

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:)
PRIVATE FUEL STORAGE, LLC,)
(Independent Spent Fuel) Docket No. 72-22
Storage Installation)) ASLBP No.
) 97-732-02-ISFSI
)

ASLBP Hearing Room
 Third Floor
 Two White Flint North Building
 11545 Rockville Pike
 Rockville, Maryland

June 26, 2002

The above-entitled matter came on for hearing,
 pursuant to notice, at 8:30 a.m. before:

MICHAEL C. FARRAR, CHAIRMAN
 Administrative Judge
 U. S. Nuclear Regulatory Commission

DR. JERRY R. KLINE
 Administrative Judge
 U. S. Nuclear Regulatory Commission

DR. PETER S. LAM
 Administrative Judge
 U. S. Nuclear Regulatory Commission

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C-O-N-T-E-N-T-S

WITNESS DIRECT CROSS REDIRECT RECROSS

MICHAEL RESNIKOFF

By Ms. Curran

12521

By Mr. Turk

12535

ALAN SOLER

EVERETT REDMOND

JOHN DONNELL

By Mr. Gaukler

12549

12583

By Mr. Turk

12567

By Ms. Chancellor

12572

MICHAEL WATERS

By Mr. Turk

12591

By Ms. Chancellor

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MICHAEL RESNIKOFF

By Ms. Curran

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12638

By Mr. Nelson

12612

By Mr. Turk

12623

JOHN STAMATAKOS

(Prefiled Testimony on page 12648)

By Mr. Turk

12646

12757

By Ms. Chancellor

12669

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E X H I B I T S

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>MARK</u>	<u>RECD</u>
<u>State</u>			
215	100 HI-TRAC transfer cask	12522	12529
216	Cross-Sectino HI-STORM 100	12522	12529
217	Resnikoff Cask Drawing	12526	
218	EPA Manual	12601	12612
219	Journal of Geophysical Res.	12727	12741
<u>PFS</u>			
241	PFS Site Plan	12548	
242	Radiation Shielding Analysis	12548	
243	PFS SAR Fig. 2.36	12548	
<u>Staff</u>			
61	Tip-Over Analysis	12637	
62	Map of Historic Seismicity	12644	12651
63	Technical Assessment of Yucca Mountain	12644	12651

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

8:33 a.m.

1
2
3 CHAIRMAN FARRAR: I see everyone's here
4 for our "smart start" at 8:30 this morning. Our goal
5 is to finish with Dr. Resnikoff by one o'clock, have
6 an hour lunch, and start with Dr. Stamatakos at 2:00,
7 with Dr. Arabasz linked in by teleconference.

8 Mr. Gaukler?

9 MR. GAUKLER: I think, restated slightly,
10 the goal is to get done with radiation dose
11 consequences by one o'clock, which includes some
12 rebuttal by both us and Dr. Resnikoff.

13 CHAIRMAN FARRAR: You are correct. Thank
14 you. So that means we will move all the faster.

15 Ms. Curran, you were going to do the
16 State's redirect examination?

17 MS. CURRAN: Yes, I'm ready.

18 CHAIRMAN FARRAR: Go ahead.

19 MS. CURRAN: Okay.

20 REDIRECT EXAMINATION BY MS. CURRAN

21 MS. CURRAN: Good morning, Dr. Resnikoff.

22 DR. RESNIKOFF: Good morning.

23 MS. CURRAN: Yesterday you were asked a
24 number of questions regarding whether you believe that
25 a cask may tip over or will tip over. Does the

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1 question of whether a cask will tip over or may tip
2 over affect your dose calculations in any way?

3 DR. RESNIKOFF: No, I simply assume the
4 cask tipped over and started from there.

5 MS. CURRAN: Yesterday I believe you
6 testified regarding the method that you used to
7 calculate the dose from the bottom of the HI-STORM
8 cask. I think you had a drawing in your hand, but
9 what I would like to do is give you two drawings, one
10 from HI-STORM and one from HI-TRAC and go over that
11 again just briefly, so that the record is clear.

12 I'm asking Ms. Chancellor to pass out
13 these two drawings, and I would ask the court reporter
14 to mark them as State's Exhibits 215 and 216.

15 CHAIRMAN FARRAR: Counsel, which one is
16 215?

17 MS. CURRAN: Two one five would be the
18 drawing entitled, "Figure 1.2.11, 100 HI-TRAC Transfer
19 Cask with Pool Lid Cross-Sectional Elevation View,"
20 and Exhibit 216 would be Figure 1.2.1, Cross-Section
21 View of the HI-STORM 100 System."

22 [Whereupon, the above-referred-
23 to documents were marked as
24 State's Exhibits 215 and 216
25 for identification.]

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1 MS. CURRAN: Just to clarify for the
2 record, Dr. Resnikoff, on the HI-TRAC drawing there's
3 two numbers, four and five. Were those on the
4 original drawing?

5 DR. RESNIKOFF: No, I put those on.

6 MS. CURRAN: Okay, and also on the
7 HI-STORM drawing there's the numbers one, two, and
8 three. Did you put those numbers on the drawing?

9 DR. RESNIKOFF: I did.

10 MS. CURRAN: Okay, why don't you go ahead
11 and explain using those drawings?

12 DR. RESNIKOFF: I thought this would be
13 more useful than standing in front of you and
14 pointing, to put the numbers on. The dose rate that
15 we know is at Point 5. That's the dose rate from the
16 bottom of the HI-TRAC. That's where we started. We
17 then worked backwards to four, to find out what the
18 dose rate is at the bottom of the MPC. We took that
19 dose rate, and that's the same dose rate as assumed at
20 Point 3 in the HI-STORM cask on Exhibit 215.

21 We then had no radiation coming through
22 the concrete pedestal and the concrete and steel
23 pedestal, so there was no radiation coming out at
24 Point 2. The radiation would be coming out at Point
25 1 and also its counterpart on the other side near the

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1 inlet vent that's shown on 215.

2 In that area, that annulus area at one, is
3 approximately 13.45 percent of the total area between
4 the walls of the HI-STORM cask, inner walls of the
5 HI-STORM cask.

6 MS. CURRAN: All right, thank you.

7 Yesterday you also testified about a
8 factor of 10 percent that you used to account for the
9 fact that the MPC is recessed, and I think you used
10 the phrase that you took it out of the air. I wonder
11 if you would like to elaborate on that a little bit?

12 DR. RESNIKOFF: Well, it was a factor of
13 ten, and we have done that and I have seen that done
14 in many other calculations to take a factor of ten as
15 a sensitivity calculation, to make sure that the
16 number is within the range.

17 MS. CURRAN: Within what range?

18 DR. RESNIKOFF: Between the range 13.45
19 percent in this case and 1.345 percent.

20 MS. CURRAN: Okay. Yesterday, in response
21 to a question from Mr. Turk, I believe you said you
22 had never used a Monte Carlo model before, is that
23 correct?

24 DR. RESNIKOFF: That's correct.

25 MS. CURRAN: Does this mean you would not

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1 know how to use it if you had it?

2 DR. RESNIKOFF: No, I'm sure we could use
3 it. I have worked with computers and computer
4 programming since 1967, .35 years. We work with
5 software, a large number of software programs that
6 calculate radiation exposure such as RADTRAN, RISKEND,
7 RESRAD, EPA programs. We would have no problem in
8 running this kind of program. We just didn't do it.

9 MS. CURRAN: Have you reviewed
10 calculations made with the Monte Carlo method before?

11 DR. RESNIKOFF: Yes. Yes, and for the
12 purposes of this hearing, all I reviewed really was
13 the results, the tables that were produced.

14 MS. CURRAN: I believe yesterday, when you
15 were being cross examined, you said that, under the
16 Certification of Compliance for the HI-STORM 100 cask,
17 a cask that has been tipped over has to be uprighted
18 in 33 hours. Is that the literal requirement?

19 DR. RESNIKOFF: No, the 33 hours was when
20 the temperature reached approximately 300 degrees
21 Centigrade. When a large amount of hydrogen would
22 come off the concrete, the concrete would degrade.

23 MS. CURRAN: Did it have to do with
24 unblocking of the vents, that there was a requirement
25 for that?

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1 DR. RESNIKOFF: Well, there's this issue
2 of horizontal cask versus a vertical cask with the
3 vents blocked. The heat-up is comparable. The heat-
4 up of those two situations is comparable.

5 MS. CURRAN: Did you make a diagram to
6 illustrate that concept?

7 DR. RESNIKOFF: I did.

8 MS. CURRAN: Okay.

9 DR. RESNIKOFF: I did.

10 MS. CURRAN: I'd like to have this drawing
11 marked for identification purposes as Exhibit 217.

12 [Whereupon, the above-referred-
13 to document was marked as
14 State's Exhibit 217 for
15 identification.]

16 MS. CURRAN: Is this your drawing, Dr.
17 Resnikoff?

18 DR. RESNIKOFF: This is my drawing, yes.

19 MS. CURRAN: Would you like to explain
20 what you meant to illustrate here?

21 DR. RESNIKOFF: First of all, I would like
22 to apologize. This is sort of the limits of my
23 drawing ability, and this is a square cask versus a
24 cylindrical cask, which it should be. But the point
25 of the diagram was to really explain in a way what was

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1 illustrated by Dr. Singh; namely, that the cask, when
2 it's properly operating, is the one on the left, where
3 cool air goes in the bottom vent and comes out warmer
4 air at the top, the chimney or Bernoulli effect.

5 When the cask is lying on its side,
6 however, and if those vents are blocked, then there's
7 no air that's moving up through the cask. The cask on
8 the side, lying on its side, in that picture I have
9 drawn these white bars which -- and that wasn't
10 discussed previously. These are the stays, or when
11 the cask, when the MPC is placed inside the cask,
12 position the cask appropriately. That serves as a
13 baffle, a further hindrance to cool air entering and
14 moving across the hot region of the cask.

15 So that the primary direction of flow is
16 through the side of the cask, through the bottom and
17 then up through the top, as the cask is lying on its
18 side. The cool air doesn't reach, effectively reach,
19 the hot region of the cask. Also, it's essentially
20 cooling the cooler area of the cask. So, effectively,
21 the two situations, a block vent and a cask lying on
22 the side, are comparable.

23 MS. CURRAN: I would like to move into
24 evidence Exhibits 215, 216, and 217.

25 CHAIRMAN FARRAR: Let me ask Dr. Resnikoff

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1 a question about 217. I thought Dr. Singh, in answer
2 to one of my questions, urged that in the cask lying
3 down situation, what is now the horizontal chimney
4 would have some impact. . In other words, the air,
5 rather than just following the arrows you've drawn on
6 the righthand side of that drawing, which was what my
7 intuition told me, would also wander around through
8 the chimney, the now horizontal chimney and come out
9 the other side. Are you urging that that would not at
10 all happen?

11 DR. RESNIKOFF: I'm not disagreeing with
12 him, but he didn't also mention that there are these
13 stays on the side which are a further hindrance to
14 that flow. I'm not disagreeing that there would be
15 some flow in that direction, too.

16 CHAIRMAN FARRAR: Any objection to
17 admission of these three exhibits?

18 MR. NELSON: I have an objection, partly
19 on the basis of the same grounds that he said for 217.
20 If they want to stipulate that they're only offering
21 it as illustrative of not necessarily what would
22 happen, but as general concerns Dr. Resnikoff may have
23 that are not accurately reflected on this, because I
24 don't think it either accurately reflects the heat in
25 the canister, the cask, and I don't think it

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1 accurately reflects the air flow based on the arrows.
2 If they want to stipulate to that, that's fine by me.

3 CHAIRMAN FARRAR: But what about 215 and
4 216?

5 MR. NELSON: I have no objections to
6 those.

7 CHAIRMAN FARRAR: Staff position?

8 MR. TURK: No objection to 215 and 216.

9 CHAIRMAN FARRAR: Then 215 and 216 will be
10 admitted.

11 [Whereupon, the above-referred-
12 to documents marked as State's
13 Exhibits 215 and 216 for
14 identification were received in
15 evidence.]

16 CHAIRMAN FARRAR: Go ahead, Mr. Turk.

17 MR. TURK: I do have a problem with 217.

18 CHAIRMAN FARRAR: State it, please.

19 MR. TURK: The drawing appears to be a
20 rough approximation of something; I'm not sure what.
21 It doesn't actually show air flow from within the cask
22 central area that Dr. Resnikoff has marked as "hot."
23 It simply attempts to show air entering from the
24 bottom, moving straight up, and entering out the top.

25 As Your Honors are aware, yesterday we

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1 distributed, but did not enter as an exhibit, the June
2 11th document prepared by Pacific Northwest National
3 Laboratories. In that document there is a very good
4 computer model demonstration of air flow within the
5 cask, and it shows the hot regions as well as the
6 cooling effect that is provided for the cask in the
7 horizontal region.

8 I would point you to page 4 of 7 of that
9 handout, if you have it handy. I will hold it up so
10 you can see which page I'm referring to. It's a
11 colored representation of air flow within the cask in
12 its horizontal position. If you will look at that
13 page, you will see that the computer model of the air
14 flow is very different from what Dr. Resnikoff has
15 sketched in State Exhibit 217. If we are going to
16 admit 217, then I would at least ask that this
17 exhibit, at least this drawing from the handout of
18 yesterday also be admitted as a Staff exhibit, to more
19 accurately represent the air flow within the
20 horizontal cask.

21 CHAIRMAN FARRAR: What was the number of
22 that exhibit?

23 MR. TURK: The one that I'm referring to?
24 We did not give it an exhibit number. We simply made
25 a distribution of it.

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1 Also, there's a diagram on the previous
2 page, page No. 3 of 7 of that document, that shows the
3 cask in its horizontal position and a modeling of air
4 flow.

5 So if Dr. Resnikoff's exhibit goes in,
6 then I think we need to supplement the record in order
7 to show more accurate representation of air flow. In
8 fact, we might just offer the entire document, unless
9 that's going to be a problem because of the textural
10 discussion.

11 MS. CURRAN: What did you say?

12 MR. TURK: We could just offer the entire
13 document prepared by Pacific Northwest Labs, but at
14 least I would put in the diagram.

15 Incidentally, if you look at page 4 of 7,
16 there's a very precise specification of the
17 temperatures at different regions within the cask,
18 modeled correctly, showing all elements within the
19 cask.

20 MS. CURRAN: Perhaps we could table our
21 motion to move in No. 217 until we've had a chance to
22 look more carefully at the NRC's report and consult
23 with our expert. But we would move in the other two,
24 215 and 216. They're admitted? Okay.

25 CHAIRMAN FARRAR: Right, those are in.

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1 Let's take up your suggestion and hold off on 217
2 temporarily.

3 MR. TURK: Your Honor, I think I misspoke.
4 I was pointing to pages 3 and 4 of 7. Those are the
5 no vents blocked case. Continuing on the next two
6 pages, 5 of 7 and 6 of 7, show the vents blocked case.
7 Oh, it shows the bottom set of vents blocks.

8 CHAIRMAN FARRAR: Right.

9 MR. TURK: It assumes that the cask is
10 lying on one set of vents entirely on one side, and
11 shows the air flow with that condition.

12 CHAIRMAN FARRAR: All right, let's, at the
13 State's suggestion, we will hold off on the ruling of
14 the admission of 217 and wait to hear more from the
15 parties on the relationship between that and the
16 unmarked document to which staff counsel was
17 referring.

18 Go ahead, Ms. Curran.

19 MS. CURRAN: Dr. Resnikoff, yesterday Dr.
20 Lam asked you, if you knew the cask would not tip
21 over, would your concerns about doses go away? I hope
22 I'm summarizing that question correctly. And I
23 believe you said they would. Do you want to amend or
24 elaborate on that answer?

25 DR. RESNIKOFF: I have a confusion as to

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1 what is the design basis accident for this proceeding,
2 whether it's a 2,000-year or a 10,000-year and whether
3 the casks are falling or not. I think that's one of
4 the issues in this proceeding, which isn't part of my
5 focus.

6 I think that's my concern at this point.
7 Again, I started from the point that casks have fallen
8 over and was working from that assumption.

9 MS. CURRAN: Okay. Dr. Resnikoff, I
10 believe there was a question or an answer yesterday
11 about whether the NRC does contingency planning or
12 requires contingency planning for beyond design basis
13 accidents. In your experience, are you aware of NRC
14 requirements for contingency planning for beyond
15 design basis accidents?

16 DR. RESNIKOFF: Oh, absolutely. There's
17 planning, for instance, for reactor meltdowns.
18 There's contingency planning for that. I think that
19 should hold here as well. There should be contingency
20 planning for over design basis accident, whatever that
21 over design basis is, 2,000 or 10,000.

22 MS. CURRAN: Thank you. I am finished
23 with this part of my examination.

24 CHAIRMAN FARRAR: Bringing a smile to the
25 Board's collective face.

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1 (Laughter.)

2 MS. CURRAN: Hoping to earn some Brownie
3 points.

4 (Laughter.)

