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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF THE SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC	)	ASLBP No. 97-732-02-ISFSI
(Independent Spent Fuel	)	April 22, 2002
Storage Installation)	)	

**STATE OF UTAH'S RESPONSE IN OPPOSITION TO THE NRC STAFF'S  
MOTION IN LIMINE TO EXCLUDE EXHIBITS AND PORTIONS OF  
PREFILED TESTIMONY OF DR. MARVIN RESNIKOFF CONCERNING  
UNIFIED CONTENTION UTAH L/QQ (GEOTECHNICAL)**

The NRC Staff's April 15, 2002 Motion in Limine moves to strike scientific publications and other Utah exhibits based on the Staff's claim that the exhibits do not have a "witness sponsor" or are duplicative. The Staff also moves to strike portions of Dr. Resnikoff's testimony. The motion has no merit and should be denied.

In filing its motion seeking to strike certain parts of the State's evidence (to which not even the Applicant has objected), the Staff appears to be an advocate for the application rather than confining to its role to determining whether the application meets the Staff's requirements. Carolina Power and Light Company (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), LBP-79-19, 10 N.R.C. 37, 107 (1979). Notably, the Staff has not moved to strike technical documents in PFS's testimony like it has with Utah's testimony - documents that under the Staff's rationale do not have a proper sponsoring witness. See e.g., PFS Exhibit QQ.

## DISCUSSION

### A. Staff's Motion to Exclude Based on Duplicative Exhibits.

In an NRC adjudicatory proceeding, “[o]nly relevant, material, and reliable evidence which is not unduly repetitious will be admitted.” 10 CFR § 2.743(c). The Staff has filed a formal motion to exclude State’s Exhibits 124 (Staff Requirements Memorandum dated November 19, 2001) and 128 (excerpts from SECY-01-0178) to Dr. Arabasz’s testimony as duplicative of Staff Exhibit U. The Staff could have informally contacted the State to determine which of the State and NRC exhibits are duplicative and arrived at an agreed-upon list of exhibits rather than filing a motion which imposes an additional workload on the State and the Licensing Board. The State submits that excluding State’s Exhibits 124 and 128 will add confusion to the record in review of Dr. Arabasz’s testimony – whether by this Board or a later appellate body. The State, of course, will do whatever the Board believes will create a clear record for review and appeal.

The State is astounded at the audacity of the Staff filing a motion to exclude State’s Exhibit 115 – excerpts from the original Luk Report<sup>1</sup> dated March 8, 2002. At the time the State filed its testimony, the March 8, 2002 Luk Report was the only version of the Luk Report the Staff had produced to the State. The Staff filed an electronic copy of the Luk and Guttman testimony<sup>2</sup> on April 1 in which Dr. Luk and Mr. Guttman testified exclusively about the cask stability Luk Report, of which Dr. Luk is the principle author. Not until

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<sup>1</sup> *Seismic Analysis Report on HI-STORM 100 Casks at Private Fuel Storage (PFS) Facility*, (March 8, 2002), Luk, Vincent K., et al, Sandia National Laboratory

<sup>2</sup> NRC Staff Testimony of Vincent K. Luk and Jack Guttman Concerning Unified Contention Utah L/ QQ (Geotechnical Issues) (April 1, 2002).

April 2 did the Staff electronically file revision 1 of the Luk Report – a report that is dated Sunday, March 31, 2002. The State on April 15, 2002, moved to strike Dr. Luk’s testimony and the Luk Report as coming too late on the grounds that the summary report does not provide sufficient technical detail to test the accuracy of the report or the testimony; the State will essentially have to depose<sup>3</sup> Dr. Luk during the proceeding in its cross examination of the witness; and the State will be hampered in formulating trial strategy and proffering its best evidence. Based on this set of circumstances, State sees no reason for the Board to grant the Staff’s request.

