

2 MR. BROWN: Certainly, we will look at --
3 you know, if it was for dropping an oxide powder, then
4 we want to be sure that that was properly used for an
5 event in which there is an oxide powder.

6 CHAIRMAN POWERS: Yes. I think you're not
7 going to have too much trouble with that one. I think
8 where it more likely is when you have the combustion
9 events, aerosolizing things that just by the
10 difficulty of doing the experiment they probably
11 didn't do the kind of event you really would have
12 liked to have seen. And that's the one where you've
13 got to look and say carefully what -- how bounding of
14 a value do they really pick.

15 MR. BROWN: I might just suggest, I
16 suppose that in the event that we simply can't agree
17 on a bounding consequence, the applicant has the
18 option to simply show that the accident is prevented.

19 CHAIRMAN POWERS: Sure.

20 MR. BROWN: Which is unique to Part 70.

21 MEMBER LEITCH: Schematically, the aqueous
22 processing unit that was shown I guess at the very
23 first slide is at the front end of this whole process,
24 and that portion of the activity is regulated by DOE.
25 Is that --

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. BROWN: No. The entire facility is
2 regulated by the NRC.

3 MEMBER LEITCH: The entire facility is.

4 MR. BROWN: If I may just clarify that the
5 -- the feedstock, the plutonium powder, will be
6 prepared in a different DOE facility.

7 MEMBER LEITCH: Okay. And it comes in in
8 the form of powder, then, is that --

9 MR. BROWN: Plutonium oxide powder.

10 CHAIRMAN POWERS: One would just really
11 love to see the trade study that resulted in taking a
12 metal tray into an oxide and redissolving the oxide to
13 polish it and make it back into an oxide. Why that
14 was chosen as the route, I would just love to see the
15 trade study that gave that. That's not these
16 gentlemen's problem.

17 (Laughter.)

18 MEMBER LEITCH: That process takes place
19 elsewhere at Savannah River or elsewhere?

20 MR. BROWN: As it has been described, say,
21 most recently in the DOE EIS for the project, it would
22 be right next door.

23 MEMBER LEITCH: But the aqueous polishing
24 process is an integral part of this facility. In
25 other words, in the plot plan where you showed the 400

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 by 400 --

2 MR. BROWN: It was barely visible as is
3 somewhat -- to a different square in that top plan.

4 MEMBER LEITCH: I guess I misunderstood
5 perhaps at the very beginning. I thought there was a
6 portion of this that was DOE regulated and a portion
7 that was NRC regulated.

8 MR. BROWN: That's right. And it is --
9 the DOE activity will be at a physically separate
10 plant, not -- and this will -- everything within the
11 protected area fence here will -- you know, to the
12 extent that it's licensed material, will be NRC
13 regulated.

14 CHAIRMAN POWERS: The waste stream coming
15 out of the facility will go back into the DOE complex?

16 MR. BROWN: Yes.

17 CHAIRMAN POWERS: And presumably in one of
18 their tanks, and then eventually to the DWPF and
19 things like that?

20 MR. BROWN: That's the plan. That's
21 correct. Yes.

22 MEMBER LEITCH: Okay. Thanks. I
23 understand.

24 MR. BROWN: Thank you.

25 CHAIRMAN POWERS: So we don't have an

NEAL R. GROSS

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

1 issue of a long-term accumulation of a waste stream
2 here?

3 MR. BROWN: We should not. No, the plan
4 is to --

5 MEMBER LEITCH: We can discuss that a
6 little bit.

7 MR. BROWN: Right. We can always talk
8 about that.

9 MR. MURRAY: Okay. Good morning
10 everybody. My name is Alex Murray. I am the chemical
11 safety reviewer for the proposed MOX facility. I am
12 also a supporting reviewer for ISA on issues related
13 to chemical safety.

14 Next slide, please.

15 This is just a quick overview of my
16 presentation. I'm going to just give you a very brief
17 discussion of the main chemical process areas in this
18 facility. Some of the details are considered
19 proprietary by the applicant, so if you have questions
20 which require detailed answers, we may have to get
21 back to you in a different forum.

22 I'm also going to discuss some of the
23 proposed design bases from the applicant. I'm going
24 to give a quick overview of where the review stands
25 right now. It is very much a work in progress, and

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 I'll give you some idea about current issues that we
2 are discussing.

3 Next slide, please.

4 Just to -- as we have discussed, there are
5 several main chemical process areas in this facility.
6 There's the AP area, aqueous polishing. Its principal
7 function/objective is to purify the plutonium and
8 basically separate out gallium, uranium, and some
9 other impurities.

10 There also is the MOX process, which is
11 essentially a powder processing route that actually
12 makes the fuel rods and assemblies. To support these
13 areas there are some chemical reagents, storage, and
14 mixing areas. Some are outside the actual MOX
15 handling building and would be regulated under OSHA.
16 Some are within the building and would be regulated by
17 the NRC because of their potential effects upon the
18 handling of licensed radioactive material.

19 And as we have with the chemical area,
20 there are both chemical and radioactive radiochemical
21 hazards.

22 Next slide, please.

23 Now, discussing aqueous polishing, it's
24 important to note that there are some modifications to
25 the standard PUREX process routes which have presented

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 some hazards which might require some controls or
2 principal SSCs in this facility.

3 First off, the plutonium dioxide which
4 comes from DOE, a separate DOE facility proposed at
5 Savannah River, is actually dissolved using an
6 electrochemical process. And there are some issues
7 with that.

8 The PUREX process itself is actually
9 tweaked, adjusted, optimized, to improve the
10 separation factors. Okay. There are some very fine
11 oxidation state adjustments which I'll mention on the
12 -- one of the next slides, and so forth.

13 I should add that at the very early stages
14 of this project there were some discussions about,
15 "Oh, why can't we use a dry process to purify the
16 weapons grade plutonium?" And the reason is it didn't
17 work. Okay. There are many other issues in addition
18 to the fact that it was basically ineffective for
19 purification.

20 Once the plutonium has been purified, the
21 proposed facility would precipitate it as an oxalate,
22 a very standard step. And I should add that in the
23 aqueous polishing area many of these operations are
24 very similar to operations that are performed in some
25 portions of the LaHague facility in France. They also

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 have been performed at some of the DOE facilities in
2 this country.

3 Next slide, please.

4 Okay. Computers are wonderful. That is
5 actually PuO₂. Okay. For the dissolution step, okay,
6 the plutonium dioxide powder would come from a DOE
7 regulated facility. It was on one of Drew's slides.
8 It is referred to as the pit disassembly and
9 conversion facility. Okay. That is regulated by DOE.

10 The dissolution uses nitric acid
11 principally as the dissolving medium. However,
12 because of concerns about processing rates, kinetics
13 if you will, they use -- the proposed process uses a
14 silver(II) ion, a very strong oxidizing agent, to
15 assist with the dissolution.

16 Because silver(II) is also extremely
17 corrosive and has some other issues, the applicant has
18 proposed means to reduce, in effect eliminate, the
19 potential hazard associated with that reagent once the
20 plutonium has been dissolved. Of course, the
21 electrochemistry -- you have both heat, gases, and,
22 you know, sort of like an interesting combination of
23 potential hazards from the electrochemical operations.

24 And also in the dissolution step the
25 applicant proposes to initiate isotopic dissolution of

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 uranium 235. Now, you may wonder, gee, why if we're
2 discussing weapons grade plutonium is there
3 uranium 235. It turns out that there -- that about
4 one percent of the heavy metal U235 from the alpha
5 decay of plutonium 239.

6 Next slide, please.

7 Okay. In the actual purification step, it
8 is a PUREX process. The PUREX process is optimized.
9 There are some very fine valence adjustments to
10 improve the extraction coefficients of plutonium.
11 Most notably, most of the plutonium is reduced from
12 the plus six state to the plus four state. This
13 improves the separation factor.

14 After it has been separated, there is some
15 other oxidation adjustments which basically allow the
16 plutonium to recover by going to the plus three state.
17 Then, there are some other adjustments made, so it
18 precipitates better with oxalic acid, the oxalate
19 precipitation steps. They take it back to the plus
20 four state.

21 All of the reagents used for these
22 operations do present some potential hazards which we
23 are reviewing to see if any potential PSSCs are
24 needed.

25 Finally, there are some solvent washing

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 and purification steps. These are actually done in
2 mixer settlers, not the columns which are used for the
3 actual plutonium purification. And this is primarily
4 -- this is a PUREX process, but it is primarily in a
5 Dodecane diluent as the actual solvent.

6 Next slide, please.

7 Okay. Once the plutonium has been
8 purified, it is just recovered by an oxalic acid
9 precipitation. There are some fine pH adjustments,
10 again, to improve the recovery, get some additional
11 decontamination factors from some of the potential
12 impurities.

13 The oxalate is filtered and then fired in
14 a calcined and oxygen atmosphere, and then this
15 purified material is sent on to the actual MOX powder
16 processing step.

17 Next slide, please.

18 As part of aqueous polishing, you do
19 generate some liquid streams which require some
20 processing for recovery of useful reagents before they
21 are sent to waste management at the Savannah River
22 site. It should be noted that the majority of these
23 recovery operations for things such as silver, some of
24 what they call the oxalic mother liquors in the
25 proposed facility.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 These have all performed on -- all of
2 these operations are performed on high alpha
3 contaminated streams. Okay? So we're looking at some
4 of the potential issues and hazards associated with
5 those to see if any principal SSCs are needed.

6 Nitric acid is recovered by evaporators
7 and subsequently rectified, distilled, to get it back
8 up to strength to be recycled within the process, and
9 that step also has some potential hazards which we'll
10 discuss shortly.

11 Next slide, please.

12 Okay. Just very quickly, the MOX powder
13 area -- this is simply a powder processing line. It
14 is based upon the advance MIMAS process from France,
15 a lot of micronization of the powders. Ultimately,
16 the powders are formed into pellets, sintered, and
17 then placed into the fuel rods and the rods into
18 assemblies.

19 From the chemical safety perspective in
20 this area, the main areas of potential concern have to
21 do with a lot of inert gas use and also around the
22 sintering furnaces where there are hydrogen/oxygen --
23 I mean, hydrogen/argon mixtures used. And I should
24 note for this area, this -- the processing steps are
25 very similar to those at the operating MELOX facility

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 in France.

2 Next slide, please.

3 CHAIRMAN POWERS: Do they do the sintering
4 with just forming gas, or do they --

5 MR. MURRAY: I'm sorry?

6 CHAIRMAN POWERS: Do they do the sintering
7 under an atmosphere of argon/hydrogen that --

8 MR. MURRAY: At MELOX?

9 CHAIRMAN POWERS: At four percent like
10 hydrogen or something like that?

11 MR. MURRAY: In the proposed facility,
12 there is actually a range.

13 CHAIRMAN POWERS: A range.

14 MR. MURRAY: Okay. And some of the
15 details on the range are proprietary.

16 Okay. Just to give you a quick overview
17 of some of the applicant's proposed principal
18 structures, systems, and components, and their design
19 bases and potential controls, for the public, a
20 receptor in the chem safety area, the consequences
21 were judged to be low and no PSSCs were proposed.

22 Similarly, for the Savannah River site
23 worker, no PSSCs are proposed. For the facility
24 worker, in the area of chemical safety, the applicant
25 has proposed that the emergency control room HVAC

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 system would be a PSSC, and the applicant has stated
2 that they believe most of the radiological-related
3 PSSCs will provide adequate protection for chemical
4 safety type events. And, hence, no additional chem
5 safety PSSCs are necessary.

6 Having said that, if you could go to the
7 next slide, please.

8 Within the text of the construction
9 authorization request, there are actually PSSCs
10 proposed for chem safety, and I've listed these here.
11 There are a lot of proposed administrative type
12 controls for chemical makeup, for reagent
13 concentrations, and so forth, the proposed controls,
14 PSSCs, on some of the vents and offgases. Some of
15 these are interrelated with radiological-related
16 issues.

17 Also, the applicant has proposed PSSCs to
18 ensure that there are non-explosive mixtures, and I've
19 listed some here. However, as our review is
20 continuing, we are finding that the specificity might
21 need more definition.

22 MEMBER LEITCH: Just a question for
23 understanding on the previous slide.

24 MR. MURRAY: Sure.

25 MEMBER LEITCH: It says emergency control

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 room AC system. Is that for an emergency control
2 room? Or should that say control room emergency AC
3 system?

4 MR. MURRAY: That is actually for an
5 emergency control room.

6 MEMBER LEITCH: Okay. That was my point.

7 MR. MURRAY: Yes.

8 MEMBER LEITCH: In other words, there is
9 an emergency control room.

10 MR. MURRAY: Yes.

11 MEMBER LEITCH: And the thing that would
12 be a PSSC is the air conditioning system for that
13 control room.

14 MR. MURRAY: That's correct.

15 MEMBER LEITCH: Okay. I understand.

16 MR. MURRAY: That's correct. That's
17 correct.

18 MEMBER LEITCH: But not for the main
19 control room apparently?

20 MR. MURRAY: With the documentation and
21 the discussions that we have had so far, not at this
22 time, no. The review is still continuing. Okay?

23 MEMBER LEITCH: Thank you.

24 MR. MURRAY: Okay. Just to give you a
25 quick overview of the status of the review and some of

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the activities, we are -- the review is continuing.
2 It is a work in progress. We have looked at the
3 construction authorization request, the RAI responses.
4 We are looking at independent sources of information
5 in the literature, including DOE peer reviewed
6 documents and what have you.

7 We are having discussions with the
8 applicant. Some of these are in public meetings.
9 Some of these are documented phone calls. And also we
10 plan additional meetings and reviews. We currently
11 are working on a very preliminary -- very, very rough
12 draft of the chem safety sections of the evaluation
13 report.

14 Next slide, please.

15 Okay. Our main findings to date are, as
16 I previously mentioned, we find a general lack of
17 specificity for some of the chemical principal
18 structures, systems, and components, and their
19 associated design bases. As we read the documents,
20 the responses from the applicant, and as we review the
21 literature, we are finding that there are many implied
22 or potentially implied PSSCs and design bases.

23 We also notice there is, particularly in
24 the chemical area, a heavy reliance on operators and
25 admin controls.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Next slide, please.

2 Okay. I've just listed some of the areas
3 where we have some current issues under review and
4 discussions. Once again, admin controls, how do you
5 get to the highly unlikely regime and minimize the
6 consequences, the high alpha waste streams, how they
7 are controlled to basically do the recovery functions
8 safely and appropriately, and then ultimately the
9 waste going on to the Savannah River site.

10 The electrolyzers, the proposed facility
11 has three electrolyzers. Right now, two are for
12 dissolution, one is for recovery of the silver which
13 is used in dissolution.

14 Evaporators, this is the red oil concern,
15 the nitrated tributyl phosphate esters. The proposed
16 facility has at least three areas where evaporators
17 are used for reagent recovery, concentration, recycle,
18 etcetera. And also, we have an issue we are reviewing
19 in the area of the uranium 235 -- where it goes in the
20 process, how it is diluted, where it is diluted, what
21 the intermediate assay levels are, and so forth.

22 CHAIRMAN POWERS: In the issue of red oil,
23 I got the impression that the principal safety control
24 on that was to control the temperature.

25 MR. MURRAY: That is what the applicant

NEAL R. GROSS

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

1 has proposed, yes.

2 CHAIRMAN POWERS: And my initial reaction
3 to that was -- I've probably gotten out of date on
4 where we stand on oil, red oil issues. But my
5 recollection is --

6 MR. MURRAY: I'm sure you're quite
7 current, Dana.

8 (Laughter.)

9 CHAIRMAN POWERS: My recollection is that
10 we had a poor understanding of the formation of this
11 material, that when we have tried to form it it's a
12 hit and miss sort of thing, that we have never been
13 able to convince everyone that what we form in the
14 laboratory is exactly what we seem to form in the
15 accidents, and that we couldn't say that there was a
16 temperature threshold for the formation of red oil.

17 MR. MURRAY: Well, this is an area that we
18 are reviewing and discussing with the applicant.
19 There are concerns that we have in this area. There
20 have been at least five events within the DOE complex
21 over the years, some as recently as the 1970s. Okay?
22 In the late 1980s, DOE did issue a summary report
23 which basically was based upon the temperature
24 control.

25 However, there have been a couple of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 incidents since then, most notably overseas, the
2 Tomsk-Sevin area in the former Soviet Union. That
3 appears to involve some other factors beyond
4 temperature. DOE has done a lot of work in the mid
5 and late 1990s looking into this issue some more. And
6 all I can say is right now we are continuing,
7 obviously, to --

8 CHAIRMAN POWERS: Stay tuned, huh?

9 MR. MURRAY: Stay tuned, yes.

10 CHAIRMAN POWERS: Good.

11 MR. MURRAY: Yes.

12 MEMBER LEITCH: Has there been any
13 discussion at this point of staffing levels or
14 operator qualifications or training, or is that all
15 premature to ask those kinds of questions?

16 MR. MURRAY: At this stage, yes. Okay.
17 In the area of admin controls, we have been in
18 discussions with the applicant about how -- how do you
19 show independence, how do you show redundancy, how do
20 you ultimately attain the highly unlikely threshold
21 for, if you will, chem safety events which could have
22 high consequences.

23 MEMBER LEITCH: Does this generally tend
24 to be a batch process or a stream process? In other
25 words, is this the kind of thing that once this

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 process is up and running it runs for -- on a
2 continuous basis around the clock, or is it a batch
3 kind of an operation?

4 MR. MURRAY: The majority of the plant, of
5 the proposed design, would run in what I would call a
6 more continuous manner. Some steps within it, notably
7 the dissolution area, is a batch, a semi-batch sort of
8 processing area. Some of the evaporators function in
9 what I would call a semi-batch mode. But it is
10 predominantly a continuous process.

11 MEMBER LEITCH: Okay.

12 MR. MURRAY: And the applicant, in their
13 description of the process, have proposed sort of like
14 idle modes, particularly in the solvent extraction
15 area, where it can sort of keep running but it doesn't
16 have to be fed fresh materials.

