

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

2002 JAN -8 AM 10: 39

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	)	
Storage Installation)	)	November 8, 2001

STATE OF UTAH'S AMENDED MOTION TO COMPEL NRC STAFF TO  
RESPOND TO STATE'S TWELFTH SET OF DISCOVERY REQUESTS  
AND TO COMPEL DR. C. ALLIN CORNELL TO ANSWER  
CERTAIN DEPOSITION QUESTIONS (Contention L, Part B)

Pursuant to 10 CFR §§ 2.740a, 2.743, 2.744, and 2.790, and the Board's Order of November 2, 2001, the State hereby requests the Board to compel 1) the NRC Staff to answer certain discovery requests propounded in State of Utah's Twelfth Set of Discovery Requests Directed to the NRC Staff (September 18, 2001) relating to Utah L, Part B (seismic exemption), and 2) Applicant's witness, Dr. C. Allin Cornell to answer deposition questions relative to his involvement as a consultant to an NRC contractor relating to probabilistic seismic hazard assessments for ISFSIs.<sup>1</sup>

<sup>1</sup> On October 10, 2001, the State of Utah filed a Motion to Compel NRC Staff to Respond to the State's Twelfth Set of Discovery Requests. On October 22, 2001, NRC Staff filed a Motion for Protective Order and Response to the State's Motion to Compel. On October 31 and November 1, 2001, the State took the deposition of Dr. C. Allin Cornell, who has been retained by PFS as an expert witness on the issues raised by the State's Contention Utah L, Part B. In the course of the deposition, the State asked Dr. Cornell certain questions relating to his work as a consultant to a NRC contractor in connection with developing technical support to allow probabilistic seismic hazard analyses for ISFSIs or the Modified Rulemaking Plan, SECY 01-0178. The NRC Staff attorney objected to the questions and directed Dr. Cornell not to answer them on the ground that the information sought was predecisional and therefore privileged, or not relevant. On November 1, 2001, the Licensing Board Chairman conducted a telephone conference with counsel for the State, the NRC Staff, and PFS with respect to the NRC Staff objections. The Board Chairman indicated that the Board "preferred to consider any discovery disputes regarding Dr. Cornell's rulemaking plan involvement in the context of ruling on" the State's pending Motion to Compel, and therefore "would accord the State an opportunity to supplement or amend its pending motion to compel to address the deposition questions it

I. MOTION TO COMPEL NRC STAFF RESPONSE TO THE STATE'S TWELFTH SET OF DISCOVERY REQUESTS

The State herein incorporates by reference its entire Motion to Compel NRC Staff to Respond to State's Twelfth Set of Discovery Requests, dated October 10, 2001.

II. MOTION FOR ORDER DIRECTING DR. CORNELL TO ANSWER CERTAIN QUESTIONS ABOUT THE REASON AND BASIS FOR HIS EXPERT OPINION ON THE APPROPRIATENESS OF PFS'S EXEMPTION REQUEST

BACKGROUND

The issue presented by this part of the State's motion is whether a testifying expert for a license applicant shall be required to disclose in deposition information given him by the NRC Staff, NRC contractors, or consultants to NRC Staff or NRC contractors (hereinafter collectively referred to as "NRC Staff") that he considered in formulating his expert opinion, when the Staff claims the information is not relevant or is pre-decisional and, therefore, privileged from disclosure under the deliberative process privilege. See 10 CFR 2.790(a)(5). To put the issue in proper perspective, some background discussion is necessary.

PFS has retained Dr. Cornell as a testifying expert witness on Utah L, Part B.<sup>2</sup> In

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wished to pose to Dr. Cornell." Board Order (November 2, 2001). In accordance with the Board's Order, the State is hereby submitting its amended Motion to Compel.

<sup>2</sup>PFS officially named Dr. Cornell as an expert witness for Utah L on December 10, 1999 and stated that Dr. Cornell would testify with respect to the "appropriateness of the probabilistic methods used by PFS to develop its seismic analysis." See Applicant's Third Supplemental Response to the State's First Request for Discovery (December 10, 1999) at 5-6. Subsequently, PFS also named Dr. Cornell as an expert witness for Utah L, Part B and stated that Dr. Cornell would testify with respect to "[a]ppropriate standards for the performance of Probabilistic Seismic Hazards Analysis for the PFSF," including the adequacy of a 2,000 year return period. See Applicant's Eighth Supplemental Response to the State's First Request for Discovery (October 2, 2001) at 2.

that contention, the State opposes the request that PFS has made for an exemption from the NRC regulation, 10 CFR 72.102(f). That regulation requires PFS to use a deterministic seismic hazard analysis to determine the design requirements for its proposed storage facility. Under a deterministic analysis, PFS would be required to calculate the maximum credible earthquake that could ever occur at its proposed Skull Valley site and then design its facility accordingly. Rather than use deterministic seismic hazard analysis, PFS is seeking permission to use probabilistic seismic hazard analysis (“PSHA”). Under a probabilistic analysis, PFS would be required to calculate the maximum credible earthquake that is likely to occur in a given time period—*i.e.*, the return period—at its proposed Skull Valley site and then design its facility accordingly.

In its initial exemption request in April 1999, PFS sought permission to use a PSHA based on a 1,000 year return period. “In August, 1999, in response to the [NRC] staff’s suggestion, PFS amended its request to use a 2000-year return period.” CLI-01-12, 53 NRC \_\_\_, slip op. at 4 (2001). The Commission, when ruling on the admissibility of Utah L, Part B, found that the NRC “staff, not the licensee, actually provided most of the justification for the use of the 2000-year return period to which Utah objects,” and that “PFS essentially adopted the staff’s reasoning when it agreed to use the 2000-year return period the staff recommended.” *Id.*, slip op. at 17. Additionally, PFS “incorporates by reference and adopts the bases asserted by the NRC Staff in granting Applicant’s requested exemption allowing the use of a probabilistic seismic hazard analysis (‘PSHA’) based on a 2,000 year return period earthquake in the seismic design of the PFSF.” *See* Applicant’s Objections and Responses to the State of Utah’s Eleventh Set of Discovery Requests Directed to the

Applicant (October 2, 2001) at 14.

On September 26, 2001, NRC Staff requested the Commission to approve, “by negative consent,” a Modified Rulemaking Plan, SECY 01-0178. September 26, 2001 Memorandum from Executive Director of Operations to the Commissioners re: Modified Rulemaking Plan: 10 CFR Part 72, at 1. The Modified Rulemaking Plan amends an already approved Rulemaking Plan, SECY-98-126, that proposes to amend the current siting and design criteria for Independent Spent Fuel Storage Installations (“ISFSIs”). The Modified Rulemaking Plan adds an option to the previous plan that would allow ISFSI license applicants like PFS to use a PSHA with a 2000-year return period. In other words, the Modified Rulemaking Plan adds an option that, if adopted in rulemaking, would codify the exemption that PFS is currently seeking and to which the State objected in Utah L, Part B.

On October 31, 2001 and November 1, 2001, the State took the deposition of Dr. Cornell in preparation for the hearing on Utah L, Part B. In the course of that deposition, the State confirmed that Dr. Cornell had served “on a committee to a contractor that was charged with providing a technical basis for the” Modified Rulemaking Plan<sup>3</sup> or the use of probabilistic seismic hazard analysis (hereinafter collectively referred to as “the Modified Rulemaking Plan”). Cornell Tr. at 11 (Dr. Cornell’s Deposition Transcript is attached hereto as Exhibit 1). In the course of that assignment, Dr. Cornell participated in “perhaps two conference calls followed by one meeting of one day,” received “additional technical

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<sup>3</sup>It should be noted that the State believes the referenced two conference calls and one meeting apparently occurred between February 1999 and March 2000, during which part of this time Dr. Cornell was officially named as an expert witness for PFS. See description of privilege log attached to letter from Sherwin Turk to Denise Chancellor (October 5, 2001), attached hereto as Exhibit 2.

information about ISFSIs,” from the NRC Staff which he considered in formulating his “opinion on the appropriateness of a 2,000-year return period for the PFS facility,” and presumably participated in substantive discussions with the Staff and others on the appropriateness of a 2000-year return period in a PSHA for ISFSIs. Id. at 13, 32-33. When the State’s counsel, Ms. Nakahara, asked questions about Dr. Cornell’s participation on the committee as it related to the formulation of his expert opinion, counsel for the NRC Staff, Mr. Turk, objected and the following exchange took place:

MR. TURK: I’m going to object, Connie. You know we’ve produced some information to you in response to discovery. We’ve indicated, in fact, we produced to you the SECY paper 01-178 [the Modified Rulemaking Plan], but we’ve asserted privilege for pre-decisional materials leading up to the publication of that paper. I don’t have any problem with you asking for Dr. Cornell’s role in the process in terms of background, but in terms of anything that might go into the substance of the document, I’m going to object.

MS. NAKAHARA: Dr. Cornell can’t claim any pre-decisional privilege.

MR. TURK: No, I can, and I am.

MS. NAKAHARA: Then I am going to ask you to answer the question.

MR. TURK: Then I’ll object and would direct the witness not to answer. To the extent that he served as a consultant to an NRC contract, that the privilege that the staff asserts embraces him as well.

MS. NAKAHARA: It goes to what influences Dr. Cornell’s opinion, what influenced the rulemaking plan, and we have a right to explore that.

MR. TURK: I don’t have any problem if you want to ask him for his opinions of the rulemaking plan; but in terms of the pre-decisional give and take and back and forth that went into the development of that, I would assert the privilege. But I have no problem if you want to ask him for his opinion on what’s stated in the ruling.

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Q. [MS. NAKAHARA] So what did you discuss at the meeting [with NRC Staff on the Modified Rulemaking Plan]?

MR. TURK: I’m going to object and assert the privilege.

Cornell Tr. at 11-12, 14.

The dispute over the scope of Dr. Cornell's examination was then presented by telephone to Chairman Bollwerk, who subsequently issued a Memorandum and Order according "the State an opportunity to supplement or amend its pending motion to compel to address the deposition questions it wished to pose to Dr. Cornell." Order at 1.

### ARGUMENT

#### 1. Purely Factual Material Is Not Privileged and Must Be Disclosed.

At his deposition, Dr. Cornell testified that he received "technical information about ISFSIs" from the NRC Staff in the course of his consulting work on the Modified Rulemaking Plan, and that he considered such information in formulating his "opinion on the appropriateness of a 2000-year return period for the PFS facility." Cornell Tr. at 32-33. Additionally, Dr. Cornell agreed with Mr. Turk that some of the information disseminated is the "kind of information that is publicly available" or that is merely factual. *Id.* at 70. It is well established that purely factual information--like the technical information received by Dr. Cornell--that does not reveal the deliberative process is not shielded by the deliberative process privilege asserted by the NRC Staff and must be disclosed. Georgia Power Company (Vogtle Electric Generating Plant, Units 1 and 2), CLI-94-5, 39 N.R.C. 190, 198 (1994). The Board should therefore order Dr. Cornell to disclose the technical information about ISFSIs he received from the NRC Staff in the course of his consulting work.

#### 2. Even Information that Would Otherwise Be Shielded by the Deliberative Process Privilege Must Be Disclosed if it Is Necessary to a Proper Decision in the Proceeding.

First, claims of privilege must be specifically asserted with respect to a particular

document. See Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), LBP-82-82, 16 NRC 1144, 1153 (citing United States v. El Paso Co., 682 F.2d 530, reh'q denied, 688 F.2d 840 (5<sup>th</sup> Cir. 1982), *cert. denied*, 466 U.S. 944 (1984)). Similarly, the Staff cannot claim a blanket privilege to all discussions and documents that occurred with respect to Dr. Cornell's involvement with respect to the Modified Rulemaking Plan issue. The Staff has not asserted specific claims. See Cornell Tr. at 11-13, 32.

Next, the deliberative process privilege asserted by the NRC Staff "is a qualified, not absolute, privilege" that can be overcome by a sufficient showing of need by the party seeking the otherwise privileged information. Vogtle, 39 NRC at 198. Under the NRC's discovery rules, information that would otherwise be exempt from disclosure "must still be released if it is 'necessary to a proper decision in the proceeding' and 'not reasonably obtainable from another source.'" Id. at 197.

The additional information that the State is seeking from Dr. Cornell, other than the purely factual information discussed above, is the substantive information he received in the course of his consulting work for NRC on the Modified Rulemaking Plan that he considered in forming his opinion on the appropriateness of PFS's request for an exemption. Such information, if it exists, is indisputably relevant to Utah L, Part B, which is a challenge to that exemption request.<sup>4</sup> When the State's counsel inquired about the substance of the discussions at the meeting Dr. Cornell attended on the Modified Rulemaking Plan, the NRC Staff's counsel stated: "I'm going to object and assert the privilege." Cornell Tr. at 14. It

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<sup>4</sup>It should be noted that Dr. Cornell himself believes the Modified Rulemaking Plan is relevant to Utah L, Part B. See Cornell Tr. at 32-34.

would be patently unfair for the Board to sustain the Staff's objection and thereby deny the State access to information on which Dr. Cornell's opinion is based.<sup>5</sup> Dr. Cornell himself, admitted that his participation in the Modified Rulemaking Plan committee influenced his opinion.<sup>6</sup> *See* Cornell Tr. at 32-33, 75-76. Under the Federal Rules of Civil Procedure, which are an appropriate guideline for the Board to follow, a litigant has the unquestioned right to discover the "basis and reasons" supporting any expert opinion which another party intends to introduce as evidence. Indeed, under the Federal Rules, the other party has an affirmative duty to disclose, in writing, "a complete statement of all opinions to be expressed and the basis and reasons therefor," including, "the data or other information considered by the witness in forming the opinions." Fed. R. Civ. P. 26(a)(2)(B). Such "data or other information" is all that the State is seeking here. Its need for such "data or other information" is obviously "essential to a proper decision in the proceeding" on Utah L, Part B. Without it, the State will be hamstrung in its trial preparations, including its response to a motion for summary disposition<sup>7</sup>, and the Board itself will be unable to properly assess the weight to be accorded Dr. Cornell's opinion, if he is allowed to testify. Accordingly, Dr. Cornell should be ordered to reveal the substantive discussions in which he participated as an NRC consultant that he then considered in formulating his opinion on the appropriateness of PFS's exemption request.

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<sup>5</sup>If the State is denied access to the information on which Dr. Cornell's opinion is based, it reserves the right to move to disqualify Dr. Cornell from testifying as PFS's expert witness in this proceeding.

<sup>6</sup>Additionally, Dr. Cornell shared substantive information with PFS, including its counsel and contractors. *See* Cornell Tr. at 25, 26, 28, 29.

