RAS 2568

OFFICIAL TRANSCRIPT OF PROCEEDINGS
UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: CAROLINA POWER & LIGHT COMPANY (Shearon Harris Nuclear Power Plant)

Docket No.: 50-400-LA

Work Order No.: NRC-1599

LOCATION: Raleigh, NC

DATE: Thursday, December 7, 2000

PAGES: 443 - 706

ANN RILEY & ASSOCIATES, LTD.
1025 Connecticut Avenue, NW, Suite 1014
Washington, D.C. 20036
(202) 842-0034

Template= SECY-032

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3

4 - - - - - - - - - - - - - - - - - -X

5 In the Matter of: :

6 CAROLINA POWER & LIGHT COMPANY : Docket No. 50-400-LA

7 :

8 (Shearon Harris Nuclear Power : ASLBP No. 99-762-02-LA

9 Plant) :

10 - - - - - - - - - - - - - - - - - -X

11

12 **TRANSCRIPT OF THE ORAL ARGUMENT**

13

14 Jane S. McKimmon Conference Center

15 North Carolina State University

16 Corner of Gorman Street & Western Avenue

17 Raleigh, North Carolina

18

19 Thursday, December 7, 2000

20

21 The above-entitled matter came on for hearing,

22 pursuant to notice, at 9:30 a.m.

23

24

25

1 APPEARANCES:

2 On Behalf of the Licensing Board:

3 G. PAUL BOLLWERK, III, Chairman

4 DR. PETER S. LAM

5 THOMAS D. MURPHY

6

7 On Behalf of the CP&L:

8 JOHN H. O'NEILL, JR.

9 DOUGLAS J. ROSINSKI

10 Shaw, Pittman, Potts & Trowbridge

11 2300 N Street, NW

12 Washington, D.C. 20037-1128

13

14 On Behalf of the BCOC:

15 DIANE CURRAN

16 Harmon, Curran, Spielberg & Eisenberg

17 1726 M Street, NW #600

18 Washington, D.C. 20036

19

20 On Behalf of the Staff:

21 SUSAN L. UTTAL

22 JENNIFER EUCHNER

23 U.S. Nuclear Regulatory Commission

24 Washington, D.C. 20555

25

1 TABLE OF CP&L EXHIBITS

2 1. Exhibit #1 Dr. Thompson's "Requirements For A
3 Comprehensive Analysis"
4 2. Exhibit #2 Table 5 - 1
5 3. Exhibit #3 Table 5
6 4. Exhibit #4 Harris Fuel Handling Building
7 5. Exhibit #5 Site Schematic
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Dr. Thompson's "Requirements For A Comprehensive Analysis"

	CP&L	NRC Staff	BCOC
Expert Team	✔	✔	
Degraded Core Accident at Harris (Level 1 PRA)			
• Consider internal and external initiating events	✔	✔	✔
• State-of-the-art analysis	✔	Δ	
Containment Failure or Bypass			
• Build upon the Level 1 PRA	✔	✔	
• Represents state-of-the-art for Level 2 PRAs	✔	Δ	
• Significant pathways for radioactive material release identified	✔	✔	
• Transport and distribution of radioactive material modeled	✔	✔	
Loss of Spent Fuel Pool Cooling and Makeup			
• Extend Level 1 PRA to address interruption of spent fuel pool cooling and makeup	✔	Δ	
• Extend Level 2 PRA to address onsite distribution of radioactive material impact on spent fuel pool cooling and makeup	✔	Δ	
Onsite Radiation Exposure			
• Characterize radiation environment at critical locations	✔	✔	
• Characterize other factors that could affect human performance	✔	✔	
• Primarily deterministic analysis	✔	✔	
Effect of Onsite Radiation Exposure On Plant Operation			
• Actions by personnel and equipment precluded by radiation or other factors	✔	✔	✔
• Scenarios whereby pool cooling and makeup may be restored identified	✔	✔	
• Radiation exposure precluding human action identified	✔	✔	✔
• Characterize required human actions, infrastructure, and preparations	✔	✔	✔
• Assess probability that scenarios could be implemented	✔	✔	
Loss of Pool Water by Evaporation			
• Deterministic calculation examining a range of assumed heat loads and gate positions	✔	✔	✔
Initiation of Exothermic Oxidation Reactions			
• Assess the potential for self-sustaining exothermic reaction	✔(1.0)	✔(1.0)	✔(1.0)
Uncertainty			
• Sensitivity Evaluation	✔		
• Conservative Upper Bound		✔	✔*
Peer Review			
• PRA	✔	✔	
• Spent Fuel Heatup Analysis	✔	✔	

Source: ERIN Engineering Report

Table 5-1

SHNPP SFPAET RESULTS BASE CASE
ACCIDENT SEQUENCE FREQUENCIES (CASE A)

Event	Description of Events that Involve Initiators, Core Damage, and Containment Failure or Bypass	Input from Level 1 & 2 Quantification[1]	Output from SFPAET[2]
Internal Events			
ISLOCA	INTERFACING SYSTEMS LOCA	9.97E-9	7.44E-10
LG-SGTR	LARGE STEAM GENERATOR TUBE RUPTURE	1.57E-06	3.44E-09
SM-SGTR	SMALL STEAM GENERATOR TUBE RUPTURE	1.51E-06	3.31E-09
LG-ISOL	LARGE ISOLATION FAILURE	7.59E-08	9.77E-10
SM-ISOL	SMALL ISOLATION FAILURE	1.88E-07	2.59E-09
EARLY	EARLY CONTAINMENT FAILURE	3.14E-08	1.15E-09
LATE	LATE CONTAINMENT FAILURE	4.28E-06	1.43E-08
Total Internal Events Contribution		7.67E-06	2.65E-08
Fire Induced Events			
EARLY	EARLY CONTAINMENT FAILURE	2.95E-09	7.98E-11
LATE	LATE CONTAINMENT FAILURE	9.77E-07	2.86E-09
Total Fire Events Contribution		9.80E-07	2.94E-09
Total Seismic Contribution		-	8.65E-08
Shutdown Events			
SHDN	SHUTDOWN WITH CONTAINMENT BYPASS	7.2E-07	1.45E-08

(1) CDF with containment failure, bypass, or containment isolation failure (per year).

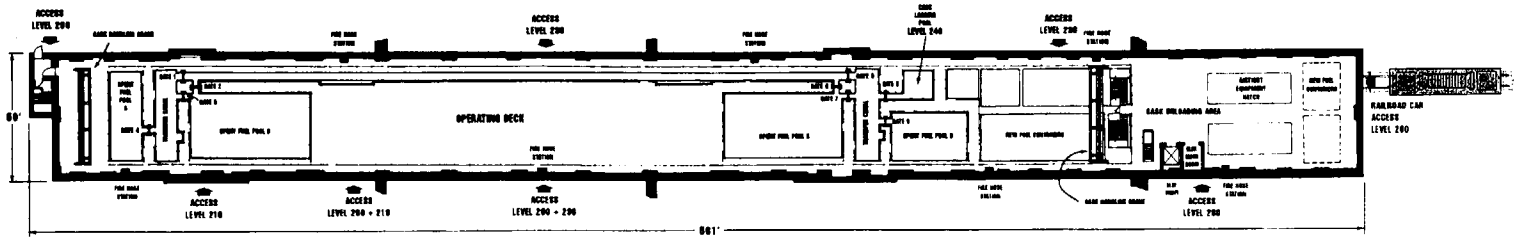
(2) Frequency of the loss of effective water cooling to the spent fuel (per year).

Source: Gordon Thompson Report

TABLE 5

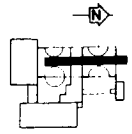
ELEMENTS OF A MINIMUM VALUE FOR THE BEST ESTIMATE OF THE OVERALL PROBABILITY OF THE SEVEN-PART EVENT SEQUENCE IDENTIFIED BY THE ASLB

Stage of Sequence	Probability
(1) Degraded-core accident (Occurrence of selected sequences)	Point Est. Prob. = 3.1×10^{-5} per yr Range = 0.4×10^{-5} to 2.4×10^{-4} per yr
(2) Containment failure or bypass (For selected degraded-core sequences)	Conditional Prob. = 0.5
(3) Loss of spent fuel cooling and makeup (For selected degraded-core sequences)	Conditional Prob. = 1.0
(4) Extreme radiation environment onsite (Assuming containment bypass)	Conditional Prob. = 1.0
(5) Restart of pool cooling or makeup (Assuming extreme radiation env.)	Conditional Prob. = zero
(6) Loss of pool water by evaporation (Assuming no restart of cooling or makeup)	Conditional Prob. = 1.0
(7) Initiation of exothermic oxidation reaction in pools C and D (Assuming loss of water)	Conditional Prob. = 1.0
BEST ESTIMATE OF OVERALL PROB. OF INITIATION OF EXO. OXIDATION REACTION IN POOLS C & D (For selected degraded-core sequences)	Point Est. Prob. = 1.6×10^{-5} per yr Range = 0.2×10^{-5} to 1.2×10^{-4} per yr

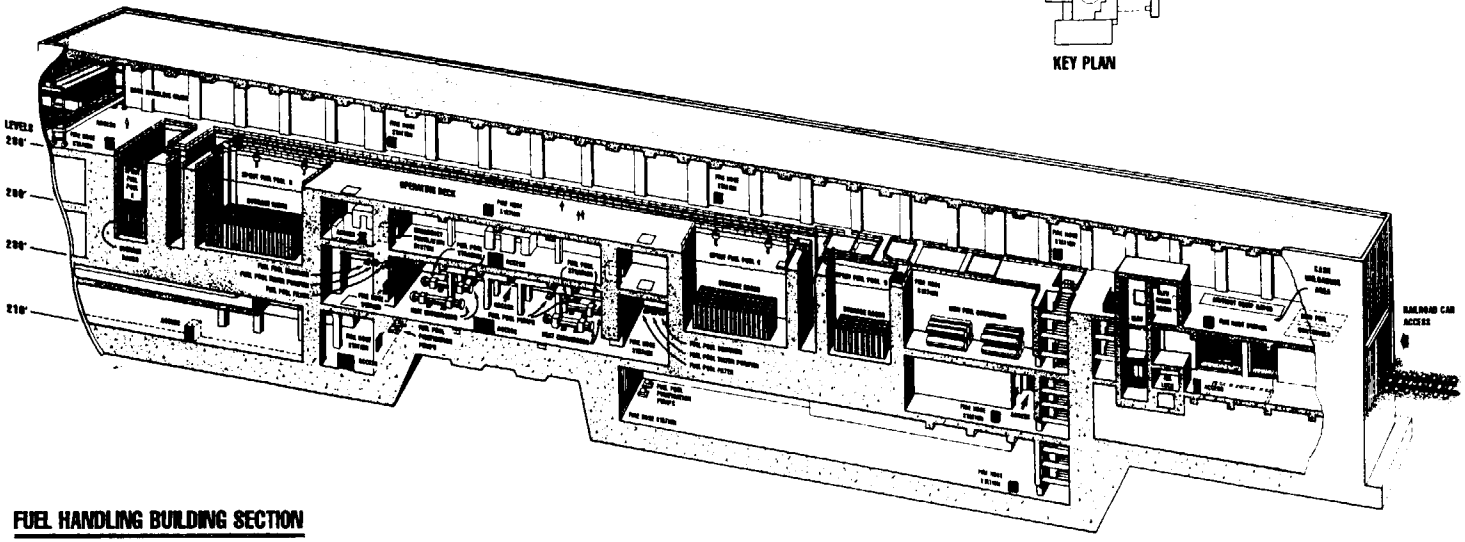


OPERATIONS DECK PLAN

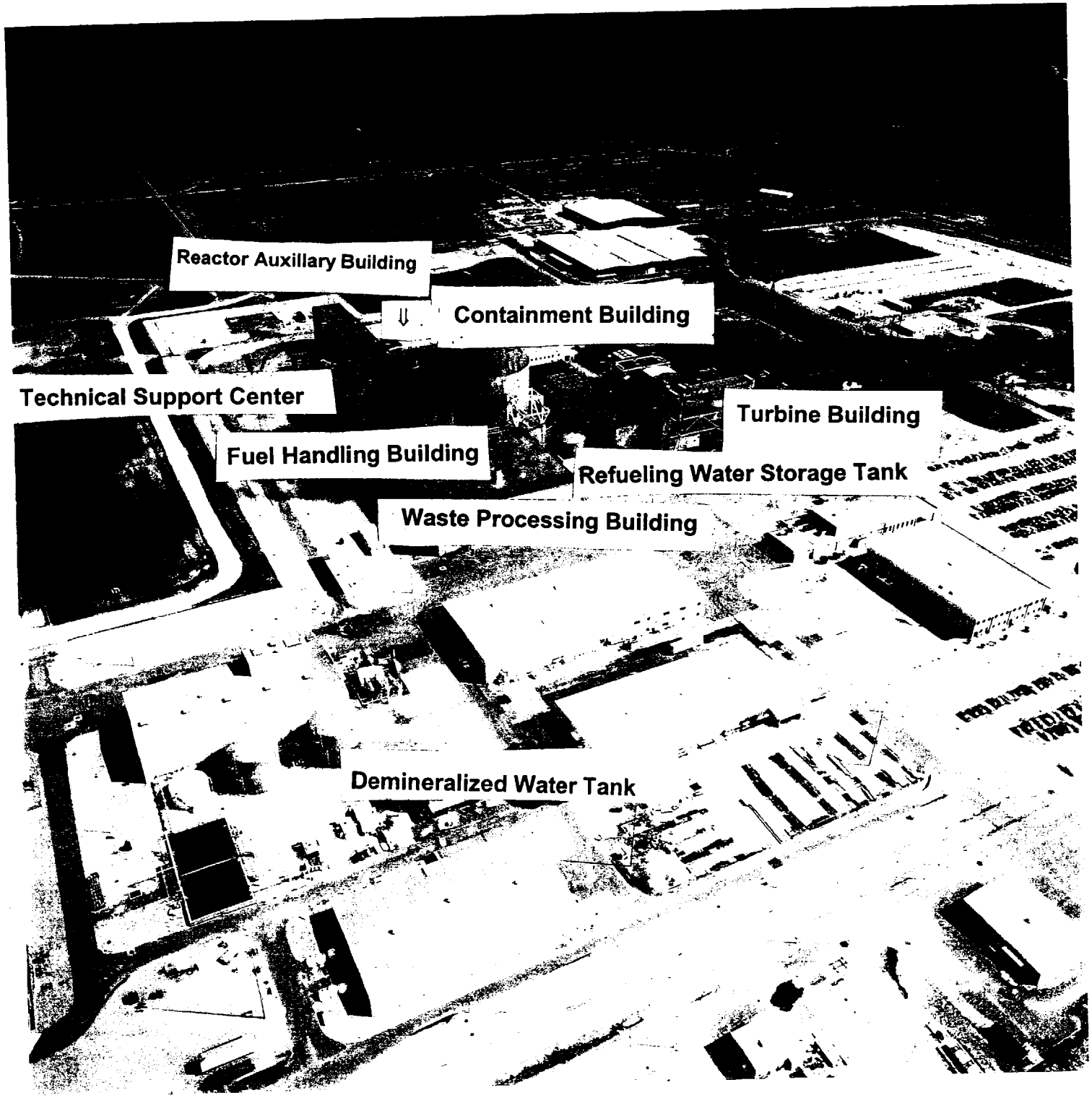
LEVEL 290'



KEY PLAN



FUEL HANDLING BUILDING SECTION


Reactor Auxillary Building
Containment Building
Technical Support Center
Turbine Building
Fuel Handling Building
Refueling Water Storage Tank
Waste Processing Building
Demineralized Water Tank

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

2 (9:30 a.m.)