5 JUDGE LAM: Many points.

6 CHAIRMAN FARRAR: Mr. Nelson?

7 MR. NELSON: If we may have a minute to go
8 over --

9 CHAIRMAN FARRAR: Should we all stay here,
10 that kind of minute, or a longer minute?

11 MR. NELSON: How about five minutes?

12 CHAIRMAN FARRAR: Okay, we'll take a very
13 quick break. Don't go far, and let's be back -- it's
14 four minutes of -- let's be back right after the hour.

15 (Whereupon, the foregoing matter went off
16 the record at 8:56 a.m. and went back on the record at
17 9:02 a.m.)

18 CHAIRMAN FARRAR: Mr. Nelson?

19 MR. NELSON: After careful deliberation
20 and consultation with my colleagues, I have nothing,
21 Your Honor.

22 MR. TRAVIESO-DIAZ: I'm beginning to look
23 good here.

24 (Laughter.)

25 CHAIRMAN FARRAR: An even bigger smile.

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1 Mr. Turk?

2 MR. TURK: I think it's a conspiracy.
3 Everyone's expecting me to put a lot of time in, but
4 I do have a few questions. It shouldn't be very long
5 at all.

6 CHAIRMAN FARRAR: Okay, now, according to
7 my scorecard, those questions have to be limited to
8 what Judge Lam asked yesterday and what Ms. Curran
9 asked today.

10 MR. TURK: My questions only go to what
11 Ms. Curran asked this morning.

12 CHAIRMAN FARRAR: Okay.

13 RECROSS EXAMINATION BY MR. TURK

14 MR. TURK: First of all, let me start with
15 State Exhibit for identification No. 217. Dr.
16 Resnikoff, that's the sketch that you drew of the air
17 flow within the HI-STORM 100 cask. You did not show
18 any arrows leading from the areas you designated as
19 hot in the horizontal cask to the vents. Were you
20 meaning to say that there is no air flow from that hot
21 region to the vents?

22 DR. RESNIKOFF: No. What I drew was the
23 primary -- first of all, this is a schematic just to
24 illustrate some general principles. The primary air
25 flow was what I drew. There will be secondary air

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1 flows that go in other directions, but there are
2 baffles there that will hinder its flow, and also
3 there's the horizontal path it has to pass through

4 MR. TURK: It's correct, isn't it, that
5 hot air or air that's heated by the MPC will rise
6 within the configuration?

7 DR. RESNIKOFF: That's certainly true.

8 MR. TURK: And the air, the hot air,
9 regardless of whether there's a direct air flow
10 passing over the hot region, isn't it correct that
11 that hot air would tend to want to escape through the
12 vents at the upper areas of the cask when the cask was
13 in its horizontal region, horizontal position?

14 DR. RESNIKOFF: Yes, that's true.

15 MR. TURK: In effect, then, as that hot
16 air rises and escapes through those vents, other air
17 would be drawn in to replace the air that's left the
18 MPC hot region, correct?

19 DR. RESNIKOFF: Sure, that's true.

20 MR. TURK: So that would, in effect, cause
21 the convection air cooling, even in the horizontal
22 position?

23 DR. RESNIKOFF: There will be some.

24 MR. TURK: Okay.

25 DR. RESNIKOFF: My point was that the two

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1 situations are effectively the same, blocked air vents
2 and the cask lying on its side are effectively the
3 same. I think that your exhibit, which has not yet
4 been introduced, shows exactly that.

5 MR. TURK: In effect, you don't need to
6 have a fan blowing air across the hot region, but,
7 instead, as the hot air rises from that region and
8 escapes, other air is drawn in past the hot region,
9 and then that air also would tend to rise and escape
10 through the vent in the upper area, correct?

11 DR. RESNIKOFF: There will be --

12 MR. TURK: That's convection flow?

13 DR. RESNIKOFF: Yes, there's a small
14 chimney effect that will occur.

15 MR. TURK: One question I have about your
16 Figures 215 and 216 -- I'm sorry, these are the
17 drawings from PFS and Holtec. As I understand it, you
18 took the radiation dose in the area marked as "5" on
19 Exhibit 215 --

20 DR. RESNIKOFF: Yes.

21 MR. TURK: You took that dose rate, right?

22 DR. RESNIKOFF: Yes.

23 MR. TURK: And then you extrapolated --
24 you put that dose rate at Point 3 on Exhibit 216? I'm
25 sorry, you back calculated from Point No. 5 to Point

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1 No. 4 on 215 to get the dose rate at the bottom of the
2 MPC; that's correct?

3 DR. RESNIKOFF: That's correct.

4 MR. TURK: And then you took that dose
5 rate from Point 4 and you applied that to Point 3 on
6 Exhibit 216?

7 DR. RESNIKOFF: That's correct.

8 MR. TURK: Now in calculating the dose
9 rate that emanates from Point 3, what did you do? Did
10 you move that Point No. 1 on 216, except that you only
11 took 13.45 percent of that dose rate?

12 DR. RESNIKOFF: That's correct.

13 MR. TURK: And that would be the dose rate
14 at Point one, exactly at the surface of the baseplate
15 on 216?

16 DR. RESNIKOFF: Not exactly. Point 5 is
17 actually one meter off, away from the bottom of the
18 cask, and Point 1 is also one meter from the bottom of
19 the cask. But other than that, yes.

20 MR. TURK: How did you get from Point 3 to
21 Point 1? What did you do to the dose as you moved
22 from Point 3 to Point 1 in Figure 216, the dose rate?
23 You simply applied that 13.45 percent?

24 DR. RESNIKOFF: That's right.

25 MR. TURK: And --

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1 DR. RESNIKOFF: And Point 3, though it's
2 not drawn precisely, Point 3 is underneath the MPC,
3 but above the pedestal.

4 MR. TURK: Okay. What was the dose rate
5 that you used at Point 5?

6 DR. RESNIKOFF: Well, that was our
7 starting point. We took that from the SAR.

8 MR. TURK: And do you recall the value or
9 can you point me to the value you used?

10 DR. RESNIKOFF: I don't recall that value
11 off the top of my head.

12 MR. TURK: Could you look at State Exhibit
13 141? If you'd look at the first page of that exhibit
14 -- again, Exhibit 141 is one of your calculations,
15 correct, entitled, "Rough Calculations Dose Emanating
16 from Bottom of Tipped-Over Cask?"

17 DR. RESNIKOFF: Yes, what page did you
18 want me to look at?

19 MR. TURK: Page 1, at the bottom of the
20 page there's a section entitled "A. Inside Dose
21 Calculation."

22 DR. RESNIKOFF: Yes.

23 MR. TURK: And there's a dose rate there
24 for cobalt-60 that's shown to be 3,058.38 millirems
25 per hour adjacent to the cask?

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1 DR. RESNIKOFF: Yes, I see that.

2 MR. TURK: Is that the dose rate you used?

3 DR. RESNIKOFF: Yes, that's one's adjacent
4 to the cask, yes. That one we used.

5 MR. TURK: So you used the dose rate
6 adjacent to the cask, not a dose rate, as you
7 indicated just now, Point 5 of the one meter away from
8 the cask?

9 DR. RESNIKOFF: Apparently, that's right.

10 MR. TURK: That's the dose rate for the
11 cobalt-60 only?

12 DR. RESNIKOFF: Yes.

13 MR. TURK: Okay, so then you backed that
14 number out up to the MPC base, got the dose rate at
15 the MPC base at Point No. 4, and then used that same
16 value at Point No. 4 for Point No. 3 in State Exhibit
17 216?

18 DR. RESNIKOFF: That's right.

19 MR. TURK: In calculating the 13.45
20 percent reduction from Point 3 to Point 1, you
21 accounted for, I think you indicated before, the
22 direct radiation from inside the cask? This is your
23 representation of direct radiation from inside the
24 cask, exiting from the annulus? Or exiting through
25 the annulus to that baseplate and then streaming

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1 through the baseplate? That's correct?

2 DR. RESNIKOFF: Yes.

3 MR. TURK: And in doing that, did you
4 account for the attenuation because there's a one-
5 meter distance from the baseplate to the Point No. 1?

6 DR. RESNIKOFF: We did not account for
7 that, nor did we account for any scattering that takes
8 place and sends, you know, rays going down to Point 1.
9 We didn't account for that.

10 MR. TURK: Attenuation, by the way, is
11 simply the reduction in dose rate that occurs because
12 of distance, correct?

13 DR. RESNIKOFF: We did not account for
14 that distance.

15 MR. TURK: Yes, but that's what is
16 referred to as attenuation?

17 DR. RESNIKOFF: Yes.

18 MR. TURK: Did you account for any
19 dispersion that occurs as the radiation leaves the
20 cask and then disperses in something other than a
21 direct-line path from the source to your measuring
22 point?

23 DR. RESNIKOFF: We did not account for
24 that, but when you're out at 600 meters, essentially,
25 each of these casks looks like a point source. Then

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1 we summed up all these point sources and considered it
2 as a line source.

3 MR. TURK: Okay, but when you calculated
4 out to -- did you calculate out then to a distance of
5 600 meters?

6 DR. RESNIKOFF: Did we?

7 MR. TURK: Yes.

8 DR. RESNIKOFF: Calculate the dose out to
9 600 meters?

10 MR. TURK: Yes.

11 DR. RESNIKOFF: Yes.

12 MR. TURK: And what was your starting
13 point for that 600-meter distance?

14 DR. RESNIKOFF: One meter.

15 MR. TURK: So, in effect, then, you
16 disregarded the difference in dose rate that might
17 exist at the surface of the cask versus one meter away
18 from the cask?

19 DR. RESNIKOFF: No, actually, I took that
20 into account, that one meter distance.

21 MR. TURK: How did you account for that?

22 DR. RESNIKOFF: Essentially, we used the
23 attenuation coefficient in air. If you look at page
24 3, at the top --

25 MR. TURK: As I understand the top of page

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1 3, it appears that what you were attempting to do was
2 account for attenuation through air, which is
3 essentially a function of distance, correct?

4 DR. RESNIKOFF: That's right.

5 MR. TURK: You recognize, however, that
6 there is also a dispersion that's going on?

7 DR. RESNIKOFF: Yes.

8 MR. TURK: And that's what is commonly
9 referred to as consideration of the geometry?

10 DR. RESNIKOFF: Yes, and I did that
11 calculation -- that's not on here, but when you're
12 close in to the source, you get a different formula
13 for what the dose is due to a surface dose rate in an
14 annulus. And I did that calculation. But when you're
15 out at 600 meters, when you're out at 600 meters,
16 these are all effectively point sources. So it's the
17 point sources emanating in all directions, and you add
18 up all those point sources and you get a line source.

19 MR. TURK: And you say you did that
20 calculation. That's not part of the calculation that
21 you presented in this exhibit or in Exhibit 141A,
22 correct?

23 DR. RESNIKOFF: No, I did it because, when
24 we did the original calculation, we didn't take that
25 into account, but then I did that calculation just to

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1 reassure myself that it would be effectively the same
2 answer. So I didn't present it here.

3 MR. TURK: You didn't find that, because
4 of dispersion, there would be a reduction in value of
5 approximately a factor of three?

6 DR. RESNIKOFF: No.

7 MR. TURK: Are you familiar with the
8 concept of dispersion?

9 DR. RESNIKOFF: I didn't hear that.

10 MR. TURK: Are you familiar with the
11 concept of dispersion?

12 DR. RESNIKOFF: Of course.

13 MR. TURK: And what you're stating is
14 there's no dispersion effect as you leave the surface
15 of a cask and move out to one meter? That's your
16 testimony? Your calculations showed no difference?

17 DR. RESNIKOFF: My testimony is it's
18 effectively the same.

19 MR. TURK: Is that consistent with your
20 understanding of dispersion theory?

21 DR. RESNIKOFF: It's consistent with that,
22 yes.

23 MR. TURK: Do you recall your testimony at
24 the end of yesterday when we were discussing the 1.88
25 millirem dose rate?

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1 DR. RESNIKOFF: Yes.

2 MR. TURK: And whether that was at the
3 surface of the cask or at a distance of one meter
4 away? That had to do with the worker dose calculation
5 you did?

6 DR. RESNIKOFF: Yes.

7 MR. TURK: Do you recognize that in your
8 testimony yesterday you stated that, if you had used
9 the 1.88 at the surface to represent the dose rate at
10 one meter, that that would be inconsistent?

11 DR. RESNIKOFF: Yes. I didn't have a
12 chance to go back and look at that, the SAR. I didn't
13 have a copy of that.

14 MR. TURK: I have nothing further.

15 CHAIRMAN FARRAR: Thank you, Mr. Turk.

16 The Board has no further questions. Ms.
17 Curran, do you have anything else?

18 MS. CURRAN: Could you give me a moment?

19 CHAIRMAN FARRAR: Yes, uh-huh.

20 (Pause.)

21 MS. CURRAN: No, I have nothing more.

22 CHAIRMAN FARRAR: All right, then, Dr.
23 Resnikoff, thank you for your testimony. You are
24 excused with the thanks of the Board, and I assume
25 we'll see you next week during aircraft.

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1 DR. RESNIKOFF: Well, you may see me in a
2 few minutes again. Not so fast.

3 (Laughter.)

4 CHAIRMAN FARRAR: Okay, well, that's fine,
5 too. Thank you.

6 (Witness excused.)

7 Does the Applicant have any rebuttal?

8 MR. GAUKLER: Yes, we do. I would like to
9 take about a 10-minute break, if I could, to make some
10 copies, et cetera.

11 CHAIRMAN FARRAR: All right, and who will
12 the witness be?

13 MR. GAUKLER: The witnesses will be Dr.
14 Soler, Dr. Redmond, and Mr. Donnell. Trying to make
15 it efficient, I believe it will be definitely less
16 than a half-hour. We have approximately about 20
17 minutes.

18 MR. TURK: We may have something that we
19 can do quickly. We'll need to talk during the break.

20 CHAIRMAN FARRAR: All right.

21 MR. TURK: But maybe we need to clarify
22 one answer that Mr. Waters gave yesterday, but we do
23 not plan any rebuttal at this time.

24 CHAIRMAN FARRAR: Okay, Mr. Gaukler, would
25 15 minutes help?

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1 MR. GAUKLER: Yes, they would.

2 CHAIRMAN FARRAR: It's 20 after; let's be
3 back at 25 of.

4 (Whereupon, the foregoing matter went off
5 the record at 9:20 a.m. and went back on the record at
6 9:40 a.m.)

7 CHAIRMAN FARRAR: Back on the record.

8 Before we start with the rebuttal, just to
9 make sure we've taken care of everything, the State is
10 not moving the introduction of Exhibit 217, is that
11 correct?

12 MS. CURRAN: That's correct.

13 CHAIRMAN FARRAR: Then the staff will not
14 find it necessary to do anything with the unmarked
15 document we discussed earlier?

16 MR. TURK: Your Honor, we think that the
17 figures are very illustrative and useful, but we
18 recognize that it was not something that we relied
19 upon in our direct testimony.

20 CHAIRMAN FARRAR: All right.

21 MR. TURK: And I think Dr. Resnikoff
22 himself indicated that there would be a convection
23 flow to some extent. So, in light of that, we don't
24 think it's necessary to enter the drawings.

25 CHAIRMAN FARRAR: All right, thank you.

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1 During the break, the Applicant
2 distributed three exhibits. Do you want to mention
3 those for the record, please?

4 MR. GAUKLER: Yes, I have three exhibits
5 which I have asked be marked as PFS Exhibit 241, 242,
6 and 243.

7 The first one is Figure 1.1-2 from the PFS
8 Site Plan which shows a -- that's from the PFS Safety
9 Analysis Report showing the layout generally of the
10 facility and the owner controlled area, with some
11 lines which I will have explained in the testimony.

12 PFS Exhibit 242 are excerpts from the
13 Radiation Shielding Analysis for the PFS, performed by
14 Holtec. These are excerpts from the calculation that
15 was referred to yesterday in Dr. Resnikoff's
16 testimony. I will explain that during the testimony.

17 PFS 243 is a one-page figure. It's Figure
18 2.36 from the PFS Safety Analysis Report with certain
19 markings which will be explained in testimony.

20 [Whereupon, the above-referred-
21 to documents were marked as PFS
22 Exhibits 241, 242, and 243 for
23 identification.]

24 With that, I'm ready to proceed.

25 CHAIRMAN FARRAR: All right, go ahead.

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1 REBUTTAL EXAMINATION BY MR. GAUKLER

2 MR. GAUKLER: Dr. Soler, in Question and
3 Answer No. 21 of Dr. Resnikoff's prefiled testimony --
4 I believe you have a copy of that?

5 DR. SOLER: I do.

6 CHAIRMAN FARRAR: Wait a minute, Mr.
7 Gaukler.

8 Dr. Soler, Dr. Redmond, you've been sworn
9 before.

10 DR. SOLER: Yes.

11 DR. REDMOND: Yes.

12 CHAIRMAN FARRAR: Mr. Donnell, I think you
13 have --

14 MR. DONNELL: Yes, sir, every day.

15 (Laughter.)