<sup>7</sup>Following discussion with the Applicant, the State reasonably believes PFS will file a motion for summary disposition on or before November 9, 2001.

**3. The NRC Staff Has Failed to Show that the Information Given to Dr. Cornell Is Subject to the Deliberative Process Privilege.**

As the Commission has stated, “The government agency—here the NRC Staff—bears the initial burden of showing that the [deliberative process] privilege should be invoked.” Vogle, 39 NRC at 198. The NRC Staff has yet to make this required showing. When the NRC Staff’s counsel first raised his objections to revealing pre-decisional information, the State’s counsel pointed out that “Dr. Cornell can’t claim any pre-decisional privilege.” The NRC Staff’s counsel responded: “No, I can, and I am.” Cornell Tr. at 12.

The NRC Staff has provided no basis for its claim that information provided to Dr. Cornell is shielded by the privilege it is asserting. If Dr. Cornell was given information as a consultant to NRC, and was not placed under any restrictions on using that information, then whatever privilege may have attached to the information was waived at the time it was shared with Dr. Cornell. The NRC Staff cannot give information to third parties like Dr. Cornell and then claim after the fact that it was confidential and subject to privilege. If the NRC Staff persists in claiming privilege for information shared with Dr. Cornell, then it has the burden of demonstrating that the information was shared with Dr. Cornell under a confidentiality agreement that binds Dr. Cornell.

Moreover, even if Dr. Cornell were subject to a confidentiality agreement, it appears that he then breached the agreement by providing the information to PFS. When asked at his deposition whether he had disclosed “any of the substantive discussion that occurred during any of the two conference calls or the meeting on the proposed rulemaking plan,” he responded, “Yes, there would have been some discussion with counsel at which PFS people

were present perhaps at one meeting.” Id. at 28. With Dr. Cornell having shared with PFS the very information the State is seeking, whatever privilege that may have attached to it has now been waived, and there can be no sound reason for denying the State access to it.

### CONCLUSION

For the foregoing reasons, prior to requiring the State’s response to a motion for summary disposition on Utah L, Part B, the Board should order the Staff to respond to the disputed discovery requests, and to order Dr. Cornell to answer deposition questions and disclose all information provided to him in the course of his consulting work for the NRC staff with respect to the Modified Rulemaking Plan that he considered in forming his opinion on the appropriateness of PFS’s exemption request.

DATED this 8th day of November, 2001.

Respectfully submitted,



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CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S AMENDED MOTION TO COMPEL NRC STAFF TO RESPOND TO STATE'S TWELFTH SET OF DISCOVERY REQUESTS AND TO COMPEL DR. C. ALLIN CORNELL TO ANSWER CERTAIN DEPOSITION QUESTIONS (Contention L, Part B) was served on the persons listed below by electronic mail (unless otherwise noted) with conforming copies by United States mail first class, this 8<sup>th</sup> day of November, 2001:

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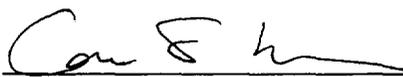
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Connie Nakahara  
Special Assistant Attorney General  
State of Utah

Exhibit 1

# CONDENSED TRANSCRIPT

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of ) Docket No. 72-22  
PRIVATE FUEL STORAGE ) ASLPB No. 97-732-02-ISFSI  
L.L.C. ) DEPOSITION OF:  
(Private Fuel Storage ) DR. C. ALLIN CORNELL  
Facility) )  
) Volume I  
) (Utah Contention I, Part B)

Wednesday, October 31, 2001 - 4:19 p.m.

Location: Office of the Attorney General  
160 East 300 South, 5th Floor  
Salt Lake City, Utah

Reporter: Vicky McDaniel  
Notary Public in and for the State of Utah



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In the Matter of Private Fuel Storage  
 Dr. C. Allin Cornell, Vol. I \* October 31, 2001

SHEET 1 PAGE 1

UNITED STATES OF AMERICA  
 NUCLEAR REGULATORY COMMISSION  
 Before the Atomic Safety and Licensing Board  
 In the Matter of ) Docket No. 72-22  
 ) ASLPB No. 97-732-02-ISFSI  
 PRIVATE FUEL STORAGE )  
 L.L.C. ) DEPOSITION OF:  
 )  
 (Private Fuel Storage ) DR. C. ALLIN CORNELL  
 Facility) )  
 ) Volume I  
 ) (Utah Contention L, Part B)  
 Wednesday, October 31, 2001 - 4:19 p.m.  
 Location: Office of the Attorney General  
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 Salt Lake City, Utah  
 Reporter: Vicky McDaniel  
 Notary Public in and for the State of Utah

PAGE 2

A P P E A R A N C E S

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4 Also Present: Walter Arabasz, James Pechmann,  
 Marty McCann, John Stamatakos

I N D E X

THE WITNESS

DR. C. ALLIN CORNELL

Examination by Ms. Nakahara

E X H I B I T S

NUMBER

L-17 CV of Dr. Cornell

L-18 Applicant's Objections and Responses to  
 State of Utah's Eleventh Set of Discovery  
 Requests Directed to the Applicant

PAGE

PAGE

PAGE

PAGE 3

3

P R O C E E D I N G S

DR. C. ALLIN CORNELL,  
 having first been duly sworn to tell the truth,  
 was examined and testified as follows:  
 EXAMINATION

BY MR. GAUKLER:

Q. Good evening, Dr. Cornell. My name is  
 Connie Nakahara and I'm an attorney for the State of  
 Utah in this PFS licensing proceeding. Would you  
 please state your name for the record.

A. My name is Dr. Carl Allin Cornell.

Q. I'm going to ask you questions related to  
 Contention Utah L B, and if at any time you don't  
 understand my question, please ask me to clarify.

A. Yes.

Q. What did you do to prepare for your  
 deposition today?

A. To prepare for my deposition today I have  
 reviewed various technical documents, reviewed various  
 legal documents, and had discussions with counsel.

Q. Who other than PFS counsel have you  
 discussed this case with?

A. There were at other times people involved in  
 the discussions with counsel. There have been a couple  
 other engineers who I contacted to clarify

PAGE 4

4

recollections on sources of references.

Q. Sources for references, PFS documents or --

A. No.  
 (Exhibit 17 marked.)

Q. Dr. Cornell, is this a copy of your CV?

A. Yes, it is.

Q. Is it current?

A. I believe this is a copy sent to counsel  
 perhaps 1999. Perhaps I sent a more recent copy. I  
 see in one case an update 2/13/01, so it's probably no  
 more updated than that with respect to references.

Q. If you have an updated CV, could we get a  
 copy of that?

MR. GAUKLER: I believe this one was just  
 sent by Dr. Cornell to us and just prior to us  
 identifying him as a witness this fall, so I believe it  
 is up to date.

A. It's as up to date of one, then, as I have,  
 yes.

Q. Under professional organizations, you  
 indicate that you were on the American Society of Civil  
 Engineers Committee on Nuclear Power Plant Safety.  
 Generally what did that relate to when you were on that  
 committee?

A. To the best of my recollection, that

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. I \* October 31, 2001

PAGE 5

5

1 committee, I was on that committee more than 20 years  
2 ago, perhaps 25 years ago, and I cannot tell you  
3 specifically about what that committee did.

4 Q. Based on your recollection, did it have to  
5 do with probabilistic seismic hazard analysis?

6 A. I can't say that it did, but it very well  
7 could have.

8 Q. Under government committees and service,  
9 there is a reference to NAE/NRC. Is that NRC the  
10 National Research Council or Nuclear Regulatory  
11 Commission?

12 A. That is the National Research Council.

13 Q. And same question with -- that would be the  
14 same as the NAE/NRC geotechnical board on the bottom,  
15 correct?

16 A. Correct.

17 Q. Okay.

18 A. And I volunteer that there is at least one  
19 more such NAS/NRC committee that I do not see on this  
20 document which contributes to the current situation.

21 Q. What are you working on? What committee are  
22 you working on?

23 A. There is a National Academy of Science,  
24 NAS/NRC committee called Committee on the Science of  
25 Earthquakes which has not completed its report. So

PAGE 6

6

1 it's currently active.

2 Q. What general scope are you investigating on  
3 that committee?

4 A. On that committee, that committee is charged  
5 with in a sense reviewing the state of understanding of  
6 earthquake science and, to a lesser degree, the issues  
7 of earthquake engineering as they interface with the  
8 science of seismology, earth science in general. And I  
9 tend to be focused on the latter part of that  
10 committee's activities.

11 Q. Are you looking at any particular structures  
12 or facilities, or in general?

13 A. On that committee?

14 Q. Yes.

15 A. Absolutely not.

16 Q. On the next page there's another NRC. Is  
17 that National Research Council or Nuclear Regulatory  
18 Commission? Seismic PRA seminar technical coordinator,  
19 1982.

20 A. I believe that is the Nuclear Regulatory  
21 Commission.

22 Q. Do you recall what the scope of that  
23 committee involved?

24 A. That was not a committee as the title  
25 suggests, and I do not remember details well. There

PAGE 7

7

1 was apparently a seminar put on on the subject of  
2 conducting seismic PRAs, which stands for probabilistic  
3 risk assessment. I believe my responsibility was to  
4 decide on some speakers for that seminar.

5 Q. Have you participated in any Nuclear  
6 Regulatory Commission advisory boards that are not  
7 listed on here, informal or formal?

8 A. Yes. That's part of my consulting  
9 activities.

10 Q. Would you describe those?

11 A. I can give you some examples. I'm not sure  
12 I can be exhaustive.

13 Q. How about if I qualify that. Related to  
14 seismic hazard analysis.

15 A. Related to seismic hazard analysis, yes.  
16 One was in an advisory committee with respect to the  
17 let's say supplementing Appendix A of Part 100 to  
18 produce what ultimately became the document 100, CFR  
19 100.23.

20 Q. What did you do as advisory -- in your  
21 advisory role?

22 A. That committee met several times and would  
23 typically listen to the presentations being made to NRC  
24 staff by their contractors who were responsible for  
25 preparing documents that would become the technical

PAGE 8

8

1 basis for making changes to regulatory documents.

2 Q. Do you provide written or oral comments?

3 A. Only oral, to my best recollection.

4 Q. Any other probabilistic seismic hazard  
5 analysis advisory committees you participated in?

6 A. With respect to the --

7 Q. NRC.

8 A. -- NRC. I'm sorry, before this preparation  
9 I did not review that part of my resume.

10 Q. That's okay. To the best of your  
11 recollection.

12 A. Surely there are others. Let's see. With  
13 respect to probabilistic seismic hazard analysis, I  
14 cannot remember another case in which I was a  
15 contractor directly to the NRC. There may be some. I  
16 apologize.

17 Q. Have you participated in a voluntary basis  
18 in an advisory role to NRC?

19 A. No.

20 Q. And back to your CV.  
21 Off the record.

22 (Discussion off the record.)

23 Q. Who is your current employer?

24 A. I am employed half time by Stanford  
25 University, and I work independently as an engineering

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. I \* October 31, 2001

SHEET 2 PAGE 9

9

1 consultant.  
2 Q. And what are your duties at Stanford?  
3 A. My title is "Professor (Research)" formally.  
4 My responsibilities there are to conduct research  
5 projects and supervise Ph.D. candidates in their  
6 research on those projects. And I may add, to write  
7 papers.  
8 Q. Any particular areas, or --  
9 A. The research projects?  
10 Q. Yes.  
11 A. Stanford does not prescribe a responsibility  
12 to me to work in particular areas.  
13 Q. So it's generally in an area of your  
14 interest?  
15 A. Correct.  
16 Q. I presume since you worked on the -- or  
17 since you participated in the advisory committee to  
18 supplement Appendix A 100, you're familiar with NRC  
19 regulation 10 CFR 100 Appendix A?  
20 A. Yes, I know that document.  
21 Q. Are you familiar with NUREG Guide 1.165?  
22 A. Yes, I'm familiar -- I have knowledge of  
23 that document.  
24 Q. What's your familiarity with that document?  
25 A. As mentioned, it was in a sense a product

PAGE 10

10

1 related to the whole process of the supplementing of  
2 Appendix A by 10 CFR 100.23 that Reg Guide 1.165 gave  
3 guidance to applicants as to how they might meet the  
4 regulatory -- the regulation 100.23.  
5 Q. Have you relied on that Reg Guide in any of  
6 your consulting work?  
7 A. I can't think of a specific incident of  
8 relying on the document. It's certainly a document  
9 that's part of the general milieu in which I do  
10 consulting.  
11 Q. Are you familiar with a document that's  
12 marked Exhibit 14 which is SECY 98-071, which is NRC  
13 staff's -- strike that.  
14 Go off the record for a second  
15 (Discussion off the record.)  
16 Q. (BY MS. NAKAHARA) Are you familiar with the  
17 staff's original rulemaking plan to allow probabilistic  
18 seismic hazard analysis for ISFSIs?  
19 A. Yes, I have read that document.  
20 Q. Were you involved in any of the drafts or  
21 technical reports that supported that plan?  
22 A. That led to the rulemaking document?  
23 Q. Yes.  
24 A. No.  
25 Q. Okay. And now we look at Exhibit 12, which

PAGE 11

11

1 is the modified rulemaking plan, SECY-01-0178. Are you  
2 familiar with this plan?  
3 A. Yes.  
4 Q. And were you involved in any technical  
5 reviews prior to the finalization of this plan?  
6 A. A technical review of this plan, no.  
7 Q. Did you receive any drafts prior to release  
8 of this plan?  
9 A. I did serve on a committee to a contractor  
10 that was charged with providing a technical basis for  
11 the modification of Part 72.  
12 Q. And what was the contractor -- who was the  
13 contractor?  
14 A. I believe the initials are IFC, if not ICF.  
15 Q. And who was your contact at IFC?  
16 MR. TURK: I'm going to object, Connie. You  
17 know we've produced some information to you in response  
18 to discovery. We've indicated, in fact, we produced to  
19 you the SECY paper 01-178, but we've asserted privilege  
20 for pre-decisional materials leading up to publication  
21 of that paper. I don't have any problem with you  
22 asking for Dr. Cornell's role in the process in terms  
23 of background, but in terms of anything that might go  
24 into the substance of the document, I'm going to  
25 object.