17 MEMBER LEITCH: Thank you.

18 MR. MURRAY: You're welcome.

19 Any other questions? I know earlier on
20 you had a question on the waste streams. In the
21 proposed design, the applicant is proposing to batch
22 the waste, the high alpha waste, to the Savannah River
23 site via a double-contained underground pipeline.

24 And the batches would be, oh, about a
25 weekly sort of operation with on the order of a few

NEAL R. GROSS

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

1 thousand gallons. They think it'll be between one and
2 two thousand gallons.

3 MEMBER LEITCH: And in order of magnitude,
4 how long is this pipeline?

5 MR. MURRAY: We do not have any specifics
6 on that at this time. We are discussing this with the
7 applicant.

8 CHAIRMAN POWERS: Okay. Well, at this
9 point, we're scheduled to take a break, which is a
10 little longer because members have to do some
11 interviewing I think.

12 MR. MURRAY: Okay.

13 CHAIRMAN POWERS: So we will recess until
14 a quarter of the hour.

15 (Whereupon, the proceedings in the
16 foregoing matter went off the record at
17 10:17 a.m. and went back on the record at
18 10:45 a.m.)

19 CHAIRMAN POWERS: I think we can come into
20 session now.

21 My agenda says that Margaret Chatterton is
22 going to talk to us next. Maybe I'm in error. Nope?

23 (Laughter.)

24 Well, in that case, here's Margaret.

25 (Laughter.)

NEAL R. GROSS

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

1 MR. TRIPP: How are you doing? My name is
2 Chris Tripp, and I'll be talking about the criticality
3 safety design for the MOX facility for the
4 construction application.

5 Next slide, please?

6 Criticality safety is one of the dominant
7 risks at the facility, along with fire safety. And
8 part of the reason for that is because of the type of
9 processes and types and forms of materials that are
10 going on -- are going to be used at the facility.

11 The criticality risk associated with this
12 plant is similar, in our view, to several other NRC-
13 regulated facilities; specifically, the high enriched
14 uranium facilities, NFS and BWXT. Those facilities
15 involve high enriched uranium. Here we're dealing
16 with plutonium.

17 And the reason for that is out of the 22
18 criticality accidents that have occurred at processing
19 plants in the United States, Russia, Japan, and the
20 United Kingdom, all but three have involved either
21 plutonium or iron-enriched uranium, and they have all
22 involved solution forms because of the small critical
23 masses, the difficulty in controlling these types of
24 material configurations, and so forth. And we have
25 similar types of processes here.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 The MOX plant is, as has been stated
2 previously, based on the MELOX and LaHague facilities.
3 And from the standpoint of criticality safety, the
4 LaHague type processes, the aqueous polishing process,
5 has the majority of the criticality risk because we're
6 dealing with solutions.

7 There are some differences between the
8 French plants and the proposed American plant, and
9 some of the equipment dimensions are different and has
10 criticality implications, because of two things,
11 because of Americanization where they have to make the
12 plant conform to American standards, and also the more
13 significant factor is that this plant is using weapons
14 grade as opposed to reactor grade plutonium as is in
15 the French plant.

16 The areas of greatest risk are where you
17 have material configurations that are difficult to
18 control, particularly Plutonium 239 solution, but also
19 in the MOX process where you're dealing with
20 uncontained powder. And that is -- the majority of
21 the criticality issues are at the front end before the
22 material is isotopically diluted with depleted
23 uranium.

24 Next slide?

25 At this point, specific controls, items

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 relied on for safety, have not been defined for
2 criticality hazards, being a worker safety issue --
3 and we'll go into that in more detail. But the basic
4 parameters of interest are the aqueous polishing phase
5 would rely mostly on favorable geometry for plutonium
6 nitrate solutions as well as spacing between the
7 components.

8 CHAIRMAN POWERS: I guess I am surprised
9 that you don't also cite acidity control and avoiding
10 the plutonium hydroxide precipitations.

11 MR. TRIPP: Well, the concentration is not
12 credited for criticality purposes.

13 CHAIRMAN POWERS: No. What I'm talking
14 about is the tendency of plutonium nitrate, if you
15 drop too low in acidity, to drop out this amorphous
16 precipitate. That's an oxyhydroxide material. It's
17 been responsible for at least one criticality event.

18 MR. TRIPP: Yes, that's true. But in this
19 case, the -- they're not taking credit for the
20 concentration, so it's being assumed it's at an
21 optimal concentration. So, therefore, if it would
22 precipitate out, you'd tend to have an undermoderated
23 solution. It would probably be less reactive than the
24 optimally moderated case.

25 Now, the chemical form is credited because

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the nitrate acts as a neutron poison, a mild neutron
2 poison.

3 CHAIRMAN POWERS: Well, I'm going to have
4 to think about that a little bit, because I get very
5 nervous when we don't have good acidity control on
6 nitrate solutions.

7 MR. TRIPP: Yes. Well, that's certainly
8 a concern, and the chemical balancing of the process
9 is important to keeping the solution out of -- keeping
10 the uranium -- plutonium in this case -- out of the
11 raffinate stream, which is another criticality hazard
12 that I should mention.

13 In the MOX process, we have -- the main
14 controls/modes are the isotopic control, where you're
15 mixing it with depleted uranium after the blending
16 stage. That's being credited for criticality safety
17 -- and also moderation, keeping the powder dry.

18 The master blend is to take the plutonium
19 oxide powder and to blend it down to about 20 weight
20 percent in Pu, with the depleted uranium, and then
21 later on it's further diluted to between two and six
22 weight percent plutonium. And the blending, as I
23 said, is crucial to ensuring the right isotopic mix.

24 So that's some information about the
25 inherent risk of the facility. It should be pointed

NEAL R. GROSS

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

1 out that the majority of the facility is going to rely
2 on passive engineered controls, particularly safe
3 geometry, and probably to a greater extent than being
4 based on a more modern design -- a greater extent
5 relying on favorable geometry than a lot of U.S.
6 plants. So that will -- should significantly reduce
7 the risk associated with the facility.

8 CHAIRMAN POWERS: I'm just surprised my
9 distinguished colleague from Tennessee didn't salute
10 the advice to keep your powder dry.

11 (Laughter.)

12 MR. TRIPP: Very important for
13 criticality and --

14 CHAIRMAN POWERS: Not going to volunteer
15 anything, huh?

16 (Laughter.)

17 MR. TRIPP: Now, I'm just going to quickly
18 summarize the regulatory requirements from Part 70.
19 As for most of the safety disciplines, it's very non-
20 prescriptive. They are free to choose pretty much any
21 high dose relied on for safety as long as they meet
22 the performance requirements of the rule. In fact,
23 the only specific SSC that's mentioned for safety is
24 the criticality alarm.

25 They have to make high consequence events

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 highly unlikely, and that's -- typically, criticality
2 is considered highly unlikely by default. At least in
3 this case, it is, so when we're talking about the risk
4 we're talking basically about likelihood associated
5 with preventing criticality.

6 They're required to maintain
7 subcriticality, and that includes using an approved
8 margin of subcriticality, which is based on code
9 validations that we'll talk about in a little bit.

10 And, finally, in 70.64, they're required
11 to adhere to the double contingency principle, such
12 that two -- at least two unlikely and independent
13 changes have to occur before criticality is possible.
14 And that is really only applicable for new plants or
15 new processes at existing plants. The reason for that
16 is a lot of -- some of the older plants have
17 historically not been able to meet double contingency,
18 because you're dealing with bulk quantities of powder
19 and other things. And then, of course, the SRP goes
20 into a lot more detail on this.

21 Next slide, please?

22 Required to ensure that the design basis
23 of the principal SSCs provide reasonable assurance of
24 safety. I'll quickly go over this, since I know you
25 heard this in more detail on the 14th.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 At this point, there have really been no
2 principal SSCs or IROFS identified for criticality
3 safety. That will come more during the review of the
4 ISA summary, along with the license application. So
5 what do we have to rely on for safety?

6 Most of the assurance is based on having
7 an adequate NCS program, and that follows the typical
8 DOE model and also the model we adopted for the
9 gaseous diffusion plants, where most of the details
10 referred to the program, and the regulator is mainly
11 overseeing the structure of the program.

12 And that will be relied on in the
13 construction stage, and then the component-level
14 review, as with the other Part 70 facilities, will be
15 more in the operating phase.

16 So I'd like now to turn to the open
17 issues, of which there are three. There were several
18 RAI questions asked. About 40 in all I think pertain
19 to criticality issues. And we've reached resolution
20 on all but three issues, and they are the NCS staff
21 qualifications, the -- what's an acceptable
22 subcritical margin, and an issue related to how we
23 meet the performance requirements.

24 And on these two issues on this slide we
25 have provided them with a summary of industry

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 experience, industry licensing precedent I should say,
2 on what we've accepted for other plants, understanding
3 that this plant has some unique issues associated with
4 it.

5 For the staff qualifications, we are only
6 interested in the construction phase, because part of
7 having a reasonable assurance that the plant could be
8 designed safely is our assurance in the qualifications
9 of the people doing the safety design. So we're only
10 interested in the roles and responsibilities
11 associated with design activities, not operation. And
12 primarily we're looking at the education and
13 experience levels associated with these individuals.

14 And what has been accepted at the
15 different plants varies across the spectrum. But in
16 this case, a couple of the unique issues are that this
17 is a brand-new facility. There really is no facility-
18 specific experience, which is often credited in
19 saying, for instance, you have to have two years of
20 industry or facility experience.

21 The other is the fact that most of the
22 industry experience is drawn from uranium plants, and
23 criticality safety depends a lot on the judgment of
24 the analyst. And so the staff has -- believes that
25 it's necessary that NCS staff have some specific

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 plutonium or MOX experience.

2 So it's a question of, what would be the
3 -- how transferable would be experience at other
4 plants? And some of that experience they can get.
5 There is experience on the DOE side, of course, with
6 plutonium. But that's one thing that we are in the
7 process of discussing.

8 The other secondary issue is, what's an
9 acceptable subcritical margin? And I'll quickly go
10 through this. This is the standard equation for
11 calculated multiplication factor plus uncertainties --
12 has to be less than what's known as the upper
13 subcritical limit, which is one minus the
14 calculational bias minus the uncertainty in the bias
15 minus -- delta Km is an arbitrary or administrative
16 margin.

17 And the bias is the difference between the
18 experimental value, typically 1.0 for K effective of
19 a critical experiment and the calculated value. And
20 all the statistical effects are taken up in the bias
21 and the uncertainty in the bias. And this
22 administrative margin is meant to account for
23 unquantified or unknown uncertainties, such as the
24 fact that what you're actually modeling differs from
25 any of the benchmarks. Well, how important is that

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 kind of effect?

2 And so what the applicant has proposed is
3 -- and this actually goes beyond what most of our
4 licensees do in practice -- is to split the types of
5 processes at the plant into five main areas and
6 perform a separate validation, which could result in
7 a separate bias and administrative margin for each
8 area.

9 And whereas the techniques for determining
10 the bias are well understood, the techniques -- there
11 is no real applicable guidance on the administrative
12 margin and what is acceptable. So, again, we provided
13 them with precedent on what was accepted at other
14 facilities, with the understanding that there are some
15 differences because you have -- plutonium physics is
16 slightly different, significantly different in some
17 cases.

18 The administrative margin of .05 has
19 typically been accepted at most uranium plants.
20 That's based on a rule of thumb, but there has still
21 always been a requirement that the licensee or
22 applicant justify it on a case-by-case basis. And
23 that's particularly true in -- for a plutonium or MOX
24 plant where we have different neutron physics.

25 The other complicating factor in the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 validation, which we're looking at as a significant
2 part of the design basis, because it tells to what
3 maximum K effective you can design the plant to, is
4 the fact that for a lot of these systems, particularly
5 the three types of systems listed in Part 2, there is
6 not really a lot of critical benchmark experiment data
7 available.

8 So a typical statistical technique may
9 need to be augmented, and there are some techniques
10 such as sensitivity uncertainty methodology, which is
11 currently being developed at Oak Ridge National
12 Laboratory, that may be applicable. It's just
13 different from what the staff has had to review in the
14 past.

15 Finally, I turn to the -- what's probably
16 the most significant of the open issues, and that is,
17 what's the relationship between the two regulatory
18 requirements to be doubly contingent and to assure
19 that high consequence events are highly unlikely?

20 Well, I know you heard some of this the
21 other day on the index likelihood method. So I won't
22 go into the details of what that is associated with.
23 The MOX SRP, standard review plan, Appendix A, is
24 based on the Part 70 standard review plan and has a
25 safe technique proposed.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Since the SRP has come out, we have
2 approved ISA plans for BWXT and NFS on the Part 70
3 side, and so there are plants that have proposed
4 methods that are acceptable to the staff that have
5 been approved.

6 Now, for hazards other than criticality,
7 DCS has proposed meeting the index likelihood method.
8 The reason for excluding criticality, as we understand
9 it, is criticality is viewed as a facility worker
10 hazard. So, therefore, there are many -- the approach
11 is one of prevention.

12 There are many different -- sometimes
13 dozens of accident sequences that have to be prevented
14 against. Unlike a site worker or a public type of
15 consequence, you can't simply mitigate the bounding
16 accident. So there's a great deal of analysis
17 involved.

18 And I believe on the ISAs that we've seen,
19 about probably more than half of the accident
20 sequences involve criticality hazards for that reason.
21 And so what DCS has proposed was to meet -- use the
22 commitment to double contingency and say that was
23 sufficient to ensure that criticality is highly
24 unlikely.

25 The industry has traditionally used a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 deterministic approach that relies on the judgment of
2 the analyst, rather than any kind of quantitative or
3 qualitative assessment of reliability of the barriers
4 relied on. So, therefore, there's a lot of
5 subjectivity associated with that kind of approach.

6 And the other thing that has been proposed
7 is what DCS calls robust double contingency, and that
8 would be a commitment to meet double contingency plus
9 a generic commitment to meet management measures and
10 the applicable criticality ANSI standards, of which
11 there are probably about 20 in total.

12 And, again, on an accident sequence basis,
13 that does -- it simply is too vague to give assurance
14 that in all cases they will beat the standard of being
15 highly unlikely. The wording of the double
16 contingency principle is taken from an ANSI standard,
17 and it's not defined in terms of a performance
18 requirement.

19 And the last bullet, let me say that what
20 the staff has determined is that the robust double
21 contingency defined above as double contingency
22 principle plus management measures and ANSI standards
23 is what we have said is not sufficient. We are still
24 discussing what would a possible form of a robust
25 double contingency be that would be sufficient to meet

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the performance requirements of the rule. And those
2 discussions are ongoing.

3 So that is basically where the status of
4 the review is now. If you have any further
5 questions --

6 MEMBER BONACA: I have a question.

7 MEMBER LEITCH: I have a question. It
8 seems to me that criticality prevention is -- if I
9 understand what you said correctly, is primarily the
10 geometry. There are passive things in the way the
11 facility is built, particularly the geometry for
12 prevention of criticality, supplemented perhaps by
13 operator actions and administrative procedures.

14 But are there no engineered systems to
15 mitigate criticality? In other words, it seems like
16 everything is geared towards preventing the initiating
17 event. But what about mitigative strategies?

18 MR. TRIPP: Okay. And you're quite right
19 in that the fact they're relying on geometry and other
20 passive controls, that all comes out of this hierarchy
21 of controls that was talked about during the ISA
22 presentation.

23 But the approach taken at -- by the NRC is
24 that criticality is something that is to be prevented.
25 It's undesirable to have a criticality, regardless of

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the actual dose consequences. At a minimum, it
2 involves a lot of cleanup activities, and so forth.

3 The only real mitigation is from 70.23,
4 which is requirement to have a criticality alarm
5 system. And, of course, that won't mitigate the dose
6 to the person that's there when the initial burst of
7 the criticality goes off, but it could mitigate dose
8 to further individuals. And also, there is -- there
9 are requirements to have emergency procedures and
10 protocols in place.

11 In DOE, there are some -- DOE facilities,
12 some of them are shielded, and they do take credit for
13 that in allowing criticality to be less than highly
14 unlikely. But the NRC has never taken the approach
15 that you can substitute mitigation for prevention for
16 a criticality accident.

17 MEMBER BONACA: Okay. I had --

18 MEMBER LEITCH: Go ahead.

19 MEMBER BONACA: I had a question on the --
20 you made a reference to 22 process accidents that have
21 occurred worldwide, and at the highly enriched uranium
22 facilities. And I was curious to know, first of all,
23 is there a dominant sequence that has occurred? I
24 mean, what is the dominant cause for these accidents?
25 And, second, could you comment on the consequences?

NEAL R. GROSS

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

1 MR. TRIPP: Certainly, yes. As I've said,
2 all of these have occurred in process tanks or vessels
3 of some type. Typically, columns relied on for
4 favorable geometry, and so the typical sequence a lot
5 of the time is you have something that has an
6 inadvertent transfer to unfavorable geometry, such as
7 to a wastewater tank or some other large geometry
8 vessel. There are variations on that, but I think
9 several fall under that category.

10 MEMBER BONACA: Right.

11 MR. TRIPP: As far as the consequences
12 have been, there have been -- most of them have not
13 involved fatalities. Some of them have. I think two
14 or three is the maximum number, and that's just --
15 that's from the worker that's in the immediate area.

16 MEMBER BONACA: So to the personnel.

17 MR. TRIPP: Right.

18 MEMBER BONACA: The release is outside the
19 -- it's at the site.

20 MR. TRIPP: Right. And that's typically
21 because it's usually operators involved in the
22 initiating event.

23 MEMBER BONACA: Okay. Thank you.

24 MR. TRIPP: Okay. I'd like --

25 MEMBER LEITCH: I asked the question of an

NEAL R. GROSS

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

1 earlier presenter about operator training, and I guess
2 the answer I got was we were a little too far
3 premature to discuss that. But you alluded to the
4 fact that you have given at least some thought to how
5 these operators might be qualified.