B. Staff’s Motion to Exclude Exhibits Based on Lack of a Proper Sponsoring Witness

The Staff requests the Board to exclude State’s Exhibits<sup>4</sup> 100, 102, 104 and 125 because “[n]one of the persons who prepared these document have been proffered as witnesses by the State, and none are available for cross-examination in this proceeding.” Motion at 3-4. Again, the Staff has filed a motion which unnecessarily burdens the State in having to file a response to motion that is completely without foundation.

State’s Exhibits 100, 102 and 104 are unbiased scholarly scientific articles that are referred to in the State’s expert witnesses’ testimony to support their opinions. In a scant one paragraph the Staff offers no substantive discussion about the nature of the documents contained in State’s Exhibits 100, 102, and 104 or how the documents were used in the

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<sup>3</sup> Counsel for the State and the Staff failed in negotiating a mutually agreeable date and location to take Dr. Luk’s deposition prior to the start of the seismic hearings.

<sup>4</sup> The Staff incorrectly refers to “Utah Exhibit” – the State’s testimony clearly identifies them as “State’s Exhibit” and they are so referred to in this response.

witnesses' testimony. Other than a reference to McGuire<sup>5</sup>, 15 NRC at 477-78, the Staff cites no authority for the proposition that a party must present a witness sponsor of scholarly articles. McGuire offers no support for the Staff's position. The Appeals Board in McGuire, finding that the witness was not qualified to offer opinion evidence, excluded 19 documents on the ground that the documents were offered in support of testimony that had not been received into evidence.<sup>6</sup> Id., 15 NRC at 475-76. Unlike the independent technical documents in the State's exhibits, the documents at issue in McGuire were primarily documents authored by or for the NRC. Id. 15 NRC at Appendix B.

A cursory glance at the State's testimony will clearly establish that the exhibits in question are admissible.<sup>7</sup> *See e.g.*, Illinois Power Co. (Clinton Power Station, Unit Nos. 1 and 2), ALAB-340, 4 NRC 27, 31 and n. 2 (1976) (an expert may rely on scientific treatises and articles despite the fact they are, by their very nature hearsay); Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 718 (1985), review declined, CLI-86-5, 23 NRC 125 (1986) (an expert witness may testify about analyses

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<sup>5</sup> Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453 (1982).

<sup>6</sup> The Staff has not challenged the qualifications of any of the State's expert witnesses who proffer the exhibits in their testimony.

<sup>7</sup> The Staff does not even cite where in the testimony the exhibits are referenced. *See* State of Utah Testimony of Dr. Steven F. Bartlett on Unified Contention Utah L/ QQ (Soils Characterization) (April 1, 2002), at 9 for Exhibit 100 (shear strength of a given soil type is directly related to the CPT penetration resistance); Tstmy at 10-11 for Exhibit 102 (cyclic laboratory testing) and Tstmy at 11 for Exhibit 104 (previous studies of Lake Bonneville sediments). *See* State of Utah Testimony of Dr. Walter J. Arabasz Regarding Unified Contention Utah L/ QQ (Seismic Exemption) (April 1, 2002), at 7-8 for Exhibit 125 (development of Reg. Guide 1.165).

performed by other experts).

The Staff complains that State's Exhibit 125 should be excluded because it was authored by certain NRC employees and should not be construed to reflect the official position of NRC. Motion at 4. As is evident from Dr. Arabasz's testimony, reference to Exhibit 125 is to dispel the notion that it is the State's rationale that forms Basis 3 of Unified Contention Utah L/QQ, Section E.<sup>8</sup> The Staff may not wish to be embarrassed by one of their initial reasons for favoring a grant of an exemption to PFS, but Exhibit 125 is relevant in the development of this contention and should not be excluded.

Finally, the Diablo Canyon NRC application excerpt dated December 21, 2001, State's Exhibit 133, is certainly reliable – like PFS, when the Diablo Canyon applicant submits information to NRC, it “must be complete and accurate in all material respects.” 10 CFR § 72.11. Exhibit 133 is relevant and material because it supports the testimony of Dr. Bartlett that any reference to the Diablo Canyon site when Kennedy and Short published the fragility curves in 1994 could not have related to dry cask storage at Diablo Canyon. State of Utah Testimony of Dr. Steven Bartlett and Dr. Farhang Ostadan on Unified Contention Utah L/QQ, Part E (Lack of Design Conservatism) (April 1, 2002) at 13. The Staff's motion has no merit and should be denied.