PAGE 12

12

1 MS. NAKAHARA: Dr. Cornell can't claim any  
2 pre-decisional privilege.  
3 MR. TURK: No, I can, and I am.  
4 MS. NAKAHARA: Then I am going to ask you to  
5 answer the question.  
6 MR. TURK: Then I'll object and would direct  
7 the witness not to answer. To the extent that he  
8 served as a consultant to an NRC contract, that the  
9 privilege that the staff asserts embraces him as well.  
10 MS. NAKAHARA: It goes to what influences  
11 Dr. Cornell's opinion, what influenced the rulemaking  
12 plan, and we have a right to explore that.  
13 MR. TURK: I don't have any problem if you  
14 want to ask him for his opinions of the rulemaking  
15 plan; but in terms of the pre-decisional give and take  
16 and back and forth that went into the development of  
17 that, I would assert the privilege. But I have no  
18 problem if you want to ask him for his opinion on  
19 what's stated in the ruling.  
20 MS. NAKAHARA: No, I'm going to request that  
21 Dr. Cornell answer.  
22 Can you repeat the question?  
23 THE REPORTER: "And who was your contact at  
24 IFC?"  
25 MR. TURK: And I would object on two

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. I \* October 31, 2001

PAGE 13 13

1 grounds: relevance and pre-decisional.  
2 MS. NAKAHARA: Well, it's 7:40 and Judge  
3 Bollwerk's not there. I suggest we call him in the  
4 morning.  
5 MR. TURK: Well, it's 4:40 p.m. here in  
6 Utah, which means 6:40 in --  
7 MS. NAKAHARA: 6:40.  
8 MR. TURK: Okay. If you want to call him in  
9 the morning, no problem.  
10 MS. NAKAHARA: And we'll come back to this  
11 area.  
12 Q. (BY MS. NAKAHARA) Did you receive any  
13 drafts from the contractor that provided the technical  
14 basis for the rulemaking plan?  
15 A. Did I receive a draft of the modified -- --  
16 Q. Yes.  
17 A. -- rulemaking plan? No.  
18 Q. How did you serve on your committee?  
19 A. The committee had perhaps two conference  
20 calls followed by one meeting of one day. And that was  
21 effectively the last -- that was the last time the  
22 committee gathered either electronically or personally.  
23 Q. Could you clarify what you mean by  
24 electronically or in person?  
25 A. Conference call.

PAGE 14 14

1 Q. All right. And was your role to give a peer  
2 review of the contractor's report?  
3 A. The meeting was held before there was any  
4 report.  
5 Q. So what did you discuss at the meeting?  
6 MR. TURK: I'm going to object AND assert  
7 the privilege.  
8 MS. NAKAHARA: To the scope?  
9 MR. TURK: Your question was what did he  
10 discuss at the meeting.  
11 Q. (BY MS. NAKAHARA) Well, what was the scope  
12 of the meeting? What was the purpose of the meeting?  
13 A. The meeting was to bring the panel together  
14 in one place, to present to us the problem at hand, to  
15 present to us background information about ISFSIs, and  
16 to discuss ways of solving the problem.  
17 Q. What was described as the problem?  
18 A. Preparing a revision to 10 CFR 72.  
19 Q. To allow --  
20 A. To allow the use of probabilistic seismic  
21 hazard analysis in lieu of the Appendix A provision  
22 that it was based on -- is based on.  
23 Q. What was the scope of the two conference  
24 calls?  
25 A. Basically the same material.

PAGE 15 15

1 Q. What was your role? To give suggestions on  
2 how to solve the problem?  
3 MR. GAUKLER: When you talk about "your  
4 role," are you talking about the committee's role or  
5 Dr. Cornell's?  
6 MS. NAKAHARA: Dr. Cornell's role.  
7 A. My role as a member of the committee was to  
8 bring my expertise to the collected expertise of the  
9 committee, and that includes the kind of material that  
10 I'm familiar with, such as probabilistic seismic hazard  
11 analysis and seismic divisions.  
12 Q. I don't understand, if you didn't see any  
13 drafts or if you didn't make any suggestions on how to  
14 solve the problem, how you interacted with the  
15 contractor and how it resulted in a rulemaking plan.  
16 MR. TURK: I don't remember him saying it  
17 resulted in a rulemaking plan.  
18 MS. NAKAHARA: It was the basis to support a  
19 rulemaking plan.  
20 MR. GAUKLER: Well, I think you're getting  
21 to the point where you're going to force him to start  
22 talking about stuff that Sherwin will object to. Might  
23 be best to wait until tomorrow morning to pursue this  
24 line of inquiry further. I think you've gotten the  
25 basic background.

PAGE 16 16

1 MS. NAKAHARA: I don't understand how the  
2 committee worked.  
3 Q. (BY MS. NAKAHARA) Have you been a  
4 consultant for other ISFSIs, just to support licensing  
5 of other ISFSIs?  
6 A. No.  
7 Q. What is your familiarity with the PFS  
8 proposal?  
9 A. Would you clarify PFS proposal?  
10 Q. Do you understand what they're planning  
11 to -- that they're planning to put a spent nuclear fuel  
12 facility in Skull Valley, Utah?  
13 A. Yes.  
14 Q. You understand that they're proposing to  
15 place 4,000 concrete storage casks at the storage  
16 facility, up to 4,000 concrete storage casks?  
17 A. Yes.  
18 Q. Are you familiar with the size of the  
19 concrete storage casks?  
20 A. In acreage? Pardon me, the size of the  
21 facility or the casks?  
22 Q. The casks in general.  
23 A. In approximate terms.  
24 Q. And are you familiar that PFS plans to store  
25 the casks out in the open?

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. I \* October 31, 2001

SHEET 3 PAGE 17 17

1 A. Yes.  
2 Q. That they plan to store the casks -- that  
3 the casks will not be anchored?  
4 A. Yes.  
5 Q. When did you enter into a professional  
6 relationship with PFS?  
7 A. In the fall of 1999.  
8 Q. And is your contract with PFS or someone  
9 else?  
10 A. It is with Shaw Pittman.  
11 Q. And what's the scope of your contract or the  
12 purpose of your contract?  
13 A. I don't recall any specific wording of the  
14 contract. It certainly was clear that it related to  
15 probabilistic seismic hazard analysis and related  
16 questions.  
17 Q. Is it to provide litigation support or  
18 technical support for the licensing proceeding?  
19 A. Litigation support.  
20 Q. And what is your familiarity with the  
21 seismic hazard analysis at the PFS site?  
22 A. I have read that analysis.  
23 Q. Did you perform any peer review prior to  
24 finalizing the report, or the analysis?  
25 MR. GAUKLER: Objection. What report and

PAGE 18 18

1 analysis are you referring to?  
2 MS. NAKAHARA: The PFS seismic hazard  
3 assessment performed by Geomatrix.  
4 MR. GAUKLER: The Geomatrix report?  
5 MS. NAKAHARA: Yes.  
6 THE WITNESS: I have provided no peer review  
7 of that report, and I presume you mean -- I understand  
8 there have been modifications of it over time.  
9 Q. (BY MS. NAKAHARA) What other PFS documents  
10 or reports have you reviewed other than the Geomatrix  
11 seismic hazard assessment?  
12 A. Material related to litigation that we  
13 discussed earlier.  
14 Q. Such as discovery responses?  
15 A. Correct.  
16 Q. The contention?  
17 A. Correct. I believe those are the documents.  
18 Q. Have you reviewed the --  
19 (Witness and counsel consult off the record.)  
20 A. Oh, the exemption request. I'm sorry. I  
21 considered that as part of the litigation material, the  
22 beginning of it.  
23 Q. Is that the original exemption request,  
24 April '99, dated April '99?  
25 A. I'm not as familiar as everyone is with the

PAGE 19 19

1 precise dates of all of this. If you can show me a  
2 copy.  
3 Q. That's because you haven't been preparing  
4 exhibits.  
5 A. Yes, I have seen this document.  
6 Q. And are you familiar with the safety  
7 analysis report prepared by PFS which describes in part  
8 the seismic hazard at the PFS facility?  
9 A. I have not looked at the SAR.  
10 (Exhibit 18 marked.)  
11 Q. This is marked as Utah Exhibit 18, which is  
12 the Applicant's Objections and Responses to State of  
13 Utah's Eleventh Set of Discovery Requests Directed to  
14 the Applicant, dated October 2nd, 2001. Are you  
15 familiar with this document?  
16 A. Yes.  
17 MS. NAKAHARA: Can we take a five-minute  
18 break and take my exhibits back? I gave you somebody's  
19 draft.  
20 (Recess from 4:55 to 5:03 p.m.)  
21 Q. (BY MS. NAKAHARA) Dr. Cornell, are you  
22 familiar with this document, Exhibit 18?  
23 A. Yes.  
24 Q. Maybe we should just quit. I have no brain.  
25 And that can go on the record.

PAGE 20 20

1 MR. GAUKLER: It's late in the day. If you  
2 want to quit, that's fine with me.  
3 MS. NAKAHARA: Is it?  
4 MR. GAUKLER: Yeah.  
5 MS. NAKAHARA: How about if we start  
6 tomorrow.  
7 (Deposition was adjourned at 5:04 p.m.)  
8 \* \* \*  
9  
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In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. I \* October 31, 2001

PAGE 21

21

1 CERTIFICATE

2 State of Utah )

3 County of Utah )

4 I, Vicky McDaniel, a Registered Merit  
5 Reporter and Notary Public in and for the State of  
6 Utah, do hereby certify:

7 That the deposition of Dr. C. Allin Cornell,  
8 the witness in the foregoing deposition named, was  
9 taken on October 31, 2001, and that said witness was by  
10 me, before examination, duly sworn to testify the  
11 truth, the whole truth, and nothing but the truth in  
12 said cause;

13 That the testimony of said witness was  
14 reported by me in stenotype and thereafter transcribed  
15 into typewriting and that a full, true, and correct  
16 transcription of said testimony so taken and  
17 transcribed is set forth in the preceding pages.

18 I further certify that I am not of kin or  
19 otherwise associated with any of the parties of said  
20 cause of action and that I am not interested in the  
21 event thereof.

22 WITNESS MY HAND and OFFICIAL SEAL at Saratoga  
23 Springs, Utah, this 2nd day of November, 2001.

24 Vicky McDaniel, RMR  
25 Utah License No. 87-108580

PAGE 22

22

1 Case: In the Matter of Private Fuel Storage  
2 Case No.: ASLPB No. 97-732-02-ISFSI  
3 Reporter: Vicky McDaniel  
4 Date taken: October 31, 2001

5 WITNESS CERTIFICATE

6 I, Dr. C. Allin Cornell, HEREBY DECLARE:

7 That I am the witness referred to in the  
8 foregoing testimony; that I have read the transcript  
9 and know the contents thereof; that with these  
10 corrections I have noted, this transcript truly and  
11 accurately reflects my testimony.

12 PAGE-LINE CHANGE/CORRECTION REASON

13  
14  
15  
16  
17 No corrections were made.

18 Dr. C. Allin Cornell

19 SUBSCRIBED and SWORN to at

20 , this day of ,

21 2001.

22 Notary Public  
23  
24  
25

# CONDENSED TRANSCRIPT

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of ) Docket No. 72-22  
PRIVATE FUEL STORAGE ) ASLPB No. 97-732-02-ISFSI  
L.L.C. ) DEPOSITION OF:  
(Private Fuel Storage ) DR. C. ALLIN CORNELL  
Facility) )  
) Volume II  
) (Utah Contention I, Part B)

Thursday, November 1, 2001 - 8:45 a.m.

Location: PARSONS, BEHLE & LATIMER  
201 S. Main, Suite 1800  
Salt Lake City, UT 84111

Reporter: Vicky McDaniel  
Notary Public in and for the State of Utah



50 South Main, Suite 920  
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801.532.3441

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In the Matter of Private Fuel Storage  
 Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 1 PAGE 23

UNITED STATES OF AMERICA  
 NUCLEAR REGULATORY COMMISSION  
 Before the Atomic Safety and Licensing Board  
 In the Matter of )  
 PRIVATE FUEL STORAGE ) Docket No. 72-22  
 L.L.C. ) ASLPB No. 97-732-02-ISFSI  
 ) DEPOSITION OF:  
 (Private Fuel Storage ) DR. C. ALLIN CORNELL  
 Facility) )  
 ) Volume II  
 ) (Utah Contention L, Part B)  
 Thursday, November 1, 2001 - 8:45 a.m.  
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 201 S. Main, Suite 1800  
 Salt Lake City, UT 84111  
 Reporter: Vicky McDaniel  
 Notary Public in and for the State of Utah

PAGE 24

A P P E A R A N C E S

1 For the Intervenor: CONNIE S. NAKAHARA, ESQ.  
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3 For the NRC: SHERWIN E. TURK, ESQ.  
 SENIOR LITIGATION ATTORNEY  
 OFFICE OF THE GENERAL COUNSEL  
 U.S. NUCLEAR REGULATORY COMMISSION  
 Washington, D.C. 20555

4 Also Present: Walter Arabasz, James Pechmann,  
 Marty McCann, John Stamatakos

I N D E X

THE WITNESS	PAGE
DR. C. ALLIN CORNELL	
Examination (Continued) by Ms. Nakahara	25
Examination by Mr. Turk	68
Examination by Mr. Gaukler	71
Further Examination by Ms. Nakahara	71
Further Examination by Mr. Turk	76

E X H I B I T S

NUMBER	PAGE
L-19 Figures 6-11 and 6-21 from the Final Report, Volume I of III of the Fault Evacuation Study and Seismic Hazard Assessment, Revision 1, dated March 2001	62
L-20 Update of Deterministic Ground Motion Assessments, Revision 1	64

PAGE 25

25

P R O C E E D I N G S  
 DR. C. ALLIN CORNELL,  
 having first been duly sworn to tell the truth,  
 was examined and testified as follows:  
 EXAMINATION (CONTINUED)

6 BY MS. NAKAHARA:  
 7 Q. Good morning, Dr. Cornell.  
 8 A. Good morning.  
 9 Q. My apologies for starting late and being  
 10 mixed up yesterday.  
 11 To some extent I'd like to go back and  
 12 explore your involvement in the proposed rulemaking  
 13 plan, in the modified proposed rulemaking plan, NRC's  
 14 proposed rulemaking plan.  
 15 A. Yes.  
 16 Q. Did you disclose any information to Private  
 17 Fuel Storage that you obtained in your meetings with  
 18 the -- on the proposed rulemaking plan or telephone  
 19 conversations?  
 20 A. I did not disclose any information, written  
 21 information from the meetings. I was sent subsequent  
 22 to the meeting a draft copy of a technical basis for  
 23 proposed reg guide, and I presume subsequently changes  
 24 of the regulations, Part 72, which, after confirming  
 25 with my technical contact, Mr. Hammer, that it was not

PAGE 26

26

1 confidential, I passed to counsel.  
 2 Q. And is Mr. Hammer an NRC consultant or NRC  
 3 staff person?  
 4 A. He was an NRC consultant, contractor to NRC  
 5 staff.  
 6 MR. GAUKLER: I'd like to have Dr. Cornell  
 7 clarify whether he transferred both the technical basis  
 8 document and the draft Regulatory Guide to counsel.  
 9 A. No, I did not transfer the draft Regulatory  
 10 Guide to counsel.  
 11 Q. Did you have a formal relationship with the  
 12 NRC consultant, ICF?  
 13 A. Yes.  
 14 Q. And can you describe your formal  
 15 relationship?  
 16 A. It was what I described yesterday. I was  
 17 retained along with several others as a group to help  
 18 them in their preparation of materials for the NRC.  
 19 Q. Did they ask you whether you were a witness  
 20 in any licensing proceeding before the Nuclear  
 21 Regulatory Commission that involved a seismic hazard  
 22 analysis for a spent fuel storage facility?  
 23 MR. TURK: Will you repeat the question,  
 24 please?  
 25 THE REPORTER: "Did they ask you whether you

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 27

27

1 were a witness in any licensing proceeding before the  
2 Nuclear Regulatory Commission that involved a seismic  
3 hazard analysis for a spent fuel storage facility?"