6 MR. TRIPP: Yes. We were -- actually, I
7 was talking about the criticality safety staff who
8 were involved in the design of the facility and what
9 their experience and qualifications are. I would
10 agree it's a little early to be talking about the
11 operator training, although that would be one of the
12 management measures that we would expect to be --

13 MEMBER LEITCH: Yes.

14 MR. TRIPP: -- applied in the next stage.

15 MEMBER LEITCH: And there again, as you
16 indicate here, that there's precious little experience
17 to draw on. I guess the same would be the case with
18 the operators.

19 MR. TRIPP: That would probably be the
20 case, unless you go to the DOE complex.

21 MEMBER LEITCH: Yes. Okay. But, again,
22 I'm hearing that it's just premature to talk about
23 that, but it's a topic that I'm very interested in.

24 MR. TRIPP: Yes. That was something that
25 will be very important later on.

NEAL R. GROSS

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

1 MEMBER LEITCH: Yes, right. Thank you.

2 MR. PERSINKO: I'd like to make a comment.
3 You asked about engineered features with respect to
4 criticality control. As I mentioned earlier, the
5 system is a highly automated system. There is an
6 instrumentation and control system referred to as the
7 MMIS system, which material is not allowed to move
8 from one station to another station unless the
9 permissive is given by the MMIS system.

10 The system keeps track of material
11 inventory at various posts, and then before material
12 can move from post A to post B the computer system --
13 the instrumentation and control system checks to see
14 whether it's permissive, whether the material can move
15 to this area or not, with respect to criticality
16 controls.

17 We will get into that particular system
18 more when John Calvert talks about the digital I&C
19 control systems.

20 MEMBER LEITCH: Thank you.

21 CHAIRMAN POWERS: Any other questions
22 about the criticality safety? I think we can move on.

23 MS. STEELE: Good morning. Can you hear
24 me clearly?

25 My name is Sharon Steele, and I'll be

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 presenting the fire safety portion of the briefing.
2 I will begin with a brief discussion of guidance in
3 the standard review plan and the applicant's proposals
4 for the facility couched in terms of the major aspects
5 of fire safety. I will discuss some of the open items
6 and then follow up with a summary.

7 In developing the standard review plan, we
8 relied on NRC guidance for fuel cycle facilities and
9 reactors, where appropriate. We also drew heavily
10 from DOE standards, particularly the one -- the fire
11 protection criteria, and also required conformance to
12 National Fire Protection Association codes and
13 standards.

14 Based on the elements of a standard review
15 plan and on accepted engineering practice, there are
16 some major aspects of fire safety that I'd like to
17 briefly touch on, and they are administrative controls
18 or -- and development of a fire protection program
19 which helps to prevent a fire from occurring. Also,
20 automatic detection and suppression systems provide
21 the capacity to extinguish a fire if they occur.

22 Manual firefighting capabilities are
23 important as well as --

24 CHAIRMAN POWERS: Do you really give
25 credit for automatic systems extinguishing a fire?

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MS. STEELE: Sometimes -- in some places,
2 automatic suppression systems are considered principal
3 structures, systems, and components. But for the most
4 part, they're used as defense-in-depth strategy.

5 CHAIRMAN POWERS: The suppression -- you
6 know, I can imagine giving credit, but giving credit
7 for an automatic system to actually extinguish the
8 fire.

9 MS. STEELE: You're referring to the
10 detection, then, automatic detection concerning --

11 CHAIRMAN POWERS: Detection you can do and
12 suppression from an automatic system. But to
13 extinguish the fire with an automatic system seems to
14 be optimistic.

15 MS. STEELE: Right. Normally, when you
16 use fire -- water-based sprinkler systems, I think the
17 probability of success is 96 percent. Other systems
18 are a little bit lower.

19 Also, one of the major aspects of fire
20 safety is compartmentation, which would help prevent
21 the spread of fires to other parts of the building.
22 And, finally, the fire hazards analysis is an
23 important part because it's a common thread throughout
24 the various aspects of fire safety. So I'll discuss
25 that next.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 The fire hazards analysis, or FHA, is a
2 systematic analysis of the fire hazards inside and
3 outside of the facility, and it is used to determine
4 the adequacy of plant fire safety. When performing a
5 fire hazards analysis, the facility is divided into
6 discrete fire areas, and the risk or the consequences
7 of ignition and combustion scenarios are evaluated.

8 The fire hazards analysis is used to
9 develop design basis fire scenarios from which
10 principal structures, systems, and components are
11 developed. The applicant has provided a preliminary
12 fire hazards analysis, which we were able to review
13 onsite, and they are continuing to develop the fire
14 hazards analysis in conjunction with the integrated
15 safety analysis.

16 The applicant has committed to develop
17 administrative controls in the license possession
18 stage, and these controls will include procedures for
19 the storage and control of ignition sources and
20 combustible items. It will include periodic
21 surveillances of the physical fire protection features
22 to ensure that these systems are operational, and also
23 periodic surveillances of the transient combustibles
24 to ensure that limits are not exceeded.

25 The applicant has proposed administrative

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 controls as a principal structure, system, and
2 component in some cases. They have also committed to
3 develop a fire protection program which will describe
4 the policy with regard to protecting items relied on
5 for safety.

6 The fire protection program will also
7 describe personnel and lines of management for the
8 development of procedures for training for combustion
9 controls and procedures for maintenance, testing, and
10 inspection of fire protection features. It will also
11 address the development of controls for design
12 changes, recordkeeping, and fire prevention activities
13 such as fire emergency planning.

14 The applicant --

15 MEMBER LEITCH: Can you talk about --

16 MS. STEELE: Sorry.

17 MEMBER LEITCH: -- the transient
18 combustibles? I'm used to thinking of transient
19 combustibles as trash, basically, that could be stored
20 in the facility. Are some of these process streams
21 combustible?

22 MS. STEELE: Yes.

23 MEMBER LEITCH: In other words --

24 MS. STEELE: Yes, they are. But in some
25 cases --

NEAL R. GROSS

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

1 MEMBER LEITCH: So is that what you mean
2 by transient combustibles, stuff that's flowing
3 through the process or --

4 MS. STEELE: I think in some cases that
5 could be the combustible, the transient combustible.
6 But largely within the process rooms there might be
7 cases where it is assumed that there could be leftover
8 pieces of polycarbonate window materials left over
9 from maintenance activities as well.

10 CHAIRMAN POWERS: It's moving drums of
11 Dodecane around.

12 MS. STEELE: The applicant has provided a
13 strategy for automatic detection and alarm systems,
14 and these include smoke and heat detectors and manual
15 pull stations throughout the facility. The systems
16 will be able to provide audible and visual alarm in
17 the affected areas, and it will indicate and transmit
18 these alarms to central alarm panels which would be
19 located in the polish and control room and at the
20 Savannah River site fire department.

21 They have also proposed various types of
22 suppression --

23 CHAIRMAN POWERS: Not to the control room?

24 MS. STEELE: I'm sorry? Polish and
25 control room.

NEAL R. GROSS

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

1 CHAIRMAN POWERS: Oh, to the control room.

2 MS. STEELE: Yes. They have also provided
3 various suppression agents. For example, sprinklers
4 will be provided in the hallways and offices, and
5 basically in areas where an inadvertent actuation of
6 the sprinkler system does not affect -- cannot affect
7 the operation.

8 Also, clean agent suppression will be used
9 where fissile materials are present, and in those
10 areas the suppression systems will be considered a
11 principal structure, system, and component.

12 They are also proposing the use of
13 standpipe and hose systems and portable extinguishers
14 for manual firefighting.

15 A baseline needs assessment for the manual
16 firefighting and the license to possess stage will be
17 provided. This assessment will evaluate the minimum
18 staffing needs of the firefighting force. It will
19 describe organization and coordination of onsite and
20 offsite firefighting resources. It will describe
21 personnel protective and firefighting equipment, also
22 training of the fire brigade, and fire emergency
23 planning.

24 The FHA will determine a need for a
25 separate emergency response team.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN POWERS: Remind me what FHA
2 stands for.

3 MS. STEELE: The fire hazards analysis.
4 I apologize.

5 CHAIRMAN POWERS: Okay.

6 MS. STEELE: Will determine the need for
7 a separate emergency response team which -- in
8 addition to what's already provided at the Savannah
9 River site fire department.

10 MEMBER BONACA: So this is the Savannah
11 River site fire department.

12 MS. STEELE: Yes. They will look at
13 the --

14 MEMBER BONACA: Because you mentioned
15 before that you will have alarms in the Savannah fire
16 department that --

17 MS. STEELE: There will be a -- there's a
18 plan to send an alarm to the Savannah River site fire
19 department as well, and in the baseline needs
20 assessment they will, during that stage, analyze the
21 firefighting forces to determine whether the Savannah
22 River site fire department would be sufficient to meet
23 the needs at the MOX facility or whether they would
24 need a separate emergency response team.

25 CHAIRMAN POWERS: It would stun me if they

NEAL R. GROSS

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

1 weren't.

2 MS. STEELE: I'm sorry?

3 CHAIRMAN POWERS: It would surprise me if
4 they weren't adequate.

5 MS. STEELE: Right. Exactly. But yes.

6 MEMBER SIEBER: Well, part of this is the
7 response time.

8 MS. STEELE: Right.

9 CHAIRMAN POWERS: Well, considering where
10 they are, that's not going to be a real problem.

11 MEMBER SIEBER: Right.

12 MEMBER BONACA: I guess my question was
13 more in the sense that, are they trained to deal with
14 a facility where you may have a fire situation and,
15 you know, radioactive release at the same time?

16 MS. STEELE: That should be part of the --

17 MEMBER BONACA: That's part of it. Okay.
18 I mean, I'm not talking about the fire brigade there.
19 I'm talking about the one in Savannah.

20 MS. STEELE: Yes.

21 CHAIRMAN POWERS: Well, I mean, at
22 Savannah River site they have lots of places where you
23 can have fires and radioactive material at the same
24 time. No question that they would have to have
25 training for the particular site.

NEAL R. GROSS

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

1 MEMBER BONACA: Okay. And then, how you
2 integrate these forces I guess.

3 MS. STEELE: Right. Integration and the
4 training for specific hazards that could be
5 encountered at the MOX facility.

6 For operational purposes and as provided
7 by the fire hazards analysis, the MOX facility -- the
8 buildings at the MOX facilities are subdivided into
9 several fire areas. The fire area boundaries are
10 typically provided to separate manufacturing
11 operations, radioactive material storage, control
12 rooms, electrical equipment rooms, offices, and
13 redundant TRANEs of principal structures, systems, and
14 components.

15 The primary structural members surrounding
16 each fire area will have a minimum of two-hour fire
17 rating. The openings in the barriers, including fire
18 doors and dampers and penetration seals, would be
19 appropriately rated.

20 There was a question earlier regarding
21 electrical circuits and cable trays. Right now, what
22 I've been able to establish is that for the most part
23 qualified cable would be used in the facility, and
24 they could be contained in non-metallic cable trays.

25 CHAIRMAN POWERS: Qualified cable --

NEAL R. GROSS

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

1 MS. STEELE: Right.

2 CHAIRMAN POWERS: -- just a little harder
3 to ignite than --

4 MS. STEELE: Right.

5 CHAIRMAN POWERS: -- unqualified cable.
6 I mean --

7 MS. STEELE: That's right.

8 CHAIRMAN POWERS: -- it's not going to
9 stop anything.

10 MS. STEELE: That's right.

11 CHAIRMAN POWERS: I mean, I'm a little
12 surprised, and maybe it's premature. But it seems to
13 me that you've got people coming in here saying,
14 "Okay. We're going to have this facility. It's going
15 to have this elaborate electronic computerized system
16 to make sure we don't have a lot of inadvertent
17 transfers," which has been the bane of most chemical
18 processes involving plutonium.

19 MS. STEELE: Right.

20 CHAIRMAN POWERS: They're going to try to
21 get around this with a computerized quasi-automatic
22 system. It seems to me that if I was defining the
23 fire strategy, I would say, "Okay. You must have a
24 TRANE that allows you to shut this system down and is
25 protected against fire."

NEAL R. GROSS

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

1 MS. STEELE: Yes. Right.

2 CHAIRMAN POWERS: And that doesn't seem to
3 be emerging from this.

4 MS. STEELE: I believe that could be
5 addressed later in the electrical portion. But there
6 would be redundant TRANEs of -- I'm sorry.

7 MR. GIITTER: As you'll see in the I&C
8 presentation, there are redundant systems that could
9 shut the system down.

10 CHAIRMAN POWERS: Well, you know, I just
11 don't think you can separate that from the fire. I
12 mean, I think you have to sit here and say, "Well,
13 you've got to have enough separation here and enough
14 protection, so that you always have one of those
15 TRANEs available." You're protected from -- I mean,
16 it's a lot like Appendix R. You have a shutdown TRANE
17 that you protect from fire.

18 And so there is some sort of a design. I
19 mean, most of this stuff is kind of routine fire
20 protection for a car body company. And, I mean, it
21 seems like there should be a strategy here that I'm
22 not seeing emerging.

23 MS. STEELE: Okay. You are not seeing the
24 integrated effort that perhaps we should -- well, that
25 we are currently doing in our review. And that will

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 be addressed. Also --

2 CHAIRMAN POWERS: I had also noticed -- I
3 jumped and noticed that you -- they are going to have
4 separate electrical equipment rooms, but you did not
5 cite sprinklers for the electrical equipment rooms.

6 MS. STEELE: I believe clean agent
7 suppression systems will be employed there.

8 CHAIRMAN POWERS: Oh, yes?

9 MS. STEELE: And it's --

10 CHAIRMAN POWERS: We're just never going
11 to learn that you've got to put these fires out with
12 water, are we?

13 MS. STEELE: In addition, fire barriers
14 are considered to be principal structures, systems,
15 and components. I will cover a couple of open items
16 that remain, and then I will summarize.

17 But, again, DCS is proposing the use of
18 polycarbonate material for the windows and the
19 gloveboxes. This is against or -- against what
20 National Fire Protection Association Code 801
21 requires, because it prohibits the use of non-
22 combustible material in the glovebox construction.

23 And even though polycarbonate is not non-
24 combustible, DCS has tried to demonstrate that an
25 equivalent level of fire safety could be still

NEAL R. GROSS

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

1 achieved, and they've done so by using -- providing
2 various test results that indicate that the
3 polycarbonate is difficult to ignite and difficult to
4 sustain combustion.

5 Also, where gloveboxes are used, they will
6 be providing additional administrative and physical
7 fire protective features. However, we feel that the
8 scenarios that DCS provided does not adequately
9 address areas where polycarbonate could be -- could be
10 combusted or could be involved in the combustion, and
11 we're asking them to develop or provide analyses to
12 indicate a better -- that the margin of safety is
13 maintained.

14 And we're requesting additional analyses,
15 such as determination of when flashover would occur if
16 these gloveboxes were involved.

17 An additional open item is that of the
18 combustible loading controls. The applicant is
19 proposing combustible loading controls only as items
20 relied on for safety to protect various forms of
21 plutonium that are not in fire qualified containers,
22 and some of these containers would be canisters, fuel
23 rods, and the final HEPA filter.

24 We have requested details on additional
25 surveillances to augment the controls, and we are

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 asking them to provide a fire safety analysis to look
2 at critical transient loads beyond the imposed or
3 established limits. We are also trying to get more
4 information on what the role of detectors would be,
5 the role of detectors which are not credited in the
6 ISA would be.

7 Finally, to summarize, I'd like to say
8 that DCS has addressed the major aspects of fire
9 safety. They have provided the commitments to develop
10 administrative controls, a fire protection program,
11 and a baseline needs assessment for manual
12 firefighting.

13 They have described the planned
14 suppression and detection features and currently have
15 a preliminary fire hazards analysis. I identified a
16 few of the open items in the fire safety, and NRC will
17 continue to review additional information in order to
18 complete the safety evaluation report.

19 Any questions?

20 CHAIRMAN POWERS: One question that pops
21 immediately into mind is in a facility everything gets
22 through and eventually they put these pellets down
23 into some zircaloid-clad tubes. Do they do any work
24 with the zirconium that would result in the
25 accumulation of scrap zirconium and turnings and

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 things like that?

2 MS. STEELE: Yes, that's a potential
3 hazard that has been identified, and I believe they
4 have ways to remove the scarce, and they are providing
5 -- the principal SSC there would be combustible --
6 would be controls, staff training, administrative
7 controls I should say, and the use of manual
8 extinguishers, Class D portable extinguishers, in
9 those areas.

10 Those areas -- currently there is no
11 suppression -- no automatic suppression provided in
12 those areas because of -- because the space is so
13 large, and they're not sure whether they could achieve
14 the desired atmosphere using a clean agent.

15 CHAIRMAN POWERS: Do you have any
16 familiarity with the available base of incidents that
17 have occurred on spontaneous combustion of zirconium
18 fines?

19 MS. STEELE: Yes. There is some
20 information that's available that I will be looking
21 at.

22 CHAIRMAN POWERS: I'm aware of two
23 incidents --

24 MS. STEELE: Right.

25 CHAIRMAN POWERS: -- myself.

NEAL R. GROSS

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

1 MS. STEELE: One occurred at MELOX in
2 France where I believe they use a vacuum, for example,
3 to remove some of the scarse, and there was a fire
4 that occurred. I believe they were able to extinguish
5 that with a Class D extinguisher.

6 CHAIRMAN POWERS: Okay. Looks like the
7 Fire Protection Committee has got a lot here.

8 MEMBER SIEBER: I think so.

9 CHAIRMAN POWERS: Yes.

10 MS. STEELE: Uh-oh. Thank you.

11 CHAIRMAN POWERS: We'll tell Mr. Rosen his
12 work is cut out for him here. Lots to read.

13 (Laughter.)

14 MR. JOHNSON: The next presentation will
15 be on confinement systems. My name is Tim Johnson,
16 and I'll discuss with you some of our issues that
17 we've identified in this system.

18 The objectives of this presentation is to
19 briefly discuss the proposed confinement system that
20 Duke Cogema, Stone & Webster presented in their
21 construction application. I'd like also to discuss an
22 issue that we've raised regarding the high efficiency
23 particulate air filter removal efficiencies, and also
24 discuss an issue involving whether HEPAs or sand
25 filters should be used.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Our review is in process. We have raised
2 some issues with DCS on these, but we're not at the
3 point where we've made any decisions on the
4 acceptability of the proposed system.