C. Motion to Strike Portions of Dr. Resnikoff's Testimony

The Staff challenges Dr. Resnikoff's qualifications to address “a number of

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<sup>8</sup> Basis 3 relates to the Staff's flawed reasoning that “a design ground motion (for an SSE) at the PFS site which had a median reference probability of exceedance of  $10^{-5}$  as defined in Regulatory Guide 1.165 would be the same as a design ground motion with a mean annual probability of exceedance of  $10^{-4}$ .” Arabasz Tstmy at 7.

engineering and/or design issues....” Motion at 6. The Staff portrays Dr. Resnikoff as “trained in physics (with an emphasis in particle physics), and that his work has involved the calculation of radioactive doses.” Motion at 5. This is a gross understatement of Dr. Resnikoff’s qualifications. Dr. Resnikoff has a PhD in Physics from the University of Michigan, he has 27 years’ experience in examining potential accidents involving nuclear containers, including dry spent fuel casks, and he has course work in graduate mechanics, including statics, at the University of Michigan. See Resnikoff Deposition (October 29, 2001) Tr. at 38-47, attached hereto. Dr. Resnikoff’s knowledge, training, and experience qualify him to render the testimony that is challenged by the Staff. Moreover, a lack of specialization by an expert witness does not disqualify him, but goes to the weight of the expert’s testimony rather than admissibility. Burkhart v. Washington Metropolitan Transit Authority, 112 F. 3d 1207, 1212 (D.C. Cir. 1997).

Furthermore, part of the challenged testimony relates to Dr. Resnikoff’s opinion about whether PFS has substantiated its claims, such as whether the “MPC has a very substantial margin built into it” (Tstmy<sup>9</sup> A.16 at 8) or whether PFS has “correctly quantified the amount of concrete flattening” (Tstmy A.17 at 8), and also to Dr Resnikoff’s observations of the relative displacement of the cask lid compared to the cask walls and the need to model cask welds (Tstmy at A21 at 10). Motion at 6-9. Dr. Resnikoff’s graduate course work in mechanics and statics as well the wealth of experience he has gained in the 27 years he has studied nuclear containers and potential accidents qualify him to offer this

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<sup>9</sup> State of Utah Testimony of Dr. Marvin Resnikoff on Unified Contention Utah L/ QQ (Seismic Exemption - Dose Exposure) (April 1, 2002).

testimony.

The Staff complains Dr. Resnikoff is not qualified to raise the claim that “PFS’s starting premise of zero initial angular velocity” and that “the initial angular velocity will be greater than zero.” Staff Motion at 7 (*emphasis added*). First, the Staff misquotes Dr. Resnikoff’s testimony; he testified that the initial angular velocity may be greater than zero. Resnikoff Tstmy at 8. Next, Dr. Resnikoff’s testimony evaluates the implications of an initial angular velocity greater than zero. Certainly, Dr. Resnikoff is qualified by 27 years’ experience in the field as well as his graduate level course work and his PhD in physics<sup>10</sup> to offer such opinions. In addition, Dr. Resnikoff has an extensive background in performing mathematical calculations and in this case he has used Holtec’s formula to calculate the drop tipover impact. It should be noted that PFS’s witnesses Singh and Soler give only conclusory statements in their testimony on how they conducted the non-mechanistic tipover analysis. Singh & Soler Tstmy<sup>11</sup> at A.35 and A. 46. Dr. Resnikoff is qualified to offer the testimony at issue. There is ample reason not to the grant the Staff’s motion, however, even if the Board should find that Dr. Resnikoff does not have the expertise to make the statements. The State has proffered testimony of Dr. Khan and Dr. Ostadan (Cask Stability)<sup>12</sup> and will be cross examining PFS and Staff witnesses on their cask stability

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<sup>10</sup> A basis law of physics is that a body in motion (e.g, a cask) will not have zero velocity; thus, the initial angular velocity of a cask undergoing seismic motion may be greater than zero.