3 CHAIRMAN BOLLWERK: Good morning. Pursuant to
4 Title 10 of the Federal Regulations, Part Two, Subpart K,
5 we're here today to conduct an oral argument in the Carolina
6 Power and Light Company proceeding.
7 Before beginning the argument, however, I would
8 like to take a few minutes to review how it came to this
9 point in the proceeding and how the Subpart K procedural
10 mechanism operates in this instance.
11 This proceeding began when in response to a
12 January 13th, 1999, Notice of Opportunity for a Hearing,
13 which was published in Volume 64 of the Federal Register,
14 beginning at page 2,237, Intervenor Board of Commissioners
15 of Orange County, North Carolina, requested a hearing to
16 challenge the December 23rd, 1998, application of Carolina
17 Power and Light Company to amend the operating license for
18 its Shearon Harris facility to add spent fuel rack modules
19 to spent fuel pools C and D and place those pools in
20 service.
21 Thereafter, in early April and May of 1999, the
22 Board of Commissioners submitted eight proposed issues for
23 hearing.
24 CP&L and the NRC Staff filed responses to those
25 issue statements as well as the Board of Commissioners'

1 arguments about why it had legal standing to be a party to
2 this proceeding.
3 In mid-May, 1999, we conducted a day-long pre-
4 hearing conference in Chapel Hill, North Carolina, during
5 which these participants had an additional opportunity to
6 make oral presentations regarding the issues of Petitioner
7 Orange County's standing to intervene and the admissibility
8 of its eight proffered contentions.
9 Based on the parties' filings and their oral
10 argument on July 12th, 1999, in LBP-99-25, a ruling reported
11 in Volume 50 of Nuclear Regulatory Issuances, beginning at
12 page 25, we concluded that Orange County had standing to
13 intervene and had provided two admissible contentions or
14 issues so as to warrant its admission as a party to this
15 proceeding.
16 These two issues designated as Technical
17 Contentions 2 and 3, or TC-2 and TC-3 for short, concerned
18 respectively the adequacy of the measures proposed by CP&L
19 to prevent fatality in spent fuel pools C and D and the
20 sufficiency of CP&L's quality assurance measures relative to
21 the piping and equipment for those pools.
22 Generally following such a ruling on standing
23 contentions, the parties would proceed under the Agency's
24 Rule 10, Code of Regulations Part Two, Subpart G, which
25 provide for a formal trial type hearing.

1 In this instance, however, because CP&L's
2 amendment request involved the expansion of its spent fuel
3 pool capacity, any of the parties could invoke a separate
4 set of procedural rules found in Subpart K of Part Two of
5 the Commission's Regulations.
6 These Rules, promulgated in response to Section
7 134 of the Nuclear Waste Policy Act of 1982, provide for a
8 period of discovery among the parties filed by simultaneous
9 written submissions by the parties in an oral argument
10 before the Licensing Board addressing the central issue of
11 whether, relative to the admitted contentions, there are any
12 disputed issues of fact or issues of law that require an
13 evidentiary hearing.
14 Considering the parties' filings and the oral
15 argument, the Board is then to issue a decision that
16 designates those matters that require an evidentiary hearing
17 and dispose of any issues that do not require such a
18 hearing.
19 As was its right, CP&L invoked to use the Subpart
20 K procedure.
21 As a consequence, pursuant to a Board established
22 schedule, the parties engaged in discovery regarding the
23 admitted contentions and provided the Board with their
24 written submissions in early January, 2000, which included
25 affidavits of supporting witnesses and documentary and

1 videotaped materials.

2 On January 21st, 2000, the Board conducted a

3 day-long oral argument relative to these pleadings.

4 Thereafter, in a May 5th, 2000, Ruling LBT-00-12, found in

5 Volume 51 of NRC Issuances beginning at page 247, the Board

6 concluded that relative to the two admitted technical

7 contentions, the Board of Commissioners had failed to show

8 there was a genuine and substantial dispute that could be

9 resolved only by introduction of evidence at an evidentiary

10 hearing and that CP&L had met its burden to establish that

11 those aspects of its proposed licensing action were

12 challenged and the Board of Commissioners' technical

13 contentions were in compliance with the requirements of the

14 Atomic Energy Act and the NRC's implementing regulations.

15 Subsequently, in CLI-00-11, a June 20th, 2000,

16 decision found beginning at page 297 of Volume 51 of NRC

17 Issuances, in rejecting an Orange County request for

18 immediate review of this Licensing Board decision, the

19 Commission held that such an appeal must abide a resolution

20 of the matter that is before the Board this morning.

21 That brings us to the issue that is the subject of

22 the parties' presentations today.

23 As part of our ruling in LBT-99-25 on the Board of

24 Commissioners' initial contentions, we dismissed, albeit it

25 without prejudice, five County contentions designated EC-1

1 through EC-5, that challenged CP&L and NRC Staff's
2 compliance with the National Environmental Policy Act of
3 1969, commonly referred to as NEPA.
4 Our ruling in this regard was based on an NRC
5 Staff determination to prepare an environmental assessment
6 or EA regarding the CP&L spent fuel pool expansion request.
7 Thereafter, in mid-December, 1999, the Staff
8 issued its EA, which can be found in Volume 64 of the
9 Federal Register, beginning at page 71,516, in which it
10 determined that an Environmental Impact Statement, or EIS,
11 was unnecessary relative to the CP&L amendment request
12 because that request did not involve a proposed action that
13 would have a significant effect on the quality of the human
14 environment.
15 Orange County responded in a January 31st, 2000,
16 filing seeking Board consideration of four late filed
17 environmental contentions, which we later designated as EC-6
18 through EC-9.
19 Subsequently in LBT-00-19, an August 7th, 2000,
20 ruling, which can be found beginning at page 85 of Volume 52
21 of NRC Issuances, the Board admitted contention EC-6, in
22 which the County Commissioners challenged the Staff's EA
23 conclusion based on the assertion that a County identified
24 severe accident sequence involving the Shearon Harris spent
25 fuel pools that would result in a significant environmental

1 impact is not remote and speculative, thus requiring that an
2 EIS be prepared.
3 Also, in that decision, knowing that CP&L
4 previously had invoked 10 Code of Regulations, Part Two,
5 Subpart K, pursuant to that procedural scheme, we
6 established a schedule for discovery on this issue and for
7 the filing of written presentations.
8 The latter was submitted on November 20th, 2000,
9 and counsel for the parties are now before the Board to
10 present oral arguments regarding the substantive validity of
11 the challenge to the Staff's environmental assessment
12 determination framed by the admitted Orange County
13 environmental contention and whether any further evidentiary
14 proceedings are required.
15 Before we begin hearing the parties' oral
16 arguments on these matters, I'd like to introduce the
17 Licensing Board members.
18 To my left is Dr. Peter Lam. Judge Lam is a
19 nuclear engineer. He's a full-time member of the Atomic
20 Safety and Licensing Board Panel.
21 To my right is Thomas D. Murphy. Judge Murphy,
22 who is a health physicist, also is a full-time member of the
23 Panel.
24 Judge Murphy was appointed to this Licensing Board
25 in September, 2000, following the untimely death of Judge

1 Frederick J. Sean.

2 My name is Paul Bollwerk. I'm an attorney and the

3 Chairman of this Licensing Board.

4 At this point I think Judge Lam would like to say

5 a few words.

6 JUDGE LAM: Thank you, Judge Bollwerk. I'd like

7 to take a moment to pay respect to Judge Fred Sean, who

8 passed away three months ago.

9 Judge Sean was critically ill in the past two

10 years while he was serving on this Licensing Board, but he

11 showed up every day for work, even during difficult times of

12 chemotherapy and radiation treatment.

13 Judge Sean's last official day was spent in the

14 office talking to Judge Bollwerk and me on the matters of

15 this particular case.

16 Judge Sean's last official ruling was the one

17 admitting this particular contention currently before us.

18 His dedication to public service earned our

19 highest respect and admiration.

20 This concludes my opening remarks and thank you

21 for listening.

22 CHAIRMAN BOLLWERK: Judge Murphy and I would

23 obviously echo Judge Lam's remarks about Judge Sean.

24 He was an outstanding Licensing Board Panel

25 member.

1 At this point, I'd like to have Counsel for the
2 parties identify themselves for the record.
3 Why don't we start with Counsel for Orange County,
4 then move to the Counsel for the Applicant, Carolina Power
5 and Light Company, and finally, the NRC Staff Counsel.
6 MS. CURRAN: Good morning. My name is Diane
7 Curran. I'm with the firm of Harmon, Curran, Spielberg and
8 Eisenberg in Washington, D.C. I represent Orange County in
9 this proceeding.
10 With me this morning is Dr. Gordon Thompson, who
11 is Orange County's expert witness.
12 CHAIRMAN BOLLWERK: Good morning. Welcome.
13 CP&L's Counsel?
14 MR. JOHN O'NEILL: Good morning. My name is John
15 O'Neill with the law firm of Shaw, Pittman in Washington,
16 D.C., Counsel for Carolina Power and Light Company.
17 With me at counsel table is an attorney with our
18 firm, Douglas Rosinski.
19 Also with us today is the Assistant General
20 Counsel for Carolina Power and Light, Mr. Steven Carr.
21 I also note that the six CP&L employees who
22 provided affidavits and worked on the Answers to the Board's
23 questions are here today.
24 And in addition, Mr. Jeff Gaber is here, who is
25 with ERIN Engineering and who was the project manager for

1 the effort of ERIN Engineering along with Dr. Burns in
2 answering the Board's questions.
3 In addition, here today is the Chief Nuclear
4 Officer Senior Vice President, Scottie Hinnant, and the Site
5 Vice President of the Harris plant, Jim Sclerola, along with
6 other members of their staff.
7 CHAIRMAN BOLLWERK: All right. Thank you and
8 welcome.
9 NCR Staff?
10 MS. UTTAL: Good morning. I'm Susan Uttal. I am
11 Counsel for the NRC Staff.
12 With me at the table is Jennifer Euchner, also
13 Counsel for the NRC Staff. She will be presenting a portion
14 of the Staff's argument today.
15 We are also accompanied by several of the Staff
16 members who prepared the Staff's affidavit in this matter.
17 CHAIRMAN BOLLWERK: Thank you. Welcome.
18 (Off the Record.)
19 CHAIRMAN BOLLWERK: I hope the background
20 explanation that I've just provided makes it clear what
21 today's proceeding involves.
22 Before we begin with the presentation by Counsel,
23 I'd like to make it clear what this proceeding does not
24 involve.
25 Last year about this time, the Board conducted two

1 days of public sessions in Raleigh and Chapel Hill during
2 which it received what are referred to in NRC parlance as
3 limited appearance statements, that is, comments from
4 members of the public regarding the matters at issue in this
5 proceeding.
6 Today's oral argument is different. This is a
7 judicial proceeding intended to allow Counsel for the
8 parties to provide the Board with their views on the legal
9 and factual matters at issue regarding admitted contention
10 EC-6.
11 As such, we will not be entertaining statements
12 from the public. However, as the Board noted in its July,
13 1999, Notice of Hearing regarding this case, which is
14 published in Volume 64 of the Federal Register, beginning at
15 page 39,542, any member of the public can provide a written
16 limited appearance statement setting forth his or her views
17 on the matters at issue in this proceeding.
18 Such statements should be sent to the Office of
19 the Secretary, US Nuclear Regulatory Commission, Washington,
20 D.C. 20555-001.
21 Attention the Rule Making and Adjudication Staff,
22 with a copy to me as the Chairman of this Licensing Board
23 panel.
24 Now, regarding the order of presentation by the
25 participants in this oral argument, normally the moving

1 party, that is, the party requesting some type of action
2 from the Board, would make the first presentation.
3 In the context of the Subpart K oral argument,
4 however, exactly which party is the moving party is not
5 readily apparent, since as is directed by 10 Code of
6 Regulations, Section 2.1113-A, all parties filed
7 simultaneously.
8 In an unpublished January, 2000, memorandum
9 regarding the oral presentations on the two admitted
10 technical contentions, the Board observed that Section
11 2.1115.B makes it clear that a central question for our
12 consideration and resolution in the context of a Subpart K
13 oral argument is whether there are any disputed factual
14 issues concerning the County's contentions that are
15 appropriate for examination in an evidentiary hearing.
16 In this regard, we noted that the Commission had
17 declared the statement for consideration accompanying the
18 adoption of Subpart K, which can be found in Volume 50 of
19 the Federal Register, at page 41,667, that the burden is,
20 quote, "on the party requesting adjudication," end quote.
21 The parties' November 20th, 2000, written
22 summaries confirmed that the County is requesting that an
23 evidentiary hearing be conducted on one or more aspects of
24 its admitted contention, a suggestion opposed by both CP&L
25 and NRC Staff.