16 CHAIRMAN FARRAR: You've been here every
17 day, but I think you also made it to the chair once
18 before. So all three of you will consider yourselves
19 still under oath.

20 WHEREUPON,

21 ALAN I. SOLER, EVERETT L. REDMOND, AND JOHN DONNELL
22 having been previously duly sworn, resumed the witness
23 stand, were examined and testified as follows:

24 CHAIRMAN FARRAR: Go ahead, Mr. Gaukler.

25 MR. GAUKLER: Thank you.

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1 In Question and Answer 21 of Dr.
2 Resnikoff's prefiled testimony, he stated with respect
3 to the hypothetical tipover analysis that you
4 performed that, and I quote, beginning about halfway
5 through the Answer 21, "The cask walls or the top of
6 the cask are expected to flatten slightly (0.11 inch,
7 page 3.b-5) when the cask top strikes the ground. On
8 the other hand, the cask lid plate is expected to be
9 displaced as much as 4.9 inches in a tipover event,"
10 referring to the TSAR. "This indicates to me that the
11 3-3/4th-inch thick lid plate is going to strike the
12 ground in a tipover event and send a strong dynamic
13 impulse to the cask wall and canister. It does not
14 appear that this cask detail that may affect the
15 canister walls has been modeled."

16 First of all, this testimony suggests, at
17 least to me, that there will be a movement or
18 displacement of the cask lid vis-a-vis the cask body
19 itself in the hypothetical tipover event. Is that
20 correct?

21 DR. SOLER: No, that's not correct.

22 MR. GAUKLER: So I take it that the cask
23 lid and the cask move together in the hypothetical
24 tipover event?

25 DR. SOLER: Both the cask lid and the cask

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1 body are included in the model, and they both displace
2 an amount approximately equal to 4.9 inches at the
3 peak into the substrate.

4 MR. GAUKLER: Now with respect to the
5 question of whether this dynamic impulse of the cask
6 lid and cask impacting the concrete pad, has that been
7 taken into account in your evaluation in the
8 hypothetical tipover analysis?

9 DR. SOLER: Yes, it is. Whatever bodies
10 strike the ground, any impulses from them are
11 transmitted back and accounted for in the acceleration
12 calculation.

13 MR. GAUKLER: And, therefore, any effect
14 that that may have had on the canister welds would be
15 taken into account in your analysis?

16 DR. SOLER: That's correct.

17 MR. GAUKLER: Dr. Soler, there was also
18 some testimony and questions yesterday about where
19 damage to the cask would occur in the hypothetical
20 tipover event and the potential effects this might
21 have on the doses measured at the surface of the cask
22 or some distance from the cask.

23 First of all, in the hypothetical tipover
24 event, where does the damage, localized damage, or
25 deformation occur?

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1 DR. SOLER: If there is any localized
2 permanent damage, it will be occurring at the top of
3 the cask.

4 MR. GAUKLER: , And when you talk about top
5 of the cask, you're saying the top foot, two feet,
6 three feet, what?

7 DR. SOLER: Approximately one foot.

8 MR. GAUKLER: And would there be any
9 permanent deformation or damage, say, in the middle of
10 the cask?

11 DR. SOLER: No.

12 MR. GAUKLER: Dr. Redmond, in terms of the
13 radiation doses measured at the cask surface, is the
14 radiation dose greater at the middle of the cask or
15 the top of the cask? Could you please tell me?

16 DR. REDMOND: The radiation dose is
17 greater in the middle of the cask compared to the top
18 of the cask.

19 MR. GAUKLER: Dr. Redmond, some questions
20 arose yesterday with respect to the distance used or
21 appropriate distance to use in the calculation of the
22 dose limits at the owner-controlled area. I believe
23 there was reference to 600 meters and 645 meters.
24 Using what has been identified as PFS Exhibit 241 and
25 PFS Exhibit 242, could you please tell me which

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1 distance, 600 or 645, you used in your calculation of
2 doses at the owner-controlled boundary and why that
3 was the appropriate distance to use?

4 DR. REDMOND: . Certainly. If we look at
5 Exhibit 241, you will see the ISFSI shown there; the
6 cask arrays are shown clearly. There's a fence around
7 it which is labeled -- well, there's a label
8 "Innerfence Corner," then there's distance shown from
9 that innerfence out to the owner-controlled area
10 boundary. That distance which is shown here as 1,969
11 feet in the west direction, is approximately 600
12 meters.

13 Now --

14 CHAIRMAN FARRAR: Hold on. That owner-
15 controlled boundary --

16 DR. REDMOND: Owner-controlled area
17 boundary.

18 CHAIRMAN FARRAR: Right, and that's the
19 dotted line in the --

20 DR. REDMOND: No, it's the solid black
21 line. I'm sorry.

22 CHAIRMAN FARRAR: It's the solid black
23 line to the --

24 DR. REDMOND: To the west --

25 CHAIRMAN FARRAR: -- to the west and to

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1 the north?

2 DR. REDMOND: Correct.

3 CHAIRMAN FARRAR: And it's the dotted line
4 to the south and to the east?

5 DR. REDMOND: That's correct.

6 CHAIRMAN FARRAR: And is there a fence
7 there? Or would there be a fence there?

8 DR. REDMOND: I believe yes.

9 MR. GAUKLER: I think Mr. Donnell could
10 answer that though.

11 MR. DONNELL: Yes.

12 CHAIRMAN FARRAR: Okay. Not as secure a
13 fence as the inner one, I assume?

14 MR. DONNELL: Yes, we call it a range
15 fence.

16 CHAIRMAN FARRAR: Go ahead.

17 DR. REDMOND: Okay. So that's the
18 distance from the inner security fence around the
19 ISFSI to the outer fence, the range fence that Mr.
20 Donnell just identified is 600 meters. The distance
21 from the edge of the casks to the security fence on
22 the inside of the security fence is 150 feet or give
23 or take 45 meters.

24 Now if you look at Exhibit 242, and if you
25 look on page 6, which is the second page of the

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1 exhibit, at the bottom of the page, the second
2 paragraph --

3 CHAIRMAN FARRAR: Can you hold on? Before
4 we leave that diagram, what are the lines on the north
5 side extending east and then going south with the
6 arrow at the bottom of it? What's that line?

7 MR. DONNELL: I will talk about that as
8 part of the buffer zone.

9 CHAIRMAN FARRAR: Okay. Go ahead.

10 DR. REDMOND: Okay, thank you.

11 On page 6 of my calculation, which is page
12 2 of the exhibit, as I say, on the bottom of the page
13 in the second paragraph from the bottom, it says, the
14 last sentence there, "The distance between the two
15 halves of the ISFSI is 90 feet and the distance to the
16 security fence is 150 feet from the nearest concrete
17 pad."

18 The last sentence of that page says,
19 "Conservatively assume that there are no obstructions
20 between the security fence and the site boundary,
21 which is 600 meters away from the fence." So, again,
22 the 600 plus 150 feet, 600 meters plus 150 feet, is
23 basically 645 meters, which, if you flip to the last
24 page of the exhibit, page D-7, that is the -- you'll
25 see in bold the distance of 645 meters and a value of

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1 5.85 millirem, for a total of 2,000-hour occupancy.
2 That is the value that has been reported in the ISFSI
3 calculation and the PFS SAR and the value that has
4 been quoted in the testimony given.

5 In fact, if you back up and you look under
6 the dimensions under feet, you have 2,018 feet for 645
7 meters, which, indeed, is 150 feet more than the
8 previous value for 600 meters. So the calculations
9 took into account the extra distance between the
10 security fence and the edge of the ISFSI pad in the
11 final calculation of the dose at the owner-controlled
12 area boundary.

13 So when I was talking about 600 meters,
14 that is the distance between the security fence and
15 the owner-controlled area boundary.

16 JUDGE LAM: Dr. Redmond?

17 DR. REDMOND: Yes?

18 JUDGE LAM: Exactly where is that extra 45
19 meters, between where and where?

20 DR. REDMOND: It's between the security
21 fence, which on the Exhibit 241 is shown -- it's not
22 labeled as a security fence, but it is shown in dark
23 around it. If you look in the top left, there's a
24 label for "Innerfence Corner."

25 JUDGE LAM: Okay.

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1 DR. REDMOND: And that is pointing to the
2 security fence that surrounds the ISFSI. So the
3 distance from that security fence to the edge of the
4 concrete pads is 150 feet.

5 JUDGE LAM: What about from the edge of
6 the concrete pad to the side of the storage cask?

7 DR. REDMOND: That's, I think, less than
8 a foot, and was not accounted for. So I assume the
9 150 feet is basically to the edge of the cask.

10 JUDGE LAM: So are you assuming the casks
11 sit right at the edge of the pad?

12 DR. REDMOND: Correct.

13 JUDGE LAM: Okay.

14 MR. GAUKLER: And so, therefore, in
15 calculating the dose at the owner-controlled area, you
16 calculated dose based upon the distance from the
17 nearest cask to the owner-controlled area, which was
18 645 meters?

19 DR. REDMOND: That's correct.

20 MR. GAUKLER: Now this table on the last
21 page of Exhibit 241 -- excuse me, 242 -- does it also
22 show how the radiation dose exposure, radiation dose
23 would vary as a function of the distance you are from
24 the cask?

25 DR. REDMOND: Certainly. In fact, we have

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1 distance here from 45 meters out to a thousand meters.
2 At 645 meters or 600 meters to the owner-controlled
3 area boundary, it's 5.85, and it drops basically by a
4 factor of four when you add another 350 meters onto
5 it, to 1.37, and as we've identified before, it drops
6 about three orders of magnitude out to two miles to
7 the nearest resident.

8 MR. GAUKLER: There was some discussion
9 yesterday about the sensitivity of your dose
10 calculation. Could you please tell us what the
11 sensitivity is?

12 DR. REDMOND: Monte Carlo calculations are
13 statistical calculations, so there's an uncertainty
14 associated with the values or standard deviation, of
15 you will. The standard deviation in my calculations
16 for Private Fuel Storage have been about 2 percent of
17 the total. So about a 2 percent uncertainty.

18 MR. GAUKLER: There's also been some
19 question or discussion of the dose rate of 1.88
20 millirem with respect to the surface of the cask,
21 whether that's at the surface of the cask or one meter
22 of the cask, and for a specific I would refer you to
23 Dr. Resnikoff's testimony in Question and Answer 23 on
24 the top of page 12.

25 DR. REDMOND: Okay.

1 MR. GAUKLER: There Dr. Resnikoff refers
2 to a value of 1.88 millirem per hour one meter from
3 the cask, mid-height. Is that correct? Is the 1.88
4 millirem per hour measured at one meter from the cask
5 surface?

6 DR. REDMOND: No, the correct value for
7 one meter from the cask surface is .78 millirem per
8 hour.

9 MR. GAUKLER: And so the 1.88 millirem per
10 hour is a measurement taken at the cask surface?

11 DR. REDMOND: That's correct.

12 MR. GAUKLER: Mr. Donnell, I would like to
13 have you refer to, I guess, both PFS Exhibit 241 and
14 PFS Exhibit 243 and discuss two things. First,
15 there's been some discussion or questions concerning
16 the current land usage in the area surrounding the
17 owner-controlled area for the PFS site, and then
18 there's also been some discussion of potential changes
19 in those land uses in the future. Using these two
20 exhibits, could you respond or discuss those two
21 topics?

22 MR. DONNELL: Certainly. Referencing the
23 Exhibit 243, this exhibit shows a large portion of the
24 Skull Valley Band of Goshute Indian Reservation, and
25 specifically identifies the PFS site, roughly located

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1 in the center of the exhibit. The line that is
2 identified on the exhibit as Township 4 South and,
3 below that, Township 5 South, that line is also the
4 northern boundary of the reservation, which, for the
5 purposes of Private Fuel Storage, is the northern
6 boundary of the owner-controlled area.

7 The other vertical line that's dashed,
8 roughly in the middle of the exhibit, identified as
9 Range 9 West and Range 8 West is the westernmost
10 boundary of the reservation and also forms the
11 westernmost boundary of the owner-controlled area.
12 The land to the west of the owner-controlled area,
13 using that as a reference point, is BLM land that is
14 used for grazing. I believe it's actually identified
15 as the southern grazing allotment. And the land that
16 is north of the owner-controlled area, which would be
17 to the right of that Range 9/8 West line, is private
18 land.

19 Within the reservation --

20 CHAIRMAN FARRAR: That private land, is
21 that the southern reach of that ranch?

22 MR. DONNELL: Yes, it's the Ensign
23 Group/Castle Rock Skull Valley Cattle Company land.

24 On the reservation --

25 CHAIRMAN FARRAR: How about to the north,

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1 the quadrant to the northwest?

2 MR. DONNELL: Identified as 36, you're
3 looking at there? There's a small number in the
4 section?

5 CHAIRMAN FARRAR: Yes, uh-huh.

6 MR. DONNELL: Thirty-six is BLM land.

7 CHAIRMAN FARRAR: Okay.

8 MR. DONNELL: As a matter of fact, these
9 sections -- by the way, the grid that you see in the
10 background, those are one mile squares. The land in
11 the reservation, looking at the sections, again the
12 one mile squares, I have actually added on this
13 particular figure, Exhibit 243, three notations. The
14 upper left-most one is identified as PFS-OCA Owner
15 Controlled Area, which I've shown on this particular
16 figure by dashing in the lines, the approximate
17 location of the Owner Controlled Area, which you can
18 see is slightly larger than a square mile.

19 CHAIRMAN FARRAR: And that's the area
20 you're leasing from the tribe, which is eight or 900
21 acres.

22 MR. DONNELL: Yes, 820 acres,
23 approximately. A square mile is 640 acres, so we're
24 larger than a square mile.

25 CHAIRMAN FARRAR: Right.

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1 MR. DONNELL: That particular area, Owner
2 Controlled Area, Private Fuel Storage has exclusive
3 use of. And we fenced that, as I identified earlier,
4 with a range fence. And by "exclusive use", I mean
5 that the lease turns over the rights of control to
6 PFS, so we can effectively prohibit the tribal members
7 from using that land for the duration of the lease.

8 The second notation, again on the left
9 side of the exhibit, PFS buffer zone is an area
10 that's, as you can see, identifies six sections of
11 land. The lease also gives Private Fuel Storage
12 control of that land, to the extent the land use
13 cannot change. That's why it's titled a "buffer
14 zone". So the tribal members, if they did something
15 there before, they can continue to do it, but that
16 would effectively prohibit changes in land use. And
17 for the perspective of what we've been talking about
18 this week, that would prohibit the creation of new
19 dwellings or other permanent structures that would
20 potentially impact the calculations, especially with
21 respect to dose, which has been the core of some of
22 the discussions this week.

23 The other notation that I added to Exhibit
24 243 on the right-hand side, I added a dot that has an
25 arrow pointing to it, and it's entitled, "Nearest

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1 Resident." I actually extracted that dot from another
2 exhibit, another figure, I mean, from the
3 Environmental report. It's Figure 2.5-2. I didn't
4 use that particular one because the reservation is
5 shown very dark, and it wouldn't reproduce very well,
6 so I transposed the dot. The dot does reflect,
7 actually in that figure from the Environment report,
8 a well. It's a well location figure, but that is
9 where the tribal residents, the nearest tribal
10 residence is, and I put it on this figure for
11 comparison purposes so you get some perspective.

12 CHAIRMAN FARRAR: And if I remember
13 correctly, at this point, there are only two
14 residences west of Skull Valley Road. Is that correct?

15 MR. DONNELL: That is correct.

16 CHAIRMAN FARRAR: But from what you've
17 just described about the buffer zone, there could be
18 additional residences west of the road, and east of
19 the buffer zone.

20 MR. DONNELL: Yes. I'll speak to that in
21 one second.

22 CHAIRMAN FARRAR: Okay.

23 MR. DONNELL: Just referencing to the
24 other figure, which I don't intend to talk about too
25 much. That was -- or exhibit, I mean, 241. The lines

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1 with the arrows reflect that same buffer zone, just in
2 a larger scale, so we won't talk about that.

3 Getting back to the direction question
4 that Mr. Gaukler posed to me about land use. Specific
5 to the area of the buffer zone on the reservation, as
6 I already have identified, the lease does grant PFS
7 the ability for continued land use as it was before,
8 but no changes, so that would effectively prohibit the
9 band from developing or using those lands for any
10 purpose than what they are now, and they're basically
11 open lands, as you have seen. They don't use those
12 lands for any purpose.