5 Ultimately, when we make our decision on
6 the acceptability of the system, we're going to have
7 to evaluate whether or not the safety features
8 presented can adequately protect public health and
9 safety. And in DCS's proposed design, the ventilation
10 and confinement systems are important features for
11 doing this.

12 As part of the construction authorization,
13 DCS needs to provide a safety assessment of the design
14 bases to demonstrate that the safety features can
15 perform their safety function under anticipated
16 accident conditions and conditions of natural
17 phenomena hazards. And since DCS is relying on the
18 confinement system as one of the safety features, it's
19 an important area for our review.

20 Another aspect of this is we are looking
21 to -- at the defense-in-depth features of the proposed
22 system.

23 MEMBER KRESS: Tim, what exactly does that
24 mean?

25 MR. JOHNSON: Defense-in-depth would be

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the use of as proposed -- what they refer to as static
2 and dynamic systems. Confinement would be by things
3 like gloveboxes, room walls, as well as a ventilation
4 system. So these are diverse systems that help to
5 confine the material and prevent releases.

6 MEMBER KRESS: So the defense-in-depth is
7 -- relates to how diversities are or --

8 MR. JOHNSON: Diversity and redundancy.

9 MEMBER KRESS: In this instance, you're
10 talking about diversity and redundancy as being --

11 MR. JOHNSON: Right.

12 MEMBER KRESS: -- defense-in-depth.

13 MR. JOHNSON: Yes.

14 MEMBER KRESS: Okay.

15 CHAIRMAN POWERS: It sounds like multiple
16 barriers as well.

17 MR. JOHNSON: Yes. We have some guidance
18 that we've published dealing with confinement systems,
19 the standard review plan. We have the fuel cycle
20 facility accident analysis handbook, and there is also
21 a regulatory guide on design of ventilation facilities
22 for plutonium processes.

23 And, of course, these guidance documents
24 provide acceptable methods for meeting our regulatory
25 requirements. They don't restrict DCS. DCS can

NEAL R. GROSS

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

1 propose alternatives, but those alternative approaches
2 would need to be provided with adequate justification.

3 The proposed confinement system of DCS
4 involves what they refer to as both static and dynamic
5 barriers. A static barrier would be a thing like a
6 glovebox, a process cell, process piping, process
7 tanks. A dynamic barrier would be the ventilation
8 system.

9 And I have a very simplified figure that
10 may help to explain the approach that's used.

11 Is that okay?

12 The confinement system is basically
13 oriented by the formation of four confinement zones.
14 These zones are oriented where leakage would go from
15 a zone of lesser hazard to a zone of higher hazard,
16 and the most hazardous zone is what they refer to as
17 C4. These would be the gloveboxes containing the
18 plutonium pellets or powder, etcetera.

19 The confinement system is the glovebox,
20 and it also has a separate ventilation system. The
21 ventilation system has HEPA filters right at the
22 glovebox, on the inside and outside of the glovebox.
23 There's another HEPA filter. This is -- this would be
24 located at the boundary of the room, and there is also
25 a separate final filtration assembly.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 This is a very simplified figure. It only
2 shows the HEPA filters, but there are also spark
3 arresters and a set of pre-filters here as well.

4 The next zone is what is referred to as a
5 C3 zone, and this is in the process room and airlocks.
6 It has -- its static confinement is the room boundary
7 itself, the walls. There's an airlock system. It has
8 its own ventilation system that has a HEPA filter
9 right at the boundary and a separate filter assembly
10 that has spark arresters, a set of pre-filters, and
11 HEPA filters here.

12 The areas surrounding the C3 process rooms
13 also have a separate ventilation system. It has,
14 again, spark arresters, a pre-filter, two sets of HEPA
15 filters that run to the stack.

16 Another example of a confinement system
17 would be the control rod itself. After it's finished,
18 it's been sealed and appropriately tested, it comes
19 out of the glovebox arrangement. That also provides
20 a confinement boundary.

21 This figure here is for the mixed oxide
22 processing areas. There's a similar figure here for
23 the aqueous polishing areas, and it has some of the --
24 a lot of the same concepts -- you know, the glovebox
25 confinement, the process room confinement, and so on.

NEAL R. GROSS

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

1 But in addition to that, DCS also has areas called
2 process cells where there are welded tanks that
3 contain aqueous polishing liquids, and so on, and
4 equipment.

5 This would be equivalent to a C4 zone. It
6 has an offgas system with filtration as part of that,
7 and the process cells also have their own separate
8 ventilation system, again with double HEPA filters,
9 pre-filter, and spark arresters.

10 CHAIRMAN POWERS: I keep coming back to
11 the fire protection. It seems to me that in the
12 events of glovebox fires you cannot credit the first
13 filters, HEPA filters.

14 MR. JOHNSON: Right.

15 CHAIRMAN POWERS: Do you have problems
16 crediting the second batch of filters in the event of
17 a fire?

18 MR. JOHNSON: DCS is not taking credit for
19 the HEPA filters right at the glovebox. There is one
20 inside and outside immediately on the glovebox. There
21 is also another one at the room boundary that they're
22 not taking credit for. The only ones they're taking
23 credit for are the final filtration assembly ones.

24 MEMBER KRESS: What is the criteria for
25 whether you take credit for it or not?

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. JOHNSON: Well, I think it has a lot
2 to do with the fire hazard itself. In the immediate
3 vicinity of the fire, the HEPA filter could degrade
4 and be ineffective.

5 MEMBER KRESS: Temperature or pressure or
6 loading, excess loading or excess temperature or
7 excess pressure? What is the --

8 MR. JOHNSON: Right. Right.

9 MEMBER KRESS: Are all those --

10 CHAIRMAN POWERS: I think the answer is
11 yes on those.

12 MEMBER KRESS: Okay. And where in that
13 line do you draw the line and say, "Okay. Now the
14 loading or the temperature or the pressure is down far
15 enough that my HEPA filter can survive"? Do you have
16 criteria for that?

17 MR. JOHNSON: Well, that's kind of the key
18 question that we have. What DCS's approach is is
19 they've set up specific fire areas, basically their
20 process rooms or -- individual process rooms would be
21 considered a separate fire area. And they're saying
22 that they can confine the fire to one fire area, and
23 the effluent exhaust from that fire area would be
24 basically diluted in temperature, and so on, by
25 exhaust from other areas as it goes into the final

NEAL R. GROSS

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

1 system.

2 So they are taking credit for dilution
3 from areas where the fire has not spread to. And
4 that's, of course, one of the things that we're --
5 where we're looking at. And it goes back to one of
6 the things that Sharon indicated was, you know, what's
7 the margin of safety of their fire barriers? And, you
8 know, will the fire spread to other areas?

9 What I'd like to talk kind of briefly
10 about is some of the key design features of the
11 ventilation system. This indicates here the design
12 base pressure areas and vacuums for each of the zones.
13 You can see there is a gradient here where leakage
14 would go from lower pressure areas to higher -- to
15 higher vacuum areas as the hazard increases.

16 There's also a supply air system. The
17 supply air into the C4 and C3 zones do get filtered by
18 HEPA filters. There is also redundant fans in that
19 system. The C4 confinement system includes
20 gloveboxes. Also, the exhaust system has redundant
21 final filter assemblies. Each of the filter
22 assemblies has two banks of HEPA filters.

23 There are four redundant fans as part of
24 this exhaust system, and other parts of the system are
25 gloveboxes and the C3 boundary wall.

NEAL R. GROSS

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

1 MEMBER SIEBER: I presume there are
2 dampers in the ductwork.

3 MR. JOHNSON: There are fire dampers in
4 each of the fire areas just to confine it.

5 MEMBER SIEBER: Would the action of a
6 glovebox fire be accompanied by shutting down the
7 ventilation system?

8 MR. JOHNSON: Yes, into that zone.

9 MEMBER SIEBER: And closing the damper.

10 MR. JOHNSON: Into that zone, yes.

11 MEMBER SIEBER: All right.

12 MR. JOHNSON: The C3 confinement system --
13 this would include process rooms and cells. It has
14 redundant filter assemblies. Each of the filter
15 assemblies has two banks of HEPA filters and two
16 redundant fans for each of those systems.

17 One of the issues that we've identified in
18 our review is the amount of credit that DCS is taking
19 for the release fraction for their accident analyses.
20 And as Dave Brown mentioned, they were basically
21 crediting each bank of the final HEPA filters -- of
22 the HEPA filters in the final filter assembly at 99
23 percent for basically a release fraction of 10^{-4} . And
24 we have some concern with that.

25 There have been fires in a number of

NEAL R. GROSS

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

1 facilities which have resulted in filter damage.
2 We're very concerned about that. There are
3 uncertainties in the fire analysis, and we requested
4 further justification for those removal fractions.

5 Our guidance says we will accept a 99
6 percent removal efficiency for a ventilation assembly,
7 and we asked DCS to provide additional justification
8 for their removal efficiencies. Their response to us
9 was basically to use a calculational approach to
10 calculate what the efficiency might be, and their
11 approach addressed soot analysis and projected
12 temperatures, but it didn't include other aging
13 effects, you know, chemical effects, and so on, that
14 left us still concerned.

15 And after some discussion with them, they
16 have decided that they will try to refine their
17 environmental conditions and send us additional
18 information on that. Again, this is an issue that we
19 have not made a decision on.

20 The other issue I wanted to talk about is
21 an issue that fell out of our environmental impact
22 statement scoping meetings where a number of people
23 talked about the Savannah River site and the fact that
24 historically they've used sand filters in their
25 plutonium processing areas. And there are other

NEAL R. GROSS

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

1 facilities. At DOE Hanford, they use some sand
2 filters as well, but it's not universal within the DOE
3 system.

4 And what we decided to do in our EIS was
5 to include this as an option in terms of our impact
6 analysis. And we had a preliminary analysis performed
7 for us, and, you know, what we found is that both
8 systems have advantages and disadvantages. Both of
9 them have similar particulate removal efficiencies.
10 They have similar life cycle costs.

11 And by life cycle costs we included the
12 installation costs, maintenance, replacement of
13 filters, in-place testing. Waste disposal and
14 decommissioning costs are in there, and our analysis
15 was that overall they are pretty similar.

16 There are some advantages to the HEPA
17 filters in terms of lower installation costs, lower
18 decommissioning costs. Sand filters -- we're talking
19 about a system here that may be, you know, a couple
20 hundred feet by a couple hundred feet by, you know,
21 eight to 10 feet deep. We're talking -- this is a
22 fairly large piece of equipment. It would have some
23 significant decommissioning costs if it was required
24 eventually to totally dismantle that facility and
25 dispose of the sand in a waste disposal area.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 The sand filters do have lower maintenance
2 costs because the sand filter is there for the life of
3 the plant. You don't need to keep replacing and
4 testing the individual filter units. And sand filters
5 can withstand severe events like fires.

6 MEMBER KRESS: The particulate removal
7 efficiency, does that apply to the most respirable
8 size of the particulates?

9 MR. JOHNSON: There have been -- yes,
10 there have been some tests on sand filters with the
11 dioctyl phalate, DOP, tests. And they come out 99.8
12 percent in a sand filter. A HEPA filter bank, when
13 it's DOP tested in the field, would generate 99.95
14 percent.

15 MEMBER KRESS: Yes. But my understanding
16 was that for sand filters the part that went through
17 was the respirable size, whereas the HEPA filters took
18 out the relative percentage of all of the sizes. Is
19 that not true?

20 MR. JOHNSON: Well, I think the bottom
21 line is is that there -- the differences are slight
22 between them in terms of, you know, all sizes of
23 particles.

24 MEMBER KRESS: Okay.

25 CHAIRMAN POWERS: Yes. These are big sand

NEAL R. GROSS

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

1 -- these are serious sand filters.

2 MEMBER KRESS: Huge.

3 CHAIRMAN POWERS: And so you just -- just
4 the interception component gets rid of that respirable
5 fraction pretty well. I mean, I've always been
6 impressed by them. And having endured the headaches
7 of misaligned --

8 MEMBER KRESS: HEPAs?

9 CHAIRMAN POWERS: -- HEPA filters and
10 testing and things like that --

11 MEMBER KRESS: It's hard to misalign a
12 sand filter.

13 CHAIRMAN POWERS: Once you've got her
14 built, she's good forever.

15 (Laughter.)

16 MR. JOHNSON: So as part of our
17 environmental impact analysis, we are including a
18 discussion of the use of sand filters as an
19 alternative.

20 In summary, I've talked about the proposed
21 confinement design. I talked about the issue
22 regarding HEPA filter removal efficiency and also
23 about how we're considering in the EIS the sand filter
24 use. If you have any questions, I'll be happy to try
25 to answer them.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN POWERS: One of the questions
2 that comes up is we have a lot of redundancy on the
3 fans for maintaining the pressure differentials.
4 Redundancy and diversity are two different things, and
5 so what -- I mean, how do we view this?

6 MR. JOHNSON: Well, I think we -- we view
7 it in terms of the confinement systems as a whole,
8 that it includes both physical barriers like
9 gloveboxes, cell walls, confinement zones, as well as
10 ventilation filtration. And, you know, the redundancy
11 built into the ventilation system, you know, is a part
12 of that. But diversity I think is achieved through
13 the use of both static and dynamic confinement areas.

14 CHAIRMAN POWERS: So you're really putting
15 ventilation and barriers on an equal footing here and
16 saying, "Yes, there's diversity."

17 MR. JOHNSON: Right.

18 CHAIRMAN POWERS: Okay. Thank you.

19 MEMBER KRESS: The other issue that
20 usually comes up about barriers is, how independent
21 are they and how independent do they need to be? And
22 the independence depends on the -- on things like
23 bypass and loads and how well the fire can spread from
24 one to the other. Have you looked at that part of it?

25 MR. JOHNSON: Well, I think the fire

NEAL R. GROSS

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

1 spread is a key area of the fire analysis, and it is
2 something that Sharon is focusing on. And that's a
3 basic assumption in the use of the HEPA filters here,
4 and its overall integrity in the event of a fire
5 event, because they are making the assumption that
6 they can confine a fire to a specific fire area.

7 MEMBER BONACA: You characterize the four
8 ventilation zones as independent. But it seems to me
9 that the C4 and the C3, for example, were depending on
10 the same intakes and exhausts. Are there still
11 independences maintained there somehow?

12 MR. JOHNSON: Well, I guess I would look
13 at them as somewhat independent in that they can be
14 segregated, they can -- through damper systems, so
15 that the -- the design goal here is that they will
16 have fire dampers that would activate and seal off a
17 fire area.

18 So in that situation, the rest of the
19 system would still remain operational in the other
20 areas where the fire doesn't spread to. But, again,
21 the question of, can you adequately contain the fire
22 into a fire area is a question that we're still
23 looking at.

24 MEMBER BONACA: Yes.

25 CHAIRMAN POWERS: Any other questions?

NEAL R. GROSS

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

1 Well, thank you.

2 MR. JOHNSON: Okay. Thank you very much.

3 CHAIRMAN POWERS: We are scheduled to take
4 a lunch break and to resume at 1:15, and I can't
5 change that resumption schedule.

6 I'd like to, at this intermediate stage,
7 congratulate all the presenters on what I think have
8 been so far outstanding presentations and hope that
9 those after lunch can maintain this high standard
10 here.

11 And with that, I'll recess this until
12 1:15.

13 (Whereupon, at 11:53 a.m., the
14 proceedings in the foregoing matter went
15 off the record for a lunch break.)

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

(202) 234-4433

www.nealrgross.com

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

2 (1:16 p.m.)

3 CHAIRMAN POWERS: Let's go back into
4 session and continue our discussions of the MOX fuel
5 fabrication facility. And I guess we're moving on to
6 the electrical stuff.

7 MR. BURROWS: I'm Fred Burrows. I'm the
8 electrical reviewer for MOX. I'm going to give a
9 general overview of the electrical systems. It'll be
10 using the viewgraph and also the slide projector, so
11 bear with me.

12 CHAIRMAN POWERS: A multimedia
13 presentation here.

14 MR. BURROWS: Yes, that's true.

15 This is a simplified one-line diagram of
16 the MOX facility. It has two feeds from the Savannah
17 River site. They are 13.8KV feeds. There are two
18 transformers, one for each feed. They're 100 percent
19 capacity. That is, they are capable of carrying all
20 of the loads in the facility.

21 There are two 4KV buses. There are two
22 4KV emergency buses. There are also 480-volt load
23 center buses. There are more than one; I've only
24 shown one to make this slide simple. There is an
25 automatic transfer scheme. If an offsite source

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 should be lost, all of the loads on this bus will
2 shift over to the opposite source following a time
3 delay.

4 Also, the 480-volt buses here have cross-
5 ties. They are manually controlled. They are used
6 for maintenance.

7 If I could go back to the overhead.

8 MEMBER LEITCH: Just before you leave
9 that, we have talked about the diesels a little bit.
10 The standby diesels --

11 MR. BURROWS: Yes.

12 MEMBER LEITCH: -- normally supply the
13 standby bus. In other words, can you tie the
14 emergency diesel to the standby bus?

15 MR. BURROWS: No. I'll be working my way
16 down to --

17 MEMBER LEITCH: Okay. Okay. I'll just
18 hang on --

19 MR. BURROWS: I'm starting at the top.

20 MEMBER LEITCH: -- for a second. Okay.
21 Good.

22 MR. BURROWS: All right. All right. I'm
23 down to the last bullet. The normal AC system that I
24 describe is designed to IEEE Standard 785 -- or 765.
25 And it is a non-principal structure system component.