1 Thus, as the Board previously indicated to the
2 parties regarding this argument, Orange County will make the
3 initial presentation followed by responsive arguments from
4 CP&L and the NRC Staff, and then a reply presentation by the
5 County.
6 Let's begin, then, with the presentation by
7 Counsel for Orange County regarding contention EC-6,
8 Environmental Impact Statement Required.
9 Ms. Curran.
10 MS. CURRAN: Thank you. I'd like to start with a
11 little bit of an introduction and an overview of what I'm
12 going to address this morning.
13 I think it will help the Board, and it will also
14 help members of the audience who may not be able to stay all
15 morning. I don't think it will take very long.
16 By gaining admission of Contention EC-6, Orange
17 County has succeeded in its effort to require the NRC Staff
18 to debate in the setting of this NCR Adjudication whether
19 the proposed significant expansion of spent fuel pools
20 storage capacity at the Harris Nuclear Power plant requires
21 the preparation of a full-scale environmental impact
22 statement that examines the impacts of the proposed action
23 and compares the costs and benefits of spent fuel expansion
24 to other reasonably available alternatives such as dry cast
25 storage.

1 In a 1999 environmental assessment, the staff
2 determined that there was no need to prepare an EIS in part
3 because the probability of a severe accident in the pools
4 was so small as to be unworthy of consideration.
5 As a result of the admission of Contention EC-6
6 into this proceeding, the NRC Staff must defend its decision
7 not to prepare an EIS.
8 As the Applicant for the license amendment, CP&L
9 is also in a position of defending the Staff's decision.
10 It's important to recognize that the burden of
11 proof in this adjudication rests with the Staff and CP&L,
12 not with Orange County.
13 Orange County also bears a burden that's imposed
14 by the regulations for this Subpart K proceeding. Orange
15 County bears the burden of demonstrating that it has a
16 significant and material factual dispute with the NRC Staff
17 and CP&L regarding the adequacy of their defense of the
18 decision not to prepare an EIS.
19 It is not Orange County's burden to prove that a
20 severe spent fuel pool accident is so likely as to require
21 an EIS.
22 It is Orange County's burden to show that neither
23 the Staff nor CP&L has justified the Staff's refusal to
24 prepare an EIS. And that's an important distinction.
25 Orange County has satisfied its burden of showing

1 a significant and material factual dispute with the NRC
2 Staff and the Applicant by submitting a technical analysis
3 of the likelihood of a spent fuel pool accident, which is
4 the report by Dr. Gordon Thompson that is attached as
5 Exhibit 2 to Orange County's Subpart K summary.
6 Dr. Thompson's report satisfies the County's
7 burden of demonstrating a material and substantial factual
8 dispute between the parties in two major ways.
9 First, using information provided by the NRC Staff
10 and CP&L, Dr. Thompson has provided a detailed and
11 documented analysis of the seven-part accident scenario that
12 is set forth in LBT-00-19.
13 His analysis demonstrates the plausibility of a
14 severe accident in the Harris spent fuel pools, leading to a
15 major radioactive release.
16 Dr. Thompson's minimum value for a best estimate
17 of the probability of a severe spent fuel pool accident is
18 one point six times ten to the minus 5, with a range from
19 zero point two times ten to the minus 5 to one point two
20 times ten to the minus four.
21 This is within the range of probabilities for
22 which the NRC typically requires an EIS.
23 As will be discussed later, there are also other
24 reasons beyond this quantitative estimate why an EIS should
25 be prepared.

1 Second, Dr. Thompson's analysis shows
2 consideration of a number of significant and material
3 factors affecting the probability of a severe spent fuel
4 pool accident which have been overlooked, ignored or
5 addressed incorrectly by the NRC Staff and CP&L.
6 These include the role of steam generator tube
7 rupture in the probability of containment bypass;
8 the characteristics and behavior of on-site
9 deposition of radioactive material that is released from
10 containment, including release and depositional
11 characteristics of high burn-up fuel;
12 the unacceptability of assuming that command and
13 control centers are habitable during high radiation levels
14 in an accident;
15 and finally, that the likelihood of an exothermic
16 reaction in pools C and D can be calculated
17 deterministically.
18 In this oral argument, Orange County will identify
19 the points of dispute between the County an the NRC Staff
20 and CP&L regarding these deficiencies in the Staff's and
21 CP&L's analyses.
22 Orange County will also discuss the other
23 significant and material factual disputes it has with the
24 NRC Staff and the Applicant regarding the quality and the
25 reliability of the analyses used to justify the staff's

1 refusal to prepare an EIS, such as whether the studies were
2 subject to independent peer review.
3 Orange County will also address the question of
4 whether the Staff's and CP&L's analyses are fundamentally
5 flawed in a legal sense because they necessarily assume that
6 the Harris plant workers will incur harm in the form of high
7 radiation doses in order to stop a severe accident from
8 progressing.
9 It would violate NEPA if the Staff were allowed to
10 justify its refusal to prepare an EIS on the basis of an
11 analysis that assumes significant environmental harm of
12 another sort.
13 In addition, Orange County will address the
14 significant role that uncertainty plays in determining
15 whether to prepare an EIS in this case.
16 As all parties agree, there are significant
17 uncertainties inherent in PRA.
18 There is a dispute, however, as to how these
19 uncertainties should be addressed.
20 Orange County believes that in light of the
21 significant uncertainties here, a conservative approach be
22 taken with respect to any decision regarding the preparation
23 of an EIS.
24 Finally, Orange County will address the completely
25 baseless attacks by the NRC Staff and CP&L on the

1 qualifications of Orange County's expert witness, Dr. Gordon
2 Thompson.
3 I'd like to--I'd just like to make clear that I am
4 not going to review all the points that were made in the
5 summary or in Dr. Thompson's report.
6 I see the purpose of this oral argument as
7 engaging the issues with the Staff and CP&L and also
8 addressing the arguments that are made in their briefs that
9 have not been previously addressed in our findings.
10 And I hope that you will ask me questions about
11 anything in our filings that are unclear to you.
12 CHAIRMAN BOLLWERK: All right.
13 MS. CURRAN: I'd like to start by addressing the
14 burden of proof in this proceeding, because both the NRC
15 Staff and CP&L make erroneous arguments about what that is.
16 As I previously stated, the burden of proof in
17 this proceeding is on the NRC staff and CP&L.
18 The NRC staff says that Orange County has the
19 burden of showing that a severe accident is not remote and
20 speculative. I don't think that is correct.
21 It is the NRC Staff, now that Contention EC-6 is
22 in play, which has the burden of defending its decision not
23 to prepare an EIS, of defending its determination that the
24 accident is remote and speculative in nature.
25 CP&L for its part cites a number of cases in which

1 courts reviewed agency decisions, applying the standard,
2 looking for clear and convincing evidence that the Plaintiff
3 had to show or the Appellant had to show.
4 That is not the posture that we're in here.
5 The NRC Staff is not the ultimate spokesman for
6 the Nuclear Regulatory Commission.
7 Once the NRC as a commission makes the decision
8 about whether to prepare an EIS, if the party goes to a
9 review in court, then the Commission's decision will stand
10 unless it contains clear error.
11 But in this situation, it is the Staff that has
12 the burden of justifying its decision in this proceeding as
13 the advocate of the issuance of the license amendment.
14 And for that I rely on Louisiana's Energy Services
15 Case 44-NRC-331, 1996.
16 And I would note that I didn't note in the brief
17 that that case was later affirmed by the Commission on
18 environmental grounds. It was reversed on financial
19 qualification grounds.
20 And I would also direct the Board's attention to
21 one of the Hope Creek cases.
22 There's a series of Hope Creek decisions back in
23 the mid to late '70's that had to do with the impacts of a
24 liquid natural gas facility on Hope Creek nuclear plant.
25 And I believe CP&L cited one of those decisions,

1 which I think was ALAP 513.

2 There is another decision, an earlier Appeal Board
3 decision in that case, ALAP 429, which is recorded at 6 NRC
4 229, and the year is 1997, which places the burden of proof
5 squarely on the NRC Staff in justifying probability
6 calculations for the likelihood that the LNG facility would
7 have an impact on the Hope Creek facility.

8 And in that particular decision, the appeal board
9 reversed a licensing board decision and remanded a
10 proceeding back to another hearing, because the NRC staff
11 had not justified its probabilistic risk calculations for
12 this LNG facility.

13 And it's a very worthwhile decision to look at in
14 terms of the criteria that the appeal board used in
15 reversing the licensing board.

16 CHAIRMAN BOLLWERK: I take it your basic point is
17 that in the environmental context, two things are different.

18 First of all, that unlike a technical contention,
19 the Staff rather than CP&L has the burden, and also that
20 usually the Staff's review process is not subject to review
21 by this board, for instance, but in the context of NEPA,
22 there is some authority or role for the Board to play in
23 reviewing what the Staff has done?

24 MS. CURRAN: The Board needs to find that the
25 Staff has satisfied its burden of proving that no EIS is

1 required.

2 Does that answer your question?

3 CHAIRMAN BOLLWERK: Yes.

4 MS. CURRAN: There are a number of respects in

5 which significant and substantial material facts are in

6 dispute in this proceeding.

7 They arise in several different ways. The first

8 is that there are key factual issues that all parties have

9 addressed and on which they have come up with a

10 significantly different result or taken a different approach

11 to the problem that also yields a different result.

12 And the most obvious one of these disputes is the

13 parties' bottom line predictions of what is the overall

14 likelihood of a severe spent fuel pool accident at Harris.

15 Those are easy because every party has spoken on

16 the same issue and it's easy to identify the statements and

17 prepare them.

18 Then there's another category of material and

19 significant dispute. And that is that in his report, Dr.

20 Thompson has identified a number of accident contributors or

21 factors that affect the probability of a severe spent fuel

22 pool accident and the various steps that lead up to it, but

23 which have been ignored or overlooked by the other parties.

24 In our view, the fact that Dr. Thompson has

25 explained the significance of these issues, explained how

1 they are factored into the calculation and how they affect,
2 taken together with the fact that the other parties have not
3 addressed those factors creates a significant and material
4 dispute that needs to be addressed in the context of a
5 hearing, in which, first of all, Dr. Thompson could further
6 explain his view about the significance of the issues and
7 the other parties' experts could be questioned about why
8 they failed to address those issues and to what do they
9 attribute that failure and what they think is the
10 significance of the issue.
11 Then there is a last category of issues. And
12 those consist of issues that have been identified by Dr.
13 Thompson as a result of reviewing the Subpart K filings that
14 were presented by the NRC Staff and CP&L on November 20th.
15 As you know, this proceeding has been conducted on
16 an expedited basis, and the parties have sixty days for
17 discovery following the admission of Contention EC-6.
18 At the close of discovery in this proceeding, none
19 of the parties had concluded the analyses that they were
20 tasked with preparing.
21 It was a formidable amount of work that was
22 required for the analysis, and I think it's fair to say that
23 all the parties took all the time available up until
24 November 20th to prepare their submittals.
25 The result of this is that we're not in the kind

1 of situation that one is normally in in a summary judgment
2 proceeding where all parties know basically what the other
3 party is going to say when discovery closes.
4 We all learned of the other parties' analyses and
5 the details of those analyses when the Subpart K filings
6 were presented.
7 As a result, there are a large number of issues
8 that Dr. Thompson could not have anticipated that are not
9 joined in his report because he didn't know to address them.
10 JUDGE MURPHY: Are you going to get into those,
11 Ms. Curran?
12 MS. CURRAN: Yes.
13 JUDGE MURPHY: All right. I didn't mean to
14 interrupt you.
15 MS. CURRAN: I will. I just wanted to kind of
16 introduce that framework of the issues, but as I do talk
17 about them, there is a problem that I don't feel it's my
18 place to testify about those things, but perhaps to outline
19 what the concerns are.
20 And this may require another round of affidavits
21 or perhaps the issue should go to trial, but basically, the
22 Board has a responsibility here, as Judge Bollwerk was
23 saying, to designate issues for a trial.
24 And in order to fulfill that requirement, one has
25 to be able to see how the issues have been joined by the

1 parties.

2 And since Dr. Thompson hasn't had a chance to
3 comment on a large number of issues that are raised by these
4 very voluminous filings by the other parties, it's difficult
5 for--it makes it impossible for us to fully identify the
6 issues here in this oral argument that should go to a
7 hearing.

8 JUDGE LAM: Ms. Curran, if and when we go to the
9 evidentiary hearing, do you intend to rely on additional
10 experts other than Dr. Thompson, or would Dr. Thompson be
11 your primary expert on this matter?

12 MS. CURRAN: We may well rely on additional
13 experts. A decision hasn't been made yet.

14 I would like to go through the seven-part accident
15 scenario that's laid out in LBT 00-19.

16 I'd like to go through each step of that and
17 identify within each step the significant and material
18 factual disputes that are raised in Dr. Thompson's report.

19 The first dispute is what is the conditional
20 probability of event number 1, step number 1, which is a
21 degraded core accident at the Harris reactor.