13 As a matter of fact, the land that is west
14 of Skull Valley Road, and you've have to find that
15 line. It's again, to the right of the center of the
16 Figure 243, but it is identified here. All the land
17 to the west of Skull Valley Road has been identified
18 to me by the Skull Valley Band of Goshute as their
19 development area, so if there were other enterprises
20 that would be put on the reservation, they would go on
21 that side of the highway. To the east of Skull Valley
22 Road is what the band treats as their private lands,
23 and do they cattle grazing and other -- they have
24 Buffalo, I think you also saw out there, so we're
25 located in an area that has already been previously

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1 identified by band for development. And obviously,
2 we've taken a large portion of that area.

3 To the west of the reservation, again
4 returning to the BLM side of the equation, that land,
5 as I've already identified, is used for grazing
6 purposes. I'm not aware of any changes in that plan.
7 Certainly, from the practicalities of changing grazing
8 land to something else, when between the highway and
9 the land is effectively the reservation, it would
10 prompt that there's not a high likelihood of any
11 change in land use. It is open land that Castle Rock
12 actually runs, or Ensign Group runs cattle on, on
13 portions of this land.

14 To the north, as I've already identified,
15 is private land. They use that for grazing, and I'm
16 not aware of any change in land use that Castle Rock
17 has proposed. At least nothing has been identified to
18 me. And again, the same issue would be of access for
19 purposes other than grazing. It would seem to be
20 unrealistic.

21 MR. GAUKLER: I have no further questions,
22 Your Honor.

23 JUDGE LAM: But unrealistic it may be, but
24 there is no prohibition that you know of, Mr. Donnell,
25 that anybody may move and live right next to the fence

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1 from the north and from the west.

2 MR. DONNELL: That is correct.

3 JUDGE LAM: So that is a possibility.

4 MR. DONNELL: That is a possibility.

5 JUDGE KLINE: Dr. Soler, I don't think we
6 have this on the record yet, and we should have. What
7 holds the cask lid onto the cask?

8 DR. SOLER: It is bolted. In the HI-
9 STORM, in reality, the lid is just bolted on, and
10 there is a mechanism by which you can lift from the
11 top. Those bolts project through into steel weldments
12 that are embedded in the top of HI-STORM, so that you
13 don't pick up the lid, and then the lid picks up the
14 cask, if you will.

15 JUDGE KLINE: Oh, I see. Okay.

16 DR. SOLER: The pick-up is directly from
17 the crane into the body of HI-STORM. The lid, though,
18 is captured by the lid bolts.

19 JUDGE KLINE: Okay. Thank you.

20 CHAIRMAN FARRAR: Mr. Gaukler, did you
21 want to move the admission of these exhibits?

22 MR. GAUKLER: Yes, please.

23 CHAIRMAN FARRAR: Any objection?

24 MS. CHANCELLOR: No objection, Your Honor.

25 CHAIRMAN FARRAR: Staff?

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1 MR. TURK: None for us.

2 CHAIRMAN FARRAR: All right. Then they
3 will be admitted, and the Staff have any examination?

4 MR. TURK: Yes. Very limited.

5 CHAIRMAN FARRAR: All right.

6 MR. TURK: I believe this goes to Dr.
7 Redmond. If I'm wrong on that, Dr. Soler is the
8 proper witness, I'd ask you to advise me.

9 CROSS EXAMINATION

10 MR. TURK: There was some testimony by Dr.
11 Resnikoff about potential flattening of the steel
12 surrounding the cask, and if you'll recall when I was
13 talking with him, he talked about the fact that
14 shielding is provided by the mass of the shield. Dr.
15 Resnikoff expressed the view that the mass could --
16 that there might be some -- if there was flattening
17 of the steel in one area, then the mass would move to
18 another area.

19 Based on the testimony that we've heard
20 today, if the area near the top of the cask is the
21 area that flattens upon impact, and if Dr. Resnikoff
22 is correct that there might be some movement of the
23 mass, would that mean that the mass would move towards
24 the middle of the cask in an area that's radioactively
25 hotter?

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1 DR. SOLER: Well, on the basis of the
2 calculation I performed in my written testimony, which
3 assumed a circular region of cask that somehow thinned
4 out a little bit, the mass would move in all
5 directions, so some would move toward the middle, and
6 some would move further around the periphery to other
7 locations, but there would be some mass of steel that
8 would move a little bit further down beyond that
9 initial 12 inches.

10 MR. TURK: Towards a more radioactively
11 hot region.

12 DR. SOLER: Towards the middle of the
13 cask.

14 MR. TURK: And the same would be true with
15 concrete, if it was to move at all?

16 DR. SOLER: That is correct, yes.

17 MR. TURK: Also, the concrete, if it does
18 not move, in effect could possibly be compressed
19 somewhat?

20 DR. SOLER: Yes.

21 MR. TURK: And that would not reduce the
22 mass of the concrete. Correct?

23 DR. SOLER: No.

24 MR. TURK: I'm sorry? That's correct.

25 DR. SOLER: That's correct.

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1 MR. TURK: I'd ask you to turn to Staff
2 Exhibit X. I guess this would be for Mr. Donnell.
3 It's the diagram of the cask emplacement area, diagram
4 of the PFS facility. It's SAR Figure 1.2-1.

5 MR. DONNELL: I have it. I have a copy of
6 it.

7 MR. TURK: If you would, look at the
8 northern region of the cask emplacement area. I'm
9 looking at X, Your Honor. It shows the --

10 CHAIRMAN FARRAR: That's the same as PFS
11 84, I think, just a smaller version of it.

12 MR. DONNELL: I believe it is. That's
13 correct.

14 CHAIRMAN FARRAR: Yeah. Go ahead, Mr.
15 Turk.

16 MR. TURK: I would simply ask you to look
17 at the area between the casks at the north -- I'm
18 sorry, the pads at the north of the site between there
19 and the security fence. And do you see the number 150
20 feet?

21 MR. DONNELL: Yes, I do.

22 MR. TURK: And that, in fact, is a
23 representation of the distance between the pads at the
24 northern extreme of the pad area leading up to the
25 security fence.

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1 MR. DONNELL: That is correct.

2 MR. TURK: Mr. Donnell, this question
3 probably goes to you. Earlier in this proceeding,
4 Castle Rock and the Ensign Group were Intervenors. Do
5 you recall that?

6 MR. DONNELL: Yes, I do.

7 MR. TURK: And they had a number of
8 contentions. And ultimately, there was a settlement
9 reached between PFS and Castle Rock. And Castle Rock
10 withdrew its contentions. Correct?

11 MR. DONNELL: Correct.

12 MR. TURK: I'm not going to go into
13 anything more, other than that fact. I take it then
14 that Castle Rock is well aware of the PFS plans for
15 this facility.

16 MR. DONNELL: Yes, they are.

17 MR. TURK: If this it out of line, I would
18 withdraw the question. But since I'm not sure what
19 confidentiality limits exist with respect to
20 settlement, I'll ask it.

21 MR. GAUKLER: Why don't we do this off the
22 record first then.

23 MS. CHANCELLOR: Yeah, I think so because
24 we're --

25 MR. TURK: Okay. That's fine.

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1 MS. CHANCELLOR: The State has --

2 MR. TURK: That's fine.

3 MS. CHANCELLOR: -- doesn't have all of
4 the information with respect to settlement either.
5 Some, but not all.

6 MR. TURK: May we go off the record then?

7 CHAIRMAN FARRAR: Yes.

8 MR. GAUKLER: Perhaps with Mr. Turk --

9 MR. TURK: I don't want to intrude on
10 confidentiality.

11 CHAIRMAN FARRAR: Right. So why don't --
12 rather than just go off the record, you all have a
13 private conversation out of everyone's hearing.

14 MR. TURK: Thank you. Okay.

15 (The parties confer.)

16 CHAIRMAN FARRAR: Back on the record. Mr.
17 Turk.

18 MR. TURK: Your Honor, with sensitivity to
19 the nature of the confidential terms of the
20 settlement, I won't ask anything that I believe might
21 be covered, or reasonably be assumed to be covered by
22 that.

23 CHAIRMAN FARRAR: All right.

24 MR. TURK: I would ask one last question
25 on this line, however, to Mr. Donnell. And that is.

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1 are you aware of any plans by Castle Rock to change
2 the current use of the land that they occupy to the
3 north of the PFS site?

4 MR. DONNELL: No, I am not aware of any
5 changes.

6 MR. TURK: That's all I have.

7 CHAIRMAN FARRAR: If we remember
8 correctly, their current buildings and so forth are
9 significantly to the north on their property.

10 MR. DONNELL: Yes. The closest ranch
11 house is further away than the nearest resident that
12 I've identified on here. And there's actually high
13 ground between that structure location and the PFS
14 facility, so there is no line of sight.

15 CHAIRMAN FARRAR: Mr. Turk, did you say
16 that was the end of your examination?

17 MR. TURK: Yes.

18 CHAIRMAN FARRAR: Thank you. Ms.
19 Chancellor.

20 MS. CHANCELLOR: Yes.

21 CROSS EXAMINATION

22 MS. CHANCELLOR: Dr. Redmond, on answer 46
23 of your testimony, you point out some errors that Dr.
24 Resnikoff made, and on page 24, Item D you state that,
25 "The distance from the cask to the site boundary

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1 should be at a minimum 600 meters, rather than 555
2 meters." That distance should be 650 meters. Is that
3 -- or 645 meters. Is that correct?

4 DR. REDMOND: The reason I said 600 meters
5 in there is because that's the distance from the
6 security fence to the OCA boundary. If you wanted to
7 use the distance from the edge of the ISFSI pad to the
8 OCA boundary, then yes, 650 meters. But again, Dr.
9 Resnikoff is making a hypothetical assumption that all
10 the casks were laying down, in which case they
11 wouldn't be on the pad, so 600 is probably a more
12 reasonable number in his case.

13 MS. CHANCELLOR: But in your testimony you
14 say, "the distance from the casks", not from the
15 security fence, or not from the edge of the storage
16 pads. You say, "The distance from the cask to the
17 site boundary is at least 600 meters." That's not
18 correct, is it?

19 DR. REDMOND: Can you point me to the
20 question again, please?

21 MS. CHANCELLOR: Yes. It's on page 24 of
22 your testimony, Item D.

23 MR. GAUKLER: Do you have that before you,
24 Dr. Redmond?

25 MS. CHANCELLOR: I can just hand you --

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1 MR. GAUKLER: I think he has it.

2 MS. CHANCELLOR: Okay.

3 DR. REDMOND: Which question are we
4 looking at again?

5 MS. CHANCELLOR: It's question 46, and it
6 carries over onto page 24, Item D.

7 DR. REDMOND: Got it. Well, I say the
8 distance from the cask to the site boundary should be
9 at a minimum 600 meters, rather than 555 meters. And
10 as I said before, the minimum distance, or the
11 distance from the security fence to the OCA boundary
12 is 600 meters, so I would think my statement is still
13 correct.

14 MS. CHANCELLOR: And you stated that that
15 was from the edge -- that the 645 meters is from the
16 edge of the storage pad, not actually from the cask?

17 DR. REDMOND: That's correct.

18 MS. CHANCELLOR: And, Dr. Soler, what's
19 the distance in the short dimension, in the 30 foot
20 direction of the pad? What's the distance from the
21 cask to the edge of the pad?

22 DR. SOLER: As you asking me that?

23 MS. CHANCELLOR: Yes, Dr. Soler.

24 DR. SOLER: Oh.

25 MS. CHANCELLOR: Yes, wake up.

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1 DR. SOLER: Under a normal condition,
2 meaning they're just sitting there and there's no
3 earthquake, the distance between the -- let me see.
4 You better ask me that question again.

5 MS. CHANCELLOR: Okay. The casks are
6 what, 11 and a half feet in diameter?

7 DR. SOLER: Just over a little over 11
8 feet in diameter.

9 MS. CHANCELLOR: Eleven feet. And the pad
10 is 30 foot long?

11 DR. SOLER: Thirty foot wide.

12 MS. CHANCELLOR: Thirty foot wide.

13 DR. SOLER: So you have --

14 MS. CHANCELLOR: So that's about --

15 DR. SOLER: -- 15 feet between centers,
16 then add another 11 feet, that's 26 feet, so you have
17 2 feet on either side from the edge of the cask to the
18 edge of the pad.

19 MS. CHANCELLOR: I came up with a two and
20 a half. Okay. And in the long dimension, the 67 foot
21 dimension of the cask.

22 DR. SOLER: Let's see. There you're
23 looking at the drawing here, which is Figure 1.2-1,
24 which is PSF 84. The distance from the center of the
25 cask to the edge of the pad is nine and a half feet,

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1 so if you subtract off the radius of the cask of five
2 and a half feet, you get again, four feet.

3 MS. CHANCELLOR: Four feet. Thank you.

4 Mr. Donnell, the buffer zone that the
5 range fence you talk about, is that just barbed wire
6 strand fence, just a couple of strands of barbed wire?

7 MR. DONNELL: It is something similar to
8 that. I don't recall exactly the fence configuration.
9 It is not an eight foot high chain link fence or
10 something like that.

11 MS. CHANCELLOR: And on PFS Exhibit 243,
12 you notice there are some white sections within the
13 sections on that map. For example, Section 36, the
14 one that's below the marking for PFS buffer zone, the
15 one right on the edge of Township Four South, various
16 scattered white sections?

17 MR. DONNELL: Yes.

18 MS. CHANCELLOR: Are these lands owned by
19 the State of Utah?

20 MR. DONNELL: In general, yes. I'm not
21 intimately familiar with these exact locations. I
22 would guess that most or all of the ones that are
23 shown on the Range Nine West side of that line are
24 school state trust lands.

25 MS. CHANCELLOR: Thank you.

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1 MR. DONNELL: Uh-huh.

2 MS. CHANCELLOR: And with --

3 CHAIRMAN FARRAR: What are school trust
4 lands?

5 MS. CHANCELLOR: When the State -- oh.
6 Sorry.

7 CHAIRMAN FARRAR: Go ahead.

8 MR. DONNELL: They are lands that were set
9 aside years ago for the benefit of schools, hence the
10 name. There's a separate trust. I think it's an agency
11 within the state. I'm not sure of the legalities
12 there, but they administer those lands.

13 CHAIRMAN FARRAR: To raise money for
14 schools.

15 MR. DONNELL: Effectively, they could be
16 sold to raise money. The assignment was by township,
17 so there was always, I think it's two or three
18 sections per township that were set aside.

19 CHAIRMAN FARRAR: So those are not lands
20 set aside for the future construction of schools.

21 MR. DONNELL: No.

22 CHAIRMAN FARRAR: But rather to raise
23 money for schools elsewhere.

24 MR. DONNELL: There might have been an
25 intent in densely populated areas for that purpose,

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1 but in the open range, that ends up being an asset
2 that could be sold. But when you're out in the middle
3 of Skull Valley like this, the land value is very,
4 very small, so they generally are traded between
5 private owners and BLM, et cetera, to move sections,
6 and they're sold from the state, et cetera, the same
7 thing.

8 CHAIRMAN FARRAR: All right. Thank you.

9 MS. CHANCELLOR: Now with respect to the
10 BLM land, PFS applied for a change in use of land in
11 Skull Valley so that it could build a railroad down a
12 portion of Skull Valley. Is that correct, from BLM?

13 MR. DONNELL: More specifically, PFS has
14 requested a right-of-way for the purpose of building
15 a railroad.

16 MS. CHANCELLOR: And that right-of-way
17 requires a change to BLM management plan. Is that
18 correct?

19 MR. DONNELL: That is correct.

20 MS. CHANCELLOR: So it's a change in land
21 use.

22 MR. DONNELL: That is correct.

23 MS. CHANCELLOR: With respect to the area
24 to the north of the PFS site, you stated that that was
25 owned by the Ensign Group, Castle Rock. Correct?

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1 MR. DONNELL: Yes.

2 MS. CHANCELLOR: And the residents there
3 -- there are some residents there. Right? There's
4 some farm houses that probably in that white area just
5 north of the site. Is that right?

6 MR. DONNELL: Actually, it would be to the
7 right adjoining Skull Valley Road, so it's a distance
8 of more than a couple of miles. I don't know the
9 exact dimension, but it's further than the nearest
10 tribal residence. I know that.

11 MS. CHANCELLOR: But it's probably located
12 on this map that we have in front of us. Right?

13 MR. DONNELL: Yes. But again, it would be
14 adjacent to Skull Valley Road, the farm buildings are.

15 MR. TURK: May I ask just for a
16 clarification? The witness indicated it's to the
17 right of something. Which --

18 MR. DONNELL: To the right of the site.
19 I thought Ms. Chancellor was referencing it to the
20 site area, so it would be to the right of the site,
21 but to the left of Skull Valley Road.

22 MS. CHANCELLOR: To the west.

23 MR. DONNELL: To the west of Skull Valley
24 Road.

25 MS. CHANCELLOR: Are you aware that the

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1 owners of Castle Rock and the Ensign Group are land
2 developers?