NEAL R. GROSS

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

1 And I should say this is similar to what you'd find in
2 a nuclear powerplant.

3 MEMBER KRESS: Is non-principal a
4 category?

5 MR. BURROWS: Yes.

6 MEMBER KRESS: Or is that just a word?

7 MR. BURROWS: No, it's non-principal SSC.

8 MEMBER KRESS: There's different kinds of
9 SSCs, principal and non-principal? Did I miss that
10 earlier?

11 MR. BURROWS: Yes. If it's not a
12 principal, it's a non-principal.

13 MEMBER KRESS: But it's still an SSC.

14 MR. BURROWS: No, it is --

15 MEMBER SHACK: I think it's like saying
16 it's non-safety-related, if we were going to put it in
17 -- you know, in reactor terms.

18 MR. BURROWS: It's non-Class 1E.

19 MEMBER SHACK: Yes, it's non-Class 1.

20 MEMBER KRESS: Non -- okay. That's the
21 basic analog.

22 MEMBER SHACK: Okay. And principal is
23 just what you think it is.

24 MEMBER KRESS: Okay.

25 MR. BURROWS: Okay. The next -- and I

NEAL R. GROSS

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

1 want to talk about the standby AC system. It has two
2 diesel generators. These each have redundant
3 batteries for starting. Also, they are not shown in
4 this diagram, but there are two 120-volt, 208-volt
5 uninterruptable power supplies, which provide power
6 for the control of the process.

7 These generators will start on the loss of
8 a feed and the failure of the transfer to the other
9 offsite source. And their purpose is to provide for
10 safe shutdown of the facility and also a quick restart
11 of production. And they are sized to carry one
12 emergency bus that corresponds to their switch gear
13 bus, and they are also sized to carry the shutdown
14 loads associated with this bus. Not all of the loads;
15 some of the loads are shed.

16 MEMBER SIEBER: What's the kilowatt output
17 of the diesels?

18 MR. BURROWS: I'm not sure of that yet.
19 I don't think that's been established. But I believe
20 they are the same size as the emergency diesel
21 generators, but that doesn't answer your question.

22 MEMBER SIEBER: No, it didn't.

23 (Laughter.)

24 It can't be too big if you use batteries
25 to start it.

NEAL R. GROSS

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

1 MR. BURROWS: Yes. Okay. Let's see, I'm
2 now down to the last bullet on this slide. The
3 standby AC system is designed to IEEE Standard 446,
4 and, again, it is not a principal SSC. It is not
5 Class 1E.

6 Now, moving on to the important stuff, the
7 emergency AC system. That's this area down here.
8 There are two separate redundant diesel generators.
9 They also have redundant batteries for starting. They
10 are, if I can use the term, Class 1E.

11 And there are also two 480-volt
12 uninterruptable power supplies. Those are for the
13 glovebox extraction fans. You saw a little bit of
14 that with the ventilation system. There are two 120-
15 volt uninterruptable power supplies, and they provide
16 power for the principal SSCs in the I&C area. That is
17 instrumentation and controls.

18 Now the diesel generators and these power
19 supplies are there for the loss of all other sources.
20 And they power -- the diesel generators provide power
21 mainly to the principal SSCs, such as the
22 depressurization exhaust fans. That's part of the
23 ventilation system also.

24 As I said, they are Class 1E, so the whole
25 emergency AC system is designed to Class 1E IEEE

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 standards such as 308, 387, and they are a principal
2 SSC.

3 Are there any questions?

4 Okay. Next slide.

5 Now we have the normal DC power system,
6 two separate 125-volt batteries. Each has a charger.
7 They provide breaker control and some DC loads in the
8 plant. As a normal system, it's designed to 485 for
9 battery sizing and 484 for the installation of the
10 batteries. And they are designed as non-principal
11 SSCs. That is, they are not Class 1E.

12 Then we get to the emergency DC system.
13 This also has two separate redundant 125-volt
14 batteries. They each have a charger, and they provide
15 power for the emergency breakers. That is, the
16 breakers that are needed for the emergency buses.
17 They also provide emergency lighting, and they are
18 also principal SSCs. They provide power to the loads
19 that are principal SSCs.

20 They are designed as Class 1E DC systems
21 to such standards as 946, 450, and 485. And they are
22 designed as principal SSCs. That is, they are
23 Class 1E.

24 Now, in summary, the whole electrical
25 system is a robust design, as I showed. They have

NEAL R. GROSS

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

1 multiple AC sources, multiple systems. I believe that
2 provides defense-in-depth -- multiple layers.

3 Specifically, the emergency AC and DC
4 power systems are designed for redundancy and
5 independence. No single failure vulnerability, have
6 sufficient capacity and capability to carry the
7 emergency loads. They will have quality assurance
8 applied. Also, some of the IEEE standards provide for
9 maintenance, and there will be an environmental
10 qualification program to ensure they perform their
11 function when required.

12 Now, the only issues I have are related to
13 the specific standards and the associated Division I
14 reg guides. As you know, the staff endorses IEEE
15 standards. It's usually specific versions, a specific
16 year. So DCS, the applicant, has used the latest
17 standards, and the staff is somewhat behind in their
18 endorsement.

19 So I am reviewing the differences with the
20 help of DCS. We are having ongoing dialogue. They
21 have also agreed to look at the Division I reg guides,
22 and in some cases they are committing to the
23 Division I reg guides.

24 Are there any questions?

25 MEMBER LEITCH: Could you get back to your

NEAL R. GROSS

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

1 single line again, please, Fred? I was just --

2 MR. BURROWS: Yes.

3 MEMBER LEITCH: I was just a little
4 confused about the answer to the diesels. The
5 emergency diesels can't backfeed through and pick up
6 the main -- the normal bus?

7 MR. BURROWS: Oh, no. That's going to be
8 separated from the switchgear, just carry the
9 emergency loads.

10 MEMBER LEITCH: All right. So, in other
11 words, if the emergency diesel breaker is closed, you
12 won't be able to close one of those tiebreakers to the
13 other bus?

14 MR. BURROWS: No. I mean, just these
15 breakers.

16 MEMBER LEITCH: I'm just curious how that
17 -- and maybe you don't have the details yet on how
18 that interlock works.

19 MR. BURROWS: Yes. You wouldn't want to
20 do that. There was a question when I was out of the
21 room this morning about separation, electrical
22 separation. You don't want to tie your emergency
23 Class 1E stuff back to the non-1E stuff.

24 MEMBER LEITCH: Yes, I agree. I was just
25 wondering how -- how that interlock is achieved. I

NEAL R. GROSS

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

1 guess you can't have those two breakers closed at the
2 same time is about what it amounts to.

3 MR. BURROWS: Yes. I don't -- I don't
4 know if they want -- they could do that, but I don't
5 think they want to do that. I'm not sure they'll have
6 interlocks to prevent it, but there may -- they may be
7 designed with interlocks. I haven't seen that level
8 of detail at this point. It's just --

9 MEMBER LEITCH: Yes. I mean, I think it
10 should be interlocked so that it's impossible to do
11 that, really. Otherwise, you compromise the
12 independence of the two systems.

13 MR. BURROWS: Well, you know, yes. You
14 know, sometimes, you know, for testing you have to
15 parallel them to the offsite sources, and so there
16 might be occasions when you want to do that to develop
17 load and --

18 MEMBER LEITCH: But at any rate, that
19 level of detail is not worked out yet.

20 MR. BURROWS: Yes. At this point, the
21 review is focusing on the standards that they're
22 using, not -- the applicant graciously used the IEEE
23 standards from nuclear powerplants, which made my
24 review very simple, somewhat simple. But, so it's
25 pedigreed as -- similar to what you find in a nuclear

NEAL R. GROSS

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

1 powerplant.

2 Actually, I personally believe it's better
3 than the powerplant, but -- than a nuclear powerplant,
4 with certain features like standby diesel generators
5 that start automatically and -- before you end up on
6 your emergency diesels.

7 MEMBER LEITCH: Okay. Do you know
8 anything about the nature of those two 13KV lines?
9 Are they aerial? How long are they? Those kinds of
10 things.

11 MR. BURROWS: No. I don't know that at
12 this point. I do know they are committing to be
13 somewhat independent of each other, but I don't -- the
14 independence is, you know, not to the point that
15 they're going to commit to using separate right-of-
16 ways. They're going to make sure one line, if it
17 falls over, doesn't fall into the other. So you're
18 going to get that type of limited separation.

19 MEMBER LEITCH: So it would not be on the
20 same pole set.

21 MR. BURROWS: No. That's all discussed in
22 IEEE 765. I won't go into GDC 17, but it's in that
23 area.

24 I believe this morning there was a
25 question about separation. Somebody had a question.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN POWERS: Right.

2 MR. BURROWS: One of the standards they
3 are committed to was 384, along with we're looking at
4 Reg. Guide 175. That's part of the ongoing dialogue,
5 to home in on, what are the issues? Where do they get
6 closer? Where do the cables get closer than what's
7 permitted by the version of 384 that's endorsed by
8 Reg. Guide 175?

9 Are there other questions?

10 MEMBER SIEBER: Could you give us examples
11 of some of the emergency loads that might be carried
12 by the emergency bus? What is the equipment that
13 you're operating?

14 MR. BURROWS: Yes. From this morning's
15 presentation by Tim Johnson, it's mostly the
16 ventilation system, the fans.

17 MEMBER SIEBER: What about the pumps and
18 things like that? Nothing?

19 MR. BURROWS: No, just mostly fans for the
20 ventilation system.

21 MEMBER SIEBER: And what are the
22 consequences if the fans don't operate?

23 MR. BURROWS: Well --

24 MEMBER SIEBER: A release? It looks like
25 everything --

NEAL R. GROSS

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

1 MR. JOHNSON: Do you want me to try to
2 answer that? If the fans don't operate, there's a
3 chance the confinement systems won't work properly and
4 you could get a release.

5 MEMBER SIEBER: Okay.

6 MR. BURROWS: You're going to lose that
7 vacuum in your gloveboxes or your different
8 confinement zones.

9 MR. GIITTER: Something that was kind of
10 interesting, we were out at -- a group of us were out
11 at Los Alamos last week, and about a year ago when
12 they had the fire that threatened the facility they
13 actually walked away. They shut the entire facility
14 down, no power to the facility, and they walked away
15 from it for two weeks.

16 They came back into it expecting, you
17 know, some at least minor contamination, but they
18 really didn't see any. So in that particular instance
19 of just shutting down the facility, walking away from
20 it, did not lead to widespread contamination at all.

21 MR. BURROWS: But, of course, this is --
22 this is designed for spills, you know, event-type
23 scenarios, upsets of things, you know, activities that
24 could cause problems, releases, not just normal
25 operation but emergency situations where you need that

NEAL R. GROSS

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

1 filtration system to work.

2 MEMBER SIEBER: Thank you.

3 CHAIRMAN POWERS: And the throughput
4 through TA-55 is substantially smaller than this
5 facility, I think.

6 MR. GIITTER: Yes, that's true.

7 CHAIRMAN POWERS: John, you're going to
8 discuss I&C, huh?

9 MR. CALVERT: Yes, sir. My name is John
10 Calvert. Fred and I work together actually on
11 instrumentation and controls.

12 Next slide, please?

13 Today I want to give you an overview of
14 the I&C systems and talk about the principal
15 structures, systems, and components that we've been
16 calling the PSSCs. They are the -- if you will, the
17 safety-related systems. A little bit about the system
18 architecture, the design bases, and then a summary.

19 Next slide, please?

20 This is -- shows you in a nutshell the
21 four major systems in the MOX facility. MOX or --
22 yes, MOX process control, AP control, utility control,
23 and emergency control. Each one of those has a
24 subsystem that's entitled normal, protective, and
25 safe. And then the Xs show which is allocated to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 those systems.

2 The PSSC is shown here as the -- in these
3 two systems here, but there is also -- in the
4 nomenclature that's used presently by the applicant,
5 there are safety controllers that aren't necessarily
6 PSSCs. The emergency control is a hard-wired system.
7 It's all PSSC. And then I showed the various control
8 rooms, which are manned according to the process.

9 There are six control rooms associated
10 with MOX, one major control room associated with AP,
11 and then there is -- utility control normally is in
12 this control room in AP, and then there's an alternate
13 control room.

14 Then, emergency control has two control
15 rooms separate and redundant. And then there is one
16 more control room for reagent processing, which I
17 don't show. But the important thing here is that
18 we've identified the PSSCs.

19 Next slide, please.

20 This is an overview of the system
21 architecture for both the process -- it could be in
22 the AP or MOX, but it will have this architecture.
23 What it centers around is there is a normal controller
24 that's programmed with the modular processing
25 algorithm, and it is -- this is the main controller

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 for that production step if you will.

2 Then, separate and independent is a safety
3 controller that's looking at limits, and then we'll
4 take action to mitigate any safety problem, or these
5 safety problems.

6 In addition, there is a protection --
7 personnel and equipment protection that's inside this
8 MCC that is used for equipment, motors, and so forth,
9 and for industrial safety of personnel.

10 CHAIRMAN POWERS: And what is an MCC
11 again?

12 MR. CALVERT: Motor control center.
13 Sorry.

14 CHAIRMAN POWERS: Motor control center.

15 MR. CALVERT: The normal process has its
16 normal complement of sensors. Then, the normal
17 controller controls to -- the motor control center
18 controls the process actuator. This could be, you
19 know, a motor, a valve, or whatever.

20 In addition, connected across this bus
21 called the immediate control network are work
22 stations. These work stations at this time are
23 usually in the associated control room that this step
24 -- this production step is associated with.

25 And this monitors the action of what's

NEAL R. GROSS

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

1 happening down here, and the normal control center
2 also sends and receives messages from the MMIS
3 computer, which is the manufacturing, management, and
4 information system. So that in some cases, for
5 example, you -- they want to start a particular
6 product module. The normal controller can't stand
7 until it receives permissive information from MMIS.

8 Then, when it stops, it sends messages
9 back to MMIS which says, "I'm done. You can proceed
10 to the next step." The MMIS keeps track of the
11 material inventory and the steps in performance. This
12 little section in here in the MMIS concerns one part
13 of the safety controller, and that is we are trying to
14 find out from the licensee in detail how this will fit
15 in with the IEEE standards that he has chosen. And we
16 are -- so that's why that's there.

17 The manufacturing status computer is
18 actually a mirror image of the MMIS, and this is where
19 production sorts and production information and
20 everything are taken out of. The MMIS, like I say, is
21 taking information from the normal controllers, and it
22 serves as a server for the terminals that are spaced
23 at the various control rooms.

24 This is a diagnostic computer that
25 receives information over the local -- local

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 industrial network this is called. And it has an
2 independent program that figures out that the normal
3 controller is in trouble or it's not performing the
4 way it should.

5 And it's used as a diagnostic aid only for
6 the operation staff. And this was added from the --
7 the foreign facilities added this, which was an
8 interesting choice.

9 So what happens is for each production
10 step you can have a normal controller by itself or a
11 normal safety controller by itself, depending on the
12 -- what the process engineers desire. So these little
13 dots here indicate different configurations, and this
14 is one of the configurations showing just a normal
15 controller by itself.

16 So this is designed such that these
17 ethernet buses here -- ICN, LEN, and XTN -- are really
18 not needed. This can control by itself. It's
19 independent and almost autonomous. The safety
20 controller is autonomous. Nobody touches it.

21 So that's the idea. Each production step,
22 then, is broken up. And if one section fails, it will
23 only be that one section, not the whole -- like
24 sometimes they put in a whole massive computer, it
25 fails, everything goes. So this is -- is designed for

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 availability.

2 CHAIRMAN POWERS: You indicated that the
3 manufacturing status device and the manufacturing --
4 the MMIS were mirror images of each other. Can they
5 send conflicting signals?

6 MR. CALVERT: At this time, we don't know
7 that because we don't know the details. But if it's
8 a non-primary or non-principal SSC, we'll ask those
9 questions. But if they come up with conflicting
10 answers, we'll have to solve it. It's not a safety
11 situation. That's why we tried to identify the PSSCs.

12 But there are the interactions where the
13 normal controlling -- there are interactions there
14 which will -- that we look for that may cause a safety
15 action to occur.

16 MEMBER SIEBER: Will the depth of your
17 review include a line-by-line review of the software?

18 MR. CALVERT: For the primary -- for the
19 principal SSCs.

20 MEMBER SIEBER: Okay.

21 MR. CALVERT: And the rest of the --

22 MEMBER SIEBER: Are they all the same?
23 You know, all of these controllers and computers.

24 MR. CALVERT: Yes. Well, I'm not sure of
25 the entire details. But the design is that the normal

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 controllers are PLCs. They have a history of
2 operation in the plants overseas. And also, the
3 software -- the requirements for the software will
4 have a background of actual operation.

5 And safety controllers will get a pretty
6 thorough review. Normal controllers we'll be looking
7 for -- that they satisfy the algorithms, that there's
8 no chemical safety problems, and so forth, and that a
9 normal failure will not cause one of these things to
10 come into existence.

11 MEMBER SIEBER: Okay.

12 MR. CALVERT: Any other questions?

13 MEMBER LEITCH: Is there some kind of a
14 manual override on the safety controller? Or once it
15 intervenes, you can't do anything about it? I was a
16 little confused. You said it was autonomous and I --

17 MR. CALVERT: It's autonomous in that it's
18 -- it's looking at a set of parameters all by itself.
19 When it senses the condition to take action, it
20 overrides anything that's coming from the normal
21 controller down to the process actuator and actually
22 causes the process to stop.

23 If that doesn't work, the administrative
24 control -- they go to -- the operators go to the
25 emergency control center and actually shut off the

NEAL R. GROSS

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

1 power either to that module or whatever, like what
2 happened in what Joe was talking about. You shutdown
3 and leave.

4 MEMBER LEITCH: All right.

5 MEMBER SIEBER: Are the process sensors
6 and the protection sensors two different sensors, or
7 do you have --

8 MR. CALVERT: At this time, I --

9 MEMBER SIEBER: -- cases where one sensor
10 would serve both functions?

11 MR. CALVERT: No. They are supposed to be
12 separate and independent. Everything here that's
13 cross-hatched, with the exception of MMIS, which we're
14 investigating, is supposed to be separate and
15 independent.