4 **A. They may have at the time of contract, but I**  
5 **was not in such a position.**

6 Q. And when did you contract with -- when did  
7 you enter into the contract?

8 **A. I would have to review my records to know**  
9 **for sure, but I believe it would have been late '98 or**  
10 **early '99.**

11 MR. GAUKLER: I'd like to have the record  
12 clarified, which contract you're talking about.

13 MS. NAKAHARA: Contract with ICF -- IFC.

14 **A. You're looking at me with a question mark in**  
15 **your eyes, and I told you yesterday I have trouble with**  
16 **ICFs and IFCs and such things, and I cannot tell you**  
17 **for sure which one it is.**

18 Q. With the NRC's consultant to support the  
19 technical basis for the proposed rulemaking plan to  
20 adopt the 2,000-year return period.

21 **A. I don't remember the beginning of the**  
22 **question. Now we've clarified who it was. Could you**  
23 **repeat the beginning of the question?**

24 MR. TURK: Or can you just ask the question  
25 again?

PAGE 28

28

1 MS. NAKAHARA: Which I think he already  
2 answered, which was, when did you enter into the  
3 contract.

4 THE WITNESS: Yes, I answered that question.

5 Q. (BY MS. NAKAHARA) Since you entered into  
6 the contract around 1998, 1999, were you retained to  
7 support the original rulemaking plan?

8 **A. No.**

9 Q. Did you disclose to PFS any verbal  
10 discussion in your conference calls or meetings on the  
11 proposed rulemaking plan -- the content of, the  
12 substance of your verbal discussions?

13 MR. TURK: I'm sorry. Could I ask for the  
14 question one more time?

15 Q. Let me rephrase it. Did you disclose to PFS  
16 any of the substantive discussion that occurred during  
17 any of the two conference calls or the meeting on the  
18 proposed rulemaking plan?

19 **A. Beyond the written material referred to?**

20 Q. Yes.

21 **A. Is that the essence of the question?**

22 Q. Yes.

23 **A. Yes, there would have been some discussion**  
24 **with counsel at which PFS people were present perhaps**  
25 **at one meeting.**

PAGE 29

29

1 Q. Are you distinguishing PFS people from PFS  
2 counsel?

3 **A. Yes.**

4 Q. As in PFS contractors? And who were at  
5 these meetings?

6 MR. TURK: Objection. He said one meeting.

7 Q. At this meeting.

8 **A. Again, I'm not good with names of people I**  
9 **meet once. I recall a Mr. Donnell, who I believe is**  
10 **with Stone and Webster as a contractor to PFS.**

11 Q. Do you recall anyone else?

12 **A. I recall there were other people. I would**  
13 **have to review my own notes or information from the**  
14 **meeting to give you names. I apologize.**

15 MS. NAKAHARA: Have you turned over  
16 Dr. Cornell's notes?

17 MR. GAUKLER: No. I as counsel was at the  
18 meeting.

19 Q. (BY MS. NAKAHARA) What professional -- what  
20 expertise were the other committee members? Strike  
21 that. What expertise did the other committee members  
22 represent on the proposed rulemaking committee?

23 MR. TURK: Objection. You haven't  
24 established that there was a committee, and you haven't  
25 established that if there was a committee there was any

PAGE 30

30

1 proposed rulemaking.

2 Q. (BY MS. NAKAHARA) Your involvement with the  
3 NRC consultant -- strike that. Were there other  
4 professionals involved that were also retained by the  
5 NRC consultant to support the technical basis for the  
6 proposed rulemaking?

7 **A. Yes.**

8 Q. What were the areas of expertise that they  
9 represented?

10 MR. TURK: I'm going to object. I don't see  
11 that this is relevant at all to the particular  
12 proceeding that we're involved in.

13 MS. NAKAHARA: And I'm not going to succeed  
14 in making an argument, so I'll just go on.

15 Q. (BY MS. NAKAHARA) Based on the discussions  
16 in the conference calls and the one meeting, did  
17 opinions of other experts influence your opinion on the  
18 justification of a 2,000-year rulemaking plan?

19 MR. TURK: You're asking -- at what stage?  
20 Can I get a clarification?

21 MS. NAKAHARA: At any stage.

22 MR. GAUKLER: I don't think you've  
23 established there was ever a 2,000-year rulemaking  
24 plan, at what point there was a 2,000-year rulemaking  
25 plan, or whether the meetings or conferences took place

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 2 PAGE 31

31

1 before the concept of a 2,000-year rulemaking plan.  
2 Q. (BY MS. NAKAHARA) The purpose of these  
3 conference calls and the meetings were to discuss the  
4 technical basis to support a 2,000-year return period,  
5 correct?  
6 MR. TURK: Excuse me. The testimony that he  
7 said was that he was working on the technical basis for  
8 a proposed regulatory guide. That's what he said in  
9 his testimony. He said, by the way, there was one  
10 meeting, not meetings. So I'm trying for a little  
11 precision.  
12 Q. (BY MS. NAKAHARA) What was the basis of --  
13 what was the reason -- strike that. The purpose of the  
14 NRC consultant -- what was the purpose of the NRC  
15 consultant's technical support?  
16 A. **As it was described to me, it was to provide**  
17 **technical support to the staff in their preparation of**  
18 **regulatory changes, including regulatory guide.**  
19 Q. On which area? What subject?  
20 A. **The consultant?**  
21 Q. What areas for changes in rulemaking or  
22 regulatory guide?  
23 A. **The changes that would be in response to the**  
24 **original rulemaking plan.**  
25 Q. And what changes were going to be made in

PAGE 32

32

1 the original rulemaking plan?  
2 MR. GAUKLER: Objection. That's not what he  
3 testified to. He said changes in response to the  
4 rulemaking plan, not changes to the rulemaking plan.  
5 Q. (BY MS. NAKAHARA) What changes were going  
6 to occur in response to the rulemaking plan?  
7 MR. TURK: I'm going to object, Connie.  
8 You're getting now into the substantive issues that  
9 were being evaluated.  
10 Q. (BY MS. NAKAHARA) Did any of the discussion  
11 that occurred in these two conference calls and the one  
12 meeting that you are involved with with the NRC  
13 consultant to support regulatory changes, did that  
14 influence your opinion on PFS's request for a  
15 2,000-year return period?  
16 MR. GAUKLER: Objection, vague and  
17 ambiguous. What do you mean by influence?  
18 Q. Did it influence your opinion to  
19 understand --  
20 A. **It certainly gave me additional technical**  
21 **information about ISFSIs.**  
22 Q. Did you consider this additional technical  
23 information in formulating your opinion on the  
24 appropriateness of a 2,000-year return period for the  
25 PFS facility?

PAGE 33

33

1 A. **Yes, I did.**  
2 MR. TURK: Could have I that question again,  
3 please?  
4 THE REPORTER: "Did you consider this  
5 additional technical information in formulating your  
6 opinion on the appropriateness of a 2,000-year return  
7 period for the PFS facility?"  
8 Q. (BY MS. NAKAHARA) For the moment we'll make  
9 everyone happy and move on to another subject.  
10 Dr. Cornell, are you familiar with Utah  
11 Contention L, subpart B, which is described in  
12 Exhibit -- which is laid out by the Licensing Board in  
13 Exhibit 1?  
14 A. **Yes, I am.**  
15 Q. And is it correct that you've been named as  
16 a witness to testify on this contention?  
17 A. **Yes, I have.**  
18 Q. And what general areas do you plan to  
19 testify?  
20 A. **They will be related to the appropriateness**  
21 **of using probabilistic seismic hazard analysis and the**  
22 **appropriateness of the level of probability associated**  
23 **with the design ground motion and the conservatism**  
24 **implied in the design procedures and criteria that will**  
25 **be applied and their implications to safety.**

PAGE 34

34

1 Q. If you'll look at Exhibit 1 on page 2, which  
2 you're at. Basis 1 under subpart B, do you intend to  
3 provide testimony on Basis 1?  
4 A. **Yes, I would provide testimony on parts,**  
5 **aspects of Basis 1.**  
6 Q. On which aspects?  
7 A. **It would certainly include the fact that I'm**  
8 **aware that the staff has modified the rulemaking plan**  
9 **according to SECY 01-0178, and that seems to be**  
10 **relevant to this particular basis.**  
11 Q. Do you expect to testify with respect to  
12 Basis 2?  
13 A. **It's my understanding that Basis 2 is**  
14 **somehow believed to be subsumed effectively by Basis 1,**  
15 **but I will not be testifying on issues associated with**  
16 **determination of dose limits or their -- or dose**  
17 **limits.**  
18 Q. Thank you. With respect to Basis 3?  
19 A. **Yes, I will be testifying on these issues.**  
20 Q. And with respect to Basis 4?  
21 A. **Yes, I will testify on issues related to**  
22 **Basis 4.**  
23 Q. And with respect to Basis 5?  
24 A. **Yes, I will.**  
25 Q. And finally, with respect to Basis 6?

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 35

35

1 A. Yes, I will.  
2 Q. Yesterday you testified that you were  
3 familiar with PFS's exemption request. I don't plan to  
4 enter this as an exhibit, but I'll use it as a  
5 reference. Is it correct that you have before you an  
6 April 2nd, 1999 Request for Exemption to 10 CFR  
7 72.102(f)(1) prepared by Private Fuel Storage?

8 A. Yes, I do.

9 Q. If you'll look to the attachment on page 1.  
10 Is it correct that the first paragraph, first sentence  
11 proposes to -- PFS proposes to use a probabilistic  
12 risk-informed approach for calculating the design  
13 earthquake?

14 A. That's what it says, yes.

15 Q. Will you define your -- will you give me  
16 your definition of risk as in a probabilistic  
17 risk-informed approach?

18 A. A risk-informed approach to seismic safety,  
19 probabilistic risk-informed approach to seismic safety  
20 implies that one will calculate or estimate  
21 probabilities associated with elements of the problem,  
22 including probabilities of different earthquake ground  
23 motions, and to estimate likelihoods of unacceptable  
24 behavior of important SSCs in the facility. That would  
25 be a risk-informed approach.

PAGE 36

36

1 And in addition, it would of course -- it  
2 would of course somehow try to establish in the end  
3 that the implications of these events and their  
4 consequences were taken into balance.

5 Q. With respect to a seismic hazard analysis,  
6 how would you define hazard, the term "hazard"?

7 A. It has two different interpretations. For  
8 some people, for example, the hazard to a building due  
9 to an earthquake is the strength of the ground motion;  
10 and for some people a hazard, the word "hazard" is  
11 synonymous with the annual probability of exceeding  
12 some specified level of ground motion. So as someone  
13 who works in the field, I have to be prepared for both  
14 alternative interpretations being presented to me.

15 Q. And can you explain how hazard differs from  
16 risk?

17 A. Both words are used colloquially, often to  
18 mean the same thing. If one is being very precise in  
19 most of the work in this field, one would distinguish  
20 hazard when interpreted in the sense of a probability  
21 as the probability levels associated with, for example,  
22 the ground motion level. And one would associate and  
23 contrast the word "risk" as something that considered  
24 as both the probabilities of the hazard and ultimately  
25 the consequences of the undesirable behavior of the

PAGE 37

37

1 system.

2 Q. How does the return period of a design-basis  
3 ground motion enter into a risk calculation?

4 A. The probability, the annual probability of  
5 exceedance of the design-basis earthquake enters as one  
6 of two major factors that determine the probability  
7 that an SSC designed to that design-basis ground motion  
8 will experience a failure, quote, failure to, that is,  
9 where failure is defined as that component exceeding  
10 some so-called structural limit state that might imply  
11 it's not capable of performing its intended function.

12 Q. And what would the other factor be?

13 A. The other main factor is the general level  
14 or specific level of conservatism in what I would  
15 generally class as the design procedures used by the  
16 engineer to establish acceptability of the component.  
17 These are design criteria, design analysis methods,  
18 etc.

19 Q. And in DOE parlance under -- would that be  
20 equivalent to a performance goal?

21 A. No. Let me clarify. By "that," I presume  
22 you mean the second part of these two pieces?

23 Q. Yes, thank you.

24 A. My answer was correct.

25 Q. Thank you. In your opinion, how should one

PAGE 38

38

1 evaluate what constitutes appropriately conservative in  
2 terms of a design-basis ground motion in a PFS  
3 facility?

4 A. How should one? If regulations were written  
5 with a specified design ground motion probability, I  
6 would follow that number.

7 Q. In the alternative, what would you  
8 recommend?

9 A. I would recommend that the designer or the  
10 person, persons responsible for making these decisions  
11 as to what that design ground motion probability would  
12 be would be to look at the other element in the  
13 problem, that is, the levels of conservatism in the  
14 codes and standards that will be followed, and the risk  
15 implications of failure of that particular seismic --  
16 particular SSC, structure system component.

17 Q. In general, how would you determine an  
18 appropriate margin of safety in developing design-basis  
19 ground motion?

20 A. I'm going to assume that what you mean by  
21 margin of safety is some measure of the relationship,  
22 let's say ratio between some way of estimating the  
23 capacity or defining the capacity, structural or  
24 seismic capacity of the component and the design-basis  
25 earthquake.

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 3 PAGE 39

39

PAGE 41

41

1 I think I've answered that question  
2 correctly. Would you repeat the question? Perhaps I  
3 have not.

4 THE REPORTER: "In general, how would you  
5 determine an appropriate margin of safety in developing  
6 design-basis ground motion?"