3 MR. DONNELL: I am aware of that.

4 MS. CHANCELLOR: They have bought many
5 sub-divisions in and around Salt Lake City?

6 MR. DONNELL: I am aware of that.

7 MS. CHANCELLOR: Are you aware of any
8 population trends in Tooele County?

9 MR. DONNELL: Not intimately, no.

10 MS. CHANCELLOR: Did you prepare the
11 information that went into the environmental report
12 with respect to population and land use?

13 MR. DONNELL: No, I did not.

14 MS. CHANCELLOR: Who prepared that?

15 MR. DONNELL: I don't recall. I had a
16 large team of people working at that time. I don't
17 remember who did it. Probably Bill Hennessey, the
18 licensing lead, did most of that, but I wouldn't be
19 able to certify that.

20 MS. CHANCELLOR: And the land to the east
21 of Skull Valley that is north of the reservation, that
22 is also private land. Correct?

23 MR. DONNELL: Yes. These --

24 MR. GAUKLER: East of Skull Valley Road
25 you mean?

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1 MS. CHANCELLOR: North of the reservation,
2 east of Skull Valley Road. Correct.

3 MR. DONNELL: There is a checkerboard of
4 ownership out there, and I believe there are also some
5 small pieces of BLM land, but it's too complicated to
6 remember.

7 MS. CHANCELLOR: But the white area on the
8 map that is to the north of the site, that's all
9 private land. Correct?

10 MR. DONNELL: It is now. I don't believe
11 this particular figure is now accurate. Ensign had
12 done some land swaps with BLM. I believe the white
13 area that I think you're referencing to, which is
14 above if you look on the reservation where the word
15 "PFS Site", emphasizing site here, there are two white
16 sections to the north of that. I believe those are
17 private land, but I believe the lands to the immediate
18 left of those two sections are also private land.

19 MS. CHANCELLOR: So Section 31 --

20 MR. DONNELL: Section 31.

21 MS. CHANCELLOR: -- your recollection is,
22 is private land.

23 MR. DONNELL: I believe that is true, yes
24 That was the section I was referencing earlier when I
25 said that the land to the north of the PFS OCA was

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1 private.

2 MS. CHANCELLOR: You've been out to the
3 site probably many more times than you would like to
4 admit. Is that right?

5 MR. DONNELL: I will admit that, yes.

6 MS. CHANCELLOR: During the time that you
7 traveled out to the site, have you traveled into
8 Tooele?

9 MR. DONNELL: Yes.

10 MS. CHANCELLOR: Have you noticed an
11 increase in housing, say from Interstate 80 to the
12 Town -- the City of Tooele?

13 MR. DONNELL: Yes, I have noticed that.

14 MS. CHANCELLOR: Based on that
15 observation, could you make any general assumptions
16 about development and land use in Tooele?

17 MR. DONNELL: From what I have observed in
18 a very small portion of Tooele County, that there is
19 obvious growth from Salt Lake City moving outward.
20 That's about as far as I could take it.

21 MS. CHANCELLOR: And that's about as far
22 as I could take it too, Mr. Donnell. Thank you very
23 much.

24 CHAIRMAN FARRAR: Thank you, Ms.
25 Chancellor. Any redirect by the Applicant?

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1 MR. GAUKLER: Yes, I have two or three
2 questions.

3 CHAIRMAN FARRAR: All right.

4 REDIRECT EXAMINATION

5 MR. GAUKLER: Mr. Donnell, if there wee a
6 significant material change with respect to statements
7 in the Safety Analysis Report, would PFS have to
8 identify those to the Nuclear Regulatory Commission?

9 MR. DONNELL: Yes. Under Part 72, I
10 believe it's Section 11, it is the obligation of the
11 licensee to maintain the basis of the license in an
12 accurate configuration, so if there was a change for
13 any reason surrounding the area, PFS -- at a minimum,
14 PFS would have to review it. If there was a change,
15 we may have to demonstrate a no-impact, or make an
16 adjustment.

17 MR. GAUKLER: And assume hypothetically
18 that there were new houses built in Section 31 right
19 north of the facility. Take that as a hypothetical.
20 Would there be room between Owner Controlled Area and
21 the casks to build an earthen berm to reduce radiation
22 doses to those houses?

23 MR. DONNELL: Yes.

24 MR. GAUKLER: And so that could be done to
25 keep radiation doses -- reduce radiation doses to any

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1 new residential developments or any new houses that
2 may exist right next to the boundary. Is that
3 correct?

4 MR. DONNELL: That is correct.

5 MR. GAUKLER: No further questions.

6 CHAIRMAN FARRAR: Thank you, Mr. Gaukler.

7 MR. TURK: Two points, Your Honor.

8 CHAIRMAN FARRAR: Go ahead, Mr. Turk.

9 MR. TURK: First to Dr. Redmond. With
10 respect to the 600 meter figure, do you understand
11 that what Dr. Resnikoff calculated was the distance of
12 600 meters from the cask?

13 DR. REDMOND: What he -- I'd have to go
14 back and review the calculation. I know the number he
15 used is 555 meters, which in any case is incorrect.

16 MR. GAUKLER: You're talking about the
17 initial calculation?

18 DR. REDMOND: Yes, of Dr. Resnikoff.

19 MR. TURK: And then are you familiar with
20 any changes he made in that respect in his amended
21 calculation?

22 DR. REDMOND: He changed the distance from
23 555 to 600 per my notation.

24 MR. TURK: And that would be, again, from
25 the cask, rather than from the security fence.

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1 DR. REDMOND: True. Correct.

2 MR. TURK: If he had calculated 600 meters
3 from the security fence, I take it his estimated dose
4 rate would be lower than what he shows in his
5 calculation.

6 DR. REDMOND: Depending on what distance
7 you use for the distance from the cask to the security
8 fence, yes.

9 MR. TURK: One question to Mr. Donnell
10 about the white squares and white areas shown in PFS
11 Exhibit 243. I have to state I'm a little bit
12 confused. Can you indicate to me which areas are
13 state-owned lands held in trust for the schools, and
14 which are privately owned areas?

15 MR. DONNELL: Okay. To the extent that I
16 can say with certainty here, there isn't much. I can
17 speculate pretty strongly that the north/south line
18 that I identified previously as Range Nine West, Range
19 Eight West, there are a number of blocks that show
20 white in that area. I would strongly suspect those
21 are state trust lands.

22 MR. TURK: Now where is Range Eight West?

23 MR. DONNELL: There's a dual -- these
24 lines are defining townships and ranges, so to the --
25 for an example, on the east/west line where you can

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1 read the text.

2 MR. TURK: Let me just ask you to look in
3 particular at the area directly above the PFS buffer
4 zone area, and if you look to the eastern-most area of
5 the buffer zone, you see directly above that area
6 there are two stacked up white squares.

7 MR. DONNELL: I understand.

8 MR. TURK: Stacked vertically.

9 MR. DONNELL: Yes.

10 MR. TURK: Are those state-owned lands, or
11 are those private lands?

12 MR. DONNELL: I believe those are private
13 lands. The state trust lands I was referring to where
14 I was speculating, the white blocks are the -- the
15 content of the white blocks was the line that roughly
16 bisects this drawing top to bottom, and is labeled,
17 "Range Nine West/Range Eight West."

18 MR. GAUKLER: Can you point out where
19 those labels are, Mr. Donnell?

20 MR. DONNELL: Yeah. I was just about to.
21 It's below the reservation area that is identified as
22 the PFS buffer zone. There are two labels that are
23 part of the drawing. Those identify a line to the
24 left as Range Nine West, and to the right of the line
25 is Range Eight West. It's a surveying notation to

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1 identify township and range. And then within the
2 township and range, you have sections. I was talking
3 about the white blocks on this particular figure that
4 were to the left of that line. There are a number of
5 them, a half a dozen or so, that I speculate are state
6 trust lands.

7 In the middle of the valley, they largely
8 state, state trust lands because they have no purpose
9 to change ownership or to buy. When you get near
10 Skull Valley Road, those sections as you go along the
11 road have been largely transferred or sold for various
12 reasons over the years, and so you don't see as much
13 state trust land in that area, but in the open areas
14 that are only used for grazing, they largely remain
15 the same.

16 CHAIRMAN FARRAR: The two stacked-up white
17 squares to the north that Mr. Turk referred to, you
18 said are now private, but those are not part of the
19 ranch to your --

20 MR. DONNELL: No, they are part of the
21 Ensign Group private land.

22 CHAIRMAN FARRAR: So the square with the
23 number 31 in it that I referred to, that is definitely
24 the ranch.

25 MR. DONNELL: Yes.

1 CHAIRMAN FARRAR: And now you're saying
2 that the two white ones that are private are also part
3 of the ranch.

4 MR. DONNELL: Yes. There's a large area
5 to the north of the reservation now, just in the last
6 couple of years, Ensign has consolidated some of their
7 holdings. And I believe a large amount of that is
8 private land going north of the reservation. The
9 trouble is there are a lot of in-holdings and things
10 that you can't say with certainty, without having the
11 land deed information and map, and some time to do
12 that.

13 CHAIRMAN FARRAR: All right.

14 MR. TURK: That's all I have.

15 CHAIRMAN FARRAR: All right. Thank you,
16 Mr. Turk. Does any of this lead the State to have
17 more questions?

18 MS. CHANCELLOR: One question, Your Honor.

19 CHAIRMAN FARRAR: Yes, ma'am.

20 MS. CHANCELLOR: Maybe sub-parts, but one
21 question.

22 Mr. Donnell, Mr. Gaukler stated that PFS
23 could build an earthen berm to the north of the site
24 if any houses were to move in there.

25 MR. GAUKLER: Okay. I said north of the

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1 security fence.

2 MS. CHANCELLOR: North of the security
3 fence. Isn't it true that the retention pond is at
4 the north end of the site?

5 MR. DONNELL: That's correct.

6 MS. CHANCELLOR: Isn't it true that
7 drainage is to the north of the site?

8 MR. DONNELL: That is correct.

9 MS. CHANCELLOR: Isn't it true that PFS
10 has conducted a probable maximum flood, and has
11 developed berms at the southern end of the site?

12 MR. DONNELL: That is correct.

13 MS. CHANCELLOR: So if you were to put any
14 berms in for radiation control, you'd also have to do
15 a drainage and flat analysis.

16 MR. DONNELL: You'd have to look at it,
17 but you're downstream of the site, so the effects
18 would be limited to how the water is draining out of
19 the detention basin in the overflow operation of it,
20 and document that you aren't impacting anything. But
21 since it's downstream, I would not expect that to be
22 a problem. We have quite a distance out there, almost
23 2,000 feet to put a berm in, so I think the
24 supposition that Mr. Gaukler was putting forth is a
25 reasonable one.

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1 MS. CHANCELLOR: No further questions,
2 Your Honor.

3 CHAIRMAN FARRAR: Okay. That wraps it up
4 then? All right. Thank you. Then this panel is
5 excused, again with our thanks. Any further rebuttal
6 by the Applicant?

7 MR. GAUKLER: No, Your Honor.

8 CHAIRMAN FARRAR: Any by the Staff?

9 MR. TURK: No rebuttal, but we need to
10 clarify a piece of testimony.

11 MS. CHANCELLOR: What's that?

12 CHAIRMAN FARRAR: Which testimony?

13 MR. TURK: Mr. Waters identified an error
14 in something that he had stated, and he'd like to make
15 that correction before we close this issue.

16 CHAIRMAN FARRAR: All right. Okay. Then
17 that would -- there's no rebuttal. That would take
18 care of that. Then will the State have any
19 surrebuttal?

20 MS. CURRAN: Yeah, we just -- I think
21 we'll have one round of rebuttal will do it.

22 CHAIRMAN FARRAR: Okay. How long will
23 your business take, Mr. Turk?

24 MR. TURK: Five minutes.

25 CHAIRMAN FARRAR: Okay. Let's do that now

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1 then.

2 MR. TURK: I would then ask that Mr.
3 Waters take the chair behind the microphone at the
4 witness stand.

5 CHAIRMAN FARRAR: And, Mr. Waters, you've
6 previously been sworn, and so consider yourself still
7 under oath, please.

8 MR. WATERS: Yes.

9 REDIRECT EXAMINATION

10 MR. TURK: Good morning, Mr. Waters.

11 MR. WATERS: Good morning.

12 MR. TURK: I believe you have indicated to
13 me that there is an area of your testimony that you
14 wish to correct?

15 MR. WATERS: Yes, correct and clarify.

16 MR. TURK: Okay. In particular, as you've
17 expressed it to me, these are two statements made that
18 appear on page 12,328 and page 12,335.

19 JUDGE LAM: Are these transcript pages?

20 MR. TURK: Yes. We're looking at the
21 transcript of June 25th at pages 12,328 and 12,335.

22 MS. CHANCELLOR: Could you hold on while
23 we find our copy?

24 MS. CURRAN: Could you give us the pages
25 again, Mr. Turk?

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1 MR. TURK: Yes. 12328 and 12335. And,
2 Your Honor, to make this simple may I use the leading
3 form of questions?

4 CHAIRMAN FARRAR: Yes.

5 MR. TURK: Mr. Waters, first of all, I'd
6 ask you to turn to page 12328, at line 4. Ms.
7 Chancellor asked you a question, and she states at
8 line 6 quote -- with respect to a Holtec. I'm sorry.
9 This is not quotation. With respect to the Holtec
10 Certificate of Compliance that you reviewed she asked
11 you, "Isn't it true that in that application, Holtec
12 used 8,760 hours for the radiation dose analysis for
13 beyond design-basis case?" Do you see that question?

14 MR. WATERS: Yes, I do.

15 MR. TURK: And you answered, "Yes." Now
16 is that one of the points in this testimony that you
17 wish to correct?

18 MR. WATERS: Yes. I misspoke on that
19 answer. It should be no.

20 MR. TURK: So the correct answer then
21 would be?

22 MR. WATERS: No.

23 MR. TURK: All right. Let's go to the
24 clarification that I asked you on page 12335,
25 immediately following the close of that line of

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1 questions by Ms. Chancellor. At line 7, I began my
2 question by asking you about that testimony you had
3 given. I won't read it into the record. My question
4 begins at line 7, and I indicate that you had stated
5 that Holtec had performed a beyond design-basis
6 evaluation using 8,760 hours. And I asked you, "Is
7 that the hypothetical cask tip-over event?" You said,
8 "No." Then I asked you what you were referring to.
9 You stated, "I was referring to a hypothetical
10 radioactive release, assuming" - I guess the word
11 there should be non-mechanistic.

12 MR. WATERS: Yes. I stuttered.

13 MR. TURK: "Assuming non-mechanistic
14 hypothetically that the confinement barrier was
15 damaged."

16 MR. WATERS: Yes.

17 MR. TURK: Now is that a second area that
18 you wish to correct?

19 MR. WATERS: Yes. I just wanted to
20 clarify that was for a normal condition dose analysis,
21 where we hypothetically assumed the cask leaks at a
22 certain rate, and that's based on the leak test
23 sensitivity that is performed after the cask is --
24 after MPC's wall is shut, and for that we did assume
25 that 8,760 exposure for normal conditions as part of

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1 the certification to be conservative.

2 MR. TURK: So what you're referring to in
3 those two pieces of testimony was not an accident
4 analysis, but rather an analysis of normal conditions,
5 assuming leak rate of a certain amount.

6 MR. WATERS: That is correct.

7 MR. TURK: It was neither an accident
8 analysis, nor a beyond design-basis accident analysis.

9 MR. WATERS: It was not an accident
10 analysis. It was not beyond design-basis, it was for
11 a normal condition analysis.

12 MR. TURK: Thank you. That's the correct
13 we wish to make, Your Honor.

14 CHAIRMAN FARRAR: Anyone want to ask any
15 questions about that?

16 MR. GAUKLER: I have no questions, Your
17 Honor.

18 RE CROSS EXAMINATION

19 MS. CHANCELLOR: I'm just a little
20 confused. Mr. Waters, Holtec used 8,760 hours in its
21 Certificate of Compliance, just for its regular
22 radiation dose analysis. Is that right?

23 MR. WATERS: Yes.

24 MS. CHANCELLOR: Thank you. With respect
25 to compliance with 72-104a, Holtec conducted that

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1 analysis. Is that right?

2 MR. WATERS: Yes, for confinement analysis
3 they assumed 8,760 to show compliance for a cask that
4 was -- for certification we do that because it's used
5 on the nuclear power plant, and we do not know where
6 the site boundary will exactly be, and what people
7 will be at the site boundary, as far as residents go.
8 Therefore, we conservatively ask them to do a bounding
9 annual exposure.

10 MS. CHANCELLOR: Okay. Thank you very
11 much.

12 CHAIRMAN FARRAR: I think that concludes
13 the correction and clarification. Thank you, Mr.
14 Waters. Now the State wants to do surrebuttal of Dr.
15 Resnikoff. Is that correct? Mr. Gaukler, you wanted
16 to say something?

17 MR. GAUKLER: I guess it would probably be
18 more -- my understanding, may we do some rebuttal and
19 surrebuttal together. That's what's been the
20 practice.