<sup>11</sup> Testimony of Krishna P. Singh and Alan I. Soler on Unified Contention Utah L/ QQ.

<sup>12</sup> State of Utah Testimony of Dr. Mohsin R. Khan and Dr. Farhang Ostadan on Unified Contention Utah L/ QQ (Cask Stability) (April 1, 2002).

testimony. Therefore, it is fitting to allow the State to connect up the evidence of the potential for an initial angular velocity to be greater than zero through those witnesses.

Contrary to the Staff's Motion, Dr. Resnikoff's testimony in Answer 20 relating to what would happen if the casks tipped over is relevant, material and reliable. Motion at 9. It is offered to counter the anticipated testimony by PFS's witnesses from the cask manufacturer Holtec International based on ¶ 27 of the Joint Declaration of Krishna P. Singh, Alan I. Soler and Everett L. Redmond II in support of PFS's Motion of Summary Disposition of Utah L, Part B, dated November 9, 2001, wherein Dr. Redmond discusses the dose rate from a tipped over cask. The declaration is essentially the same as Dr. Redmond's testimony A23. Singh, Soler & Redmond Tstmy at 8-10. With respect to the Staff's challenge to the first sentence of Answer 24, the State voluntarily withdraws the first sentence – it is unnecessary to the point that Dr. Resnikoff makes in his response. See Motion at 9-10.

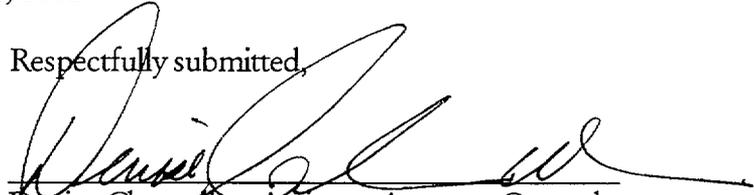
Finally, the Staff challenges the relevance of Dr. Resnikoff's testimony of the burnup rate of the fuel at the TMI-2 ISFSI at INEEL. Motion at 10. Of course this testimony is relevant. The Staff relies, in part, on a grant of an exemption to INEEL for its decision on PFS's seismic exemption request. See e.g., Final Safety Evaluation Report at 2-42 (September 29, 2000); Consolidated SER (March 2002) at 2-51. The fact that the fuel destined for the PFS facility is at least 15 times more radioactive than the INEEL fuel is certainly relevant to whether the Staff can rely on the INEEL exemption as "precedent" for the PFS exemption.

CONCLUSION

The State voluntarily withdraws the first sentence of Answer 24 of the Resnikoff testimony. In all other respects, the Staff's motion has no merit and should be denied.

DATED this 22<sup>nd</sup> day of April, 2002.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Denise Chancellor", written over a horizontal line.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S RESPONSE IN OPPOSITION TO THE NRC STAFF'S MOTION IN LIMINE TO EXCLUDE EXHIBITS AND PORTIONS OF PREFILED TESTIMONY OF DR. MARVIN RESNIKOFF CONCERNING UNIFIED CONTENTION UTAH L/QQ (GEOTECHNICAL) was served on the persons listed below by electronic mail (unless otherwise noted) with conforming copies by United States mail first class, this 22<sup>nd</sup> day of April, 2002:

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A handwritten signature in black ink, appearing to read "Denise Chancellor", written over a horizontal line.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of :  
 : Docket No. 72-22  
PRIVATE FUEL STORAGE L.L.C. : ASLBP No.  
 : 97-732-02-ISFSI  
(Private Fuel Storage Facility) :  
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Washington, D.C.