7 A. Yes, that's right, I told you how I would  
8 look at and think about what the margin is; and then to  
9 establish how large that margin should be, I would want  
10 to understand what the probability level of the  
11 design-basis earthquake is and essentially what kind of  
12 probability of failure I'm prepared to tolerate for  
13 that component. That toleratable -- tolerable failure  
14 probability is equivalent to the DOE 1020 performance  
15 goal you asked about earlier and was discussed  
16 yesterday in the testimony of Dr. Arabasz.

17 Q. And how would you recommend or determine  
18 what level you're willing to tolerate?

19 MR. GAUKLER: In terms of the performance  
20 goal?

21 MS. NAKAHARA: Yes.

22 A. In terms of the performance goal?

23 Q. Performance goal.

24 A. Again, if I'm working to a particular set of  
25 standards, that number may be specified in the

1 performance category?

2 A. Not as we carefully defined the word "risk"  
3 previously. It defines a probability of failure goal.

4 Q. What is the purpose of a performance goal?

5 MR. GAUKLER: In DOE parlance?

6 MS. NAKAHARA: Yes.

7 A. We're still speaking in the context of 1020?

8 Q. Yes.

9 A. Can we be precise about that, so I don't  
10 have to preface everything by "in general," "broadly,"  
11 etc. The purpose of the performance goals,  
12 quantitative performance goals in 1020 is to ensure  
13 that there is a graded or risk-informed approach to the  
14 design of the SSCs involved across the range, spectrum  
15 of DOE facilities.

16 Q. Given that you have used the DOE performance  
17 categories as examples of seismic safety, as a good  
18 example of seismic safety, formulation of seismic  
19 safety, do you agree with the concept of a performance  
20 goal as implied in the DOE Standard 1020?

21 MR. TURK: I don't understand that question.

22 Q. Strike that.

23 A. Thank you.

24 Q. Let me re-ask it. Do you agree with the  
25 concept of a DOE Standard 1020 performance goal?

PAGE 40

40

1 standards explicitly or implicitly. For example, DOE  
2 Standard 1020 is a case where those performance goals  
3 are specified by DOE administration rules and  
4 regulations. And in other cases, and as one should, or  
5 the decision making group should consider what are the  
6 general terms, what are the consequences of failure of  
7 that particular SSC.

8 Q. Continuing on with discussing DOE Standard  
9 1020-94, since we've already been talking about it, I  
10 assume you're familiar with it?

11 A. Yes, I'm familiar with that document.

12 Q. Have you relied on DOE performance  
13 categories in the past in your consulting work?

14 A. I have not relied upon them, to the best of  
15 my memory. I have certainly discussed them, used them  
16 as good examples of how such seismic standards -- I've  
17 used the standard as a good example of how such  
18 standards for seismic safety -- procedures for seismic  
19 safety and evaluation should be formulated.

20 Q. So do you agree that DOE Standard 1020-94  
21 requires a quantified safety or performance goal or --  
22 strike that. We've already been talking about  
23 performance goal under DOE Standard 1020-94. Do you  
24 agree that that performance goal is essentially a risk  
25 goal for each -- establishes a risk goal for each

PAGE 42

42

1 A. Yes. It's a good concept.

2 Q. And do you believe that a performance goal  
3 should be applied in determining the appropriate return  
4 level to use in the PFS facility, used at the PFS  
5 facility?

6 A. I don't think it's necessary.

7 Q. Why not?

8 A. Because the similar or relative performance  
9 goals can be -- strike that. Let me start that  
10 sentence over. One can assure himself that  
11 risk-informed decisions are being made, risk-consistent  
12 decisions are being made that are adequate by using  
13 other approaches to the problem.

14 Q. And what would those approaches be?

15 A. An approach -- various approaches are used  
16 in different industries. The one used, generally  
17 speaking, in the -- by the Nuclear Regulatory  
18 Commission is to establish the probability level of the  
19 design ground motion and then to apply to it a set, a  
20 specified set, particular set of design criteria as  
21 described, for example, in its standard review plan.

22 Q. Now if you'll look at Exhibit 18 that I  
23 introduced yesterday. And are you familiar with  
24 Exhibit 18, which is Applicant's Objections and  
25 Responses to the State of Utah's Eleventh Set of

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 43 43

1 Discovery Requests Directed to the Applicant dated  
2 October 2nd, 2001?  
3 A. Yes, I am.  
4 Q. And is it correct that you participated in  
5 the development of the response to Interrogatory No.  
6 15, paragraph 9?  
7 A. Yes, I did.  
8 Q. And looks like you've already turned to it.  
9 A. We were there yesterday.  
10 Q. The very first sentence under paragraph 9  
11 reads, "Typical SSCs in nuclear facilities, such as the  
12 PFSF, that are designed to satisfy the US NRC Standard  
13 Review Plan structural and mechanical criteria have  
14 been found to have a mean component failure return  
15 period 5 to 20 times or more greater than the mean  
16 return period of the design-basis ground motion." What  
17 is meant by the mean component failure return period?  
18 A. That would be the inverse, the reciprocal of  
19 the mean annual probability of failure -- pardon me.  
20 Pardon me. You asked about the mean return period of  
21 the design-basis earthquake, the last portion of the  
22 sentence?  
23 Q. No.  
24 A. You mean the money component failure --  
25 Q. The return --

PAGE 44 44

1 A. Pardon me, yes. I'm sorry. Yes, I stay  
2 with my original answer. The mean component failure  
3 return period is the reciprocal of the mean annual  
4 failure probability of the component. It's completely  
5 analogous to the mean annual return period of the  
6 earthquake being the reciprocal of the mean annual  
7 probability of exceedance.  
8 Q. Okay. What assumptions were made in  
9 estimating the mean component failure return period, in  
10 your estimating a mean component failure return period?  
11 MR. GAUKLER: Object. It's unclear.  
12 If you understand the question, you can  
13 answer it.  
14 A. I can tell you how I -- the two major pieces  
15 that are associated with establishing that, which we  
16 discussed earlier. One is the mean return period of  
17 the design ground motion, and the second is a measure  
18 such as that referred to as the risk reduction factor  
19 in DOE Standard 1020 that indicates the implications of  
20 the degree of conservatism in the design standards and  
21 criteria.  
22 Q. What is the basis for the statement that the  
23 mean component failure return period for typical SSC's  
24 is 5 to 20 times or more?  
25 A. There are many pieces of evidence that go

PAGE 45 45

1 into the development and support of those particular  
2 kinds of calculations. Let me cite one easy one, and  
3 that is the information available directly in DOE  
4 Standard 1020, which indicates a value for that number  
5 for PC Category 4 of 10 or 20.  
6 Q. Value for which number? I'm sorry.  
7 A. The number you -- pardon me. The risk  
8 reduction ratio associated with the conservatisms of  
9 the standards.  
10 Let me -- pardon me. That takes one more  
11 piece of information which is provided also in DOE 1020  
12 which says that the standards criteria and design  
13 procedures in DOE 1020 for Category 4 approach those of  
14 the standard review plan -- or, pardon me, more  
15 precisely it says approach those for commercial nuclear  
16 power plants, which are designed to the NRC standard  
17 review plan, in their degree of conservatism. Approach  
18 I read to mean those criteria, conservatisms in  
19 Category 4 are not necessarily as large as those in the  
20 standard review plan.  
21 Q. What are typical SSC's at a nuclear  
22 facility?  
23 A. They range from fences to nuclear power  
24 reactors.  
25 Q. Specifically do any of the -- strike that.

PAGE 46 46

1 What are the SSC's at the proposed PFS facility?  
2 A. I'm aware of some of them that are important  
3 to safety at ISFSIs, and specifically the PFS ISFSI.  
4 They would presumably include also fences if necessary  
5 to keep the public at required distances from the  
6 casks, and they would include elements and components  
7 in the canister transfer building and they would  
8 include casks and the canisters they contain.  
9 Q. In your opinion, would the cask pad be  
10 considered an SSC?  
11 A. Yes. Everything is an SSC of one kind or  
12 another.  
13 Q. Would the canister transfer building be  
14 encompassed in a typical SSC -- strike that. In your  
15 response to Interrogatory 15, paragraph 9 where you  
16 state that typical SSC's have a mean component failure  
17 return period 5 to 20 times or more greater, would the  
18 canister transfer building be encompassed in that type  
19 of a typical SSC?  
20 MR. TURK: Let me clarify. You're asking  
21 typical, you're not asking PFS? I think some of the  
22 questions and answers have blurred the distinction  
23 between generalisms and specific findings at the PFS  
24 facility.  
25 Q. (BY MS. NAKAHARA) Okay, let me re-ask that.

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 4 PAGE 47 47

1 In your definition of a -- in your -- strike that. In  
2 your opinion, would the PFS canister transfer building  
3 be included in your representation in your response to  
4 Interrogatory 15, paragraph 9 that typical SSC's at  
5 nuclear facilities have a mean component failure return  
6 period 5 to 20 times or more greater than the mean  
7 period of the design-basis ground motion?  
8 **A. To the best of my knowledge.**  
9 Q. In your opinion, would that hold true for a  
10 HI-STORM 100 cask?  
11 **A. The HI-STORM cask would surely be contained**  
12 **in the range 5 to 20 or more, in my opinion.**  
13 Q. In your opinion would the pad, the cask pad  
14 be contained within the 5 to 20 range?  
15 **A. I do not have technical knowledge or**  
16 **expertise in the area of soils and such -- issues**  
17 **associated with the pad and soils. It's not my general**  
18 **area of expertise. I cannot make a satisfactory**  
19 **judgment on that.**  
20 Q. In your use of the term "mean component  
21 failure" for an SSC, what is meant by failure?  
22 **A. Well, the word "mean" has nothing to do with**  
23 **that. If we discuss the mean, it's tended to modify a**  
24 **return period. The word "failure" is -- component**  
25 **failure is normally determined, defined, as I believe I**

PAGE 48 48

1 **said earlier, as the component exceeding some**  
2 **particular limit state, type of behavior that could**  
3 **potentially leave it unable to perform its intended**  
4 **safety function during or after the earthquake.**  
5 Q. In your opinion, what would be the limit for  
6 the canister transfer building at the PFS facility?  
7 MR. GAUKLER: Objection to that question.  
8 It's unclear to me. Vague and ambiguous.  
9 Q. How would you define failure of the canister  
10 transfer building?  
11 **A. Well, I certainly do not want -- if the**  
12 **canister building were to literally collapse upon the**  
13 **elements underneath it associated with canister**  
14 **transfer operations, that would not be performing its**  
15 **function.**  
16 Q. And how would you define failure of a  
17 HI-STORM 100 cask?  
18 **A. I am not close to the details of**  
19 **calculations of cask structural assessments. I know**  
20 **that they are designed to meet the standard review**  
21 **plan, which would appropriately define those limit**  
22 **states.**  
23 Q. Do you know the mean failure return period  
24 if the seismic design is based on ground motion with a  
25 return period of 2,000 years for the HI-STORM 100 cask?

PAGE 49 49

1 **A. Do I know the number?**  
2 Q. Yes.  
3 **A. No, I don't.**  
4 Q. Do you know the number for the canister  
5 transfer building?  
6 **A. I do not know the number.**  
7 Q. Do you know the number for the cask pad?  
8 **A. I do not know the number.**  
9 Q. Do you know if it's been developed?  
10 **A. The mean failure probability?**  
11 Q. Yes.  
12 **A. No, I do not know if it's been developed.**  
13 Q. Do you know if fragility curves were  
14 developed for the canister transfer building?  
15 **A. No, I do not know.**  
16 Q. For the storage cask?  
17 **A. No, I do not.**  
18 Q. And one last one, for the concrete pad?  
19 **A. No, I do not.**  
20 Q. Have you ever estimated the mean failure  
21 return period of SSC's due to exceeding the  
22 design-basis ground motion? It's a general question.  
23 **A. Could you state it again? Have I ever**  
24 **calculated --**  
25 Q. The mean -- actually, I probably should --

PAGE 50 50

1 strike that. Let me try this again. Have you ever  
2 calculated, thank you, the mean component failure  
3 return period for SSCs?  
4 **A. Stop?**  
5 Q. Stop.  
6 **A. Yes.**  
7 Q. What type of SSCs have you performed those  
8 calculations on, generally?  
9 **A. Generally, mostly structures.**  
10 Q. Have you ever performed a calculation for a  
11 structure similar to a concrete cask?  
12 **A. No.**  
13 Q. And what about concrete storage pads?  
14 **A. No.**  
15 Q. When in a range did you perform the  
16 structure calculations, in a general ballpark?  
17 **A. I have made such calculations over my entire**  
18 **professional career.**  
19 Q. In your opinion, should a risk reduction  
20 factor be applied to the foundation?  
21 MR. GAUKLER: Objection, foundation. It's  
22 unclear. Foundation of what?  
23 Q. Foundation of the canister transfer  
24 building.  
25 **A. At the PFS facility?**

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 51

51

1 Q. At the PFS facility.  
2 A. Should a risk reduction be applied?  
3 Q. Not should, can a risk reduction factor be  
4 applied to the foundation of the canister transfer  
5 building?  
6 A. The foundation of the canister transfer  
7 building.  
8 Q. Strike that. Let me try this again. In  
9 your opinion, would it be appropriate to apply a risk  
10 reduction factor to the canister transfer foundation?  
11 MR. GAUKLER: Objection. How do you define  
12 canister transfer foundation?  
13 Q. The supporting structure for the canister  
14 transfer building. The interface between the soil and  
15 the structural supports.  
16 A. Yes. We both know what a foundation is.  
17 Once one uses a particular set of criteria such as  
18 standard review plan, one has implicitly applied a risk  
19 reduction factor.  
20 Q. Could you calculate the mean component  
21 failure return period for the SSCs at the PFS facility?  
22 A. Was the question could I?  
23 Q. Yes, could you.  
24 A. Together with the proper group of  
25 specialists, yes.