21 MS. CHANCELLOR: That's what we're --

22 CHAIRMAN FARRAR: I'm sorry. I'm sorry.
23 Rebuttal and surrebuttal. Right. How long will that
24 take?

25 MS. CURRAN: I don't think it's going to

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1 take more than a half an hour.

2 CHAIRMAN FARRAR: Now is this -- is that
3 the last item of business?

4 MR. GAUKLER: Unless we have to put
5 something on in response, that's the last item. Yes.

6 CHAIRMAN FARRAR: But that's the last item
7 of business before Dr. Stamatakos.

8 MR. GAUKLER: Yeah, unless we have to put
9 something in in response to their stuff.

10 CHAIRMAN FARRAR: Yeah.

11 MR. GAUKLER: Hope it doesn't happen.

12 MS. CURRAN: I would ask if we could take
13 a break before we do that.

14 CHAIRMAN FARRAR: Yeah. Let's take a good
15 size mid-morning break, help you organize your
16 thoughts. We're ahead of -- I think far ahead of
17 where we had hoped to be. It's 18 of, let's come back
18 at 11:05.

19 MS. CURRAN: Thank you.

20 (Off the record 10:42:10 - 11:09:11 a.m.)

21 CHAIRMAN FARRAR: We're five minutes after
22 the resumption time. Mr. Turk is not here.
23 Ordinarily, I might wait but we're on the final run
24 here, and we're going to have to keep moving. So, Mr.
25 O'Neill, I trust you to hold the fort for a few

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1 minutes until Mr. Turk gets here.

2 Dr. Resnikoff, you've been previously
3 sworn. You're still under oath. Do you understand
4 that?

5 DR. RESNIKOFF: I do.

6 MR. O'NEILL: I was going to say so
7 there's a -- you're not willing to wait any longer for
8 sure? Okay. Because the other day he had
9 specifically instructed me to wait for him if he --
10 you could see, he's handling this portion of the
11 case, but it's obviously your call, so --

12 CHAIRMAN FARRAR: And the problem is we're
13 at a point where we need to keep moving, and we don't
14 have time to spare.

15 (Off mic comment.)

16 CHAIRMAN FARRAR: There is. All right.
17 Go ahead, Ms. Curran.

18 MS. CURRAN: Okay.

19 CHAIRMAN FARRAR: And this is, as I
20 understand it --

21 MS. CURRAN: This is our rebuttal
22 testimony.

23 CHAIRMAN FARRAR: And it's also
24 surrebuttal.

25 MS. CURRAN: Surrebuttal.

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1 CHAIRMAN FARRAR: All right. Go ahead.

2 DIRECT EXAMINATION

3 MS. CURRAN: Dr. Resnikoff, there's been
4 some discussion recently about the distance from the
5 pad to the Control Area Boundary, which has now been
6 established that the distance from the pad to the
7 Controlled Area Boundary is 645 meters. Is that
8 right?

9 DR. RESNIKOFF: Yes.

10 MS. CURRAN: Can you tell us how that
11 would change the calculation, the dose calculation is
12 presented in your testimony?

13 DR. RESNIKOFF: Well, in the rough
14 calculations that we did, it would reduce the doses by
15 approximately 8 percent, that additional distance. I
16 might add further that there are other contributors to
17 the dose that we didn't take into account as we
18 calculated the bottom of the cask, so there are
19 additional factors that would add to the dose that we
20 didn't take into account; such as, scattering from the
21 ground.

22 MS. CURRAN: There's also been testimony
23 in the last day or so regarding the location in which
24 the concrete cask might be flattened or the steel of
25 the container might be stretched. And I think you

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1 heard Dr. Soler say earlier today that in his view,
2 the concrete would be flattened and the steel would be
3 stretched at the ends of the cask if it were to fall
4 over. Is that right?

5 DR. RESNIKOFF: That's right.

6 MS. CURRAN: Hearing that testimony, does
7 that resolve your concern?

8 DR. RESNIKOFF: No, it doesn't, because
9 he's looking at a single cask in isolation, and
10 looking at the question of what happens to it as it
11 strikes the ground. But when you have a field of
12 casks, and there is an earthquake, it's just my
13 opinion that casks can fall in various directions, and
14 one can fall on top of another and roll around, and it
15 would necessarily be the case that a cask would be
16 struck at the top. Some might land on another cask,
17 some might hit sideways, hit the middle of a cask. In
18 other words, the thinning might take place at the
19 center where the hottest region, rather than at the
20 end point, so there are other scenarios, in short,
21 that are possible when there's a field of casks.

22 MS. CURRAN: Okay. Dr. Resnikoff, is it
23 correct that in 10 CFR 72-1.06b, there is no mention
24 of a time frame for the application of the dose limit
25 of five rems. Is that right?

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1 DR. RESNIKOFF: That's right.

2 MS. CURRAN: And to what would you -- to
3 what time frame would you apply that dose limit?

4 DR. RESNIKOFF: Well, I would apply the
5 dose limit to the duration of the accident. And that
6 duration -- it's unclear what the duration is right
7 now. There's no scenario that's been constructed.
8 There's no contingency planning that's taken place as
9 to how one would get the appropriate equipment to the
10 site, machinery, cranes, hooks. You know, how workers
11 would be trained to handle the situation, the road
12 situation following an earthquake. There's a whole
13 list of planning that would have to take place if
14 there were an accident. And so, the actual time is
15 not clear. It hasn't been stated in the application,
16 and I did the calculation for one year but, you know,
17 what the dose rate would be per year, but the number
18 of years that the accident would take place is just
19 not clear.

20 I'll give one example of a kind of problem
21 that could occur, and that's not exactly the kind that
22 could occur at the PFS site, but at the Palisades
23 reactor, there was a Quality Assurance problem with
24 one of the casks, the dry storage casks. And there
25 was a method for actually removing the MPC from the

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1 cask, and then putting that MPC in another cask. It
2 was the cask that had the Quality Assurance problem,
3 and they wanted to replace it.

4 As far as I'm aware, that still has not
5 been done. And I -- my recollection now is it has
6 been five years since this problem was discovered, and
7 it could be longer, and still nothing has been done
8 for removing that MPC from that cask. The problem was
9 how to cool the cask in order to remove the material,
10 and they hadn't figured out quite how to do that. So
11 I'm just mentioning that, just for the purpose of
12 saying that sometimes these kinds of problems can take
13 a long time.

14 MS. CURRAN: Dr. Resnikoff, I'd like to
15 show you an excerpt from the U.S. Environmental
16 Protection Agency's, Manual of Protective Action
17 Guides and Protective Actions for Nuclear Incidents,
18 dated May, 1992, and ask the court reporter to mark it
19 for identification purposes as Exhibit 218.

20 CHAIRMAN FARRAR: State Exhibit 218. All
21 right.

22 (State Exhibit 218 marked for identification.)

23 MS. CURRAN: Dr. Resnikoff, I believe
24 there's a reference in your testimony to this manual.
25 And also, I think it has been referred to in Mr.

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1 Waters' testimony in this hearing. And I'd like to
2 ask you what kind of guidance did this document
3 provide to you in looking at the time frame for an
4 accident?

5 DR. RESNIKOFF: Well, this Protective
6 Action Guide is, I believe, provided the guidance to
7 the NRC when they developed the 5 Rem Regulation. I
8 think Mr. Waters said something similar to that
9 yesterday. If I look on page 4-4, the Protective
10 Action Guides assure that a dose in a single year is
11 less than 500 millirems, .5 rems. And the cumulative
12 dose over 50 years, including the first and second
13 year, will not exceed 5 rem. That 5 rem number is the
14 same as 106b.

15 So the EPA is thinking here in the long
16 term, 50 year period, for an accident. In an
17 accident, they're thinking all sorts of accidents.
18 They're thinking of reactor accidents, transportation
19 accidents, any accident. Some may involve a clean-up
20 of areas, but the bottom line is that a total of the
21 accident will not exceed 5 rems total over all years.

22 I should also mention that after --
23 whenever the accident ends, if that's five years or
24 twenty years, the exact end point is not clear. You
25 know, if casks are stood up and they're dented, or the

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1 doses from them are higher than before, do we then
2 move -- I'm asking this question in a question. Do we
3 then move from 106b over to 104a, and look at the dose
4 from that for a storage site? Or are we still in an
5 accident mode if we have not restored the site to its
6 pre-accident condition? That's a question that I have
7 in my mind, but I think it's either one or the other.
8 If the accident has subsided after 10 years, then
9 that's the point at which you take -- you can take
10 104a and the dose limit is 25 millirems.

11 (Phone rings.)

12 DR. RESNIKOFF: Did I win?

13 (Laughter.)

14 MS. CURRAN: Okay. I think one of the
15 factors that you had referred to earlier related to
16 the use of workers to restore the PFS site to pre-
17 accident conditions. And I'd just like to ask you in
18 general terms what are the factors -- how does the use
19 of workers affect the consideration of the time it
20 takes to restore the site?

21 MR. TURK: Objection.

22 MR. NELSON: I'm going to object to that
23 question, as well.

24 MR. TURK: I think we've had a ruling
25 already on the issue of worker doses. I think the

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1 State is looking to go back to an issue that the Board
2 has already indicated would not be part of its
3 decision, had not been raised fairly within the
4 contention.

5 CHAIRMAN FARRAR: Is that the same
6 position the Applicant would take?

7 MR. GAUKLER: It depends for what purpose
8 they're using it. Okay. I want to hear the argument
9 of the State for why -- what they're getting into and
10 why.

11 CHAIRMAN FARRAR: Yes, Ms. Curran. Where
12 are we headed with this?

13 MS. CURRAN: The purpose is simply to set
14 out for the Board the kinds of factors that need to be
15 considered in determining what is the length of the
16 accident. We don't think that you can really evaluate
17 whether 72.106b is satisfied, if you're not able to
18 apply some reasonable term for the accident. And this
19 is just one factor that would go into it. Dr.
20 Resnikoff has listed others, and we're proposing to
21 address it in very general terms, that if the dose to
22 workers is -- the occupational dose is achieved
23 quickly, then you probably need more workers, and you
24 have to have a higher labor force. That's the purpose
25 of the evidence.

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1 CHAIRMAN FARRAR: What do the Applicant
2 and Staff think about a limited examination for that
3 purpose?

4 MR. GAUKLER: I have no problem in terms
5 of the issues we were talking about yesterday. Since
6 it's not a challenge to worker dose, I would -- may
7 question in terms of how relevant or speculative it
8 is, but it's a totally different question than
9 yesterday.

10 MR. TURK: I have a different position,
11 Your Honor.

12 CHAIRMAN FARRAR: All right.

13 MR. TURK: First of all, it's not relevant
14 to the contention before you. The contention is what
15 is the design earthquake? Should it be set at a off-
16 site dose of 104a, or is 106b the proper standard, and
17 would the exemption result in an exceedance of the
18 appropriate dose standard for off-site populations, or
19 the nearest individual? That's not something that the
20 State wants to inquire about now. They want to talk
21 about, essentially, what is an emergency planning
22 issue. Emergency planning has already been the
23 subject of hearings two years ago. And not only that,
24 they're not even addressing an accident that's within
25 the design-basis. They're now talking about a very

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1 speculative situation in which you get cask tip-over,
2 and not just of one cask, but of many casks. And
3 they're trying to say that this hearing must address
4 worker doses in uprighting, or resolving a situation
5 in which many casks tip-over. I think that's way
6 beyond the scope of the contention.

7 MS. CURRAN: May I respond?

8 (Judges confer.)

9 CHAIRMAN FARRAR: We'll overrule the
10 objections and permit very limited examination in this
11 area for a very short period of time. And again, not
12 for purposes of seeing about the workers themselves,
13 but only for the purpose the State stated; namely, to
14 see what sort of accident duration we might be talking
15 about. Go ahead, but very limited.

16 MS. CURRAN: Do you remember the question,
17 Dr. Resnikoff? I don't either. Could I ask the court
18 reporter to read back the question?

19 CHAIRMAN FARRAR: Yes.

20 (Last question played back.)

21 DR. RESNIKOFF: The purpose of --

22 (Alarm sound.)

23 CHAIRMAN FARRAR: Go ahead, Dr. Resnikoff.

24 DR. RESNIKOFF: The purpose of our
25 calculation in Exhibit 143, which was a calculation of

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1 neutron doses from the side of the cask, due to heat-
2 up of the cask, heat-up of the concrete was to show
3 that the radiation field that would be present
4 following an earthquake is a consideration that would
5 have to be taken into account in planning for -- the
6 contingency planning for righting the cask and getting
7 the site back its original condition. That was the
8 purpose for doing that.

9 If the radiation exposures are high in the
10 area, then you have to use means to reduce those
11 exposures to workers. And that was already mentioned
12 by Mr. Waters yesterday, and they involve distance,
13 they involve shielding, and they involve time that a
14 worker would be near the high radiation fields. And
15 all of those factors; for instance, distance, if
16 you're going to use cranes, all of those factors would
17 increase the time that it would take to return the
18 site to normal.

19 MS. CURRAN: Did you have any correction
20 that you wanted to make to Exhibit 143 while we're on
21 it?

22 DR. RESNIKOFF: Well, it's been pointed
23 out that the surface -- that we used the surface
24 neutron dose rate rather than the dose rate one meter
25 from the surface, and therefore, the dose rate is

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1 lower. I think the number mentioned was .7, and we
2 used 1.88. And I haven't had the chance to check
3 those numbers. If that is correct, then the doses
4 would be reduced by that factor.

5 MS. CURRAN: I would like to move Exhibit
6 218 into evidence.

7 CHAIRMAN FARRAR: Any objection?

8 MR. TURK: May I inquire the purpose of
9 the offer?

10 CHAIRMAN FARRAR: Yes.

11 MS. CURRAN: The purpose is to -- Dr.
12 Resnikoff mentions this document in his testimony, and
13 it supports his view that the duration of the accident
14 is relevant under Section 72.104b, and that in fact,
15 -- I'm sorry, 72.106b, and that in fact, that in some
16 accidents at least, the EPA foresees that an accident
17 may be of relatively long duration.

18 MR. TURK: Your Honor, I think that the
19 exhibit should not be admitted. Certainly, let me
20 begin by noting that the EPA's Protective Action
21 Guides are used in NRC regulatory practice, and they
22 are referenced in our Emergency Planning Regulations.
23 The issue before you is not emergency planning, which
24 is the use to which these Protective Action Guides is
25 made in the NRC practice.

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1 The specific area that the State wishes to
2 introduce is Chapter 4. And if you look at page 4-1,
3 the very page of this discussion, you will note that
4 the discussion here relates to Protective Action
5 Guides of the intermediate phase (Deposited
6 Radioactive Materials). There is no issue in this
7 case about the deposition of radioactive materials, or
8 the release of radioactive materials. We're only
9 talking about direct radiation, so I'm not sure that
10 this chapter has any applicability in this proceeding.

11 Second, the witness has already testified
12 with respect to the issue that he wished to address,
13 which is the duration of an accident. We don't need
14 this exhibit in order to establish the proper duration
15 of the accident, so I think it's irrelevant, and I
16 think it's misleading. And I think because it
17 specifically deals with direct - I'm sorry - with
18 deposited materials, rather than direct radiation
19 specifically, that it is not applicable to our
20 consideration.

21 MR. NELSON: I would second everything
22 that Mr. Turk said. In addition, something that makes
23 it clear how problematic and confusing introducing
24 this would be, if you look at page 4-4, Section 4.2.1,
25 and this is a reference that, I can't remember if Ms.

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1 Curran or Dr. Resnikoff referenced it, but the .5 rem
2 in a single year. That's obviously not a regulation
3 that's an NRC regulation that applies to the PFS. It
4 would confuse the issue to start introducing these
5 sorts of things. Dr. Resnikoff might be citing it,
6 but to put this in as something that's applicable to
7 the PFSF, it certainly isn't, and it confuses the
8 issue.

9 MS. CURRAN: Can I respond?

10 CHAIRMAN FARRAR: Uh-huh.

11 MS. CURRAN: Well, I think one of the
12 issues here is how does one go about determining the
13 appropriate length of the accident. And the Staff
14 moved into evidence a NUREG document that had a
15 suggested rule of thumb for a confinement accident,
16 which this is not, so that this is reference to a
17 government regulatory guide by analogy. And that's
18 what we're all doing here, is trying to find
19 references, trying to see if the government has
20 established any kind of road map for developing a
21 model of what should the appropriate accident duration
22 be. So we've had this NUREG that's not quite on
23 point, and now we had this -- I'm asking the Board to
24 consider an EPA guidance document.

25 Now it's true that Chapter 4 relates to

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1 radioactivity that's been deposited, but the analogy
2 here is that it's a situation where it's not going
3 away really fast, and that's what the example is for,
4 is to say that one looks at -- one tries to figure out
5 what is the duration of the problem here, and then one
6 takes the 5 rem limit and spreads it out over that
7 duration, so it's another model. It's confirmation
8 that that is the approach that the EPA recommends, and
9 that it's not an instantaneous, or for some, you know,
10 some arbitrarily determined period of let's say 30
11 days, because that's when we'd like it to go away.
12 You have to look at what is the characteristic of this
13 particular event, and then figure it out from there,
14 so I think the EPA guidance is useful.