16 MEMBER SIEBER: Okay.

17 MR. CALVERT: Any other questions?

18 Okay. So that's the main architecture
19 that will be used.

20 The second architecture is for utility
21 control.

22 Next slide. Oh, there we are.

23 It has the same structure, except this one
24 has two data communication networks. Here again, we
25 have the normal safety controller arrangement. But

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 now the safety controller, which is also independent,
2 has independent, manual, and actually from safety work
3 station. This is in a control room, and this is in a
4 different location than this.

5 But, again, this is a non-principal SSC.
6 But it has a redundant design. And so this is for
7 utilities, you know, the gas, and so forth.

8 Next slide, please.

9 The emergency control is actually what
10 we're used to looking at -- is separate, redundant,
11 control centers, actually in separate rooms. And this
12 has no -- these have no software involved at all. And
13 their main -- this is where the operators will go to
14 manually control the process, essentially to turn it
15 off. So it has the same kind of structure, but it is
16 separate and redundant.

17 Okay. The design bases at this time --
18 the function of -- these are the safety control
19 subsystems. These are the PSSCs. Again, here is the
20 safety limits, can't be exceeded, and they are used to
21 prevent or mitigate the undesirable conditions or
22 events.

23 The design is -- what they've done since
24 they've modularized everything -- this is the
25 applicant -- they've chosen standards for the system

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 design, the programmable electronic system, and then,
2 for software -- these are usually all the things for
3 software. They've chosen IEEE specs. These are IEEE
4 specs, the set points, independent separation,
5 isolation, EMI, follow pretty much what we have in the
6 reactor arena. The only tricky part in this is we
7 have to check their application as applied to this
8 kind of facility.

9 Again, here's the safety controller,
10 single, separate, independent. And all of its
11 interfaces with non-SSCs are isolated.

12 Here is the emergency control center or
13 system. Again, its function -- and its design, again,
14 is redundant, primarily manual control. This we have
15 to work out with the applicant what that means. I
16 think it comes in in the design phase where they might
17 find something different.

18 And, again, they use appropriate standards
19 from the reactor arena that are applied to this type
20 of facility.

21 CHAIRMAN POWERS: They don't have
22 standards of an appropriate nature coming out of the
23 chemical process industry?

24 MR. CALVERT: The applicant has chosen to
25 apply reactors. There are some in the chemical

NEAL R. GROSS

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

1 industry, yes, and I'm familiar with them and so is
2 the applicant. But they've chosen the route of
3 reactor -- actually, for us it's a better deal because
4 we're quite familiar with those.

5 CHAIRMAN POWERS: Sure. Sure. But I'm
6 just anxious that we're not missing something.

7 MR. CALVERT: That's been discussed, but,
8 as I say, I and some of the other fellows have a
9 little bit of background in that. We don't apply them
10 in our industry, of course. But I have looked at them
11 for -- part of my job is to look at other industries
12 and see what's good.

13 CHAIRMAN POWERS: We have -- I mean, we
14 have -- I think what you said, looking at the
15 applicability issues, because you've got other -- a
16 different environment here.

17 MR. CALVERT: Yes.

18 CHAIRMAN POWERS: You have a lot more
19 chemical vapors that you have to worry about, and
20 things like that.

21 MR. CALVERT: And that's -- I didn't
22 mention that part of the -- in the I&C review, I have
23 to work with the chemical process, the ventilation,
24 everybody. And this comes in in the design stage,
25 because actually the requirements that will hopefully

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 be firmed up in the ISA actually become requirements
2 of the design for those controllers.

3 So I have to make sure that those hazards
4 and the mitigation of those hazards are actually in
5 the software requirements and actually get done.

6 In summary, again, the appropriate
7 standards are used. It's really the application
8 trickiness of it. We have discussed this with the
9 licensee and we're working that out.

10 The design basis commitments -- at this
11 time, they are appropriate for a construction
12 application. And then the allocation of safety
13 controllers to the process modules for the PSSCs, what
14 we would like -- and discussing it now -- is what PSSC
15 goes with what process module, or what module of the
16 process. So we can -- you know, we've got eight of
17 these or four of them, or whatever. And then we can
18 check back through the various other reviewers to see
19 that that's correct.

20 So that ends my presentation. Are there
21 any questions?

22 CHAIRMAN POWERS: Questions from the
23 members? My off-hand reaction to this system is it's
24 sufficiently complex that we may need some consulting
25 help on this, examining this system. And I am writing

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 a note to that effect to the able cognizant engineer.

2 Thanks, John.

3 MR. CALVERT: Yes, sir.

4 CHAIRMAN POWERS: I guess we're moving now
5 to the seismic discussion, a non-controversial area on
6 the southern -- South Carolina area. We'll all become
7 familiar with sand vents, and I think we ought to have
8 a subcommittee meeting in Charleston, just so we get
9 familiarity with the seismic issue.

10 MEMBER KRESS: I second that. I second
11 that.

12 MR. STAMATOKOS: What's the easiest for
13 me? Do you want me to sit and talk or --

14 CHAIRMAN POWERS: Whatever is easiest with
15 you. You have the option of sitting or standing.
16 It's just you have to be next to a microphone. That's
17 the one requirement or our extremely competent and
18 charming reporter will be on your case. And you don't
19 want that to happen to you.

20 MR. STAMATOKOS: Well, my name is John
21 Stamatokos. I work at the Center for Nuclear Waste
22 Regulatory Analysis in San Antonio. And our task is
23 to evaluate the seismic hazards among other parts of
24 this particular project.

25 The bottom line I think of the applicant's

NEAL R. GROSS

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

1 approach to the seismic, as you'll see, is that they
2 have chosen to use Reg. Guide 160 design spectrum
3 anchored at .2G, which is similar to a nearby nuclear
4 facility. And their whole analysis in their
5 construction authorization request is developed to try
6 to support that as an appropriate and safe level
7 ground motion.

8 So what we're evaluating is sort of their
9 technical basis for choosing the design spectrum that
10 they have. So what I'm going to walk you through in
11 this talk is just some of the things that they've done
12 in support of that and some of the things that we've
13 talked about with them in our preliminary part of the
14 review.

15 Go to the next slide.

16 So the history of the seismic evaluation
17 at Savannah River has gone on for a long time.
18 There's a long history of the evaluation. The
19 approach that was taken by the applicant was to first
20 develop a probabilistic seismic hazard assessment,
21 generic for the entire Savannah River site.

22 The way that that was done was by using
23 existing probabilistic seismic hazard results from
24 Lawrence Livermore and EPRI. They've averaged those
25 two to develop a better hazard spectrum. They

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 established, then, a design basis earthquake, and in
2 doing so they were implementing Standard -- DOE
3 Standard 1023, which is quite similar to NRC guidance
4 Reg. Guide 1.165.

5 DOE uses -- also uses a standard now in
6 their probabilistic seismic assessments of DOE
7 Standard 1020, which sets -- it's a graded approach.
8 It sets five performance goals, PC0 through PC4, and
9 in this particular instance we are -- they are most
10 interested in the highest levels, PC3 and PC4.

11 PC3 standards are essentially for nuclear
12 fuel-type storage facilities, those kinds of
13 facilities. PC4, which is the highest, are
14 established for reactor-type facilities. And the
15 input return periods for those are 2,000 and 10,000
16 years.

17 Okay. Next slide.

18 MEMBER KRESS: Did you say you averaged
19 the LL -- the Lawrence Livermore and the EPRI?

20 MR. STAMATOKOS: Yes, they averaged them
21 together to get a composite.

22 MEMBER KRESS: To come up with a new
23 composite?

24 MR. STAMATOKOS: Right. Yes. It's sort
25 of intermediate between the end member --

NEAL R. GROSS

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

1 MEMBER KRESS: That was very interesting.

2 MR. STAMATOKOS: Diplomatic. The other
3 thing they did, and they've -- they performed a lot of
4 checks along the way. One of the things they did was
5 what they called their historical earthquake check.
6 In this case, they are using the Charleston 1886
7 earthquake, which is a magnitude 7.2 earthquake, at a
8 distance of approximately 120 kilometers from the
9 site.

10 So there was the -- the approximate
11 location of the Charleston earthquake, an approximate
12 surface magnitude of 7.2. We don't, obviously, know
13 the exact magnitude of that.

14 So they then filtered this information in
15 to make sure that the design spectrum they were going
16 to ultimately use will envelope that ground motion
17 from the Charleston earthquake.

18 Next slide?

19 The other half, once they've developed
20 these input rock ground motion, probabilistic seismic
21 ground motions, is that they did a study of the site
22 response. And, again, like the other one, this is
23 sort of a two-part approach.

24 They used the ground motion attenuation
25 models to generate what they call the site-specific

NEAL R. GROSS

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

1 PSHA, and then they used the extensive soil data they
2 had to develop the soil profiles in order to bring
3 those ground motions from the bedrock up to the soil
4 surface.

5 And the way that they did that was to
6 develop some amplification functions which would scale
7 the uniform hazard spectrum bedrock to the soil
8 surface. But they also developed an alternative
9 methodology, looking at amplification functions as a
10 way to test to make sure that their approach was
11 conservative. This is an approach developed by
12 Cornell, and I can't remember the other author's
13 names, but it's basically to perform a check of the
14 scaling they used for the amplifications.

15 And then they said in their soil stability
16 analysis what they're going to do is use their bedrock
17 PC3 ground motions and scale those to the surface, so
18 that the PGA is at .2G.

19 Next slide, please.

20 MEMBER SIEBER: Do you use actual borings
21 from the actual location of the plant?

22 MR. STAMATOKOS: Yes, they have both a
23 site-wide soil response model, and they have some
24 site-specific information which they used to show that
25 the site-wide model is appropriate.

NEAL R. GROSS

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

1 MEMBER SIEBER: So you are comfortable
2 that there won't be a soil liquification --

3 MR. STAMATOKOS: Well, I haven't talked
4 about liquefaction in this particular topic. Yes, but
5 we're pretty confident that that is also handled in
6 the application.

7 So this is the -- this diagram, which
8 didn't come out as clear as I had hoped on the slide,
9 but anyway, this is the design spectrum that they're
10 going to use. What they're showing you here is that
11 PC4 and PC3 spectrum, so this would be the 10,000
12 year, this is the 2,000 year. Theirs is -- this is
13 the 160 spectrum anchored at .2G.

14 And as I said, they tied this to Reg.
15 Guide 160. The resulting spectrum that they're using
16 they say is quite comparable to what's used at the
17 nearby nuclear powerplant. The only differences are
18 at the -- there are some very low frequencies. The
19 frequencies of interest in the facility are probably
20 in this range, but I'll let the engineers address
21 that.

22 And then the final point is that the --
23 these were all done for the horizontal spectrum, and
24 for the vertical spectrum they originally started with
25 using the sort of traditional two-thirds horizontal,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 but they decided that wasn't conservative enough, and
2 so they went back and they're using the vertical
3 spectrum also from Reg. Guide 160 anchored at .2G PGA.

4 CHAIRMAN POWERS: That's interesting.

5 MR. STAMATOKOS: Next slide.

6 So our evaluations, which have been talked
7 about with -- in our preliminary RAI and in the
8 meeting with them in South Carolina -- have to do with
9 the use simply of the Lawrence Livermore and EPRI
10 hazards and whether or not there is any need to
11 consider updating those or modifying those slightly to
12 consider a closer source for the Charleston
13 earthquake.

14 There are some differences between what
15 has been produced for this site and what the USGS --
16 that's the national earthquake hazard reduction
17 program has predicted, and that -- those differences,
18 the USGS -- the NEHRP results are a little bit higher
19 has to do with just how some of the attenuation models
20 are scaled. And that was a question that was raised
21 at that meeting, and we're looking forward to seeing
22 how they might modify to incorporate the additional
23 attenuation models.

24 And, of course, we're looking at the site
25 response information and, in particular, the sort of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 interesting way that they're checking their site
2 response with the alternative method that was proposed
3 by Cornell.

4 So that's a very quick summary of the
5 seismic assessment, and I'll be glad to take some
6 questions.

7 CHAIRMAN POWERS: Any other questions on
8 this particular area? I bet we get to visit this
9 again.

10 (Laughter.)

11 MR. STAMATOKOS: I think so, too. Yes.

12 CHAIRMAN POWERS: I mean, this issue of
13 closer sources is one that's been around for as long
14 as I've been going to Savannah River. And it would be
15 interesting to see how that gets resolved. The other
16 question, of course, is the bedrock to soil transfers
17 and how they do that.

18 Fine. Fair enough.

19 MEMBER SIEBER: Just are there differences
20 when they do the two amplification models?

21 MR. STAMATOKOS: There are some slight
22 differences, and they show that the one that they're
23 using is a higher motion than the --

24 MEMBER SIEBER: The Cornell model.

25 MR. STAMATOKOS: That's right. So they

NEAL R. GROSS

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

1 justify it by saying, "We did this check, and we still
2 feel that by anchoring at .2 and using the 160 that we
3 essentially envelope what a specific hazard would tell
4 us."

5 MEMBER SIEBER: Did they compute the
6 G-forces using separately EPRI and Lawrence Livermore
7 data?

8 MR. STAMATOKOS: No.

9 MEMBER SIEBER: Okay. So this means that
10 that choice of averaging is -- makes it non-bounding.

11 MR. STAMATOKOS: In that sense, yes. If
12 you would just use -- certainly, if you'd use the
13 Lawrence Livermore, you'd get higher values.

14 MEMBER SIEBER: That's right.

15 MR. STAMATOKOS: But I --

16 MEMBER SIEBER: I'm just wondering if
17 that's significant or not because --

18 MR. STAMATOKOS: I don't think so. I
19 think that -- I think that the choice of giving them
20 equal weight actually is -- is -- you know, at least
21 it gives deference to all of the information that's
22 out there.

23 MEMBER SIEBER: Both of them are just
24 opinions anyway.

25 MR. STAMATOKOS: That's right. That's

NEAL R. GROSS

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

1 right. I think that the proof comes in this
2 historical check. I mean, you know, if you take --
3 you know, and that's where this controversy about
4 where you place the Charleston earthquake is
5 important.

6 MEMBER SIEBER: Okay. Thank you.

7 CHAIRMAN POWERS: On my agenda, I have
8 physical security. Is -- oh, no, I'm sorry. Material
9 control and accountability.

10 MR. PHAM: Good afternoon. My name is Tom
11 Pham. I am the reviewer in the material control and
12 accounting, MC&A, area. As you know, complementary to
13 the physical protection aspect, MC&A is a part of the
14 overall safeguard program for the applicant.

15 The basic regulatory requirements for the
16 MOX MC&A program consists of the MC&A regulation
17 contained in 10 CFR Part 74, subpart A, paragraphs 51
18 through 59. This put the applicant into what we call
19 a Category 1 facility, which requires the most
20 stringent requirements in MC&A.

21 Along with the regulations, the applicant
22 needs to submit a so-called fundamental nuclear
23 material control plan, FNMCP, following the guideline
24 for how NUREG guidance document 1280. And this plan
25 is being prepared by DCS following our NUREG

NEAL R. GROSS

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

1 guideline, and it will be submitted to us with the
2 operation license application stage.

3 In the construction authorization
4 application, and also in two different meetings in
5 December 1999 and March 2001, DCS staff presented to
6 the NRC and -- in the CAR application DCS committed to
7 provide to us the FNMC plan consistent with the NUREG-
8 1280 and also provide us the overall approach and
9 different physical aspects of various MC&A elements,
10 including the process monitoring, the program item
11 monitoring, the receipt measurement, measurement
12 system, and how to control the measurement, and also
13 about the annual inventory, physical inventory.

14 And the overall aspect is it depends on
15 the current expected highly automated control process
16 and manufacturing features.

17 CHAIRMAN POWERS: Do they give you a
18 feeling for the kind of MOF that they're going to
19 have, the materials that they just miss in this -- in
20 their monitoring process? I mean, do they have a
21 target for that or anything that --

22 MR. PHAM: Yes. They -- it's -- I can
23 give you an overall description. I cannot give you
24 into detail a description they provide to us. For the
25 process monitoring, the program is designed to detect

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 some material in case they -- if that happened.
2 That's the main idea for the NRC to ask to require
3 that process monitoring.

4 And in two different stages, process
5 stages, the first one, the aqueous polishing, they
6 want to divide that process in some subdivisions, some
7 subunit. And in those subunits, they are going to set
8 up a certain control limit and monitor that through
9 different material control tests to detect any
10 potential material lost during three-day or seven-day
11 tests, depending on the characteristic of the time of
12 the material getting involved.

13 And after that process goes through the
14 material -- the MOX process, the fuel process, they
15 also divide, depending on the type of material and the
16 stages, into more subdivisions. And its subunits that
17 -- they have to set up also the same thing, different
18 control, material control limits and material control
19 tests, three-day or seven-day, and also those things
20 combine to trigger in case they have some kind of
21 alarm or material loss. So it's in there.

22 MEMBER SHACK: Well, I think Dana was
23 asking whether it was some sort of specific kind of
24 tolerance that they would -- you know, they would
25 track the -- to plus or minus X grams.

NEAL R. GROSS

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

1 MR. PHAM: Right now, they do not provide
2 to us those specific numbers. Like, for example, we
3 don't know exactly right now the applicant wants to
4 put in one batch -- for example, a batch of material,
5 10 kilograms or five kilograms or 20 kilograms. It
6 depends on -- later on, during the operations stage,
7 depending on that quantity of material, that's what
8 you need to use your statistical calculation to come
9 up with the control limit.

10 At that stage, the staff had to look at
11 that -- how much is the input and what is -- if the
12 control limit is appropriate for that material
13 quantity. And what is the input? What is the output?
14 What is the process different to calculate it to see
15 that it is okay?

16 And even after setting those control
17 limits, the applicant is still allowed to -- to do
18 that for a certain period of time to get some
19 experience and modify their control limit to make sure
20 everything is running smoothly, how many alarms, how
21 many -- yes, how many alarms has happened during a
22 certain period of time. And you have to adjust that
23 and control that.

24 But right now, at this stage, they come up
25 with some information about the design basis to do

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that, but not a specific number or even more detail
2 how they do that in the future.