22 There is basic agreement between Orange County and
23 the NRC Staff on this aspect of the accident scenario.

24 However, it is very difficult to tell what the
25 position of CP&L is on this issue. And to illustrate, I'd

1 like to point to Table 5-1, which is in the ERIN report, and
2 it's also at page 14 of Dr. Burns' affidavit.
3 Table 5-1 is entitled SHNPP SFPAET Results Base
4 Case, Accident Sequence Frequencies, Case A.
5 Now, this table is a bit hard to read, but what it
6 appears to show is that CP&L has essentially merged Level 1
7 and Level 2 in the first column of this table which is
8 entitled, "Input CDF from FT Quantification."
9 There is no quantification in the Applicant's
10 submittal of the probability of a core melt accident, Level
11 1.
12 This is the only number--this column of numbers in
13 Table 5-1 is the closest thing one can come to that, and it
14 appears to merge Level 1 and Level 2.
15 This is significant for a number of reasons.
16 First of all, in the guidance for preparing PRA, it's
17 generally required that each step in the accident sequence
18 is to be identified and separately addressed.
19 By blending them together, it makes it difficult
20 to review or verify what the Applicant did, what assumptions
21 the Applicant made about what is the core melt frequency at
22 Harris.
23 There is an additional problem in the fact that if
24 you'll look on the row entitled, "Total Seismic
25 Contribution," there's a blank under the first column.

1 And then in the column to the right, there's a
2 number 8.65E-08. It's eight point six five times ten to the
3 minus eight, which apparently is CP&L's view of the total
4 seismic contribution to a spent fuel pool accident.
5 But we have no idea from this table what CP&L's
6 view is regarding core melt frequency contribution from
7 seismic events or the Level 2 contribution from seismic
8 events.
9 This is important because--for several reasons.
10 First, because in his report, Dr. Thompson relied on
11 information in the PSA about the seismic contribution to
12 core melt frequency, for the accident sequences that were
13 selected for his analysis.
14 For the TQUB sequences identified in the PSA, Dr.
15 Thompson assigned forty percent of that probability to
16 seismically induced sequences based on statements made in
17 the PSA.
18 In an interrogatory response that was sent to us
19 in mid-October, CP&L basically repudiated that number
20 without saying why.
21 Dr. Thompson didn't change his reliance on the
22 number because CP&L hadn't explained why it was changing the
23 reliance, but Dr. Thompson was interested to see whether in
24 the ERIN report CP&L might explain why it had changed that
25 number.

1 We still haven't gotten the explanation. And as a
2 matter of fact, there is no number in Table 5-1 that could
3 even be evaluated.
4 The seismic contribution to a core melt accident
5 is important, as the NRC Staff recognizes it in paragraph
6 215 of its affidavit, because the seismic scenario is
7 considered to be the most limiting.
8 JUDGE LAM: Ms. Curran, what is your point? Are
9 you saying Table 5-1 is incomprehensible, therefore there
10 are errors in it? Is that where you are going?
11 MS. CURRAN: I don't think you can--there's no
12 conclusion that you can draw. That's part of the problem.
13 A PRA needs to be transparent. If you want to
14 rely on a PRA, you need to be able to look at it and see
15 what are the calculations, what are the assumptions
16 underlying the calculations, each step of the analysis, and
17 you need to be able to reproduce it.
18 JUDGE LAM: So what you're saying is this table is
19 incomprehensible. Therefore, there may be errors in it.
20 You're not saying there will be errors?
21 MS. CURRAN: That's right. Therefore, if it's
22 incomprehensible, it cannot be relied upon. Bear in mind
23 that PRA is a very complex technology that is used for very
24 important purposes.
25 And the NRC has guidance that requires that if one

1 is going to rely on PRA, one needs to have --to be shown why
2 reliance is appropriate.
3 I want to refer you to some language in New
4 Reg/2300, Volume 1. This is a document called The PRA
5 Procedures Guide. It was written in 1983. It's listed in
6 the Thompson bibliography.
7 In section 2.2.8, New Reg/2300 says, "The results
8 of the analysis must be fully documented. This is a
9 substantial task for an analysis of this magnitude.
10 "All major assumptions made in the analysis should
11 be discussed. Where possible, supporting analyses in the
12 literature should be referenced.
13 "The report should describe all tasks of the
14 analysis in sufficient detail to permit the reader to
15 understand how the plant systems work to independently
16 calculate the frequencies of the dominant accident sequences
17 and to calculate or at least understand the derivation of
18 quantities that are important in the assessment of public
19 risk, such as the magnitude of the radionucleid source terms
20 and interval between the awareness of an impending core melt
21 and the start of a radionucleid release to the environment."
22 It would not be possible for a reviewer to
23 duplicate the result of anything CP&L has done because right
24 from the start, there's a major assumption that's just
25 missing or a calculation that's missing.

1 I also refer you to Reg Guide 1.174 entitled, "An
2 Approach for Using Probabilistic Risk Assessment and Risk
3 Informed Decisions in Plant Specific Changes to the
4 Licensing Basis," which is attached as Exhibit 10 to the NRC
5 Staff Summary.
6 This again requires documentation, a detailed
7 description of engineering analyses conducted and the
8 results that are obtained, irrespective of whether they were
9 quantitative or qualitative or whether the analyses made use
10 of traditional engineering methods or probabilistic
11 approaches.
12 Documentation is key to a PRA.
13 The next step in the analysis is the step of
14 containment by-pass.
15 In his report, Dr. Thompson asserts there is a
16 fifty percent conditional probability of by-pass for his
17 selected degraded core sequences.
18 This is found in his report at pages 26 to 28.
19 Dr. Thompson's assertion is based entirely on New Reg 1570,
20 a Staff product.
21 He did not make an independent judgment about the
22 potential for a temperature induced steam generated tube
23 rupture. He used the analysis provided by the NRC Staff.
24 There is a significant dispute here between Orange
25 County and the NRC Staff because the Staff, although it does

1 not attempt to repudiate New Reg 1570, it states that it's
2 not worried about steam generator tube rupture because the
3 steam generators are going to be replaced in the year 2001.
4 But this argument does not make sense for a number
5 of reasons.
6 First of all, the steam generators have been
7 operating now for thirteen years. At the end of thirteen
8 years they're ready to be replaced.
9 It may be possible to say that at the beginning of
10 the life of the steam generator that they're in pristine
11 condition and that one does not need to worry about steam
12 generator tube degradation, but in fact, this plant may be
13 operating for many more years and may go through several
14 cycles like this.
15 And one cannot make an assumption that applies to
16 the entire future of this operating plant based on the fact
17 that in the year 2001 CP&L may get a new set of steam
18 generators. It just doesn't make sense to ignore that.
19 And this is in paragraph 100 of the Staff's
20 affidavit where the Staff makes this assertion.
21 CP&L says almost nothing about steam generator
22 tube rupture in the ERIN report, but if one goes back into
23 the PSA and ITP, it appears that CP&L has focused on the
24 possibility that reactor coolant pumps will be restarted
25 while the core is exposed, thereby cooling a loop seal.

1 There's a diagram of this loop seal issue on page
2 54 of the Thompson report.
3 Thus, CP&L rewrote its procedures so that
4 operators do not try to restart the reactor coolant pumps,
5 and thereby CP&L apparently hopes that the steam generator
6 tube rupture issue will be resolved.
7 However, the findings in New Reg 1570 about the
8 potential for temperature induced steam generator tube
9 rupture do not depend upon the restarting of reactor coolant
10 pumps.
11 New Reg 1570 finds that the loop seal would be
12 cleared by other means that are occurring in the steam
13 generator, so the decision not to restart them has no
14 independent effect on this phenomenon.
15 So at bottom there is a major dispute here about
16 the significance of this issue.
17 The NRC Staff simply states that steam generator
18 tube rupture events do not impact the Staff's assessment of
19 the seven-step accident sequence, but of course, Orange
20 County reaches a very different conclusion.
21 So these go to the heart of what is the
22 probability of this series of events.
23 And a hearing is necessary in order to allow the
24 experts to fully explain their views and be questioned on
25 the significance of steam generator tube rupture on the

1 importance of New Reg 1570 and on the various fixes that
2 CP&L and the NRC Staff have proposed to deal with this
3 issue.
4 Dr. Thompson in his report also addresses a number
5 of the characteristics that are released during a
6 containment bypass that are not addressed by CP&L or the
7 Staff.
8 One of these is that the effects stem from the
9 fact that CP&L is using high burn-up fuel in the Harris
10 reactor.
11 As Dr. Thompson discusses in detail in his report
12 in Appendix D, high burn-up fuel is fragmented and thus
13 releases are likely to be in chunks or particulates of
14 varying sizes, thus affecting the pattern of deposition of
15 radioactive material on site.
16 This phenomenon is not addressed at all by CP&L
17 and NRC Staff.
18 So again, by raising this factor that no other
19 party has considered and which significantly affects the
20 levels of radioactivity on the site, Dr. Thompson has
21 created a substantial and material factual dispute with CP&L
22 and the NRC Staff which can only be resolved by fully
23 ventilating the issue in the context of an adjudicatory
24 hearing.
25 Another dispute that Dr. Thompson raises in his

1 report is--relates to the effect of building weights,
2 aerosol agglomeration, rain-out and resuspension on the
3 deposition or characteristics of deposition of radioactive
4 material on site.
5 And again, this is addressed in Appendix D of his
6 report.
7 This is one of those disputes where CP&L has
8 provided very little information to address this particular
9 issue.
10 It's very notable that in all of the material in
11 the very large volume of material that CP&L filed in this
12 proceeding, CP&L has not made a single calculation of
13 radiation levels or a single calculation of doses to workers
14 as the result of a severe accident.
15 One can find general discussions of these things
16 having been modeled and identification of models that were
17 used.
18 For instance, CP&L says that it used the math
19 model which applies to confined spaces, but it never says
20 what the result of that modelling activity was. It's a
21 total mystery.
22 So if all we have is a qualitative statement that
23 "Yes, we modelled the deposition of radioactive material at
24 the Harris site," then how can that be useful in determining
25 whether the ultimate probability calculation is correct?

1 We have no idea what CP&L thinks are the radiation
2 levels at the Harris site after -- following a containment
3 release.
4 The NRC in comparison, has done those calculations
5 and has modelled the deposition of radioactive material on
6 site and has identified the model they used and explained
7 what radiation levels that it determined.
8 But it uses a model called Arcon, which as
9 discussed in Dr. Thompson's report in Appendix D, is a
10 straight-line model that is too simplistic for a site
11 containing numerous buildings.
12 Again, this is very important because it relates
13 to the next issue, which is whether workers will be able to
14 return to their posts to restore makeup functions to the
15 spent fuel pools during the accident.
16 The way that the staff determines that the
17 deposition occurs is that a plume carries the radioactivity
18 in a straight line and it falls out in a way that there will
19 be areas of the plant that are not highly radioactive.
20 Interestingly, the Staff determines that some of
21 the areas of the plant will have high radiation levels that
22 are on the same order as the radiation levels that Dr.
23 Thompson calculated in his report.
24 But using this straight line model, the Staff
25 makes the determination that there will be other areas that

1 are not affected.

2 So, of course, this bears on the determination of

3 how feasible it is, how safe it is for workers to return to

4 the plant and restore makeup functions.

5 There's other problems with the Staff's analysis

6 of this that have to do with how is anybody going to

7 communicate where the safe places to go are. I'm going to

8 get to those later.

9 There is also some dispute about the intensity of

10 radiation that can occur from on-site deposition of

11 radioactive material. I'm sorry. I misspoke. There is

12 some agreement about the intensity of radioactivity that can

13 occur from on-site deposition of radioactive material.

14 And that's what I was just mentioning, that the

15 Staff has found in some areas at least levels of

16 radioactivity that are equivalent to the levels that Dr.

17 Thompson calculates in his analysis.

18 Where the difference lies is in the quantity and

19 distribution of the material and the phenomenon that govern

20 the distribution, and that relates back to the staff's use

21 of the arcon model.

22 And Dr. Thompson's view is that a more complex

23 model considering such factors as building weights,

24 rain-out, resuspension and aerosol agglomeration should be

25 used.

1 And Orange County did not have the resources or
2 the time to perform that kind of sophisticated analysis, but
3 that is what is necessary to make a reliable determination
4 of what those radiation levels will be on site.
5 It's important to point out here that historically
6 the NRC has been focused on behavior of radioactive material
7 as it goes off-site and affects the general public.
8 And there hasn't been a tremendous amount of work
9 on the behavior of radioactive material and its deposition
10 on site.
11 So this is a complicated area that deserves a much
12 more thorough and sophisticated analysis than it has been
13 given in the Staff's report.
14 JUDGE LAM: But Ms. Curran, you just mentioned the
15 County does not have the resources nor the expertise to do
16 the kind of--
17 MS. CURRAN: (Interposing) I mean the money.
18 JUDGE LAM: Or the money.
19 MS. CURRAN: I mean the money. When I say
20 resources, I mean in order to do justice to what this calls
21 for here, this problem.
22 JUDGE LAM: But how could you pursue this
23 litigation in an evidentiary hearing if you don't have the
24 money or the time?
25 Would you find money? Would the County find money

1 to do the litigation?

2 MS. CURRAN: To do a probabilistic risk assessment

3 is an immensely expensive and time- consuming task.

4 JUDGE LAM: Yes, indeed.

5 MS. CURRAN: I don't believe that it is the

6 County's burden to prove its case through the preparation of

7 a PRA.

8 I do believe it's the County's burden to explain

9 through analysis and through comparative calculations,

10 scoping calculations, to demonstrate why this sophisticated

11 necessary--sophisticated analysis should be performed by the

12 Government.

13 JUDGE LAM: Well, what I'm asking is, if and when

14 we have an evidentiary hearing, the County's role would be

15 limited by what you just said--

16 MS. CURRAN: (Interposing) The County would do

17 what it needed to do to obtain the expertise needed to

18 evaluate what are the demands of an adequate PRA in this

19 case and to identify what those are.