Monday, October 29, 2001

Deposition of

MARVIN RESNIKOFF

a witness, called for examination by counsel  
for Applicant pursuant to notice and  
agreement of counsel, beginning at  
approximately 10:40 a.m. at the law offices  
of Shaw Pittman, 2300 N Street, N.W.,  
Washington, D.C. 20037, before Marilyn  
Feldman of Beta Reporting & Videography  
Services, notary public in and for the  
District of Columbia, when were present on  
behalf of the respective parties:



1 MS. CURRAN: It makes sense to  
2 give Marvin a little time.

3 BY MR. GAUKLER:

4 Q Want to look at that over lunch  
5 and get back to me on that?

6 A Okay.

7 Q When you talk about cask response,  
8 what do you mean by "cask response"?

9 A The issues that we worked on  
10 involve transportation casks, and the other  
11 issues that we worked on that pertain to  
12 this subject involve some of the issues in  
13 this proceeding, and also some other  
14 proceedings that we worked on involving  
15 heatup of casks.

16 Q What other proceedings are you  
17 referring to?

18 A I have to refer to Exhibit 4.  
19 Point Beach, Prairie Island, and Palisade  
20 reactors are some of the other proceedings  
21 we have worked on. Some involved hearings  
22 before state commissions. The Palisades

1 reactor involved a federal court proceeding.

2 Q What work did you do with respect  
3 to Point Beach?

4 A This is to the best of my  
5 recollection, okay?

6 Q Okay.

7 A It was the issue of alternatives.  
8 These were hearings before -- Point Beach  
9 and Prairie Island were hearings before  
10 various state commissions. One, I believe  
11 was the Public Utility Commission in the  
12 State of Wisconsin, Point Beach reactor, and  
13 it involved the cost of one reactor versus  
14 another reactor -- excuse me, the cost of  
15 one storage cask versus the cost of another.

16 These hearings took place sometime  
17 ago so I don't really recall well the exact,  
18 you know, the exact discussions that took  
19 place. It might have involved sabotage.

20 Q Which one might have?

21 A The Point Beach reactor might  
22 have. I think there was a discussion of

1 that.

2 Q What did Prairie Island involve,  
3 as far as you recall?

4 A I don't really remember. We were  
5 working on behalf of the Sioux tribe. I do  
6 remember that.

7 Q What did Palisades involve?

8 A That involved the issue of whether  
9 an environmental impact statement should be  
10 prepared for the Nuclear Regulatory  
11 Commission.

12 Q What technical issues were  
13 involved in that context?

14 A Sorry?

15 Q What technical or regulatory  
16 issues were involved in that context?

17 A The potential environmental impact  
18 is my best recollection of what we worked on  
19 there.

20 Q Do you recall what you identified  
21 as potential environmental impacts there?

22 A I have to say I don't.

1           Q     I take it from your previous  
2 responses, the work that you have done that  
3 you believe is most relevant to the issues  
4 you are going to be covering with respect to  
5 Utah L, Part B, is work involving the  
6 response of casks, as you have mentioned  
7 that?

8           A     Dose consequences, yes,  
9 radiological consequences.

10          Q     When you say response of casks,  
11 are you referring to it in any other way  
12 than meaning radiological dose consequences?

13          A     Just to make it perfectly clear,  
14 we first estimated whether cracking could  
15 occur, for one issue. If cracking did not  
16 occur, and therefore -- that was our issue,  
17 whether cracking occurred or not, and then  
18 if cracking occurred, then our next step was  
19 to determine the size of the crack and what  
20 the radiation exposure would be at the  
21 boundary.

22                   Those last two steps, we haven't

1 yet done and we are not going to do all of  
2 that part of it. The actual size of the  
3 crack, there will be other consultants that  
4 are going to be looking into that.

5 Then the other issue is heatup,  
6 potential heatup of the cask in a horizontal  
7 position and the potential degradation of  
8 concrete, which also involves the issue that  
9 we are working on, radiological  
10 consequences. As I said, we are just  
11 looking into that now.

12 Q What background or work have you  
13 done that's relevant to evaluating the  
14 cracking of concrete?

15 A This is a straight physics  
16 engineering issue. We are looking into  
17 stresses on the steel shell and on the  
18 concrete due to an earthquake.