3 MEMBER KRESS: Is this different than the
4 way it's been done in the past?

5 MR. PHAM: No. This is the normal
6 operation process the other NRC licensed facilities
7 are doing, like we have -- right now, we have two
8 Category 1 facilities, nuclear fuel -- BWXT down in
9 Lynchburg doing that. And my understanding is the
10 contractor for writing the fundamental nuclear
11 material control for the DCS, they are using the
12 licensee, the NRC licensee people from NFS and other
13 consultants working in the past have experience in
14 Cat. 1 facilities.

15 So we feel like they use the right people,
16 they use the knowledgeable people, experienced people,
17 to do that. And how Cat. 2 facilities -- they run
18 that for many years in 1980s when we first proposed or
19 when we first put into the regulations for a Cat. 1
20 facility like the process monitoring program. We put
21 that back in 1985, and those people have experience to
22 do that.

23 MEMBER KRESS: Yes. But I thought that
24 part of that experience was that the plus or minus
25 that Dana is talking about, if you integrated it over

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 a number of years, it would come out to be a
2 substantial quantity. And that's what I think Dana
3 was getting at.

4 I don't know what that quantity is, but I
5 just wondered if they are doing better here or not.
6 Just a comment for you to think about.

7 CHAIRMAN POWERS: I mean, it's -- this is
8 a highly visible program internationally. And losing,
9 you know, 80 kilograms of material is probably not a
10 real good idea.

11 MEMBER KRESS: Not a good idea.

12 (Laughter.)

13 And your system has to be set up to be
14 sensitive at that level.

15 CHAIRMAN POWERS: I mean, it seems like
16 it's a particularly challenging design element, that
17 you'd want some -- I mean, it seems to me that you'd
18 want some pretty specific considerations of it at the
19 design stage, because it's -- it's been a problem in
20 all of our facilities.

21 MEMBER KRESS: It's basically a
22 measurement error and statistics problem that can be
23 dealt with.

24 CHAIRMAN POWERS: Well, there is also the
25 -- I mean, most of the wayward material is actually

NEAL R. GROSS

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

1 just holed up in the system.

2 MEMBER KRESS: Yes, that's the other part
3 of it. Where does it get --

4 CHAIRMAN POWERS: You've got to convince
5 people that that's the case, and trying to do it after
6 the fact, after the system has been designed and what
7 not, is a chore.

8 MEMBER KRESS: Yes, particularly when
9 you're dealing with powder and liquified systems you
10 get that problem.

11 CHAIRMAN POWERS: And these, of course,
12 are powders that are particularly obnoxious because
13 they tend to distribute themselves uniformly over any
14 surface that they encounter.

15 MEMBER KRESS: They get electrified.

16 CHAIRMAN POWERS: Yes.

17 MEMBER KRESS: Anyway, that's --

18 MEMBER SHACK: The good news is you can
19 make the measurements of what goes in and what comes
20 out precisely.

21 MEMBER KRESS: Yes. You can do that --

22 CHAIRMAN POWERS: Yes. But the trouble
23 is, they're not going to be the same number.

24 (Laughter.)

25 MEMBER KRESS: You can do that for --

NEAL R. GROSS

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

1 CHAIRMAN POWERS: Well, you don't want to
2 be too glib about that. It becomes increasingly
3 difficult as you move down this processing line. What
4 comes in you'll know pretty well.

5 MR. PHAM: At this stage, the staff found
6 that the overall approach and the physical aspects of
7 the DCS MC&A design basis, that they are adequate.
8 And we have no outstanding issue in this stage, and we
9 expect to conduct further review when DCS submits the
10 MC&A plan at the operations stage.

11 And that concludes my presentation on the
12 MC&A.

13 CHAIRMAN POWERS: Any other questions on
14 this? Okay. I think now we can move to physical
15 security.

16 MEMBER KRESS: Is this in closed session
17 or not?

18 CHAIRMAN POWERS: No. I think this is
19 general.

20 Are they different from these?

21 MS. FRAGOYANNIS: Yes.

22 CHAIRMAN POWERS: Now, this is Mike
23 Warren, who has metamorphosed some.

24 (Laughter.)

25 MS. FRAGOYANNIS: You've got new slides

NEAL R. GROSS

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

1 that are coming around.

2 MEMBER KRESS: These are different than
3 the ones we have?

4 MS. FRAGOYANNIS: Yes. Disregard the one
5 that you have in your packet, since we have one coming
6 through.

7 CHAIRMAN POWERS: We've got lots of
8 slides.

9 MS. FRAGOYANNIS: Okay.

10 CHAIRMAN POWERS: We're up to date here.

11 MS. FRAGOYANNIS: Okay. You're up to
12 date. All right.

13 CHAIRMAN POWERS: You can't get ahead of
14 us.

15 MEMBER KRESS: One package has not arrived
16 I guess.

17 MS. FRAGOYANNIS: Oh, okay. Well, we'll
18 start. My name is Nancy Fragoyannis. I'm a physical
19 protection specialist here at the NRC, and I do want
20 to mention before I get into my presentation that
21 discussions and reviews of physical protection were
22 made prior to September 11th.

23 As a result of the events of
24 September 11th, the NRC is conducting a top to bottom
25 review of physical protection regulations, including

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the design basis threat. That is an ongoing process,
2 and we're communicating frequently with other agencies
3 throughout the government.

4 So what we'll be discussing today is pre-
5 9/11, and many of these may change. So what I'm going
6 to do is I'm just going to give you a quick overview
7 of the process that we went through and just some of
8 the security measures that we would have implemented
9 at the time.

10 What we're doing in the physical
11 protection is -- the goal is to protect nuclear
12 material or facilities from unauthorized removal of
13 nuclear material and sabotage. The safeguards
14 approach that we use in order to protect our
15 facilities is, first, a graded approach, and that's
16 dependent on the type of material, the significance of
17 the material.

18 Then we incorporate a defense-in-depth
19 strategy, which will include multiple barriers which
20 could be physical barriers such as fences, reinforced
21 walls, or even protective forces. Various alarms,
22 whether they're internal or external.

23 Can you hear me okay when I back up?
24 Okay.

25 Communications, onsite and offsite, and

NEAL R. GROSS

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

1 response. And regarding response, you will have
2 immediate response by your licensees and then
3 reinforced response through local law enforcement and
4 the Federal Bureau of Investigations.

5 NRC provided DCS with a detailed SRP and
6 other documents to help in their -- to assist, excuse
7 me, in the physical protection design. DCS, in turn,
8 provided us a comprehensive briefing on protection
9 strategies and designs that they would incorporate in
10 the facility. That included defensive strategies,
11 location of their guards, wall structure, types of
12 walls, thicknesses of their MMAs in vault areas, and
13 they also discuss the modeling tools they use for
14 vulnerability assessment, which will help in worst-
15 case scenario and as well as response force.

16 The NRC will review a physical protection
17 training and qualifications and contingency plan --
18 will review that to make sure that they do meet the
19 intent of our regulations, as well as do an onsite
20 review.

21 MEMBER KRESS: Will these measures be
22 tested routinely by --

23 MS. FRAGOYANNIS: Well, there are
24 requirements to test measures, yes. Your protective
25 force will be tested routinely through various force-

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 on-force exercises throughout the course of the year.
2 There are a certain number that you have to do, yes.

3 I'm just going to go over a number of
4 measures. This is not all inclusive. And this first
5 group is more physical protection measures that you
6 would incorporate at the site. First, is your dual
7 perimeter fences that have an isolation zone. And
8 there is where our PIDAS -- our perimeter intrusion
9 detection and assessment system is incorporated, where
10 we will have alarms, CCTV coverage, adequate
11 illumination to provide detection and assessment for
12 the protective force.

13 MEMBER KRESS: Are there specifications on
14 what the fence has to be?

15 MS. FRAGOYANNIS: There are certain
16 specifications at this time, and we don't know if that
17 will change. But there are specifications, and the
18 type of alarm system that has to be tested, routinely
19 tested for operational and effectiveness testing. So
20 there are a number of those that will be incorporated.

21 We have a hardened central alarm station
22 that will be manned 24 hours a day with another
23 independent, secondary alarm station in the event of
24 an emergency. Volumetric alarms in unoccupied areas
25 for quick type of detection and then an assessment.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 On the next --

2 MEMBER SIEBER: I presume the CAS will
3 have its own emergency diesel generator?

4 MS. FRAGOYANNIS: It will have -- if I'm
5 correct, I believe it does. Yes, it does. It will be
6 independent, yes. So it will be a stand-alone
7 redundant system at the SAS also.

8 MEMBER SIEBER: All right.

9 MS. FRAGOYANNIS: These are some other
10 measures, not physical in itself, but more operational
11 measures. There will be access control points in
12 which contraband will be screened, firearms,
13 explosives, and other contraband deemed at the site.

14 There will be also exit searches for
15 special nuclear material coming out of the facility.
16 The MAAs will be locked and alarmed, and there will be
17 access control in those areas, limited control areas
18 also, so they won't allow anybody into the material
19 access area. HEU and PU will be stored in vaults.

20 Here we talk quickly about protective
21 local police response force, but on the next page I
22 get into a little more about the armed response.
23 There will be armed security force onsite provided by
24 the Savannah River site. They will have
25 qualifications and training for site members. They're

NEAL R. GROSS

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

1 going to have a special tactical response team,
2 special response team for DOE, who are more like their
3 SWAT members, and they will have special training and
4 qualifications.

5 There will be performance evaluations
6 conducted on the protective force. It could be in
7 writing. It could be test-taking as well as firearms
8 training and other response training. And then we'll
9 have multiple offsite communications, actually onsite
10 and offsite, but in that case --

11 And then these are some other measures
12 that we're going to also incorporate, and we want to
13 protect against internal conspiracies, possibly put
14 CCTVs at locations, two-man rule, MC&A controls,
15 additional searches, maybe a -- I believe it was a
16 two-guard search or two searches going out, so no
17 nuclear material will be removed.

18 They will have a personal screening
19 program, the fitness for duty and access
20 authorization, and full-field background
21 investigations will be conducted if the government --

22 MEMBER KRESS: Does that include drug
23 testing?

24 MS. FRAGOYANNIS: I'm sorry. Drug testing
25 -- I believe fitness for duty is drug testing.

NEAL R. GROSS

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

1 And just a quick overall summary. It is
2 on the Savannah River site, the DOE reservation, the
3 MOX facility will be located. They will be protected
4 by the Savannah River site guard force.

5 In January of this year, NRC traveled to
6 Savannah River site to meet with DOE security
7 management and discuss onsite security. At that time,
8 they had the opportunity to observe two force-on-force
9 exercises conducted by the protective force. NRC
10 staff was very pleased with the results, which help
11 reinforce that we think that the Savannah River site
12 and DCS will be able to provide the level of
13 protection needed for the MOX facility. And as we
14 indicated, they had two force-on-force exercises
15 there.

16 I must add that the MOX facility, in
17 addition to meeting NRC regulations, will also have to
18 meet certain DOE landlord requirements. Thus, it may
19 go over the NRC regulations and requirements.

20 And we feel that the security prior to
21 9/11 and the discussions we had and some of the
22 documents we reviewed will protect the public health
23 and safety. And, again, after 9/11, that will all
24 have to be reviewed again.

25 CHAIRMAN POWERS: Stay tuned.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MS. FRAGOYANNIS: Yes.

2 (Laughter.)

3 CHAIRMAN POWERS: None of us know exactly
4 what that one will be.

5 MS. FRAGOYANNIS: Well, time will tell on
6 that.

7 MEMBER SIEBER: Your personnel screening
8 program, I presume that the screening that's done will
9 be at a higher level than it would be for powerplant
10 workers.

11 MS. FRAGOYANNIS: Well, it would be for
12 the Category 1 facilities.

13 MEMBER SIEBER: Okay.

14 MS. FRAGOYANNIS: Yes. Yes.

15 MEMBER SIEBER: So it's equivalent to
16 the TQ?

17 MS. FRAGOYANNIS: It's different than your
18 power reactors, yes. They will get background
19 investigations where they have access to classified
20 material, yes.

21 MEMBER KRESS: What do you do about
22 offsite contractors that come in occasionally to do
23 maintenance and things? Are they --

24 MS. FRAGOYANNIS: We haven't really gotten
25 to that point yet where we've discussed -- do you mean

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 escort requirements?

2 MEMBER KRESS: Yes.

3 MS. FRAGOYANNIS: I don't think we've
4 gotten to that point where there's like one to five or
5 one to three. I don't know. We haven't gotten there
6 yet. I can't answer that.

7 MEMBER SIEBER: But they will be escorted
8 just like in a powerplant.

9 MEMBER KRESS: Oh, yes.

10 MS. FRAGOYANNIS: They will be escorted,
11 but I can't tell you the number of escorts per onsite
12 contractor, independent --

13 MEMBER SIEBER: I take it there is not yet
14 a physical security plan by the applicant nor a TQ
15 plan?

16 MS. FRAGOYANNIS: I can't answer that.
17 I'm sorry. I don't know that.

18 MEMBER SIEBER: Oh, okay.

19 MS. FRAGOYANNIS: We had a very thorough
20 briefing provided to us because it's a classified
21 briefing, and they went through what they plan on
22 doing for physical protection. And that was provided
23 to us. I apologize. I'm not the main person on the
24 MOX project, so I -- I've been involved in it, but I
25 don't know if there's a specific plan that has come

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 in.

2 MEMBER SIEBER: But NRC approval is
3 usually based on --

4 MS. FRAGOYANNIS: Oh, yes, I'm sorry. It
5 will be based on a plan, and we will review that plan
6 and then do an onsite verification, yes.

7 MEMBER SIEBER: Okay.

8 MS. FRAGOYANNIS: Sorry.

9 Any other questions? I'm sure you'll have
10 more for me --

11 CHAIRMAN POWERS: Well, I guess -- you
12 know, I sit here saying -- I'm picturing the site.

13 MS. FRAGOYANNIS: Okay.

14 CHAIRMAN POWERS: And I'm saying, okay,
15 I've got Savannah River, and then I have this new
16 operational entity operating in there. And at the
17 gates, and what not, it has its own people. And then
18 -- but then there's this other layer out there, and
19 I'm saying, what goes wrong in the interface between
20 the two?

21 MS. FRAGOYANNIS: Well, the goal -- it's
22 going to be the -- are you talking about the
23 protective force itself? The protective force will be
24 from Savannah River. They will augment their current
25 forces in order to be able to protect the new

NEAL R. GROSS

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

1 facility, and there will definitely be coordination
2 between the sites out there, because you've got the --
3 it's a very large reservation. I don't know the exact
4 size of the reservation, but they've got a number of
5 buildings. This will be a separate protected area.

6 MEMBER KRESS: It had design basis threats
7 that you've already identified prior to --

8 MS. FRAGOYANNIS: Pre-9/11, yes. We had
9 the design basis threat pre-9/11, and -- but we don't
10 know what changes will be made. And, of course, we'll
11 have to incorporate that in the security plan. But
12 those were discussed prior to.

13 MEMBER SIEBER: If you want a description
14 of that, that's in the first set of slides you got.

15 (Laughter.)

16 MS. FRAGOYANNIS: I wanted to avoid that.

17 (Laughter.)

18 That's an unclassified version which --
19 what you have there, it just gives you a -- just a
20 quick synopsis of what the DBT was prior to 9/11.

21 CHAIRMAN POWERS: Okay. Any other
22 questions? Thank you.

23 MS. FRAGOYANNIS: Thank you.

24 CHAIRMAN POWERS: We'll come now to a
25 summation.

NEAL R. GROSS

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

1 MR. PERSINKO: Thank you. At the outset,
2 we said we were here to tell you a little bit of
3 information about a lot of areas, and I think we did
4 that. And, in fact, in some areas we --

5 CHAIRMAN POWERS: You did very well, too,
6 by the way. I am very --

7 MR. PERSINKO: Well, thank you.

8 CHAIRMAN POWERS: -- impressed with the
9 amount of information you were able to pack in.

10 MR. PERSINKO: And I was going to say, and
11 maybe in some cases we gave you a lot of information.
12 But even though we did that, there are still areas we
13 did not discuss with you, for example, quality
14 assurance, human factors, wind and tornadoes,
15 structural criteria, heavy load, control of heavy
16 loads, material handling, fluid systems.

17 So there are still a number of areas that
18 we have not discussed, primarily due to time
19 limitations. We'd be happy to discuss any of these
20 areas with the committee. We'd also be happy to come
21 back and talk to you about any of the areas we spoke
22 today about in more detail.

23 And one thing we would seek from the
24 committee is feedback. We are in the process of doing
25 our review. We're well along in our review, and we

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 would appreciate feedback from the committee,
2 preferably in the form of a letter, so that we know
3 whether we are moving in the right direction or
4 whether there are areas that we should be doing
5 differently or items we should be considering
6 differently.

7 But this is a good stage that we get the
8 feedback, because our schedule, as I showed you at the
9 outset, was to issue a draft SER in April. So we can
10 make mid-course corrections right now.

11 And with that, that concludes the staff's
12 presentation.

13 CHAIRMAN POWERS: Now, your schedule is
14 for April. What I want to do is try to schedule
15 things with the full committee. I know right now that
16 they will shoot me dead if I try to get something in
17 on the February meeting. So it strikes me as March is
18 the earliest we can.

19 What I would propose doing, then, is
20 sometime after the first of the year getting together
21 with you and discussing the areas that I think you
22 should bring up in a meeting to the full committee,
23 because it's only the full committee that can produce
24 a letter. And it will be the areas -- it's going to
25 be difficult.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 I'm going to pick the areas that I think
2 we have the most questions about, so that you're not
3 going to get to put your best foot forward. Okay?

4 (Laughter.)

5 Because I want to concentrate on that,
6 because I want to get feedback on the areas that --
7 where we might have comments about what you're doing.
8 And I will do that with you sometime after the first
9 of the year, once I can get us a slot on the schedule,
10 which is a bit jammed right now with power uprates and
11 license renewals coming in at prodigious rates. We're
12 just getting booked. That's the problem.