20 And I'm thinking that would be expensive by

21 itself. But to prepare a PRA is another order of magnitude

22 in terms of expense.

23 JUDGE LAM: So you would not bring in your own

24 evidence, so to speak.

25 But you would provide experts in an evidentiary

1 hearing to examine and to cross-examine what the Staff has
2 done?
3 MS. CURRAN: I wouldn't rule out doing at least
4 some parts of a PRA, but in terms of doing a comprehensive
5 PRA for this particular problem, it does seem unlikely that
6 Orange County would have the money to do that kind of an
7 analysis.
8 And that is what we would expect the Government to
9 do.
10 OK, the next step in the analysis is Step 3, which
11 the Board identifies as Loss of Spent Fuel Pool Cooling and
12 MakeUp.
13 And I'd just like to start by making--I think
14 there's an important distinction that needs to be made here
15 between pool cooling and makeup.
16 You look at pool cooling as the standard pool
17 cooling function that occurs during operation.
18 And the question is whether it is interrupted by
19 an accident and whether that interruption continues and
20 whether that interruption can be ended in a cooling, and
21 pool cooling restored.
22 The word, "makeup" to us is--implies more of the
23 function that occurs when pool cooling is not available and
24 has basically ended, and then the problem becomes what are
25 the alternative measures that you take to make up for the

1 fact that you don't have pool cooling.

2 So I just want to make that distinction here,

3 because I think it gets a little confusing.

4 The Thompson report discusses pool makeup or pool

5 cooling at pages 37 and 38.

6 Dr. Thompson asserts that electrical power will be

7 unavailable during an accident, leaving only two of CP&L's

8 makeup options potentially available.

9 I'm sorry, and there again, I've moved into

10 makeup.

11 For the selected sequences, Dr. Thompson assumes

12 that--or calculates, determines that fuel cooling will be

13 unavailable.

14 JUDGE LAM: Because of loss of power?

15 MS. CURRAN: Yes.

16 JUDGE LAM: Are you assuming all the accident

17 sequences under consideration involve loss of power?

18 MS. CURRAN: All of the sequences that Dr.

19 Thompson selected involve either a loss of component cooling

20 water or a loss of electrical power.

21 Then after release, Dr. Thompson also determines

22 that because of radiation levels, the command and control

23 centers will be not be functional such that the cooling

24 functions can't be restored, as he explains in his report.

25 The ERIN report filed by CP&L does not provide any

1 numerical estimate for the probability, either conditional
2 or absolute, of a failure of pool cooling in the event of a
3 degraded core accident with containment failure or bypass.
4 Table 4.1-1, which is on page 4-12 and onward of
5 the ERIN report, shows that pool cooling would fail in many
6 cases.
7 However, there is no numerical estimate that one
8 could look at and determine what is CP&L's calculation of
9 this particular event.
10 Again, this raises the same problem that I was
11 discussing earlier, which is the lack of transparency of the
12 ERIN report, the difficulty of determining what it was that
13 ERIN assumed, what it was that ERIN did or what the result
14 was that it calculated.
15 It would not be possible to reproduce any
16 calculation of what is a probability of loss of spent fuel
17 pool cooling under this step from the material that ERIN has
18 provided.
19 The NRC for its part says that the Staff has not
20 focused on assessing the probability of restoring cooling,
21 so that we don't have an estimate from the Staff.
22 That's on paragraph 134. So we don't have any
23 calculation by the Staff of this probability.
24 JUDGE LAM: Which paragraph, Ms. Curran?
25 MS. CURRAN: Paragraph 134 of the Staff's

1 affidavit.

2 This is rather important in the sequence of steps
3 because it matters very much whether the fuel pool cooling
4 systems will be interrupted or whether they will be restored
5 after they've been interrupted, because, of course, if they
6 can be restored, then the next step is to look at these
7 various back-up makeup functions that CP&L has identified in
8 their availability and reliability.

9 So the dispute here is--I'm not sure that you
10 would quite call it a dispute just because the Staff and
11 CP&L have done so little to address the issue, but it
12 certainly raises a significant question of fact that should
13 be explored in a hearing as to what, in fact, is CP&L's and
14 the Staff's calculation of this step in the accident
15 sequence.

16 The next two steps I'd like to mix together, link
17 together, and that is, steps 4 and 5, extreme radiation
18 doses, including personnel access, and inability to
19 implement makeup systems, because they're so closely
20 related.

21 There is a significant and very substantial
22 material dispute about this particular question.

23 Orange County shows that radiation levels in the
24 control room and the technical support center, which is the
25 backup to the control room, would be extremely high, so as

1 to render these facilities non-functional.

2 This is discussed in Dr. Thompson's report on

3 pages 29 to 31 and 34 to 35.

4 This is important because there is a limited

5 window of opportunity to return to the plant and restore

6 cooling water to the pools once they start boiling.

7 According to Dr. Burns, for instance, there is a

8 four-day window of opportunity to do this.

9 In looking at this aspect of the question, the

10 question of extreme radiation doses and inaccessibility of

11 the plant, Orange County focused on the control room and the

12 technical support center because these are the key locations

13 where a severe accident is monitored, where the staff makes

14 decisions about what kind of a response to make and where

15 the response is directed from.

16 The affidavits filed by CP&L and the Staff show

17 essential agreement that these locations are crucial to an

18 accident response.

19 For instance, in the NRC's affidavit in paragraph

20 220, the Staff recognizes that successful coping with

21 accidents requires recognition of the problem and

22 formulation and execution of a response plan.

23 This indicates there's someone in charge, who is

24 directing--who is observing the conditions and making

25 decisions and directing a response.

1 In paragraph 219, the Staff says that "Once core
2 damage has occurred, responsibility for management of the
3 accident is transferred to the technical support center,
4 which has a large staff and facilities for overseeing all
5 aspects of the plant, including the spent fuel pool."
6 At paragraph 228, the Staff says that "It is most
7 likely that the response will be made by the plant operating
8 staff, the TSC or the NRC incident response center."
9 At paragraph 229, the Staff says that, "Once an
10 accident condition has been recognized, it is necessary to
11 choose among responsive actions."
12 That indicates that this is not an ad hoc kind of
13 a response where someone takes it on themselves to go take
14 whatever action occurs to them is necessary;
15 that the response has to be coordinated by people
16 who are familiar with what's going on and understand the
17 various options open to them.
18 In paragraphs 221, 222, 224, and 225, the Staff
19 acknowledges that the cooling pumps are operated from the
20 control room where the pool alarms are also located.
21 CP&L also makes a number of statements recognizing
22 the importance of a command structure when responding to an
23 accident.
24 For instance, Mr. McCartney says at page 35 of his
25 affidavit that "The TSC sets the priority for all site

1 missions."

2 He also states in paragraph 37 that "The Site

3 Emergency Coordinator," who incidentally is based in the

4 TSC, "is in constant communication with the control room."

5 At page C-8 of the ERIN report, ERIN also states

6 that "Control room interface and availability of the TSC are

7 key-performance shaping factors."

8 Despite the importance of the command and control

9 function, NRC and CP&L say little or nothing about

10 radiation--the radiation environment in the control room or

11 the TSC.

12 They focus on the areas below the control room

13 where workers will need to go to perform the various makeup

14 functions, but they never address the problem of how the

15 workers are to be instructed and how the choices are going

16 to be made as to what the workers are supposed to do if the

17 heart and the brain of the organization are not functioning.

18 To the extent that the Staff does address the

19 habitability of the control room, the Staff is inconsistent.

20 At one point, the Staff says that the control room

21 is unavailable for sixty percent of the time.

22 At another point, the Staff says it may be

23 necessary to assume that the control room is completely

24 unavailable.

25 But the Staff never makes a careful, thorough,

1 methodical analysis of whether the control room is going to
2 be functioning and habitable on a continuous basis. There
3 is basically an educated guess here.
4 And the Staff does assume that the TSC is
5 functioning, which as Dr. Thompson has determined is not
6 likely to be the case.
7 As I mentioned before, it's impossible to really
8 determine what CP&L thinks because CP&L has not provided any
9 dose calculations or any figures on radiation environments
10 for any part of the Harris plant during an accident.
11 So although we have some general statements about
12 how X and such locations should be accessible after so many
13 hours, there's no way to verify those assertions or to
14 determine on what they're based.
15 This dispute is important because there are a
16 large array of potential makeup actions that have to be
17 directed from somewhere.
18 I believe CP&L has identified ten of them. It
19 can't be determined from either the Staff's or CP&L's
20 analyses where that somewhere is or how the monitoring is
21 going to be carried out, how the decisions are going to be
22 made, and how instructions will be given if the
23 decision-making locus of the plant is out of order.
24 One example of how this could have a significant
25 effect on the accident response relates to the Staff's

1 assertion that because of the manner in which radioactive
2 material would be deposited, there will be some parts of the
3 site that will be accessible while others have very high
4 radiation levels.
5 As I had mentioned before, the Staff used a
6 straight-line model to determine what the radiation levels
7 would be in various parts of the plant and looked at a plume
8 moving down wind.
9 But for any plant worker who is required to or
10 being asked to go and respond to an accident, one would
11 expect that someone would be able to tell that worker where
12 it was safe to go.
13 And it's not clear at all how that is to be
14 carried out.
15 Dr. Thompson's report also demonstrates the
16 importance of a command structure with respect to the timing
17 of makeup functions.
18 A response that is not properly timed or modulated
19 could exacerbate rather than stop the accident. And for
20 this, I would refer you to footnote 33 of Dr. Thompson's
21 report.
22 JUDGE MURPHY: What page?
23 MS. CURRAN: It's on page 21. He says, "As one
24 illustration of the need for a coherent strategy, note that
25 there could be situations in which the addition of water to

1 a fuel pool would increase the potential for an exothermic
2 oxidation reaction in the pool.
3 "Such a situation could arise if water were lost
4 by evaporation, an exothermic reaction had not yet been
5 initiated, and the fuel was uncovered for most or all of its
6 height."
7 So again, that example illustrates the importance
8 of having a command and control structure that is
9 functional.
10 We also have here what I think is fundamentally a
11 legal dispute with respect to what is the--what is the
12 acceptable dose, the maximum dose that could be assumed in
13 an environmental study that attempts to justify a decision
14 not to prepare an EIS.
15 And that is addressed at length in our summary.
16 We set forth the view that the maximum worker exposure that
17 could reasonably be assumed in this type of analysis is the
18 occupational dose limit that's set by the NRC.
19 And Dr. Thompson goes a little further and says
20 that he would accept the occupational dose for an
21 accident--excuse me--the occupational dose for special
22 circumstances.
23 This is addressed in Orange County summary at 33
24 and the Thompson report at 33 to 34.
25 It's quite clear from the affidavits submitted by

1 the NRC Staff and CP&L that they use doses that are far in
2 excess of this.
3 The NRC Staff uses 25 rems as an exposure
4 criteria, and that's five times the level that Orange County
5 considers to be the maximum that can be assumed.
6 CP&L's position is also that the acceptable dose
7 is higher, although it's somewhat inconsistent internally.
8 At one point CP&L states that it uses a 25 rem
9 dose to determine the time limits for individual access, and
10 at another point it states that it uses five hundred rem per
11 hour, which is 25 rems in three minutes, to determine if an
12 area is non-accessible.
13 And I would ask you to compare the Morgan
14 declaration at page 9 and 10. As we have argued in our
15 summary, we think this is a legal issue that can be
16 determined without a trial.
17 But to the extent that the Board determines there
18 are factual issues involved here, then certainly there is a
19 significant and material dispute between Dr. Thompson and
20 CP&L and the NRC Staff which deserves to be aired in a
21 hearing, for the parties to explain where they derive these
22 standards. It's not completely clear.
23 Step six is loss of pool water by evaporation.
24 CHAIRMAN BOLLWERK: Before we go into that, maybe
25 it's a good time to take a break. Could we break right

1 here? Would that be all right?

2 MS. CURRAN: That'd be fine.

3 CHAIRMAN BOLLWERK: We'll be in recess for ten

4 minutes and reconvene at 11:05.

5 (Recess.)

6 CHAIRMAN BOLLWERK: Could we come to order,

7 please? Let's go back on the record.

8 Ms. Curran, you were about to talk about cooling?

9 MS. CURRAN: Well, I told you I was going on to

10 step six, but I'd like to just revisit step five for a

11 minute first.

12 CHAIRMAN BOLLWERK: All right.

13 MS. CURRAN: As I was discussing before, it's

14 important to make a distinction between loss of cooling and

15 the makeup function or restoring the cooling function and

16 makeup.

17 They're two really different ideas, restoring the

18 normal cooling functions that are part of the operating

19 system for Harris, and then makeup being taking these backup

20 measures that are designed to function if the

21 cooling--excuse me--there's normal makeup and there's backup

22 makeup, but both of them are used if the normal cooling

23 functions are not working.