PAGE 52

52

1 Q. If you'd look at the PFS exemption request  
2 dated April 2nd on page 5. The second --  
3 A. The attachment?  
4 Q. The attachment, yes, thank you. The  
5 attachment on page 5, the third and fourth paragraph  
6 down.  
7 A. I'm looking at them. Would you like me to  
8 read them?  
9 Q. Yes, please.  
10 A. Thank you. (Witness reads document.) Yes,  
11 I've read them.  
12 Q. Do you agree that in part the paragraphs  
13 discuss the consequences of a seismic event at the PFS  
14 facility?  
15 A. Do they discuss that?  
16 Q. Yeah, in part.  
17 A. In part, yes.  
18 Q. And do you agree -- I'm sorry.  
19 A. Do they discuss -- they discuss -- they  
20 don't -- I'll stand with that until you ask me more.  
21 Q. And do you agree that essentially PFS claims  
22 that there will be no breach to the canister?  
23 A. It says that -- what it says is the cask  
24 tipover is not a credible event, and I of course  
25 presume that means, following the previous sentence,

PAGE 53

53

1 which says it is a very, very unlikely event, and they  
2 interpret that to mean credible, apparently. And they  
3 also say that they have looked at tipover events and  
4 concluded that the canister stresses are well within  
5 the design margins and criteria; and the conclusion is  
6 that there are significant -- the implications are  
7 there are significant margins available there and  
8 conservatism available there, which means in a  
9 probabilistic sense it's a very small probability that  
10 that will happen should there be a tipover.  
11 Q. And in that same sentence, is it correct  
12 that it states canisters are designed to withstand the  
13 stresses resulting from a non-mechanistic cask tipover  
14 event with no breach?  
15 MR. GAUKLER: Objection. The document  
16 obviously speaks for itself.  
17 Go ahead and answer.  
18 A. It says that the canisters are designed to  
19 withstand the stresses resulting from a non-mechanistic  
20 cask tipover with no breach. It says that.  
21 Q. In your opinion, would a breached canister or  
22 release of radioactive -- strike that. In your opinion  
23 would a breached canister or release of radioactive  
24 material be the only relevant SSC failure with respect  
25 to a cask?

PAGE 54

54

1 A. I'm not sure I can answer that, because I --  
2 that is certainly one relevant one, yes. Perhaps there  
3 are others. I'm not a specialist in that part of the  
4 problem.  
5 Q. Do you know if the probability of an  
6 increase in radiological dose at the fence line has  
7 been calculated in the event of an SSC failure?  
8 MR. GAUKLER: What type of SSC are you  
9 talking about?  
10 MS. NAKAHARA: In the event of a cask  
11 failure.  
12 MR. GAUKLER: What kind of a cask failure  
13 are you talking about?  
14 MS. NAKAHARA: A tipover.  
15 MR. TURK: That's a different question.  
16 Q. (BY MS. NAKAHARA) Do you know if the  
17 probability of an increase in radiological dose at the  
18 fence line has been calculated due to a cask tipover at  
19 the PFS facility?  
20 A. Do I know that? No, I do not.  
21 Q. If you'll look at the seismic exemption  
22 request, the attachment on page 2, very last paragraph  
23 which states, "When 10 CFR Part 72 was first  
24 promulgated in 1980, ISFSIs were largely envisioned to  
25 be spent fuel pools or single, massive dry storage

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 5 PAGE 55 55

1 structures."  
2 **A. It says that.**  
3 **Q. Can you define what a massive dry storage**  
4 **structure is?**  
5 **A. Not precisely. I believe it has reference**  
6 **to visions that individuals had at that time as to how**  
7 **large numbers of ISFSIs might be stored. I presume it**  
8 **means what it says, a very large structure that's**  
9 **massive.**  
10 **Q. In your opinion, how would that differ from**  
11 **a storage cask?**  
12 **A. One is a cask and one is a structure. Those**  
13 **are very different things.**  
14 **Q. How would a risk-informed analysis for a**  
15 **massive dry storage structure differ from the PFS**  
16 **analysis, in general terms?**  
17 **A. How would the risk-informed assessment**  
18 **happen?**  
19 **Q. Yes.**  
20 **A. It could happen in many ways. One way would**  
21 **be, as we've discussed earlier, one would try to get a**  
22 **sense or a bound on the probability of some SS --**  
23 **important SSC failure probabilities and -- which may --**  
24 **and look at the consequences for the two cases. So the**  
25 **risk-informed aspect would be this balancing between**

PAGE 56 56

1 **the relative consequences and the relative**  
2 **probabilities.**  
3 **Q. If the PFS facility experienced an**  
4 **earthquake, how would PFS determine if the design-basis**  
5 **ground motion was exceeded -- design-basis ground**  
6 **motion for the SSCs was exceeded?**  
7 **MR. GAUKLER: Objection, lack of relevance.**  
8 **MS. NAKAHARA: It goes to conservativeness**  
9 **needed in developing the design-basis ground motion.**  
10 **If you can't tell whether your design basis was**  
11 **exceeded, it doesn't do any good.**  
12 **MR. GAUKLER: Objection. It's not relevant.**  
13 **You can answer if you can.**  
14 **A. I don't know how they determine it, but I**  
15 **concur I don't understand the implications why it's**  
16 **important to the safety -- to an estimate of the**  
17 **failure probability of the components.**  
18 **Q. How would you recommend that PFS determine**  
19 **whether the design-basis ground motion was exceeded**  
20 **during an earthquake?**  
21 **MR. GAUKLER: Objection, lack of relevance.**  
22 **Q. Please answer if you can.**  
23 **MR. GAUKLER: You can answer if you can.**  
24 **THE WITNESS: How would I recommend? Was**  
25 **that the beginning?**

PAGE 57 57

1 **MS. NAKAHARA: Yes.**  
2 **MR. GAUKLER: I guess you're assuming he'd**  
3 **recommend. We haven't established that proposition.**  
4 **I'll object on that basis, too. It assumes a fact not**  
5 **established.**  
6 **Q. (BY MS. NAKAHARA) If you recommend, how**  
7 **would you do it?**  
8 **A. This is a hypothetical.**  
9 **Q. Yes.**  
10 **A. If PFS asked me to recommend how to**  
11 **determine if the SSC had been exceeded in an**  
12 **earthquake, then I would say you would want something**  
13 **such as a strong ground motion accelerometer to measure**  
14 **the earthquake. Or, depending on how important it was**  
15 **to know that, I might depend on the kinds of estimates**  
16 **we use many times after earthquakes to judge the ground**  
17 **motion by using results from other accelerometers**  
18 **elsewhere and to infer, based on our knowledge of how**  
19 **seismic waves attenuate, what the ground motion would**  
20 **be or might have been at any given location.**  
21 **MS. NAKAHARA: We've been going for almost**  
22 **an hour and a half. Do you want to take a break?**  
23 **(Recess from 10:01 to 10:22 a.m.)**  
24 **Q. (BY MS. NAKAHARA) Dr. Cornell, will you**  
25 **please look at Exhibit 12, which is the staff's**

PAGE 58 58

1 **modified rulemaking plan, SECY-01-0178, and turn to**  
2 **page 7. And if you'll look at the second bullet that**  
3 **reads, "the total" -- page 7 of the attachment. I'm**  
4 **sorry.**  
5 **MR. TURK: Could we pause for one second?**  
6 **(Recess from 10:25 to 10:28 a.m.)**  
7 **Q. (BY MS. NAKAHARA) And if you'll look at**  
8 **bullet No. 2 -- second bullet, not number 2, which**  
9 **says, "The total probability of exceedance for a design**  
10 **earthquake at an ISFSI facility with an operational**  
11 **period of 20 years (20 years x 5.0E-4 = 1.0E-02) is the**  
12 **same as the total probability of exceedance for an**  
13 **earthquake event at the proposed pre-closure facility**  
14 **at Yucca Mountain with an operational period of 100**  
15 **years (100 years x 1.0E-04 = 1.0E-02)." For the**  
16 **Private Fuel Storage facility site, are you aware that**  
17 **PFS has plans to operate for approximately 40 years?**  
18 **A. I've heard that.**  
19 **Q. Would that factor into the calculation --**  
20 **should that factor into the calculation of the total**  
21 **probability of exceedance?**  
22 **A. Of the design earthquake?**  
23 **Q. Yes.**  
24 **A. In my opinion, no.**  
25 **Q. Why?**

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 59

59

1 A. Because in principle, it's what I would call  
2 usual general principles of risk assessment and safety  
3 assessment. The basis for an estimation should be --  
4 the characterization and decision making should be the  
5 mean annual failure probability or failure frequency,  
6 and that number is clearly independent of the number of  
7 years of operation of the facility.

8 Q. Based on the staff's logic in the second  
9 bullet, knowing that you don't agree with the use of  
10 total probability, but to continue on with the total  
11 probability, should the staff consider it a 20-year or  
12 40-year operational period for the PFS facility?

13 MR. GAUKLER: Objection. He's already said  
14 it's irrelevant from his point of view.

15 MR. TURK: I also object that you're looking  
16 now at the rulemaking plan. You're not looking at the  
17 staff evaluation of the PFS facility. This is a  
18 generic rulemaking plan in the SECY paper that you're  
19 looking at.

20 MS. NAKAHARA: Yes, I know that.

21 MR. TURK: But your question is not about  
22 rulemaking plans, it's about the PFS facility.

23 Q. (BY MS. NAKAHARA) In determining the total  
24 probability of exceedance for a facility, should --  
25 if -- strike that. Let's move on.

PAGE 60

60

1 Yesterday do you recall Dr. Arabasz's  
2 testimony concerning the International Building Code  
3 2000 requirements and the Utah highway bridges  
4 requirements to use a return period of 2,500 years for  
5 a design-basis earthquake?

6 A. Do I remember that testimony?

7 Q. In general.

8 A. In general, yes.

9 Q. Wouldn't a 2,000-year return period for the  
10 PFS facility be less stringent and unconservative in  
11 comparison to the 25 years required in the  
12 International Building Code 2000 and the Utah highway  
13 and bridges standards?

14 MR. TURK: I would object also on that.  
15 Dr. Arabasz answered a question that I asked yesterday.  
16 He did not calculate how the reduction factor and the  
17 multiplication factor would apply for the PFS facility.  
18 If you're going to try to judge it under the IBC or the  
19 highway standard.

20 MS. NAKAHARA: Not asking about  
21 Dr. Arabasz's opinion, I'm asking about Dr. Cornell's  
22 opinion.

23 Q. (BY MS. NAKAHARA) Answer if you can.

24 THE WITNESS: After all of that, may we  
25 restate that long question?

PAGE 61

61

1 THE REPORTER: "Wouldn't a 2,000-year return  
2 period for the PFS facility be less stringent and  
3 unconservative in comparison to the 25 years  
4 required -- "

5 THE WITNESS: Twenty-five hundred.

6 THE REPORTER: "-- 2,500 years required in  
7 the International Building Code 2000 and the Utah  
8 highway and bridges standards?"

9 THE WITNESS: No.

10 Q. (BY MS. NAKAHARA) Why?

11 A. Why. If you'll recall prior testimony,  
12 there are two portions, two elements that determine  
13 what the failure probability of the SSC is, and those  
14 are both the return period of the design-basis  
15 earthquake and the design procedures and criteria used  
16 to evaluate the SSC, and the latter part of your  
17 question differs between those two codes and standards.  
18 And the third element, of course, is, how do we define  
19 conservative? It has to be relative to the  
20 consequences.

21 Q. Would the PFS -- would the proposed  
22 2,000-year return period for the PFS facility be less  
23 stringent or unconservative compared to the new DOE  
24 Standard 1020 2001 requirement for a 2,500-year return  
25 period for a PC category 3 -- category -- performance

PAGE 62

62

1 category 3 facility?

2 A. I do not believe so. I have not read that  
3 document, but if the only difference is the change  
4 alluded to from a 2,000-year mean return period to a  
5 2,500-year return period in the new 1020, then it would  
6 not make the new 1020 criteria -- it would not make  
7 the -- by itself, not make the performance goal of the  
8 PC 3 much different. But I also heard Dr. Arabasz  
9 testify that the performance goal was retained at the  
10 same level of a mean annual probability of 10<sup>-4</sup> for the  
11 PC category, PC Category 3 in 1020.

12 Q. So wouldn't the -- is it correct that the  
13 risk reduction factor would change?

14 A. If the -- if in this document which I have  
15 not seen the probability of the ground motion, or the  
16 ground motion probability is changed and you keep the  
17 same performance goal, it must be that the risk  
18 reduction factor has changed by some parallel change in  
19 the conservatism in the criteria. And the excellent  
20 thing about the 1020 criteria is it tells you exactly  
21 how to make those changes to maintain consistency in  
22 the performance goal.

23 (Exhibit 19 marked.)

24 Q. Exhibit 19 is Figures 6-11 and 6-21 from the  
25 Final Report, Volume I of III of the Fault Evacuation

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 6 PAGE 63 63

1 Study and Seismic Hazard Assessment, Revision 1 dated  
2 March 2001 prepared by Geomatrix Consultants. Are you  
3 familiar with Figure 6-11, which is a figure which is  
4 the computed total mean and 5th to 95th percentile  
5 horizontal motion hazard curves for the CTB site at the  
6 Private Fuel Storage facility?

7 **A. I have not seen this figure before. I have**  
8 **seen a curve which I understand to be precisely the**  
9 **left-hand portion of Figure 6-11.**

10 **Q. On the left-hand portion of Figure 6-11, do**  
11 **you agree that the mean horizontal peak acceleration**  
12 **with a frequency of  $1 \times 10^{-4}$  are greater -- not greater.**  
13 **Strike that. Do you agree that the mean horizontal**  
14 **peak acceleration with an annual frequency of  $1 \times 10^{-4}$  is**  
15 **greater than  $1g$ ?**

16 **A. I would read the curves that way, yes.**

17 **Q. And if you'll look at Figure 6-21 on the**  
18 **next page. Are you familiar with this document?**

19 **A. No, I've not seen this one.**

20 **Q. Looking at the peak acceleration diagram,**  
21 **would you agree that the mean vertical peak**  
22 **acceleration with an annual frequency of  $10^{-4}$  is**  
23 **greater than  $1g$ ?**

24 **A. I believe we want the peak acceleration**  
25 **associated with the mean annual frequency, which is not**

PAGE 64 64

1 quite what you said, but I will take that to be what  
2 you said, and I would agree that the peak vertical  
3 acceleration associated with a mean annual frequency of  
4 exceedance of  $10^{-4}$  is greater than  $1g$ .

5 **Q. In your opinion, if the PFS casks are**  
6 **subject to vibratory ground motions with peak**  
7 **horizontal and vertical accelerations greater than  $1g$**   
8 **such as the mean 10,000-year return period ground**  
9 **motions shown in Exhibit 19 here in Figures 6-11 and**  
10 **6-21, do you believe that some of the PFS's 4,000 casks**  
11 **may tip over?**

12 **A. I'm not prepared to answer that. I**  
13 **understand in discussions in which counsel was involved**  
14 **that the ground motion required to tip over the PFS**  
15 **casks is substantially larger than that associated with**  
16 **a mean annual probability of 10 to the -- let's keep**  
17 **this simple -- with a mean return period of 2,000**  
18 **years.**

19 **Q. Do you know which PFS expert would be able**  
20 **to discuss the required ground motion to tip over a**  
21 **Holtec cask?**

22 **A. I know that it would be a member --**  
23 **engineers working for Holtec.**  
24 **(Exhibit 20 marked.)**

25 **Q. This is marked Exhibit 20 and is titled**

PAGE 65 65

1 Update of Deterministic Ground Motion Assessments,  
2 Revision 1, prepared by Geomatrix Consultants, Inc.  
3 dated April 2001, which includes Figures 1, 2, 3, and  
4 4, which show response spectra for the PFS facility.  
5 Are you familiar with these figures?