13 But I -- we'll have to strategize exactly
14 how we want to present that. And some of the
15 materials I think can be presented in a summary
16 fashion, and some areas we will want to go into
17 detail. In the meantime, I am going to ask that the
18 Fire Protection Subcommittee take over looking at the
19 fire protection aspects of this rather than the Fuel
20 Subcommittee. I think that's just efficient and it's
21 -- it's an area that can be broken out fairly
22 efficiently on that.

23 And I'm sure fire protection will be one
24 of the issues that we'll want to bring up with the
25 full committee, and what not. And so I propose we'll

NEAL R. GROSS

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

1 just get back after the first of the year on those
2 things. And before then, I can assure you that you
3 put on an impressive show here. This was --

4 MR. PERSINKO: Thank you very much.

5 CHAIRMAN POWERS: -- extremely well done
6 presentations, extremely well organized, and if
7 nothing else you persuaded at least the Chairman of
8 this committee that you guys have got your act
9 together. So, but I think we will try to get you
10 before the committee, but I think it -- I think the
11 earliest we can do that is the first week of March.

12 MR. PERSINKO: Okay. Thank you very much.
13 Any feedback we can have would be appreciated.

14 CHAIRMAN POWERS: Okay. Well, and, of
15 course, the comments that came around here, you have
16 heard those.

17 MR. PERSINKO: We've taken note of those.

18 CHAIRMAN POWERS: And if you -- and I
19 think the members are always willing to follow up with
20 you if you just want some elaboration on, you know,
21 what were you talking about, and what not. In the
22 meantime, the members are getting this several pounds
23 of documentation to get themselves all up to speed on
24 this, and more is coming. I know that, indeed. Thank
25 you very much.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. PERSINKO: Thank you.

2 CHAIRMAN POWERS: Let's see, the next
3 scheduled -- we're a little ahead of schedule. I
4 wondered if -- Dr. Lyman, are you prepared to make
5 your presentation? Why don't you go ahead and do
6 that. I think most of the members are -- have met Dr.
7 Lyman. If you have a written copy of your
8 presentation, can we get one for the record, or --

9 MR. LYMAN: I actually don't. But I can
10 maybe supply one afterwards.

11 CHAIRMAN POWERS: Oh, sure. Whatever is
12 easiest. Well --

13 MR. LYMAN: I'm going by the seat of my
14 pants here. Things are changing very rapidly. And I
15 don't have much time today, but since, Dana, you've
16 anticipated a lot of what I was going to say, as
17 usual, it makes my job easier.

18 The Nuclear Control Institute has had a
19 long-standing concern with the U.S. MOX program, in
20 particular issues of safeguards and physical
21 protection. And to cut to the chase, I think in this
22 context the question we have to ask right now -- is
23 the approach that the staff and DCS are taking for
24 safeguards and physical protection at this facility --
25 the question is: are those approaches adequate to the

NEAL R. GROSS

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

1 task?

2 We had concerns about that pre-September
3 11th, and now that it's post-September 11th our
4 concerns are even greater. For that reason, I did
5 assist Georgians Against Nuclear Energy, or GANE, in
6 preparing a couple of the contentions which they've
7 submitted in the current licensing proceeding on the
8 construction authorization request. And I guess I'd
9 just like to summarize some of my concerns in that
10 context.

11 I think the overarching concern we have is
12 that the inertia of NRC and its whole regulatory
13 bureaucracy may interfere with the ability to make
14 changes swiftly enough so that this proceeding can be
15 more credible in light of post-September 11th events.
16 And to illustrate that, I'd just like to point out
17 that The Washington Post, in a front-page story on
18 November 3rd, used an NRC staff legal brief in this
19 proceeding to illustrate the sluggishness of the
20 bureaucracy.

21 It was a brief dated September 12th, and
22 it was responding to GANE's contention that sabotage
23 issues should be considered in the MOX plan
24 environmental impact assessment. The staff's response
25 on September 12th was, "That's not necessary because

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 it doesn't meet the legal tests that a terrorist act
2 is a reasonably foreseeable occurrence."

3 Now, I think NRC has to be extremely
4 careful now about avoiding stories like that in the
5 future, because I think it may affect its credibility
6 and public confidence that it's dealing with these
7 issues in a timely way.

8 And I'd just like to recap some of the
9 issues that GANE has raised in this proceeding. I
10 think the -- one of the overarching concerns we have
11 is the fact that the license application under Part 70
12 has been bifurcated effectively into two pieces. One
13 is the construction authorization request, which is
14 not a document defined in Part 70 in any way. It's an
15 invention of DCS and the staff.

16 And the impact of this is that the CAR
17 itself contains a fairly limited amount of
18 information, and, in fact, does not contain
19 significant bodies or significant categories of
20 information which one may argue is something that
21 should be available at the design stage and be part of
22 the review.

23 The fact that a number of issues have been
24 segregated and deferred to the actual application for
25 the license to possess and use SNM means that there is

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 certain information not available now to the staff
2 that may actually be very relevant at the design
3 stage. And in my mind, one of the primary areas where
4 this is true is what was just discussed before in the
5 material control and accounting area.

6 It seems to be accepted wisdom in other
7 quarters that -- that material control and accounting
8 should be an important feature at the design stage,
9 and that issues of making sure that the systems are
10 adequate to the task at hand is something that should
11 be built into the design. Both the International
12 Atomic Energy Agency has emphasized that, and so has
13 DOE.

14 In fact, a report from 1997 with co-
15 authors from Los Alamos and Sandia made exactly this
16 point, that there are design considerations that have
17 to be taken into account at the design stage to make
18 sure that the material control and accountancy and
19 physical protection systems will work as billed when
20 the plant is built.

21 And if those aren't considered at the
22 design stage in enough detail, there's a risk that
23 there may have to be expensive backfitting to modify
24 those systems to make sure that they actually can meet
25 the regulations. One good example -- I'm sorry.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN POWERS: Let me interject here.
2 You know, you could argue that NRC's job is to set the
3 standard, and it's the licensee's job to meet that
4 standard. And if he wants to blow this off at the
5 design stage, that's his business. NRC just says when
6 the thing is up and running, it's got to meet the
7 standard.

8 Certainly, the designers might be foolish
9 not to recognize what IAEA has said about this. But
10 if they want to ignore that, shouldn't they have --
11 shouldn't it be left up to them?

12 MR. LYMAN: Well, that actually was the
13 argument that DCS made in responding to this
14 contention. They said, "Well, we're willing to assume
15 the risk." You know, you say, "Well, we may have to
16 backfit later. We're willing to take that risk." But
17 the fact is DCS is doing the public's job and, in
18 fact, they're not assuming any risk at all. The
19 public is going to end up with the bill.

20 So I think it's really the public's -- it
21 should be in the public interest to determine whether
22 or not DCS should be allowed to risk their money or
23 not. So that was a pretty disingenuous comment on the
24 part of DCS.

25 A second part is that this is a program of

NEAL R. GROSS

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

1 larger implications, as Dr. Powers mentioned. The
2 International Atomic Energy Agency theoretically
3 should play a role or even apply verification to this
4 facility, because this program is not in isolation.
5 It is a bilateral program, hopefully with an
6 international component. And we have to lead the way
7 by example.

8 And to that end, I still haven't seen --
9 I know -- if there is a response to a letter sent to
10 DOE in December 1999 by NRC saying it is their
11 operating assumption that IA safeguards would be
12 applied to this facility, and if they could get an
13 answer, a clarification of that as soon as possible,
14 it would assist in their review of the design.

15 And I have not found a response to that.
16 Maybe Pat Rhodes would be able to supply that
17 response. But to my knowledge, DOE ignored this
18 request. So it right now is not known to the extent
19 to which IAEA will be allowed access to this facility.
20 And that would be an important component, especially
21 at the design stage, because it -- for instance, the
22 Los Alamos report in 1997 indicates that if
23 international safeguards are going to be applied there
24 are space considerations and other things which may be
25 important in the design.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 So I do think that the inappropriate
2 limitation of what we should look at at the design
3 stage and what information is necessary to make the --
4 to approve construction, that limitation is
5 inappropriate, especially now. I think that the
6 applicant should be willing, well, to exceed what may
7 be the appropriate requirements.

8 After September 11th, I think they should
9 step to the plate and say, "Well, we're going to take
10 this issue -- issues of both safeguard and physical
11 protection as seriously as possible. And we're not
12 going to be bound by this very strict legal -- what
13 we're required to do and no further." I think that
14 doesn't show good faith on their part in this threat
15 environment.

16 I just wanted to get in one more
17 illustration of the importance of design
18 considerations in safeguarding, and that's the
19 experience of the plutonium fuel fabrication facility
20 in Japan or plutonium fuel production facility, PFPP,
21 where this plant operated for a few years, accumulated
22 at least 70 kilograms of plutonium in the ductwork,
23 necessitating a shutdown for many years, including a
24 cleanout and a complete redesign of the internal
25 measurement systems, redesign of the gloveboxes to

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 improve the ability to measure in-process materials,
2 all to the tune of over \$100 million.

3 So this issue of backfitting is a
4 significant cost, and, really, I think there has to be
5 additional attention now and additional information
6 about details of the material control and accounting
7 system and how problems like holdup will be mitigated
8 by the design.

9 The second issue I'd like to raise is,
10 again, in the post-September 11th context. I am
11 encouraged by the letter that NRC sent to DCS only a
12 few days ago reminding DCS that the design basis
13 threat, as well as all other physical protection
14 regulations, are under review. .

15 But this letter wasn't very helpful. It
16 said that NRC couldn't say right now what was going to
17 happen, if anything, but DCS should be aware of it.
18 But certainly there needs to be a better sense right
19 now of whether there's going to be a major change in
20 the design basis threat and other aspects that might
21 affect the design of the facility.

22 And to that end, GANE and NCI did file, on
23 October 13th, a motion to postpone the existing
24 proceeding pending the results of the top to bottom
25 security review, and we maintain that that's prudent

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 because staff resources are being wasted right now in
2 a review of the design which may be obsolete in the
3 post-September 11th era.

4 And one aspect which I think deserves
5 particular attention is the aspect of resistance of a
6 plant to a deliberate air crash. The facility, as
7 designed now, screened out even accidental air crashes
8 as part of the design basis on the basis of low
9 probability. So there is no -- not even any
10 consideration of an air crash as an external event
11 threatening the plant.

12 Therefore, the design basis missiles used
13 to establish the missile resistance of the building
14 are those generated by tornados and high winds, which
15 are considerably less penetrating than the jet engine
16 of a 767 plowing into the facility at full speed. I
17 calculate the penetration of the design basis missile
18 to be something like a factor of 10 lower than what
19 the jet engine in the 767 would be at full speed.

20 So whether the appropriate new design
21 basis threat should include an intentional plane crash
22 I think has to be considered. And for all we know,
23 the whole way that nuclear facilities are going to be
24 built in this country or elsewhere is going to have to
25 be rethought in the context of this kind of threat.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 It may be that facilities will have to go
2 underground in the future. That may be a significant
3 constraint that would lead to a substantial redesign
4 of this facility. So these questions have to be
5 asked, and obviously they are appropriate for the
6 design phase.

7 So, you know, we do feel that there needs
8 to be a pause in the review until questions are
9 clarified. And, again, this is because the public is
10 paying the bill for this facility.

11 One last issue is something we're
12 concerned about, and that's the control area boundary
13 definition, which is cross-cutting and impacts the
14 whole safety basis for the facility. I missed the
15 discussion this morning, but I'd just like to
16 reiterate our position that it only makes sense to
17 define the controlled area boundary as one which is
18 reasonably -- reasonably includes only the facility
19 that we're talking about and not the entire Savannah
20 River site.

21 I think that such a definition simply does
22 not pass the red face test, and to imply that the
23 licensee, DCS, can by any definition have authority,
24 sole authority to exclude anyone from the entire
25 Savannah River site, which is what the regulations

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 require, that kind of authority should not be granted
2 to a private entity. And it clearly seems to violate
3 the intent of Part 70 as written to have such an
4 extensive definition for the controlled area. And we
5 believe that a legal review will show that our
6 position is right.

7 So I think I'll stop there. Thank you.

8 CHAIRMAN POWERS: Will you entertain
9 questions if members have any?

10 MR. LYMAN: I'll try.

11 CHAIRMAN POWERS: Any people have
12 questions?

13 Mr. Lyman, I will recall for you that I
14 think in one of your packages you have a recently
15 published paper on use of MOX as a disposal means.
16 And it's -- I can attest to be a good read. So I'd
17 recommend it to the members to read.

18 Any questions for Mr. Lyman?

19 Thanks, Ed.

20 MR. LYMAN: Thank you. Appreciate the
21 opportunity.

22 CHAIRMAN POWERS: Let's chat just a minute
23 or two before we adjourn about strategy. I suggest
24 that we have something of an oral summary on this
25 meeting and acquaint the full membership with this

NEAL R. GROSS

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

1 coming along the pike at our December meeting, just
2 mostly to say that -- to summarize the fact that we
3 have met and the kinds of things that we forecast.

4 I see some challenges for us in the
5 instrumentation area, just because of the dilution of
6 membership. Mr. Persinko mentioned to us several
7 areas we have not gone into which includes flow
8 systems, and what not. I am sure that if I bring up
9 flow systems for our Thermal Hydraulics Committee they
10 will throw large, heavy objects at me. So we may have
11 some challenges there.

12 I think we should ask the Fire Protection
13 Subcommittee to look at this in addition to us,
14 because it's an issue up their alley, and it -- it can
15 be split out kind of easily, I think.

16 Are there any other suggestions on
17 strategy here?

18 MEMBER KRESS: I think your thought of
19 narrowing the presentations down to items where we may
20 have additional questions or concerns is a good one.
21 We'll have to define what those area, so --

22 CHAIRMAN POWERS: Yes. If members could
23 send me notes on the areas that they think those
24 presentations should be concentrated in for the -- it
25 will probably be the March meeting.

NEAL R. GROSS

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

1 My thinking is if we're going to prepare
2 a letter that has feedback, we've got to bring up
3 those items where we're going to have feedback. And
4 this covers a host of things, and I don't see any
5 convenient way to cut it down, because they were
6 pretty synoptic presentations they made to begin with.
7 So it's a little hard to tell them what to leave out
8 on any one of them. So I'd like to focus on those
9 areas where I think we'll have comments on.

10 I am -- I have a sense that we'll have
11 comments on the fire protection area for sure, the
12 MC&A area for sure. I think --

13 MEMBER KRESS: And there may be some
14 defense-in-depth questions.

15 CHAIRMAN POWERS: We're going to have some
16 questions about the philosophical approach overall
17 here, including the bifurcations issues.

18 MEMBER KRESS: And I suspect we may have
19 some safeguards issues.

20 CHAIRMAN POWERS: Well, you know, I'm
21 reluctant to bring that one up because I think it's --
22 I think it's still too much up in the air, and I'd
23 rather do it as part of our more integrated view. You
24 know, we're going to have -- we're going to have to go
25 back and understand better what the results are of

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 what the NRC is doing now. There is no point in going
2 back immediately on that because they are still fixing
3 to do it.

4 And then, I mean, once they're in a
5 position there, then I think this is one of several
6 areas that this comes up in. And I wouldn't leave
7 them out of this.

8 I do see a distinction between this
9 facility and commercial facilities. I mean, you know,
10 commercial nuclear powerplants and a facility doing a
11 government job on a government reservation. I see
12 distinctions here.

13 MEMBER KRESS: It's two completely
14 separate missions, too.

15 CHAIRMAN POWERS: Yes.

16 MEMBER KRESS: And that needs to be
17 considered.

18 CHAIRMAN POWERS: Right.

19 MEMBER SIEBER: Well, the philosophical
20 approach to safety is different, too. Our plants use
21 PRAs, and these kinds of plants are integrated safety
22 assessments, and I think people need to understand
23 what that really means and how they're done.

24 CHAIRMAN POWERS: Yes. That's the other
25 thing we should think about. In the presentation to

NEAL R. GROSS

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

1 the full committee, they really need our Wednesday
2 morning presentation as well as this presentation. I
3 mean, they have to have both of them. We'll have to
4 figure out how to do that exactly. So I think I'm
5 going to --

6 MEMBER KRESS: Just more time on the
7 agenda.

8 MEMBER SIEBER: I think we ought to
9 have --

10 CHAIRMAN POWERS: Yes, that's --

11 MEMBER SIEBER: -- to the meeting. That
12 would do.

13 CHAIRMAN POWERS: That would make people
14 real happy with me, wouldn't it?

15 (Laughter.)

16 Okay. So we've got some challenges to
17 deal with the planning and procedures folks. Any
18 other comments?

19 Well, again, I want to thank the speakers
20 and presenters. I think seldom have I seen such
21 terrifically organized and well-presented material for
22 a one-day meeting. It was an outstanding job. I
23 think it does reflect well on the kind of work that's
24 being done at this stage, and it was very useful to
25 the subcommittee. I think it will be useful to the

NEAL R. GROSS

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

1 full committee.

2 MEMBER KRESS: And I think we should thank
3 Mr. Lyman for his input.

4 CHAIRMAN POWERS: He always has something
5 useful to tell us, and I encourage the members, if
6 they have a chance, to take time to look at the GANE
7 submission here. They didn't have a chance to
8 present, but I found it interesting reading.

9 And with that, I will adjourn the meeting.

10 (Whereupon, at 2:56 p.m., the proceedings
11 in the foregoing matter were adjourned.)
12
13
14
15
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

(202) 234-4433

www.nealrgross.com

CERTIFICATE

This is to certify that the attached proceedings
before the United States Nuclear Regulatory Commission
in the matter of:

Name of Proceeding: ACRS Reactor Fuels

Subcommittee - MOX Fuel

Fabrication Facility

Docket Number: (Not Applicable)

Location: Rockville, Maryland

were held as herein appears, and that this is the
original transcript thereof for the file of the United
States Nuclear Regulatory Commission taken by me and,
thereafter reduced to typewriting by me or under the
direction of the court reporting company, and that the
transcript is a true and accurate record of the
foregoing proceedings.



Pippa Antonio
Official Reporter
Neal R. Gross & Co., Inc.

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

(202) 234-4433

www.nealrgross.com