24 With respect to the makeup function, this is an

25 important issue because it relates to whether or not workers

1 are going to be successful in going back and restoring
2 cooling to the pools in the event that the ordinary cooling
3 systems remain unavailable during the accident-- in
4 providing makeup during the accident, not cooling, pardon
5 me.
6 With respect to the makeup function, neither the
7 NRC Staff nor CP&L has provided any independent calculation
8 of what is the probability that the makeup function can be
9 performed.
10 What they've done is they've blended the loss of
11 cooling issue with the makeup issue such that it's
12 impossible to determine what's the relative contribution of
13 each component, and they really come at different--they come
14 at different stages in the accident sequence, and it's
15 important that these things be addressed separately.
16 One of the reasons why it's important is because a
17 number of the makeup functions that are relied on by CP&L
18 and the NRC Staff are ad hoc, to say the least.
19 These include a fire truck, apparently from
20 off-site, and a portable pump, whose origin is unknown.
21 It also includes the on-site diesel pump. There's
22 an on-site diesel fire pump.
23 All of these makeup measures would have different
24 levels of reliability, would involve different sets of
25 assumptions and information about where they're available,

1 when they're available, who operates them. For instance,
2 where does the fire truck come from?
3 And none of this is addressed by either one,
4 either party. They just kind of assume that these makeup
5 functions will be available somehow.
6 This is problematic for a number of reasons,
7 including things like what is the reliability of the on-site
8 diesel pump?
9 Will the portable pump be available and will it be
10 functioning in an accident environment?
11 If firefighters come to pump water out of the lake
12 at Harris, will there be radiation levels on- site that are
13 high enough to preclude them from performing that function?
14 These are the kinds of things that ought to be
15 addressed in some kind of an analysis, but there isn't any
16 that one could evaluate here.
17 There's not even qualitative statements about the
18 reliability of these measures, just that maybe they can be
19 used.
20 We also have a factual dispute with the Applicant
21 and the NRC Staff about the accessibility of the
22 two-hundred-and-eighty-six-foot level of the fuel handling
23 building.
24 Both the Applicant and the Staff assert that this
25 level will be accessible even though there -- even in an

1 environment of saturated steam that could reach temperatures
2 of a hundred and ninety degrees Fahrenheit, because the
3 workers will be wearing fire suits.
4 Orange County contends that fire suits are
5 designed to protect against radiant heat, and would not
6 protect a worker against the extreme steam environment to
7 which they could be subjected.
8 The Staff does mention steam suits but just in
9 passing. There's no indication of where the suits are and
10 whether they'd be available in the proper place.
11 In an adequate PRA, we would expect to see a table
12 identifying each of the identified makeup functions and the
13 probability that each one of those functions could be
14 performed, or an adequate qualitative statement about the
15 likelihood that they could be performed and their
16 reliability, and a sensitivity analysis that would examine
17 how these probabilities would be affected by changes.
18 With respect to loss of pool water by evaporation,
19 the dispute here arises from CP&L's own work.
20 Dr. Burns basically gives a four-day window of
21 opportunity to perform makeup actions but also suggests that
22 there is a worst case scenario for a two-day dry out.
23 But he doesn't discuss that in--but he does not
24 discuss that in the context of the overall sequence.
25 Orange County has also identified the scenario

1 which proceeds more quickly than Dr. Burns' scenario of a
2 four-day--I'm sorry--faster than the CP&L scenario.
3 So there is a dispute of fact there as to how long
4 it takes for the water to be lost by evaporation.
5 JUDGE LAM: May I ask you what scenario is that
6 that is faster than four days or two days?
7 MS. CURRAN: I misspoke earlier.
8 JUDGE LAM: Thank you.
9 MS. CURRAN: The scenario was faster than what
10 CP&L posed in responses to interrogatories that we filed.
11 Actually, they were interrogatories by the Staff.
12 I would just add in this context that this
13 particular step involves deterministic calculations of how
14 fast water boils.
15 This is not a probabilistic calculation in that
16 some of the variation in the calculations has to do with
17 changes that CP&L has made to assumptions about gate
18 positions in the pools, which if those things are not in the
19 tech specs, they can be manipulated - -assumptions about
20 them can be manipulated to change the time for the boiling
21 of the pools.
22 And we looked at that too.
23 JUDGE MURPHY: Is there a place in Dr. Thompson's
24 report that you would lead us to follow that discussion?
25 MS. CURRAN: Well, I'm looking at the table on

1 page 51, which refers to Appendix G. I think that's where
2 it is.
3 With respect to step 7, an important point of
4 agreement has emerged from the filings on November 20th,
5 which is that if a fire occurs in pools A and B, then it
6 will inevitably lead to a fire in pools C and D.
7 And that's an important area of agreement here.
8 The reason for this is that if a fire occurs in pools A and
9 B, then the radioactivity that is liberated by that fire
10 will preclude any restorative actions with respect to pools
11 C and D.
12 And the parties' agreement is reflected in the
13 ERIN report at page 2-36 and at page D-1 and the Parry
14 affidavit at paragraph 29 and in the Thompson report at page
15 40.
16 I would like to note there's a statement on page
17 2-6 of the ERIN report about the incremental risk of
18 operating pools C and D. ERIN says that pools C and D will
19 have a negligible or very small incremental contribution to
20 the consequences. No technical basis for that statement is
21 provided.
22 In any case, the statement flatly contradicts
23 other statements by ERIN.
24 ERIN assumes that a fire in pools A and B will
25 lead to loss of cooling in pools C and D and therefore to

1 their dry-out.

2 ERIN also assumes that the dry-out will lead to a

3 fire. Therefore, if the release will involve a component

4 from pools A and B and a comparable or larger component from

5 pools C and D, the consequences will be doubled.

6 And a doubling of the consequences cannot be

7 fairly described as negligible or very small.

8 Finally, there's a dispute relating to step 7

9 about whether it is a conservatism to assume that the

10 probability of an exothermic reaction in a Harris pool is

11 one.

12 Dr. Thompson has made the deterministic

13 calculation that this probability is one. It's not a very

14 complicated calculation.

15 It doesn't require probabilistic risk assessment,

16 but neither CP&L nor the NRC Staff will do that.

17 Instead, they--the Staff, at least, talks about

18 making a conservative assumption. This is not a

19 conservatism. It is a reasonable deterministic calculation

20 of what the probability is.

21 This appears in appendix H of the Thompson report.

22 JUDGE LAM: So what you're saying is the Staff and

23 the Applicant concede, but they concede for the wrong

24 reason?

25 MS. CURRAN: They adopt the probability of one,

1 but then they--or at least the Staff puts it on the side of
2 the ledger with conservatisms, which makes the analysis look
3 more conservative than it is.
4 There is also a substantial material dispute about
5 whether either CP&L or the NRC subjected any part of their
6 analyses to an independent peer review.
7 Now, all parties acknowledge that peer review is a
8 valuable aspect of probabilistic risk assessment.
9 Although CP&L claims that the peer review that was
10 done-- in this case it was done of the PSA and the IPE-- was
11 independent, in fact, this peer review was conducted by two
12 high officials of the ERIN Company.
13 And ERIN was tasked with coming up with an overall
14 probability figure for a spent fuel pool accident using the
15 PSA and using the IPE.
16 So it cannot be said to be an independent peer
17 review to have individuals who are responsible for coming up
18 with the ultimate calculation of probability to assess
19 whether the information they're working with is reliable.
20 One needs to get a disinterested, uninvolved
21 entity to do such a review.
22 This is comparable to having the fox assess the
23 strength of the chicken house fence.
24 There is another problem with this asserted peer
25 review, which is that it's not documented anywhere.

1 And that is an important element of peer review,
2 that someone be able to tell what exactly the peer review
3 consisted of and how it was done.
4 So to say that a peer review was done here
5 doesn't--it doesn't satisfy any reasonable standard of what
6 peer review is.
7 And it's also important to note that the alleged
8 peer review was only done for the level 1 and level 2
9 portions of this analysis, and there's no assertion that
10 peer review was done by any entity for the rest of the ERIN
11 assessment.
12 With respect to the NRC Staff, the Staff claims
13 that a peer review was done by a separate branch of the
14 agency, but once again, the nature of that peer review is
15 not described.
16 There's no documentation of what was done. So
17 we're unable to evaluate it in any way.
18 And finally, and this is very important, is that
19 neither--in Dr. Thompson's view, neither of the CP&L or the
20 NRC Staff studies are susceptible to peer review.
21 The CP&L study isn't because it omits so much
22 information and fails to provide calculations or
23 explanations for so much.
24 I've given you some significant examples.
25 And the NRC Staff study isn't because it is a

1 rather unscientific blend of judgment and numerical
2 assertions for which it is really difficult to determine to
3 what degree the numerical assertions depend on calculations
4 and to what degree they are numerical representations of an
5 individual subjective judgment.
6 So it would be hard to see how either one of these
7 studies could be subjected to peer review.
8 Getting to the bottom line number here that the
9 Board asked for, the number of the overall probability of
10 the seven-part accident sequence, there is a substantial and
11 material dispute as to how to evaluate the reliability of
12 the probability calculations or representations by CP&L and
13 the NRC Staff.
14 As the NRC Staff affidavit states, one can't just
15 look at the number alone, but the reasoning behind it.
16 This calls for an exercise in professional
17 judgment on several issues which are in contention here.
18 First is what is the inherent reliability of a
19 PRA?
20 At levels 1 and 2, where despite the accumulation
21 of information over the last ten years, there are still
22 basic unknowns about human behavior, including intentional
23 and accidental human behavior, that will enlarge the
24 reliability of a PRA and that still have not been factored
25 in or quantified in any way.

1 This continues to be a problem with PRA. And all
2 the advances that have been made have not resolved that
3 problem.
4 A second--and there is a significant dispute of
5 fact on this issue between Dr. Thompson and the experts for
6 the NRC Staff and CP&L.
7 Second, to what degree can one depend on
8 calculations and judgments about events further along in the
9 accident progression for which there is far less knowledge?
10 For instance, the phenomenon associated with
11 on-site deposition patterns of radioactive material and
12 resulting radiation environments and doses?
13 As I stated previously, not a great deal of work
14 has been done regarding the on-site deposition of
15 radioactive material. This is new territory.
16 Another factor is the ability of workers to
17 perform makeup functions under highly stressed conditions.
18 Again, this is an area in which there hasn't been
19 a great deal of study. New territory.
20 Another issue is the behavior of spent fuel pools
21 during severe accidents.
22 In the course of this proceeding, we've seen the
23 NRC Staff make a major change in its own position on that
24 very issue, showing that new knowledge is being gained all
25 the time.

1 So when you get into an area of PRA where you're
2 looking at accident--elements of an accident that go further
3 and further down the chain of events away from the level 1
4 and level 2 analyses that have been done much more
5 intensely, the level of uncertainty rises.
6 The concern about the degree to which these
7 numbers can be relied on rises.
8 This is something that is subject to professional
9 opinion, professional judgment by experts who have worked
10 with PRA over the years. And it's an appropriate issue to
11 discuss in a trial.
12 CHAIRMAN BOLLWERK: Did Dr. Thompson or does Dr.
13 Thompson's estimate include these types of factors in it?
14 MS. CURRAN: Just bear with me for a moment. It's
15 a more complicated question that it may appear.
16 (Pause.)
17 MS. CURRAN: It may be helpful to look at Section
18 4.8 of Dr. Thompson's report, which explains that in his
19 view--
20 JUDGE MURPHY: (Interposing) Page number, please?
21 MS. CURRAN: Yes. Page 42.
22 JUDGE MURPHY: Thank you.
23 MS. CURRAN: Looking at a number by itself is not
24 sufficient. One has to look at the context of the problem
25 and all the factors that go into it. This is also discussed

1 in Section 2.4.

2 CHAIRMAN BOLLWERK: The Commission guidance in

3 this states that they want us to look at the number, don't

4 they, or at least attempt to do it, anyway?

5 MS. CURRAN: They have not--I don't believe that

6 the Commission has instructed you to look at a number in

7 isolation from the context of the problem.

8 For instance, in the latest Commission policy

9 pronouncement, as I recall, the Commission talked about

10 state of the art PRA and looking to rely on a so-called

11 state of the art PRA, that if one wants to use it for a

12 particular regulatory purpose, the degree to which it's

13 state of the art is relevant.

14 And the state of the art in this case is something

15 that needs to be examined because the-- state of the art

16 with this particular type of analysis, because it involves

17 accident sequences that are not well understood, because it

18 involves a large number of human actions that are not well

19 understood.

20 It cannot be compared to a so-called state of the

21 art analysis for a level 1 PRA, like New Reg 1150. It

22 doesn't have the same degree of reliability.

23 That has to be taken into account. I don't think

24 the Commission has anywhere said that one should look at

25 such a number in isolation.

1 JUDGE LAM: Well, I'd like to follow up on Judge
2 Bollwerk's question, Ms. Curran.
3 Because the essential issue here is if this
4 postulated sequence by the Orange County would meet the test
5 of not being remote and speculative, and on which we have to
6 make the determination.
7 At least one way of doing that is by the numbers.
8 So what insight would you bring to this particular issue of
9 the lack of finality in the methodology of risk assessment?
10 MS. CURRAN: We did give the Board a best estimate
11 with a minimum value of one point six, I think, times ten to
12 the minus five.
13 And that--we believe that that value falls in the
14 realm of accidents that are not remote and speculative.
15 It falls in the realm of accidents that were
16 looked at in the Hope Creek case that I mentioned to you
17 earlier in New Reg 0396 and other environmental impact
18 statements.
19 I think where it gets harder--the principle that I
20 would advocate to the Board is that as these probability
21 numbers get lower and lower, it's necessary to look at the
22 reason why they're getting lower and lower.
23 It may be for certain kinds of phenomenon that
24 their reason is really that the phenomenon is not very
25 likely.

1 And there are some natural events for which you
2 could easily say that.
3 We know enough about it to know that when you get
4 down to ten to the minus seven or ten to the minus eight,
5 just because it's not likely to happen, when you're talking
6 about little known phenomenon like spent fuel pool
7 accidents, and you're getting down into these numbers, the
8 thing that it should raise, the concern that it should raise
9 is is the number low because the probability is really low
10 or because we just don't know very much about it?
11 It's important to make that distinction because
12 these are very high consequences if you're wrong.
13 And so there has to be a conservative approach to
14 this that looks at what is the level of uncertainty in a
15 qualitative and quantitative way.
16 And what we have here--first of all, as I've
17 explained this morning, there are a lot of problems with the
18 analyses that have been done here, a lot of holes in CP&L's
19 and NRC Staff's analyses.
20 But setting that aside, there's also a lot of
21 uncertainty about these phenomena that are being studied.
22 And it would take a lot more in our view to rule
23 out the need for an EIS than what's been done here so far.
24 I don't--and I'll just comment that I think New
25 Reg 1353 would also support the need for an Environmental

1 Impact Statement.

2 There's an estimate that the probability is ten to

3 the minus six.