19 We have essentially in this case  
20 taken the calculations that have previously  
21 been done by PFS and Holtec and are updating  
22 them to put in the new numbers. So this is

1 not different than other issues that I have  
2 taken courses on at college, like statics.

3 Q Since college, what work have you  
4 done involving cracking or potential  
5 cracking of concrete?

6 A This is the first time we have  
7 worked on the potential cracking of  
8 concrete. Excuse me, maybe I should say the  
9 second time.

10 We looked also into -- for the  
11 aircraft contention K, we looked into the  
12 issue of an MK84, inert bomb or -- not an  
13 inert bomb -- canister striking the  
14 concrete, and we looked into that issue of  
15 whether the MK84 would penetrate the  
16 concrete. So we previously looked into that  
17 issue.

18 Q That was also in the context of --

19 A Those are the two times. Right  
20 now, looking into cracking, and this  
21 previous analysis that we did.

22 Q The previous analysis was also

1 part of this PFS licensing proceeding,  
2 correct?

3 A Yes, that's right.

4 Q What work have you done previously  
5 with respect to thermal degradation of  
6 concrete from heat?

7 A Previous to this PFS proceeding,  
8 or looking at Utah H, heating up of  
9 concrete?

10 Q Let's go first to the PFS  
11 proceeding.

12 A Coursework on thermodynamics in  
13 college, computer work, understanding  
14 computer programs that were used -- Fluent.  
15 That's the previous work.

16 Q So there would be nothing since  
17 college up to the PFS proceeding; is that  
18 correct the way I interpret your answer?

19 A No.

20 Q In what way am I interpreting  
21 incorrectly?

22 A No. I have worked on heatup of

1 casks for a long time, heatup of  
2 transportation casks. So I have looked into  
3 heatup of casks.

4 Q What about transportation casks,  
5 they don't involve concrete, do they?

6 A No, they don't involve concrete.

7 MS. CURRAN: Paul, it's been about  
8 two hours --

9 MR. GAUKLER: Hour and 15 minutes.

10 MS. CURRAN: Can we take a break  
11 sometime soon?

12 MR. GAUKLER: Sure. Why don't we  
13 take a break and have another short session  
14 before lunch. That sounds reasonable to me.

15 (Recess)

16 BY MR. GAUKLER:

17 Q Have you ever done an original  
18 calculation of the strength of steel or  
19 concrete when subjected to stresses,  
20 external stresses?

21 A Original calculation? So far, our  
22 calculations have been to use the procedures

1 that were in the PFS SAR and update the  
2 numbers, so our work is in Exhibit 2.

3 Q I take it from your answer that  
4 you have never done in the past any original  
5 calculations or design calculations that  
6 concern the strength of steel and concrete  
7 when subjected to external stresses?

8 A No, I wouldn't say that. We have  
9 looked into the issue of the penetration of  
10 steel and concrete, and as I mentioned to  
11 you before, I did that as far back as 1975,  
12 looking into the consequences of an air  
13 crash with a plutonium container as part of  
14 a lawsuit for the State of New York attorney  
15 general. So we have looked into that issue.

16 Q Have you ever done any design  
17 calculations involving the strength of steel  
18 and concrete as part of the design of a  
19 structure or component?

20 A No.

21 Q Have you ever done any evaluation  
22 of the thermal degradation of concrete as

1 part of the original design of a structure  
2 or component?

3 A Design work, no.

4 Q Have you ever done any calculation  
5 of the thermal degradation of concrete other  
6 than what you have done in this case here?

7 A Other than what we have done in  
8 this proceeding?

9 Q Yes.

10 A No.

11 Q Looking at Exhibit 6, this is your  
12 list of court proceedings. What area of  
13 expertise were you qualified for in these  
14 proceedings generally?

15 A For these court cases, generally,  
16 they have involved dose calculations.

17 Q Have you ever been qualified as an  
18 expert in any other area other than what you  
19 have described as dose calculations?

20 A What do you mean?

21 Q Have you ever been certified to  
22 testify and have you testified in an area