6 **A. No. I'm looking at them and becoming**  
7 **familiar. Would you like me to do that?**

8 **Q. Yes, please.**  
9 **(Witness reads document.)**

10 **A. Okay, I believe I understand what these**  
11 **figures contain.**

12 **Q. Okay. Will you please look at the**  
13 **10,000-year equal hazard response spectra for each of**  
14 **these figures.**

15 **A. The 10,000-year spectra, yes, I see that.**

16 **Q. In your opinion, if ground motion occurs at**  
17 **the PFS facility which is similar to the 10,000-year**  
18 **equal hazard response spectra in these exhibits, do you**  
19 **believe some of PFS's 4,000 casks would tip over?**

20 **A. I don't know.**

21 **Q. If ground motions occur at the PFS site with**  
22 **vertical and horizontal accelerations greater than  $1g$**   
23 **and response spectra similar to the 10,000-year equal**  
24 **hazard response spectra in Exhibit 20, do you believe**  
25 **that most of the PFS casks will tip over?**

PAGE 66 66

1 **A. I don't know.**

2 MS. NAKAHARA: Can we take a real short  
3 break, and I may be done.  
4 (Recess from 10:47 to 10:57 a.m.)

5 **Q. (BY MS. NAKAHARA) Dr. Cornell, is the**  
6 **probability of a cask tipover relevant to meeting the**  
7 **PFS safety goals for developing a design-basis ground**  
8 **motion?**

9 MR. GAUKLER: Will you repeat that question?

10 **Q. Is the probability of cask tipover relevant**  
11 **to developing a design-basis ground motion in meeting**  
12 **the PFS safety goals?**

13 **A. In meeting the PFS safety goals. I don't**  
14 **believe they have safety goals in the explicit context**  
15 **we were discussing earlier.**

16 **Q. In your opinion, do you believe the**  
17 **probability of a cask tipover should be considered in**  
18 **developing PFS's design-basis ground motion?**

19 **A. Implicitly, at least, yes.**

20 **Q. In your opinion, should you consider a range**  
21 **of ground motion return periods for cask tipover, or**  
22 **only the 2,000-year return period?**

23 MR. GAUKLER: Objection. What do you mean  
24 by range?

25 MS. NAKAHARA: The range of something other

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 67

67

1 than 2,000 years, something more conservative than  
2 2,000 years.  
3 MR. TURK: Now I've lost the question. I'm  
4 sorry. Either read it back or --  
5 Q. Let me try and rephrase it. In your  
6 opinion, to evaluate the conservativeness of a  
7 design-basis ground motion for the PFS facility, should  
8 you evaluate the probability of cask tipover in  
9 ranges --  
10 MR. PECHMANN: Return periods longer than  
11 2,000 years.  
12 MS. NAKAHARA: Thank you.  
13 A. In evaluating -- pardon me. In  
14 consideration of conservatism implied by the 2,000-year  
15 return period ground motion, you would consider ground  
16 motions of that level and whatever level further is  
17 required to tip the cask over, and that would give you  
18 a sense of what probability is associated -- pardon me.  
19 That coupled with information about the probabilities  
20 of those higher ground motions would give you part of  
21 the information sense of which you would use to  
22 evaluate subjectively or explicitly the probability of  
23 the cask tipover event.  
24 MS. NAKAHARA: I have no more questions.  
25 Thank you.

PAGE 68

68

1 MR. TURK: I have a few.  
2 EXAMINATION  
3 BY MR. TURK:  
4 Q. Dr. Cornell, my name is Sherwin Turk. I'm a  
5 lawyer with the NRC staff in Washington. I wanted to  
6 ask you a few questions which follow on to some of the  
7 questions that Ms. Nakahara asked you earlier today.  
8 You indicated in discussing the work you did  
9 with ICF, as a consultant to ICF, you indicated that  
10 you talked to a Mr. Hammer. Do you recall his full  
11 name?  
12 A. I believe it's Donald Hammer.  
13 Q. And by whom is he employed?  
14 A. ICF.  
15 Q. And you indicated that he indicated that the  
16 information which you later passed to PFS counsel was  
17 not confidential.  
18 A. Yes.  
19 Q. Do you know if he spoke with anyone at the  
20 NRC staff before he made that determination?  
21 A. I don't know whether he did or not.  
22 Q. Ms. Nakahara also asked you whether your  
23 participation in the ICF project -- maybe I should just  
24 refer to it that way.  
25 A. Yes.

PAGE 69

69

1 Q. If I say the ICF project, you understand  
2 that to mean the work you did as a consultant to ICF?  
3 A. Yes, I shall interpret it that way.  
4 Q. Relevant to the rulemaking or the regulatory  
5 guidance?  
6 A. The work was, yes, relative -- yes, I  
7 understand what you mean.  
8 Q. Was it relative to the regulatory guidance  
9 that was being developed?  
10 A. Yes.  
11 Q. You indicated in response to a question by  
12 Ms. Nakahara that you considered additional technical  
13 information that you received through that process in  
14 forming an opinion on the PFS ISFSI project.  
15 A. Yes, I did.  
16 Q. What information were you referring to when  
17 you stated that?  
18 A. For example, at the meeting that was held in  
19 March of 2000, to the best of my knowledge, we --  
20 presentations were made by individuals I believe I  
21 alluded to yesterday about showing diagrams of typical  
22 dry storage casks, their typical dimensions,  
23 proportions, giving information about what kinds of  
24 calculations are required by the SRP with respect to  
25 the casks and the canisters, information about the kind

PAGE 70

70

1 of activities, operations that go on in the transfer  
2 building, the kinds of assessments that are made under  
3 the standard review plan of drop accidents if they're  
4 independent of the earthquake. In general, that kind  
5 of technical engineering knowledge about the kinds --  
6 what the nature and character of these components are  
7 that are different from a, for example, that are unique  
8 to the ISFSIs as opposed to a nuclear power plant or  
9 other nuclear material handling facilities.  
10 Q. The type of information that you just  
11 described appears to me to be the kind of information  
12 that's publicly available.  
13 A. Yes, it is. It was the first time I had  
14 encountered it in my practice.  
15 Q. And when you say that the information that  
16 you received through this process was something you  
17 considered in forming an opinion on the PFS project --  
18 A. Yes.  
19 Q. -- were you talking about this type of  
20 publicly available information?  
21 A. Yes.  
22 Q. And that's what you meant?  
23 A. Yes.  
24 MR. TURK: May I take just a minute, please.  
25 Can we take a two-minute break?

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 7 PAGE 71 71

1 (Recess from 11:09 to 11:17 a.m.)  
2 MR. TURK: I have nothing further.  
3 EXAMINATION  
4 BY MR. GAUKLER:  
5 Q. I have one quick follow-up question to one  
6 of the last questions that Ms. Nakahara asked you  
7 concerning analysis of potential for cask tipover at  
8 longer return periods than the 2,000-year. To clarify:  
9 do you believe you need to do analysis of higher or  
10 longer return period earthquakes until you find the  
11 cask tips over?  
12 A. Well, you can do an analysis to a higher  
13 ground motion which has a longer return period, and it  
14 doesn't tip over, that gives you information about the  
15 fact that the risks of its tipping over are smaller  
16 than one in 2,000.  
17 MR. GAUKLER: No further questions.  
18 FURTHER EXAMINATION  
19 BY MS. NAKAHARA:  
20 Q. I have one follow-up question to Mr. Turk's.  
21 In response to Mr. Turk's question, you stated that the  
22 information or the presentation at a March 2000 meeting  
23 related to the ICF project was publicly available  
24 information. Is that correct?  
25 MR. TURK: The question I asked is when he

PAGE 72 72

1 was talking about information that influenced or may  
2 have affected his consideration of the PFS project, was  
3 that publicly available information. That's when he  
4 said yes.  
5 Q. (BY MS. NAKAHARA) The experts in the March  
6 2000 meeting or the conference calls related to the ICF  
7 project discussed the technical merits of ICF's  
8 technical support for their regulatory guide,  
9 development of the regulatory guide?  
10 MR. GAUKLER: Objection. It's a vague and  
11 ambiguous question. Technical merits of what?  
12 MS. NAKAHARA: The technical merits of the  
13 support to develop the Regulatory Guide, ICF mission to  
14 support the regulatory guide.  
15 MR. TURK: I'm not sure that you've  
16 established a predicate. I don't understand what you  
17 mean when you refer to ICF's support.  
18 Q. (BY MS. NAKAHARA) ICF's project was to  
19 support the technical merits in developing a regulatory  
20 guide; is that correct?  
21 MR. TURK: To support the -- I don't  
22 understand the question when you say "to support the  
23 technical merits."  
24 Q. (BY MS. NAKAHARA) Okay, let's start over.  
25 What was ICF's mission?

PAGE 73 73

1 A. As I understand it, it was to support the  
2 staff and to help provide a document which would be  
3 typically called the technical basis for whatever  
4 followed, regulatory guide or regulatory changes.  
5 Q. Did experts in the March 2000 meeting or the  
6 conference calls that you participated in discuss the  
7 technical merits of this technical basis?  
8 A. There wasn't any technical basis document at  
9 that time. The discussions were on the issues or the  
10 elements of the problem, of the task before them.  
11 Q. And did experts discuss the technical merits  
12 of those issues?  
13 MR. TURK: The merits of the issues? That  
14 doesn't make any sense.  
15 A. I'm sorry, I don't understand that question.  
16 Q. Did you discuss the technical -- in  
17 technical terms you discussed the issues --  
18 A. Yes.  
19 Q. -- based on each expert's expertise?  
20 A. Yes.  
21 Q. Did you use any of that discussion to form  
22 your opinions on the PFS facility?  
23 A. Yes, because those discussions were the  
24 kinds of technical knowledge and technical information  
25 that I just alluded to.

PAGE 74 74

1 Q. So they didn't rely on any particular  
2 expert's own opinion, independent opinion?  
3 MR. TURK: Who didn't rely?  
4 MS. NAKAHARA: The publicly available  
5 information.  
6 MR. TURK: I think the trail is so confused  
7 at this point.  
8 Q. (BY MS. NAKAHARA) Did information that you  
9 considered in developing your opinion for the PFS  
10 facility, was that based on individual expert opinions  
11 that participated in the ICF project meetings or  
12 conference calls?  
13 MR. TURK: I don't understand. He's already  
14 stated that the kind of information that he considered  
15 with respect to the PFS project was publicly available  
16 information.  
17 MS. NAKAHARA: And I'm exploring that.  
18 MR. TURK: Are you asking more about the  
19 publicly available information, or are you asking him  
20 about non-publicly available information?  
21 MS. NAKAHARA: I'm asking about what he  
22 relied on to form his opinion for the PFS facility that  
23 he received through the ICF project meetings or  
24 conference calls.  
25 MR. GAUKLER: I think he's already answered

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

PAGE 75

75

1 that, asked and answered.  
2 MS. NAKAHARA: I would like to clarify.  
3 MR. TURK: But it's not clarifying anything.  
4 You're just going to lead to a string of follow-on  
5 questions trying to make a clear record out of whatever  
6 answer he gives to this confusing question.  
7 Q. (BY MS. NAKAHARA) In forming your opinion  
8 on the adequacy of the 2,000-year return period for the  
9 PFS facility, did you consider individual expert  
10 opinions that were given in the March 2000 or  
11 conference calls related to the ICF project?  
12 MR. TURK: You're asking about expert  
13 opinion, not publicly available information?  
14 Q. You can answer if you can, please.  
15 A. Experts in those discussions, as I said  
16 earlier, explained things such as we do an analysis --  
17 one does, in order to meet standard review plan does an  
18 analysis of the cask, assuming it drops a certain  
19 distance, this creates certain accelerations in the  
20 canisters, and here's the level of these accelerations  
21 that are typically identified by people who do these  
22 calculations. And those are important numbers to me.  
23 I guess that includes the person's -- he's reporting  
24 that information to me. Let's say I trust what he  
25 said, put it that way. That in a sense depends on his

PAGE 76

76

1 opinion and my opinion of that person, as well as I  
2 know him.  
3 Q. And I presume that you were allowed, you and  
4 other experts were allowed to ask follow-up questions  
5 on the presentation of material at these meetings or  
6 conference calls?  
7 A. Yes.  
8 MS. NAKAHARA: Okay, I have no other  
9 questions. Thank you.  
10 MR. TURK: Let me take a minute here,  
11 please. You're all done?  
12 MS. NAKAHARA: Uh-huh, unless I want to  
13 follow up on anything you ask.  
14 FURTHER EXAMINATION  
15 BY MR. TURK:  
16 Q. Dr. Cornell, in listening to your  
17 questions -- your answers to that last set of  
18 questions --  
19 A. Yes.  
20 Q. -- it's my impression that what you were  
21 describing was information provided at the meeting with  
22 ICF --  
23 A. Yes.  
24 Q. -- as to how the process works, as to how  
25 cask drop is analyzed typically in meeting the standard

PAGE 77

77

1 review plan. Is that what you were saying?  
2 A. That's a good example of the kind of  
3 information that I had not encountered before in my  
4 professional background. And that is relevant to my  
5 forming an opinion about the conservatism implied by  
6 design-basis ground motion of 2,000 years.  
7 Q. Again, it sounds like what you're describing  
8 is, if you will excuse the term, the education that you  
9 received in the meeting as to how the process -- how  
10 the analysis typically is done in meeting the standard  
11 review plan.  
12 A. Correct.  
13 Q. Is that correct?  
14 A. Yeah.  
15 Q. And it's that education that you received at  
16 the meeting as to the general process that you say you  
17 considered when you were evaluating the PFS 2,000-year  
18 return period?  
19 A. Correct.  
20 MR. TURK: Thank you.  
21 MR. GAUKLER: I have one follow-up question.  
22 In your evaluation of the PFS -- appropriateness of the  
23 PFS design level, did you rely upon any particular  
24 options or that were considered in terms of standards  
25 for setting a design-basis standard for Part 72?