15 MR. NELSON: If I may be heard --

16 (Judges confer.)

17 CHAIRMAN FARRAR: We're going to overrule
18 the objections, allow the document to be admitted for
19 a very limited purpose. I think the arguments have
20 indicated it's not right on point, but there may be
21 analogies the State can draw, just like other parties.
22 WE've allowed other parties to do, so by parity of
23 reasoning we'll let this in for what it's worth, and
24 the parties can argue what they think it's worth is,
25 and how good the analogy is. Let's keep going.

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1 (State Exhibit 218 admitted in evidence.)

2 MS. CURRAN: I'm finished.

3 CHAIRMAN FARRAR: Okay.

4 MR. GAUKLER: I'd like to take about a
5 five minute break, Your Honor, if we could?

6 CHAIRMAN FARRAR: To organize yourself?

7 MR. GAUKLER: Yes. I don't think we'll
8 have -- we'll have some cross, but not really that
9 much.

10 CHAIRMAN FARRAR: All right. It's 23 of.
11 Let's be back at quarter of, eight minutes.

12 (Off the record 11:37:02 - 11:48:11 a.m.)

1 CHAIRMAN FARRAR: Go ahead, counsel.

2 MR. NELSON: Good morning, Dr. Resnikoff.

3 DR. RESNIKOFF: Good morning, counsel.

4 MR. NELSON: Let's start with your
5 discussion in your rebuttal testimony regarding the
6 possibility of a center impact of a falling cask. Do
7 you recall your testimony about that?

8 DR. RESNIKOFF: I do.

9 MR. NELSON: Yesterday we talked at great
10 length about your experience or lack thereof in cask
11 stability in dynamic analyses. Do you know that it is
12 physically possible for a storage cask to fall in the
13 manner that you've described? Have you done an

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1 analysis of that?

2 DR. RESNIKOFF: I've not done a
3 calculation, no.

4 MR. NELSON: Do you know if it's
5 physically possible, or is that just your hypothesis?

6 DR. RESNIKOFF: It was my hypothesis.

7 MR. NELSON: So you don't have any basis
8 for that, other than to you it seemed reasonable.

9 DR. RESNIKOFF: No, it was just common
10 sense. If some casks are lying on their side, it's
11 possible for other casks while the earth is going up
12 and down to fall on other casks. My only basis is
13 train wrecks that I've seen where cars have fallen on
14 top of other cars, but I have no detailed knowledge of
15 what would happen in a seismic event.

16 MR. NELSON: So if I were to tell you that
17 the -- given the dimensions of the casks, the height
18 being 20 feet and the diameter being slightly more
19 than 11 feet, that if you did a calculation, at best,
20 it would be slightly less -- slightly more than CG
21 over corner, and therefore, if you could get it to tip
22 onto another one, a cask to tip over onto another
23 cask, the distance that that would go would be so
24 minute that it probably isn't worth talking about.
25 Would you have any reason to dispute that?

1 DR. RESNIKOFF: Well, that's assuming the
2 earth is just standing still.

3 MR. NELSON: But you don't --

4 DR. RESNIKOFF: And one cask is falling on
5 another cask. That may not be the case. I'm not an
6 expert on the seismic part. Okay? And I'm not a
7 structural engineer. It just seemed to be my common
8 sense.

9 MR. NELSON: Let's move on then to a
10 discussion about your concerns about the duration of
11 the accident, and how you define that. I guess the
12 first question I would have for you is, whether or not
13 you have any basis for making any guesses about the
14 duration of an accident?

15 DR. RESNIKOFF: I don't have an estimate
16 for how long the accident could take place. I haven't
17 seen any contingency plans by the Applicant.

18 MR. NELSON: That's not my question. My
19 question is do you have a basis for making any
20 assertion about how long that the accident would last?

21 DR. RESNIKOFF: I simply don't have an
22 estimate for a time.

23 MR. NELSON: Well, yesterday Judge Lam
24 asked you at the close of the day several questions
25 about potential worst scenario. Do you remember that

1 line of questions from Judge Lam?

2 DR. RESNIKOFF: I do.

3 MR. NELSON: And let's see, there were
4 several times when Judge Lam asked you about duration
5 and access. If you would refer to page 12,507 of the
6 transcript from yesterday's proceeding, do you have a
7 copy of that?

8 DR. RESNIKOFF: I don't.

9 MR. NELSON: Okay. Let me provide you
10 with it. If you would please turn to 12,507.

11 DR. RESNIKOFF: Yes, I have that.

12 MR. NELSON: And Dr. Lam, starting at line
13 5 said, "But I would like to hear more from you as to
14 the scenarios, how they would play out. Take the
15 worst case and take the best case, how do they play
16 out? Take the worst case, would it be that within 30
17 years no access would be feasible to site?" And line
18 12 your response is, "I don't exactly know the answer
19 to this question. When is the end of the accident is
20 another issue." Do you see that?

21 DR. RESNIKOFF: I do. I see that.

22 MR. NELSON: Okay. Could you turn to page
23 12,508. Judge Lam -- I'm sorry. That's a
24 continuation of your answer to Judge Lam. And on --
25 starting at line 8 you say, "And I don't know how

1 long that takes", referring to evaluating and taking
2 corrective action at a site in event of an accident,
3 whether that goes out to 30 or 40 years, the life of
4 the facility, or 20 years, whatever that is, or
5 whether that takes two years." Did you say that
6 yesterday?

7 DR. RESNIKOFF: Yes.

8 MR. NELSON: And if you go down to 12,509,
9 when Dr. Lam asks you again about, "Whether or not
10 this is a major radiological disaster?" You said --
11 first you said, "I would say yes." Then you said, "I
12 would say you could construction some scenarios, and
13 I haven't done that, to estimate what the length of
14 time would be, how long would it would take to right
15 the casks, keeping occupational exposures within
16 bounds." Did you say that?

17 DR. RESNIKOFF: I did.

18 MR. NELSON: Have you done any estimates
19 since yesterday when Dr. Lam asked you those questions
20 that gives you any better sense that you had yesterday
21 as to how long a seismically induced accident may
22 persist at the PFS site?

23 DR. RESNIKOFF: I haven't done any
24 estimates since yesterday.

25 MR. NELSON: Now let me ask you some

1 technical questions that relate to radiological dose
2 consequences in event of a beyond design-basis
3 accident. If we were to take your calculations as
4 you've set forth in -- let's start with Exhibit 141A.
5 In Exhibit 141A, that dose that you did for a year
6 which in your second amendment to your testimony,
7 roughly came to 150 millirem. Is that correct? Per
8 year?

9 DR. RESNIKOFF: 140 millirems?

10 MR. NELSON: 150, I think.

11 DR. RESNIKOFF: Yes, 150. Yes.

12 MR. NELSON: Okay. Now when you computed
13 that dose consequence, would that 150 millirem be
14 constant over time? Let's say the casks, your 80
15 casks, as you postulate, are lying there for 30 years.
16 At year 30, there's 150 millirem coming out of the
17 bottom of those per year?

18 DR. RESNIKOFF: No.

19 MR. NELSON: In fact, it would be
20 substantially less than that. Would it not?

21 DR. RESNIKOFF: It would.

22 MR. NELSON: And in fact, it exponentially
23 decays, doesn't it? It gets less exponentially.
24 Isn't that correct?

25 DR. RESNIKOFF: It does.

1 MR. NELSON: And so, when we were giving
2 you credit yesterday for the full 150 millirem, year
3 after year, we arrived at a figure of 33.3 years
4 before 5 rem was hit. Isn't that correct? Assuming
5 150 millirem per year?

6 DR. RESNIKOFF: You did.

7 MR. NELSON: And if we take your 8 percent
8 discount, that rounds it up to about 36 years. Right?
9 Assuming that there's no decay of any spent fuel. Is
10 that correct?

11 DR. RESNIKOFF: Yes.

12 MR. NELSON: So if we were to take into
13 account decay, isn't it true that even if we went out
14 to 50 years, you'd never hit 5 rem?

15 DR. RESNIKOFF: I think one needs to do a
16 detailed --

17 DR. RESNIKOFF: I think one needs to do a
18 detailed calculation. Mine was a rough calculation.
19 I don't think one is going to prove the point by this
20 kind of argument. I think you need to really do a
21 detailed calculation using Monte Carlo methods for
22 what's coming out of the cask, taking into account all
23 the contributors, and including scattering, to
24 estimate what the dose would be at the boundary. And
25 I think the Applicant is the one who should be doing

1 it. So far, I've been the only one that's been doing
2 it.

3 MR. NELSON: I understand that, but my
4 question was, simply taking your calculation, and
5 that's what I'd like to do. I understand that you
6 might think there are better calculations to be done,
7 but simply taking your calculation which you said is
8 very rough, but doing a rough exponential decay. And
9 I think that's actually fairly easy to do. We might
10 even take a five minute break for you to calculate if
11 you would feel more comfortable, but you would never
12 hit 5 rem in 50 years, would you?

13 DR. RESNIKOFF: Using this 150 millirem
14 per year number and -- I think this would take me a
15 little more than a five minute break. It would take
16 me a short time. I'd have to look at what's in the
17 cask, the radionuclides, their half lives, which ones
18 are the gamma emitters, which ones are the neutron
19 emitters. And then do that calculation.

20 MR. NELSON: Isn't it true that most of
21 the dose from the bottom of the cask is from Cobalt
22 60?

23 DR. RESNIKOFF: Yes.

24 MR. NELSON: And do you know what the
25 half-life of Cobalt 60 is approximately?

1 DR. RESNIKOFF: Five years.

2 MR. NELSON: So if you were to just look
3 at the decrease in Cobalt 60, which would be fairly
4 simple to do, with just that decrease, you wouldn't
5 get 5 rem in 50 years. Would you?

6 DR. RESNIKOFF: From this one contributor,
7 likely not.

8 MR. NELSON: Thank you. Let's -- now that
9 you mentioned -- you keeping putting in the caveat,
10 "this one contributor." Just to refresh my
11 recollection, I think we talked a lot yesterday about
12 different contributors that you suggested. Do you
13 recall our conversation about that, flattening,
14 cracking, thinning, those things?

15 DR. RESNIKOFF: I do.

16 MR. NELSON: And when we talked about it,
17 when I asked you about each of those things, you told
18 me that once you knew how much of that occurred, you
19 could do a radiological dose consequence calculation.
20 But you did not know how to get those values, how to
21 measure thinning, how to measure cracking, how to
22 measure deformation that might take place. And that
23 wasn't what you were intending to do. Isn't that
24 correct? Isn't that what you said yesterday?

25 DR. RESNIKOFF: That -- I didn't get the

1 end of the sentence.

2 MR. NELSON: I said isn't that correct,
3 isn't that what you said yesterday, that you did not
4 do any analyses, nor were you purporting to do
5 analyses of what damage may occur to the casks. You
6 didn't know. You thought that damage could occur
7 based on the testimony of Dr. Kahn, Dr. Ostadan and
8 Dr. Bartlett.

9 DR. RESNIKOFF: But I could not, and I did
10 try to estimate what size crack could occur, so that
11 we could do such a calculation. We were not able to
12 determine that.

13 MR. NELSON: Okay. But my point --

14 DR. RESNIKOFF: But that doesn't mean that
15 just because we could not determine it, and just
16 because we could not do the calculation, does not mean
17 that the event would not occur.

18 MR. NELSON: Okay. I was just trying to
19 clarify that you didn't have any new independent basis
20 for asserting something else. Is that --

21 DR. RESNIKOFF: That's right.

22 MR. NELSON: Suppose that an accident, a
23 seismically induced accident does occur. Isn't it
24 true, as I think you've said, there are lots of
25 mitigating measures that can be taken to make sure

1 that the radiation dose at the OCA is within
2 regulatory limits?

3 DR. RESNIKOFF: Are we talking about 104a
4 or 106b now?

5 MR. NELSON: At the moment we're talking
6 about 106b, which is the regulation that would set the
7 dose limit for the accident.

8 DR. RESNIKOFF: Well, I mentioned three
9 principles of radiation safety. Is that what you
10 mean?

11 MR. NELSON: Yes. And they were distance,
12 shielding and time. Is that correct?

13 DR. RESNIKOFF: Yes.

14 MR. NELSON: And you heard -- and we've
15 talked about time already, but you heard testimony,
16 for example, on rebuttal by Mr. Donnell that it would
17 be relatively easy to build an earthen berm around the
18 PFS facility, or on one side of the PFS facility if
19 necessary to lower radiation doses. Did you not hear
20 that testimony here today?

21 DR. RESNIKOFF: I heard Mr. Donnell say
22 that. Actually, I'd like to second that proposition.
23 I think it should be built now before the facility is
24 put into effect.

25 MR. NELSON: So you don't have any reason

1 to disagree with the general principal that an earthen
2 berm or other kinds of protective measures could be
3 used to minimize radiation doses, if necessary, to
4 make sure they're within regulatory limits.

5 DR. RESNIKOFF: There are methods that can
6 be used, yes.

7 MR. NELSON: I think that's all, Your
8 Honor.

9 CHAIRMAN FARRAR: All right. Anything by
10 the Staff?

11 MR. TURK: Yes, we do, Your Honor.

12 CHAIRMAN FARRAR: Okay.

13 MR. TURK: Let me pick up on the issue of
14 Cobalt-60. In your calculation, State Exhibit 141,
15 you use doses for Cobalt and Cesium. Is that correct?

16 DR. RESNIKOFF: Yes, that's right.

17 MR. TURK: And if you look at page 8 of 8,
18 for case number -- by the way, this is Case Number One
19 that we are discussing, that involves the 150 millirem
20 dose.

21 DR. RESNIKOFF: Are you in where, Exhibit
22 141?

23 MR. TURK: Yes. My preliminary question
24 is when we're talking about the 150 millirem dose,
25 we're talking about your Case Number One, as modified

1 to include the increase that you testified to earlier
2 this week.

3 DR. RESNIKOFF: Yes.

4 MR. TURK: For Case Number One on page 8
5 of 8, you show a dose from Cesium-137 of 41.7 millirem
6 per year, assuming 8,760 hours per year. Do you see
7 that figure -- that statement on page 8 of 8?

8 DR. RESNIKOFF: I do.

9 MR. TURK: Okay. And that's before the
10 adjustment to account for the increase that you talked
11 about.

12 DR. RESNIKOFF: Yes.

13 MR. TURK: Okay. Just looking at this
14 41.7 number, however, the Cesium dose that you're
15 calculating there is approximately 10 percent of the
16 total dose. Correct? Emanating from the bottom of
17 the cask.

18 DR. RESNIKOFF: Yes, 10 percent of the
19 gamma dose. That's right. Ten percent of the total
20 gamma dose. Yes.

21 MR. TURK: And in your calculation, the
22 other 90 percent comes from Cobalt-60.

23 DR. RESNIKOFF: The other 90 percent of
24 the gamma dose. That's right.

25 MR. TURK: And that's shown on page 5 of

1 8, your Case Number One. You show 410 millirems per
2 year, assuming 8,760 hours per year.

3 DR. RESNIKOFF: That's right.

4 MR. TURK: Okay. So if you're going to do
5 a reduction in dose as a function of time, you could
6 use those numbers as you did in your calculation, and
7 simply say okay, what's the half-life of each of those
8 elements, and then do your calculation down to get the
9 resulting dose at the end of 50 years.

10 DR. RESNIKOFF: You could do that.

11 MR. TURK: What's the half-life of Cesium-
12 137?

13 DR. RESNIKOFF: Approximately 30 years,
14 maybe 31. I'm not -- approximately 30 years.

15 MR. TURK: So we could look at your
16 calculation and do our own estimate then of what the
17 reduction would be. Correct?

18 DR. RESNIKOFF: You could.

19 MR. TURK: And essentially, as I
20 understand half-life computations, if you had a dose
21 of -- from Cobalt-61 of 410 millirems initially, then
22 at the end of five years, the reduction would be down
23 to what dose rate? Approximately 200 millirem per
24 year?

25 DR. RESNIKOFF: Yes.

1 MR. TURK: And then five years after that,
2 at year ten, the dose rate would be approximately 100
3 millirems per year?

4 DR. RESNIKOFF: Yes.

5 MR. TURK: Now that's at the end of ten
6 years. At the end of 15 years, would your dose rate
7 then be down to about 50 millirem per year?

8 DR. RESNIKOFF: Yes.

9 MR. TURK: And we'd just continue that
10 process all the way to 50 years. Correct?

11 DR. RESNIKOFF: Yes.

12 MR. TURK: So there would be a very
13 substantial reduction over time if -- using your
14 calculation based on Cobalt and Cesium.