4 That is within the realm of credible accident risk

5 that has been required to be studied in the past.

6 We are in the range. And I think you have to look

7 at a range. You can't take a point and say this is the

8 point. The range of accidents that need to be studied in an

9 EIS.

10 Another area of significant material dispute would

11 be what is the significance of the fact that the Staff

12 concedes that it has not attempted to perform a true PRA

13 here?

14 The Staff's analysis is more of a blend of

15 qualitative judgements and numerical statements, but it

16 can't be evaluated in the same way that one can evaluate a

17 PRA.

18 How does that affect the reliability of the

19 Staff's bottom line number that the Staff gives?

20 We think that it prevents the Board from relying

21 on that number.

22 Another material dispute here is how reliable is a

23 PRA or the Staff's analysis when they can't be subjected to

24 peer review, as I mentioned before, because their

25 characteristics prevent them from being peer reviewed.

1 That's an element that the NRC Staff has
2 identified as something that contributes to the reliability
3 of a PRA.
4 So how does that affect the Board's judgment on
5 these bottom line numbers, knowing that these analyses could
6 not be subject to a peer review, could not be reproduced?
7 All of these issues are significant, and they all
8 call for the careful and thorough application of expert
9 judgment to the facts.
10 This can only be done in a trial.
11 I just want to touch on the third category of
12 factual disputes that I have described before, and that is
13 the category of factual disputes that have been raised since
14 the evidentiary materials were filed on November 20th.
15 It is not possible for me to identify every area
16 of factual dispute that Dr. Thompson has with CP&L and the
17 NRC Staff. I cannot speak for him.
18 What is needed here is an opportunity for the
19 issues to be joined by the experts. I think that as an
20 attorney I have been able to do that with respect to issues
21 where the experts have spoken on them-- have all spoken on
22 them.
23 For instance, issues that Dr. Thompson has raised
24 in his report and that the other parties either addressed or
25 did not address.

1 But in terms of doing a comprehensive evaluation
2 of the adequacy of the CP&L study and the NRC study, this is
3 a major expert undertaking that is appropriate for some
4 further process than this oral argument.
5 And otherwise, it is impossible for the Board to
6 fully identify all of the factual disputes that are--should
7 go to a hearing.
8 JUDGE LAM: But Ms. Curran, it still remains
9 unclear to me if the County would intend to undertake such a
10 major effort of doing the analysis in an evidentiary
11 hearing.
12 I have not heard a commitment either way from you
13 in that regard.
14 MS. CURRAN: Well, let me say again that whether
15 or not the County decides as a matter of its own discretion
16 that it wants to sponsor such a major undertaking, the
17 important thing to bear in mind is that it is not the
18 County's legal burden in this case to present a PRA in a
19 hearing, and that the County can satisfy its burden of going
20 forward by presenting the kind of expert criticism that we
21 have discussed here today of the work that CP&L and the
22 Staff have done.
23 That is the County's burden. That is the
24 appropriate role for the County.
25 And to deny the County a hearing because the

1 County isn't willing to assume the burden of proving that
2 the accident is not remote and speculative would be
3 unlawful.
4 The positions on which Dr. Thompson would present
5 testimony regarding the inadequacies of the NRC Staff and
6 CP&L's analyses are many.
7 They include such things as whether conservatisms
8 that are claimed by NRC and CP&L are actual conservatisms or
9 whether they should be--they are reasonable and don't make
10 the analysis conservative.
11 They include identifying, in addition to the holes
12 that we have identified today in the CP&L and NRC Staff
13 studies, other omissions, a more comprehensive list of areas
14 in which the Staff and CP&L have not addressed the details
15 needed to be addressed in a PRA for this kind of a problem.
16 They would include such things as the adequacy of
17 claims about sensitivity analyses and uncertainty analyses.
18 The probability calculations or lack thereof for
19 each and every accident step that is listed in the seven
20 part sequence, this is a major aspect of this proceeding
21 that because of the procedural posture it's been in, the
22 parties have not been able to undertake, and we would assume
23 that the other parties would want the same opportunity to
24 have their experts address whatever deficiencies they see in
25 Dr. Thompson's report.

1 We basically have not engaged each other on the
2 materials that we have submitted here.
3 Finally, I would like to address the question of
4 Dr. Thompson's qualifications and the utterly baseless
5 arguments by CP&L and the NRC Staff that he is not qualified
6 to present expert testimony on the issues in this
7 proceeding.
8 In the Orange County summary and in Dr.
9 Thompson's declaration and curriculum vitae, we have
10 addressed in great detail Dr. Thompson's high level of
11 qualifications to address the probability of an accident in
12 spent fuel pools at Harris.
13 We have also included as exhibits to Dr.
14 Thompson's report copies of reports that he authored or
15 participated in that show a detailed level of understanding
16 of probabilistic risk assessment that he has developed over
17 the past twenty years.
18 Perhaps most telling, we have shown that
19 assertions by Dr. Thompson regarding the hazards of partial
20 spent fuel pool drainage, which the Staff scoffed at in
21 response to this contention when it was filed, have now been
22 accepted by the Staff.
23 I will not repeat those arguments but refer you to
24 them again.
25 Both CP&L and the Staff tried to make a great deal

1 out of the fact that Dr. Thompson said he is not qualified
2 to single-handedly prepare a probabilistic risk assessment.
3 This is nonsense. As they well know, a PRA must
4 be performed by a team of individuals coming from a variety
5 of disciplines.
6 Dr. Thompson did state in his deposition that he
7 is qualified to supervise the preparation of a PRA and is
8 qualified to review one.
9 The only obstacle to Dr. Thompson preparing a PRA
10 or supervising the preparation of a PRA in this case is the
11 very large expense and the amount of time that such an
12 effort would consume.
13 It would be humanly impossible for Dr. Thompson to
14 have done that in the time that's been provided in this
15 Subpart K proceeding in addition to the very large expense.
16 Dr. Thompson's work history and the exhibits that
17 we have filed show that he is generally familiar with
18 nuclear power plant design and operation. He has reviewed a
19 number of them.
20 And he has applied PRA methods to nuclear power
21 plant design and operation in a number of cases.
22 CP&L also makes the absurd claim that Dr.
23 Thompson's deposition showed he was never planning to
24 identify any facts to the Board.
25 This argument, like others by CP&L, distorts Dr.

1 Thompson's statements.

2 Dr. Thompson made it quite clear in his deposition
3 that he would not be preparing a PRA. Orange County has
4 neither the time nor the money to commission this type of
5 comprehensive task in the time frame provided by the Board's
6 schedule.

7 Nor is Orange County required to undertake such a
8 study. That is the responsibility of the government agency
9 charged with regulating nuclear facilities and protecting
10 public health and safety, the NRC.

11 Dr. Thompson also made it quite clear in his
12 deposition that he does not believe anyone could have
13 performed a complete and adequate PRA in the time allowed
14 and allotted for this Subpart K proceeding.

15 This has been borne out by the affidavit presented
16 by CP&L, which indicated that when CP&L got to the end of
17 the analysis that--to analyze the thermohydraulic behavior
18 of a spent fuel pool to its satisfaction would have been a
19 major undertaking that it didn't pursue.

20 That's at paragraph 20 of Dr. Burns' affidavit.
21 Also the Staff didn't attempt to address step 7 either. Dr.
22 Thompson stated that given the time and resources allotted,
23 he could perform an analysis that's indicative of the
24 probability of a spent fuel pool accident at Harris.

25 To provide a definitive analysis would not be

1 possible by any person. He has done what he said he would
2 do.
3 He has used the best available information from
4 CP&L studies at Harris and NRC generic studies, and he had
5 performed calculations and judgments for each step of the
6 seven-part scenario.
7 He is the only individual who has addressed each
8 part of the seven-part scenario. It is important to observe
9 that his work is transparent.
10 All of his assumptions and methods are explained
11 and documented. A person attempting a peer review of Dr.
12 Thompson's work could reproduce it and get the same result.
13 This is not the case for either CP&L or the NRC
14 Staff analysis, which fail in many significant respects to
15 explain the basis for their conclusions.
16 CP&L also argues that Dr. Thompson is not
17 qualified as an expert because he has never operated a
18 nuclear power plant.
19 But CP&L's own witness, Dr. Burns, stated that no
20 such experience was necessary to be an expert on PRA.
21 And I would like the Board's permission to
22 distribute BCOC Summary Exhibit 3, which consists of
23 excerpts from Dr. Burns' deposition.
24 CHAIRMAN BOLLWERK: Is this something that's
25 already in the record somewhere?

1 MS. CURRAN: No, I'm afraid it's not.

2 CHAIRMAN BOLLWERK: Well, certainly you can show
3 it to Counsel and see where we head from there. Do you have
4 anything to say about that, Mr. O'Neill?

5 MR. O'NEILL: I think the Rules are pretty clear
6 that anything that is to be relied on at oral argument must
7 be presented with the filing that is called the summary.

8 That is why we go to such great lengths to do all
9 these affidavits and file all these exhibits.

10 And so the Rules say no, that if it is not--and
11 quite frankly, I have no problem with the Board reading Dr.
12 Burns' affidavit if it desires to. I'm just stating what
13 the Rules are.

14 JUDGE MURPHY: Well, this is his deposition,
15 right?

16 MS. CURRAN: This is the deposition.

17 MR. O'NEILL: His deposition. Again, I have no
18 problem with the Board reading it. I'm just stating for the
19 record that there are certain rules that govern Subpart K to
20 insure that it's an expedited procedure.

21 CHAIRMAN BOLLWERK: Why don't you go ahead and at
22 minimum, let's distribute it and we'll make a ruling on
23 whether we accept it.

24 I take it you're making a motion to admit this as
25 an exhibit?

1 MS. CURRAN: Yes. And as part of my motion, I
2 would say that we could not have anticipated that this
3 argument would have been made.
4 CHAIRMAN BOLLWERK: Do either of you want to be
5 heard on this request to admit this BCOC Summary Exhibit 3?
6 JUDGE MURPHY: Can you tell us which page of this
7 exhibit, please, Ms. Curran?
8 MS. CURRAN: Well, the page that I'm referring to
9 is page 12. And I would also like to refer you to page 16,
10 where Dr. Burns also says that a PRA is done by a team of
11 people.
12 JUDGE MURPHY: This is an excerpt from his
13 deposition, right?
14 MS. CURRAN: Yes, it is. It's multiple pages.
15 MR. O'NEILL: Your Honors, if I might be heard on
16 that point, if the Board were interested in his deposition,
17 certainly they would have to have the entire deposition and
18 not just certain excerpts. In any event, the issues which
19 she is raising are not in dispute.
20 Certainly, Dr. Burns said that it requires a team
21 to do a PRA. We'll certainly stipulate to that.
22 And secondly, Dr. Burns said that the person who
23 is in charge of the PRA need not have been a nuclear plant
24 operator.
25 Of course, he did say that someone on the team had

1 better be a nuclear plant operator or understand the
2 operation of the plant in order to do a PRA, which of
3 course, is also true.
4 So the purpose for which she's submitting it seems
5 to be not in dispute.
6 In any event, the Rules provide that evidence must
7 be pre-filed. But if the Board wants to look at it, that's
8 fine, as long as the entire deposition transcript is
9 provided.
10 We, of course, provided Dr. Thompson's deposition
11 transcript. We anticipated that we might want to refer to
12 it. And we also provided Dr. Parry's deposition transcript
13 because we anticipated that we might want to refer to it.
14 And certainly, BCOC had a copy of the deposition
15 transcript when they filed their filing on November 20th.
16 CHAIRMAN BOLLWERK: All right. Ms. Uttal, do you
17 want to say anything on the subject?
18 MS. UTTAL: I generally agree that procedurally
19 this is incorrect, but so long as the entire deposition is
20 offered, I have no problem with it.
21 MS. CURRAN: We're willing to submit the entire
22 deposition.
23 CHAIRMAN BOLLWERK: All right. At this point,
24 we're going to reserve ruling on this, I guess with the
25 understanding that if we should decide to admit it, we would

1 want a suitable document, I believe.

2 At this point, I will let the record reflect that

3 a document entitled, "BCOC Summary Exhibit Number 3," which

4 is portions of the deposition of Dr. Burns, has been marked

5 for identification. And whether we admit that or later have

6 it withdrawn or have something else done, we'll deal with

7 that when we make a ruling on it.

8 JUDGE LAM: Let me add, an earlier motion to

9 disqualify Dr. Thompson was denied by this Licensing Board

10 and we ruled to give Dr. Thompson's testimony its due weight

11 that it deserves.

12 And currently, there is no motion to disqualify

13 him.

14 MS. CURRAN: No, but there are arguments that have

15 been presented that his testimony should not be given any

16 weight.

17 And when you say due weight, I don't know what due

18 weight means.

19 With all due respect, I would like to assure that

20 this Board is fully informed of Dr. Thompson's very high

21 level of qualifications which are as high or higher than any

22 of the other experts that are present here.

23 CHAIRMAN BOLLWERK: Anything further at this point

24 you want to say about Dr. Thompson's qualifications?

25 MS. CURRAN: Yes. Finally, CP&L falsely accuses

1 Dr. Thompson of calculating an absurdly high spent fuel
2 assembly temperature in his 1999 report, which was submitted
3 as an attachment to Orange County's contentions.
4 This has to do with an assertion in Dr.
5 Thompson's report that under certain conditions the spent
6 fuel assembly could reach a temperature higher than the
7 temperature of the sun. And CP&L mocks this statement.
8 This is really a gross distortion of what Dr.
9 Thompson said in his report. It takes it entirely out of
10 context to try to make it look like Dr. Thompson doesn't
11 know what he's talking about.
12 And this is a very unfair tactic. When one looks
13 at the sentence criticized by CP&L, one sees first that it
14 is made in the context of the scoping calculation for heat
15 transfer.
16 The discussion proposes an equation for
17 calculating the temperature of steam meeting the top of the
18 partially submerged fuel assembly.
19 The offending sentence is, "If one tenth of the
20 fuel assembly is submerged (S = 0.1), this equation yields a
21 temperature of ninety-eight hundred degrees centigrade."
22 The rest of the paragraph which follows, which was
23 not included by CP&L in its summary, states, "A temperature
24 of this magnitude would not be generated in practice because
25 of thermal inertia and the operation of other heat transfer

1 mechanisms.