PAGE 78

78

1 THE WITNESS: No.  
2 MR. GAUKLER: Okay.  
3 MS. NAKAHARA: I have no further questions.  
4 (Deposition was adjourned at 11:28 a.m.)  
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In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

SHEET 8 PAGE 79

79

C E R T I F I C A T E

1 State of Utah )  
2 ss.  
3 County of Utah )  
4 I, Vicky McDaniel, a Registered Merit  
5 Reporter and Notary Public in and for the State of  
6 Utah, do hereby certify:  
7 That the deposition of Dr. C. Allin Cornell,  
8 the witness in the foregoing deposition named, was  
9 taken on November 1, 2001, and that said witness was by  
10 me, before examination, duly sworn to testify the  
11 truth, the whole truth, and nothing but the truth in  
12 said cause;

13 That the testimony of said witness was  
14 reported by me in stenotype and thereafter transcribed  
15 into typewriting and that a full, true, and correct  
16 transcription of said testimony so taken and  
17 transcribed is set forth in the preceding pages.

18 I further certify that I am not of kin or  
19 otherwise associated with any of the parties of said  
20 cause of action and that I am not interested in the  
21 event thereof.

22 WITNESS MY HAND and OFFICIAL SEAL at Saratoga  
23 Springs, Utah, this 2nd day of November, 2001.

24 Vicky McDaniel, RMR  
25 Utah License No. 87-108580

PAGE 80

80

1 Case: In the Matter of Private Fuel Storage  
2 Case No.: ASLPB No. 97-732-02-ISFSI  
3 Reporter: Vicky McDaniel  
4 Date taken: November 1, 2001

WITNESS CERTIFICATE

5 I, Dr. C. Allin Cornell, HEREBY DECLARE:

6 That I am the witness referred to in the  
7 foregoing testimony; that I have read the transcript  
8 and know the contents thereof; that with these  
9 corrections I have noted, this transcript truly and  
10 accurately reflects my testimony.

11 PAGE-LINE	12 CHANGE/CORRECTION	13 REASON
--------------	----------------------	-----------

14 \_\_\_\_\_ No corrections were made.

15  
16  
17  
18  
19 SUBSCRIBED and SWORN to at Dr. C. Allin Cornell  
20 , this day of  
21 2001.  
22

23 Notary Public  
24  
25

In the Matter of Private Fuel Storage  
Dr. C. Allin Cornell, Vol. II \* November 1, 2001

Exhibit 2



OFFICE OF THE  
GENERAL COUNSEL

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

ATTORNEY  
GENERAL

OCT 11 2001

ENVIRONMENT

October 5, 2001

Denise Chancellor, Esq.  
Utah Attorney General's Office  
160 East 300 South, 5th Floor  
P.O. Box 140873  
Salt Lake City, Utah 84114-0873

In the Matter of  
Private Fuel Storage, L.L.C.  
(Independent Spent Fuel Storage Installation)  
Docket No. 72-22-ISFSI

Dear Ms. Chancellor:

Enclosed please find a list of documents in the possession of the NRC Staff ("Staff") which may be responsive to the State of Utah's ("State's") request for production of documents pertaining to Utah Contention L, Part B, contained in the "State of Utah's Twelfth Set of Discovery Requests Directed to the NRC Staff." These documents consist of two groups: (a) documents that appear to be available in the public docket, and (b) documents that are being withheld as privileged or otherwise exempt from disclosure under 10 C.F.R. § 2.790.

Documents relating to Utah Contention L, Part B that have previously been produced by the Staff (see, e.g., documents provided with my letter of March 7, 2000), or that are in the docket of the Private Fuel Storage ("PFS") proceeding (including legal correspondence, pleadings, Orders, license application submittals, and licensing-related correspondence), are not identified herein. Those materials should already be in the State's possession, as a result of the State's participation as a party in the PFS proceeding and its inclusion on the PFS and Staff service lists.

In addition, copies of the following documents, which may not be readily accessible by the State, are provided herewith:

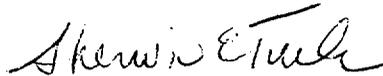
1. Official Transcript of Public Meeting on Use of Risk Information in Regulating Nuclear Waste and Materials - Case Study on TMI-2, July 31, 2001;
2. Agenda and two slides for Public Meeting to Discuss Use of Risk Information in Regulating Nuclear Waste and Materials - Case Study on TMI-2 [ISFSI] Seismic Exemption, July 31, 2001;
3. Slides, "Risk Information in the Regulation of Materials and Waste Disposal - Case Study on the Seismic Exemption for the [TMI-2 ISFSI], July 31, 2001;

Denise Chancellor, Esq.  
October 5, 2001  
Page 2

4. Slides, "Case Study on the [TMI-2 ISFSI], Albert Wong (NRC), July 31, 2001;
5. Technical Issues Related to Siting Criteria and Seismic Design of ISFSI Using DCSS," Paper ID No. 1504, by B. Tripathi (SAIC) and M. Shah (NRC) [Aug. 12-17, 2001]; and
6. Memo, "Summary - Stakeholder Meeting to Discuss Case Study on the DOE/INEEL TMI-2 Fuel Debris [ISFSI] Exemption," from J. Shin (NRC) to L. Kokajko (NRC), Sept. 17, 2001.

In the event that any further documents responsive to the State's discovery requests are located, they will be identified or forwarded promptly to the State. Please contact me if you have any difficulty obtaining copies of any documents identified in the Attachment hereto as publicly available.

Sincerely,



Sherwin E. Turk  
Counsel for NRC Staff

cc w/Encl.: Jay Silberg, Esq.  
cc w/out Encl.: Service List

**B. Documents Withheld Under a Claim of Privilege.<sup>2</sup>**

<u>Date</u>	<u>Author</u>	<u>Recipient</u>	<u>Subject</u>	<u>Privilege Asserted</u>
--	--	--	Options for Part 72 Rulemaking Plan	PD
4/98	NMSS		Request for Extension of Rulemaking Plan Schedule; WITS NO. 9600161	PD
--	--	--	Seismic Rulemaking Plan Chronology	PD
5/1/98	D. Cool	J. Funches B. Shelton J. Gray	Memo forwarding, for comment, "Rulemaking Plan: Geological and Seismological Characteristics of Dry Cask ISFSIs - 10 CFR Part 72" (Pt. 72 Rulemaking Plan)	PD
--	NRC	NMSS	"NRR Comments on Pt. 72 Rulemaking Plan	PD
5/11/98	D. Cool	J. Funches et al.	Memo forwarding Rulemaking Plan for office concurrence	PD
5/20/98	E. Jensen	NRC	OGC informal comments on Rulemaking Plan	AC, AWP, PD
5/21/98	J. Gray	D. Cool	OGC Comments on Rulemaking Plan	AC, AWP, PD
10/29/98	C.W. Reamer	J. Piccone	Memo Re: Task Interface Agreement (TIA) on Pt. 72 Rulemaking	PD
11/4/98	C. Paperiello	S. Collins A. Thadani	Memo Re: TIA on Pt. 72 Rulemaking	PD
12/1/98	A. Thadani	C. Paperiello	Memo Re: TIA on Pt. 72 Rulemaking	PD

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<sup>2</sup> The following abbreviations are used herein: AC - attorney-client privilege; AWP - attorney work product; PD - predecisional deliberative process.

1/5/99	--	--	List of Attendees - 1/5/99 Staff Meeting	PD
2/4/99	--	--	Agenda for NRC WG Meeting With ICF & Other Consultants	PD
2/4/99	--	--	List of Attendees - 2/4/99 Consultant/Staff Meeting	PD
11/10/99	--	--	Record of Conference Call - Panel of Experts	PD
11/16/99	B. Tripathi	NRC Staff	List of Requests for Info./ Guidance Submitted by the "Expert Panel"	PD
11/17/99	--	--	Working Group (WG) Meeting Issues	PD
12/1/99	--	--	List of Attendees - Pt. 72 Rulemaking WG Meeting	PD
12/7/99	--	--	Comments on SAIC Proposed Additional Scope of Work	PD
1/6/00	D. Hammer B. Tripathi	K. McDaniel	Memo Re: Revised Scope For Subtask 1.5	PD
1/7/00	L. Kokajko	J. Kimball	Letter - "Subject: Request for DOE Support Regarding 10 CFR Part 72 Amendment"	PD
1/11/00	D. Hammer B. Tripathi	K. McDaniel	Memo Re: Subtask 1.1 - Recommendations and Basis For Graded Approach for Design	PD
1/21/00	--	--	Agenda for 1/21/00 WG Meeting Pt. 72 Rulemaking	PD
1/27/00	Advisory Comm.	D. Hammer (ICF)	Memo Re: NRC ISFSI Project	PD
2/15/00	B. Tripathi	NRC Staff/ Distribution	Fax forwarding White Paper Re: Technical Justifications for Rulemaking Recommendations	PD

2/17/00	--	NRC Staff	Summary of Teleconference w/ ICF/SAIC and Expert Panel Members on 2/17/00	PD
3/1/00	D. Hammer	K. McDaniel	Memo Re: Proposed Requirements for Dry Cask Storage	PD
3/7/00	B. Tripathi D. Hammer	NRC	Consultant Notes Re: technical basis for Pt. 72 Rulemaking	PD
3/7/00	B. Tripathi D. Hammer	K. McDaniel	Memo Re: Summary of Issues Discussed During 2/17/00 Teleconference Call	PD
3/12/00	B. Tripathi	NRC	Consultant Notes Re: technical basis for Pt. 72 Rulemaking	PD
3/14/00	D. Hammer B. Tripathi	Expert Panel Members	Memo - "Subject: Upcoming Meeting (03-16-2000) on 10 CFR Part 72 Rulemaking	PD
3/16/00	--	--	Meeting Notes, Agenda, Contact List -NRC/ICF/Expert Panel Meeting - SAIC [Germantown] Pt. 72 Rulemaking	PD
3/29/00	B. Tripathi	--	Draft - "Technical Bases in Support of Recommendations to Use Risk-Based Approach In Design of SSCs for DCSS/ ISFSIs Applications"	PD
5/10/00	NRC	--	Draft - Proposed SFPO Position for Part 72 Rulemaking	PD
6/5/00	B. Tripathi	--	"Regulatory Guide X.XXX: Site Evaluations and Determination of Design Earthquake Ground Motion for Seismic Design of Independent Spent Fuel Storage Installations (ISFSIs)" (Draft Rev. 2, June 5, 2000)	PD

6/7/00	B. Tripathi J. Kimball B. Kennedy	--	Review Comments on: "Draft" Proposed SFPO Position for Part 72 Rulemaking (Revised 6-1-2000)	PD
6/7/00	K. MCDaniel	--	Handwritten Comments on Proposed SFPO Position	PD
7/6/00	K. Manoly	K. McDaniel	Memo forwarding Comments on Draft Regulatory Guide, Draft/Rev.2	PD
8/18/00	D. Damon	M. Shah	Comments on Proposed SFPO Position on Pt. 72 Seismic Criteria (8-10-200 version)	PD
9/11/00 11/27/00 3/1/01 5/11/01	NRC	--	Drafts of "Technical Basis for Revisions to 10 CFR Part 72 - [Draft] Final Report"	PD
10/00	NRC	--	Draft Document - "Regulatory Guide X.XXX: Site Evaluations And Determination of Design Earthquake Ground Motion for Seismic Design of Independent Spent Fuel Storage Installations (ISFSIs)"	PD
2/2/01 2/12/01	NRC	--	Draft Document - "Regulatory Guide ____: Site Evaluations And Determination of Design Earthquake Ground Motion for Seismic Design of Independent Spent Fuel Storage Installations (ISFSIs)," RG Rev 3-icf and RG Rev 4-icf	PD
5/16/01 - 8/15/01	NRC	--	Part 72 Seismic Rulemaking Schedule - various drafts	PD
6/6/01	D. Cool	NRC Mgmt.	"Review and Concurrence: Modified Rulemaking Plan: 10 CFR Part 72"	PD
6/11/01	M. Lesar	D. Cool	Memo Re: Office Concurrence on Draft Pt. 72 Modified Rulemaking Plan	PD

6/15/01	NRC	--	"Environmental Assessment of Geological and Seismological Characteristics For Design of Dry Cask Independent Spent Fuel Storage Installations (10 CFR Part 72) - Preliminary Draft Report"	PD
6/19/01 7/5/01 7/19/01	NRC	--	Resource Needs in Support of Expedited Part 72 Rulemaking - various drafts	PD
6/25/01	M. O'Neill	K. McDaniel	OGC Review of Modified Rulemaking Plan	AC, AWP, PD
7/18/01	NRC		"Regulatory Analysis of Geological and Seismological Characteristics for Design of Dry Cask Independent Spent Fuel Storage Installations (10 CFR Part 72), Preliminary Draft Report	PD
8/20/01	D. Cool	J. Greeves et al.	Request for Assistance for Expedited Rulemaking to Revise 10 CFR Part 72	PD
9/17/01	NRC	--	Draft of Proposed Rule - 10 CFR Part 72	PD
9/01	NRC	--	"Draft Regulatory Guide DG-3021: Site Evaluations And Determination of Design Earthquake Ground Motion For Seismic Design of Independent Spent Fuel Storage Installations"	PD
9/26/01	W. Travers EDO, NRC	Commissioners	SECY-01-0178: Modified Rulemaking Plan: 10 CFR Part 72 -- "Geological and Seismological Characteristics For Siting and Design of Dry Cask Independent Spent Fuel Storage Installations"	PD

--	NRC	--	"NRC Data Request on Seismic Design of Dry Cask ISFSIs"	PD
10/1/01	A. Wong	--	Draft Technical Report - "Risk Informing the Storage of Spent Nuclear Fuel"	PD
--	NRC	--	Draft Update of SECY-00-213, "Risk-Informed Regulation Implementation Plan" - Pt. 72 entry	PD
--	NRC	--	Various undated notes, charts, outlines, lists, etc., used for internal staff meetings/briefings and/or for personal use	PD, AWP, and/or AC
3/98 - 10/01	NRC/NRC Contractors		Approximately 700 e-mails relating to Pt. 72 seismic rulemaking activities, generally falling into the following categories: development/Staff Review of SECY-98-126 (approx. 30); development/Staff review of technical basis for Part 72 rulemaking, supporting documents, and/or modified rulemaking plan (approx. 550); OGC legal review/communications (approx. 65); scheduling matters (approx. 30); financial/resource issues (approx. 50); and TMI Unit-2 seismic exemption case study (approx. 5). May include duplicate copies, from various recipients.	PD, AWP, and/or AC
Various (1998-2001)	NRC		File folder and two 3-ring Binders containing documents Related to contract(s) for technical assistance between NRC and third parties (ICF, SAIC), related to development of probabilistic geological and seismic standards for siting and design of dry cask ISFSIs.	PD, proprietary