15 DR. RESNIKOFF: That's true.

16 MR. TURK: That's true. Okay.

17 DR. RESNIKOFF: That's true.

18 MR. TURK: You were talking about the
19 possibility of a cask falling down in a manner in
20 which the center of the cask, the center of the
21 longitudinal plane of the cask hits the ground and
22 suffers denting, or some other localized damage. Were
23 you talking about hitting the ground, or hitting some
24 other cask when you postulated that?

25 DR. RESNIKOFF Hitting some other cask.

1 MR. TURK Okay. And that would require
2 that the other cask be somewhere in the proximity of
3 this falling cask.

4 DR. RESNIKOFF That's right.

5 MR. TURK: And if the falling cask was to
6 impact that other cask, would it travel the same
7 distance to impact that it would travel if it was
8 traveling down, impact on the ground?

9 DR. RESNIKOFF: Oh, no.

10 MR. TURK: In fact, the distance would be
11 much less.

12 DR. RESNIKOFF: That's right.

13 MR. TURK: Because the other cask is 11
14 feet in diameter, so you would expect the cask to
15 travel down no more than the distance it would take
16 for the top of the cask to reach some height above 11
17 feet.

18 DR. RESNIKOFF: That's right.

19 MR. TURK: And the center of the cask
20 would be moving down to a lesser extent than it would
21 be if it was moving to hit the ground.

22 DR. RESNIKOFF: That's true.

23 MR. TURK: In the event, the deceleration
24 value would be much less than if it was impacting the
25 ground.

1 DR. RESNIKOFF: That's also true in the
2 case where the ground -- where everything is static.

3 MR. TURK: So you wouldn't be looking at
4 a 43 or a 45 G deceleration in that case. You'd be
5 looking at something considerably less than 43 or 45
6 Gs.

7 DR. RESNIKOFF: That's right. It still
8 could damage the cask, but that's right.

9 MR. TURK: But to a lesser extent than if
10 the cask was going to hit the ground.

11 DR. RESNIKOFF: I agree.

12 MR. TURK: You indicated that so far,
13 you're the only person who's attempted to do some
14 calculations. PFS has not done any. Correct?

15 DR. RESNIKOFF: Yes.

16 MR. TURK: Are you forgetting Mr. Waters'
17 testimony?

18 DR. RESNIKOFF: The kind of calculations
19 that I'm talking about are Monte Carlo calculations
20 from the bottom of the cask, involving neutrons and
21 gamma rays.

22 MR. TURK: You have not done that.

23 DR. RESNIKOFF: I have not done that, and
24 it should be done.

25 MR. TURK: All right. But you have not

1 done an analysis of the type that Mr. Waters performed
2 either though, have you?

3 DR. RESNIKOFF: I have not done the
4 analysis that Mr. Waters has done, no.

5 MR. TURK: Okay. I'd like to talk to you
6 about the PAG which was introduced as Utah Exhibit
7 Number 218. Are you familiar with this document?

8 DR. RESNIKOFF: I am.

9 MR. TURK: I'd like to see to what extent
10 it's applicable in this proceeding, if at all. First
11 of all, are you aware that the Nuclear Regulatory
12 Commission has established by rule that no off-site
13 emergency planning need be done for ISFSI?

14 DR. RESNIKOFF: I'm not aware of that, no.

15 MR. TURK: So when you were talking about
16 contingency planning, you were essentially assuming
17 that the Applicant has an obligation to perform some
18 sort of emergency planning function to address this
19 case in which you postulate that many casks may fall
20 during an earthquake event.

21 DR. RESNIKOFF: It wasn't clear what is a
22 design-basis accident or not. And I thought for a
23 design-basis accident the planning had to take place,
24 but you say that's incorrect?

25 MR. TURK: Well, I'm talking about

1 emergency planning, off-site emergency planning.

2 DR. RESNIKOFF: Well, then the number of
3 30 days just comes out of the air if you don't have
4 some plan as to how 30 days fits in with reality. How
5 are you going to right the site within 30 days? Where
6 does that number come from?

7 MR. TURK: My question to you, when you
8 were talking about your belief that there has to be
9 some contingency planning because an accident --
10 because many casks could fall down, and in your view,
11 the accident could take some long duration of time to
12 be rectified. There would be a dose to off-site
13 populations, and for that reason, you are saying there
14 has to be some contingency planning in order to reduce
15 the dose to the off-site population. Correct?

16 DR. RESNIKOFF: Yes.

17 MR. TURK: And in that regard, the State
18 introduced its Exhibit Number 218. Correct?

19 DR. RESNIKOFF: Yes.

20 MR. TURK: If you would take a look, first
21 of all, at the title of Chapter 4 of this exhibit,
22 which indicates that, "This chapter establishes a
23 Protection Action Guide for the intermediate phase."
24 What does that mean to you?

25 DR. RESNIKOFF: It means for a period

1 after the initial onset of the accident.

2 MR. TURK: Does it specify what that
3 period is? I'm sorry. You said, "A period after the
4 onset of the accident"?

5 DR. RESNIKOFF: Yes.

6 MR. TURK: Okay. I would ask you to look
7 at page 4-1, and let's begin, first of all, with the
8 first paragraph.

9 CHAIRMAN FARRAR: Mr. Turk, why not --
10 let's not begin with it at all. You've made an --
11 you and the Applicant have made an argument that this
12 is of very limited usefulness. And I do -- we don't
13 have time for you to go through this --

14 MR. TURK: I'll make a statement by way of
15 proffer without questions.

16 CHAIRMAN FARRAR: Okay.

17 MR. TURK: If Your Honors would look at
18 the second paragraph in this exhibit, whenever it is
19 that findings have to be submitted, you'll note that
20 contrary to DR. Resnikoff's statement, there's a
21 definition of the intermediate phase, and it states,
22 "This is arbitrarily designed as the period beginning
23 after the source and releases have been brought under
24 control."

25 CHAIRMAN FARRAR: Right. We can read

1 this.

2 MR. TURK: Okay.

3 CHAIRMAN FARRAR: You can file briefs on
4 it. You've made --

5 MR. TURK: I would simply make the proffer
6 that this document will show you that it applies after
7 control of the site has been accomplished. It applies
8 to depositions.

9 CHAIRMAN FARRAR: I don't need a proffer.
10 It's in front of me. I can read it. You all can
11 argue about it.

12 MR. TURK: Your Honor, there's one more
13 point I want to make on the record.

14 CHAIRMAN FARRAR: Go ahead.

15 MR. TURK: The document also establishes
16 that what it's talking about is protection of the
17 population from ground shine, inhalation and ingestion
18 of deposited radioactivity. That is not a situation
19 that applies here, and it's with that regard that this
20 PAG addresses the need to possibly relocate personnel.
21 It does not deal with the first phase of the accident,
22 in which the accident occurs and is brought under
23 control. Nor does it deal with direct radiation from
24 the site. It deals with contamination of the ground,
25 which could possibly be a continuing source of hazard

1 to the population. That's a different situation than
2 we're addressing in this contention.

3 CHAIRMAN FARRAR: But I --

4 MR. TURK: And those are the questions I
5 would raised with the witness, and I would get his
6 confirmation that that's correct. And I think the
7 exhibit is self-evident.

8 CHAIRMAN FARRAR: All right. We don't
9 need his -- it either says that or it doesn't, and we
10 can read it. And everyone can argue about in their
11 post-hearing filings.

12 MR. TURK: Okay. One other question, Dr.
13 Resnikoff. In your testimony before, you were talking
14 about the cask at Palisades.

15 DR. RESNIKOFF: Yes.

16 MR. TURK: Have you read any documents
17 concerning that situation?

18 DR. RESNIKOFF: Yes, I have.

19 MR. TURK: Okay. You're familiar with the
20 cask involved there was a VSC cask, or are you not?

21 DR. RESNIKOFF: I am.

22 MR. TURK: Are you familiar also with the
23 fact that the crack occurred in the longitudinal
24 direction of the cask?

25 DR. RESNIKOFF: Of the MPC, yes.

1 MR. TURK: Of the MPC. That's your
2 understanding?

3 DR. RESNIKOFF: Yes.

4 MR. TURK: Is it your understanding that
5 there was an increase in radiation exposure as a
6 result of that cracking?

7 DR. RESNIKOFF: Actually, I'm not aware of
8 that, that part of it.

9 MR. TURK: In fact, it's true that that
10 cask did not have any safety or radiological impact as
11 a result of the cracking. Isn't that correct?

12 DR. RESNIKOFF: I --

13 MR. TURK: You don't know that?

14 DR. RESNIKOFF: I don't know the answer to
15 that question.

16 MR. TURK: So if there was no radiological
17 dose increase as a result of that cracking, it would
18 not be unreasonable for the cask to simply sit for an
19 additional period of five years, or some period of
20 time, before the owner of the cask decided to move the
21 MPC into another overpack.

22 DR. RESNIKOFF: No, that was not the
23 reason why the cask was not opened. Initially --

24 MR. TURK: No, please answer the question
25 that I asked you, which was, if there was no

1 radiological dose increase as a result of the
2 cracking, there would be no need to take immediate
3 action to rectify the situation. Isn't that correct?
4 Yes or no, please. And you can explain afterwards.

5 DR. RESNIKOFF: If there's no radiological
6 emergency, it makes sense to let the cask sit for a
7 longer period of time while, as you've pointed out so
8 eloquently, the Cobalt-60 decays away, and some of the
9 other radionuclides, so it makes sense to wait some
10 time, but that's not the reason why they were waiting
11 that time, if that's the implication of your question.

12 MR. TURK: No, my reading -- my question
13 is that what it was, whatever the owner of the cask's
14 decision was, whether to wait or not wait, the point
15 is that if there was no radiation hazard because of
16 the cracking, then there's no reason why it had to be
17 -- the situation would have to be rectified promptly.
18 Correct? Yes or no?

19 DR. RESNIKOFF: Yes, but this is a strange
20 way to regulate the industry, to allow them to have
21 cracked casks sitting out on pads, and just having
22 that happen.

23 MR. TURK: That's your view.

24 DR. RESNIKOFF: That's my view.

25 MR. TURK: And, in fact, if there was no

1 radiation hazard posed by that cracking, then that
2 situation may not be applicable to our consideration
3 in this proceeding at all, where you're postulating an
4 increase in dose because of some damage to the cask.

5 DR. RESNIKOFF: It was the MPC, the inner
6 portion that was the problem, not the outer concrete.

7 MR. TURK: Could you read my --

8 DR. RESNIKOFF: The shielding, in other
9 words, remained.

10 MR. TURK: Your Honors, I'm done with my
11 examination. I'd like to make a proffer at this time.
12 We've had a lot of discussion about the thermal
13 changes in the concrete cask as a result of the -- I'm
14 sorry, in the concrete, as a result of the cask lying
15 on its side. I don't intend to file any findings with
16 respect to the document I'm about to ask to have
17 marked for identification, but I think it should at
18 least be in the file so that in case anyone ever
19 wonders what was the document that we were talking
20 about, it's there so they can see it. And for that
21 reason, I would ask to have marked for identification
22 the June 11, 2002 document submitted by Mr. Fort and
23 Mr. Michener to the NRC entitled, "Tip-Over Thermal
24 Analysis for Holtec HI-STORM Ventilated Concrete Spent
25 Fuel Storage Casks." And we have extra copies for the

1 court reporter, and if anyone else needs a copy, we
2 can distribute extra copies of this.

3 CHAIRMAN FARRAR: And that would be marked
4 as Staff exhibit what?

5 MR. TURK: Just one moment, please. May
6 we go off the record for just a moment?

7 CHAIRMAN FARRAR: Yes.

8 (Off the record 12:21:04 - 12:25:06 p.m.)

9 (Staff Exhibit 61 marked for identification.)

10 CHAIRMAN FARRAR: Staff Exhibit 61 was
11 marked for identification, but I understand, Mr. Turk,
12 you're not going to offer it.

13 MR. TURK: You're right, Your Honor. This
14 is a proffer that if we were to introduce the document
15 that we talked about, this is the document that we
16 would have introduced.

17 CHAIRMAN FARRAR: Right.

18 MR. TURK: And it would then have the same
19 status as State Exhibit for identification 217.

20 CHAIRMAN FARRAR: Right.

21 MR. TURK: Which was the sketch, the color
22 drawing --

23 CHAIRMAN FARRAR: Right.

24 MR. TURK: -- by Dr. Resnikoff.

25 CHAIRMAN FARRAR: All right. We've then

1 completed the cross examination of Dr. Resnikoff.
2 Board has no questions. Ms. Chancellor.

3 MS. CHANCELLOR: Ms. Curran.

4 CHAIRMAN FARRAR: Ms. Curran.

5 MS. CURRAN: I have a couple of follow-up
6 questions, not many.

7 REDIRECT EXAMINATION

8 MS. CURRAN: Dr. Resnikoff, in your dose
9 calculations, you looked at Cobalt-60 and Cesium-137.
10 Is that right?

11 DR. RESNIKOFF: Yes.

12 MS. CURRAN: Why did you pick those
13 particular radionuclides?

14 DR. RESNIKOFF: Because those are the
15 primary contributors to gamma dose.

16 MS. CURRAN: Are there other radiation
17 contributors that should also be taken into
18 consideration in an overall dose calculation?

19 DR. RESNIKOFF: Well, there are other
20 gamma emitters, and also the neutron producers are
21 longer lived generally, much longer lived.

22 MS. CURRAN: How much?

23 DR. RESNIKOFF: Well, thousands of years
24 long, so the total dose rate is not going to decline
25 as Cobalt-60. There are other materials around that

1 will continue to radiate. In addition, these were
2 rough calculations that we did, just to indicate that
3 this is an important consideration. And I continue to
4 emphasize that these calculations should be done, you
5 know, correctly by the Applicant using Monte Carlo
6 methods. You know, one needs to take into account the
7 production of gamma by neutrons moving out of the
8 cask. One needs to take into scattering, and
9 radiation coming from other parts of the cask, so this
10 is only one rough calculation. It should be done more
11 precisely.

12 MS. CURRAN: You were also questioned
13 about the cask at the Palisades Plant, that I believe
14 had a crack in the MPC. Is that right?

15 DR. RESNIKOFF: Yes.

16 MS. CURRAN: And I think Mr. Turk said --
17 asked you a question to the effect of if there was no
18 radiation emanating from the cask, then it should be
19 allowable to leave the cask where it is, and not try
20 to rectify the situation. Other than concern about
21 actual radiation emitting from a cask, are there other
22 reasons why one would want to rectify that situation
23 promptly, or not let it sit for a long time
24 unaddressed?

25 DR. RESNIKOFF: Well, it was definitely

1 counter to the regulations, and the Quality Assurance
2 requirements. The NRC should have required the
3 company to fix this violation, in my opinion.

4 MS. CURRAN: And to your knowledge, was
5 there some effort to rectify the situation and restore
6 the container to a cask state of normalcy?

7 DR. RESNIKOFF: The Applicant -- actually,
8 the NRC had a whole panel investigate the situation at
9 the Palisades reactor and look into the situation.
10 There was a plan for how to remove the MPC from the
11 concrete overpack, and to actually open up the MPC
12 again. There was a plan for doing that, but in going
13 into more detail, they realized that the plan had some
14 problems. And so, they never did fix the problem.

15 MS. CURRAN: To your knowledge, the
16 process of investigating the problem and coming up
17 with a solution, and seeing if it would work, how long
18 did that process take?

19 MR. NELSON: Excuse me, Your Honor. I'd
20 like to interject an objection here. I don't want to
21 slow things down, but I've let lots of questions about
22 the Palisades go. I don't see the relevance of this.
23 Even Mr. Turk's limited cross of Dr. Resnikoff on it,
24 now she's talking about the process of evaluating it,
25 and I don't know how many more questions she has about

1 it. It just seems totally irrelevant, and we could be
2 more efficient.

3 MS. CURRAN: Frankly, this was my last
4 question.

5 CHAIRMAN FARRAR: Okay. Then go ahead
6 with it. Answer it.

7 DR. RESNIKOFF: Well, the process has gone
8 on for -- I have to go check the exact time period,
9 but at least five years, and it looks like nothing is
10 going to be done. The cask is just going to sit
11 there. This cask, by the way, is a precursor of the
12 Transtor cask, the VSC-24. It's by the same company,
13 which has now moved on to several other owners.

14 MS. CURRAN: Thank you. I'm finished.

15 CHAIRMAN FARRAR: All right. Any recross
16 by the Applicant?

17 MS. CURRAN: To make amends for my
18 objection, no.

19 CHAIRMAN FARRAR: Okay. I didn't rule on
20 your objection, I just mooted it. Mr. Turk.

21 MR. TURK: We have nothing further.

22 CHAIRMAN FARRAR: All right. Then, Dr.
23 Resnikoff, again you're excused with the Board's
24 thanks for your testimony.

25 DR. RESNIKOFF: Thank you.