2 "However, the calculation establishes an important
3 point. Convective cooling of fuel assemblies plus steam
4 from residual water will be ineffective when the submerged
5 fraction of the fuel assemblies is small."

6 That's --there is nothing inexpert or incorrect
7 about Dr. Thompson's statement, and if it had been quoted in
8 its full context, it could not have been used for the
9 purpose that CP&L tried to use it.

10 Perhaps CP&L is resorting to such tactics because
11 it fears it cannot defend the ERIN risk analysis on its own
12 merits.

13 The Board should not allow CP&L to avoid scrutiny
14 by a highly qualified expert like Dr. Thompson by making
15 false and unfounded challenges to his qualifications.

16 And that concludes my presentation.

17 CHAIRMAN BOLLWERK: Let me turn to the Board and
18 see if there's any questions at this point. Dr. Lam?

19 JUDGE LAM: If I may, Ms. Curran, I would like to
20 reiterate my understanding of what Dr. Thompson has done in
21 arriving at one estimate.

22 I will welcome feedback from you if my
23 understanding as I read Dr. Thompson's report is incorrect.

24 Dr. Thompson has selected four specific accident
25 scenarios for his analysis on number one, degraded core

1 accident, three of which involve the TQU, and the fourth one
2 involved a small station black-out sequence, which he
3 estimated the event probability for event number one of
4 three point one times ten to the minus five.
5 And then he went on to look at New Reg 1570 and
6 looked at the steam generator tube rupture, given this
7 accident sequence, and came up with a conditional
8 probability of zero point four nine, which he rounded up to
9 zero point five.
10 And then from then on, each and every one of the
11 seven sequences, I mean, seven event sequences, Dr. Thompson
12 had estimated to the best of his ability as a certainty.
13 So each event sequence is assigned a probability
14 of one. That would be event numbers 3, 4, 5, 6 and 7.
15 And therefore, the best point estimate is one
16 point six times ten to the minus 5.
17 Is that a correct understanding of what Dr.
18 Thompson has done?
19 MS. CURRAN: Bear with me one moment. I wish Dr.
20 Thompson could answer directly your questions.
21 JUDGE LAM: Well, he has an able spokesperson in
22 you, Ms. Curran.
23 (Pause.)
24 MS. CURRAN: Step 7 is the product of a
25 deterministic calculation.

1 Step 6 is also the product of a deterministic
2 calculation.
3 Step 3 is the result of the nature of the selected
4 accident sequences.
5 Steps 4 and 5 relate to the radiation environment
6 and have the probability of one and zero respectively.
7 Dr. Thompson provides a scoping estimate of on-
8 site deposition of radioactive material for which he
9 concludes that the command and control center is
10 non-functional, thus generating the probability of zero for
11 step 5.
12 Does that answer your question?
13 JUDGE LAM: Yes, yes. So after you made number 2,
14 there is certainty in every one of the events possible, is
15 that correct?
16 One and two are where the numbers come from?
17 Events one and two are where the numbers come? Events 3, 4,
18 5, 6, and 7 are certain to occur?
19 MS. CURRAN: Are certain to occur? Is that what
20 you said?
21 JUDGE LAM: Yes.
22 MS. CURRAN: A more sophisticated analysis of
23 on-site deposition could lead to a different number instead
24 of five. But this was the conservative approach that Dr.
25 Thompson took.

1 JUDGE LAM: And therefore, my next question is
2 this. Event number 2 involved both containment failure and
3 bypass.
4 Is it my correct understanding that Dr. Thompson
5 only focused on bypasses?
6 MS. CURRAN: Dr. Thompson looked at containment
7 bypass alone to find a minimum value, and because of time
8 and available researchers we couldn't do a full-scale PRA in
9 looking at containment failure.
10 JUDGE LAM: So containment failure was not
11 examined?
12 MS. CURRAN: That's right.
13 JUDGE LAM: My third and final question would be,
14 given this steam generator tube rupture is the dominant
15 release pathway in Dr. Thompson's analysis, has Dr. Thompson
16 determined the relative location of the steam generator tube
17 release pathway relative to where the control room is and
18 also relative to the cooling equipment where the spent fuel
19 pool is?
20 Has that analysis been performed?
21 MS. CURRAN: Dr. Thompson provides a scoping
22 estimate of on-site deposition of radioactive material for
23 which he concludes that the command and control center is
24 non-functional, giving a probability of zero for step five.
25 The scoping estimate for the deposition pattern is

1 discussed in the report and shown on Figure 3.

2 And the probability of zero for step five reflects

3 the rendering of the command structure non- functional

4 because of its proximity to the control room and the TSE.

5 The doses that would accompany this deposition

6 pattern are discussed in Table 3 and the text of Dr.

7 Thompson's report in sections 4.4 and 4.5 at pages 29 and

8 39.

9 JUDGE LAM: So the answer is yes, there was an

10 analysis?

11 MS. CURRAN: Yes, there was.

12 JUDGE LAM: Thank you, Ms. Curran and Dr.

13 Thompson.

14 CHAIRMAN BOLLWERK: Judge Murphy?

15 JUDGE MURPHY: I just have one clarification

16 question.

17 Was Dr. Thompson's report peer reviewed?

18 MS. CURRAN: No.

19 CHAIRMAN BOLLWERK: I just have two brief

20 questions, the first one being Dr. Thompson-- or you've

21 indicated, I guess, the feeling was that there wasn't enough

22 time and you needed more time to do some kind of analysis.

23 How much time were you talking about?

24 MS. CURRAN: To do a statement of what the factual

25 disputes are? Or are you referring to a PRA, or what?

1 CHAIRMAN BOLLWERK: You said you wouldn't do a
2 PRA, but you would do some kind of additional analysis based
3 on what you've now seen.
4 What kind of time were you talking about to do
5 that?
6 You've already said you cannot do a PRA, or you
7 basically indicated that you wouldn't. You would not have
8 the resources and the time.
9 But to do the analysis that you're talking about,
10 how much time?
11 MS. CURRAN: Three to six months.
12 CHAIRMAN BOLLWERK: My second question is, you've
13 indicated, I guess, that there were disputes or omissions or
14 things that you felt had been left out.
15 You hadn't identified necessarily all of them,
16 given the time you had to go through it.
17 Can you give me or give us any examples, again
18 looking for substantial material disputes, of any of these
19 omissions that you've identified?
20 MS. CURRAN: Well, some of them, I guess,
21 would--some of the ones that I've talked about earlier would
22 fall into that category that they happen to be issues that
23 Dr. Thompson had raised in his report, but they're examples
24 of the kind of things that we'd be looking at.
25 For instance, in Table 5-1, the blank in the

1 table. The lack of discussion. The merging of two levels
2 of calculations, level 1 and level 2.
3 That's an example of the kind of thing that you'd
4 want to go through it carefully and look for all of those
5 types of problems, whether they happen to relate to
6 something that Dr. Thompson had already said or not, but
7 just on its own merit, does this analysis stand up?
8 CHAIRMAN BOLLWERK: And I take it from what you
9 just told me that you haven't done that at this point?
10 MS. CURRAN: We haven't had the opportunity
11 because we've been preparing for this oral argument.
12 CHAIRMAN BOLLWERK: All right. Any other
13 questions by any of the Board members?
14 (Off the Record.)
15 CHAIRMAN BOLLWERK: Sir, I'm about to adjourn this
16 hearing for lunch.
17 We stand adjourned until 1:30.
18 (Whereupon, at 12:00 p.m., the meeting was
19 recessed, to reconvene, at 1:30 p.m., this same day.)
20
21
22
23
24
25

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

2 (1:30 p.m.)

3 CHAIRMAN BOLLWERK: Let's go back on the record.
4 We're here for the afternoon session. There are a couple of
5 procedural matters that I need to take care of.
6 In the first instance, during the luncheon break,
7 I was handed a copy of a document entitled, "A Pleading For
8 Open Scientific Debate on the Uncertainties of CP&L's
9 Nuclear Waste Plant."
10 It's a statement directed to the NRC Atomic Safety
11 and Licensing Board, dated December 7, 2000, from N.C.
12 Warren, and I was asked to read this.
13 And I will, as we do all limited appearance
14 statements, I will read it, and it will also be put in the
15 record of this case.
16 It looks like all the parties may have already
17 received a copy, but it will be placed in the record of the
18 proceeding as a limited appearance statement.
19 The other comment that I would make again is that
20 this is a judicial proceeding. We're here for the parties.
21 But if there are individuals who want to express
22 their views to the Board, they're certainly welcome to do so
23 in the form of a written limited appearance statement, and I
24 would urge them to do that.
25 Anything more you want to say on that subject

1 matter, Judge Lam?

2 JUDGE LAM: I second Judge Bollwerk's comment to
3 the public citizens. We have been here to listen to the
4 citizens' concerns in a limited appearance session. We have
5 been getting limited appearance statements from the public.

6 I'd certainly say that we welcome statements from
7 the public and we certainly read them. It's consistent with
8 what we have done before, and we continue to do so.

9 CHAIRMAN BOLLWERK: The other procedural matter
10 I'd like to deal with is the request for admission of I
11 believe it was marked BCOC Summary Exhibit 3.

12 Looking at the Rules, specifically 2.113D, and my
13 recollection of the statement of the considerations for that
14 rule, it's fairly clear to me that, in fact, we cannot
15 accept that exhibit.

16 So I'm going to deny the motion for its
17 admittance. Having said that, I certainly heard what CP&L's
18 counsel said about the fact that PRAs need to be done by a
19 team.

20 I think that's our understanding as well. Judge
21 Lam has had some experience in that area, and he certainly
22 knows what's required.

23 So the point that you were trying to make is one
24 that we are certainly aware of.

25 Anything else from any of the Board members at

1 this point?

2 JUDGE LAM: Nothing.

3 JUDGE MURPHY: No.

4 CHAIRMAN BOLLWERK: All right, then the order that
5 we had set up was CP&L and then the Staff, but if you prefer
6 to switch that, I'll allow you to do it. It's really up to
7 you all.

8 Do you want to go first?

9 MR. O'NEILL: I offered to Ms. Uttal to go second
10 and she said that she would like to back clean up, and I
11 said fine.

12 CHAIRMAN BOLLWERK: All right. Mr. O'Neill.

13 MR. O'NEILL: If it please the Board, picking up
14 where Ms. Curran left off, I intend to engage Dr. Thompson
15 on the materials presented here.

16 The Board asked the parties to provide a best
17 estimate of the overall probability of the postulated seven
18 step-scenario.

19 The Board believed that quantification was
20 required to make a determination whether BCOC's attack on
21 the NRC's environmental assessment should result in
22 preparation of an environmental impact statement relating to
23 the license amendment request.

24 The clear direction from the Board was to use
25 probabilistic risk assessment techniques, also called

1 probabilistic safety assessment techniques. I may use those
2 interchangeably, or a PRA or PSA.
3 I would like first to turn to what the three
4 parties did in response to that request by the Board. And
5 hopefully I'll clear up a lot of the confusion.
6 Secondly, I will address why BCOC has utterly
7 failed to sustain its burden to require a hearing under
8 Subpart K and its burden that Ms. Curran admitted later, the
9 burden of going forward with some facts that if proven would
10 establish that this scenario is not, is not remote and
11 speculative.
12 And finally, I will address, although I'm sure the
13 Staff will have more to say, why the Staff has satisfied
14 NEPA requirements of a hard look, a very hard look by now of
15 the environmental consequences of spent fuel storage.
16 In making my presentation, to make it easier for
17 the convenience of the Board, we've prepared some visuals.
18 I've labelled them Visuals 1 through 5. They're not intended
19 to be exhibits to be admitted into evidence. Rather, they
20 are simply to facilitate the exposition of the facts and the
21 arguments that I'll make today.
22 With the Board's permission, I'll ask someone to
23 hand out for your convenience a copy of each of those five
24 visuals that I will use on the easels during the course of
25 my argument.

1 Would that be acceptable, Your Honor?

2 CHAIRMAN BOLLWERK: Any objection from any of the

3 parties?

4 MS. CURRAN: I would like to see what they look

5 like before I decide whether to object or not.

6 CHAIRMAN BOLLWERK: All right.

7 MR. O'NEILL: Sure.

8 (Pause.)

9 MS. CURRAN: I don't object.

10 MR. O'NEILL: With the Board's permission, I'll

11 periodically get up and down to put something on the easel.

12 I've given a copy of this to the court reporter

13 and ask that it be bound in the record, again, not as

14 evidence, but so that my remarks will make sense when I

15 refer to visual 1 and in some cases a picture or a chart.

16 (Discussion off the Record.)

17 MR. O'NEILL: Visual 1, which I'll spend some time

18 with going back and forth in the arguments, is taken

19 directly from Dr. Thompson's report, Section 3 of his report

20 to be exact.

21 Dr. Thompson was there during the depositions of

22 Dr. Burns and Dr. Parry.

23 It appears he listened intently and was able to

24 write down what are the steps that would be required to

25 evaluate the seven-step scenario that has been posed by

1 contention EC-6.

2 I'm going to go over how all three parties address

3 the requirements that Dr. Thompson imposed on what it would

4 take.

5 First, an expert team.

6 Second, an evaluation of the degraded core

7 accident at Harris, a level 1 PSA analysis.

8 Two, containment failure or bypass.

9 Three, spent fuel pool cooling and makeup.

10 Four, onsite radiation exposure.

11 Five, effect of onsite radiation exposure on plant

12 operation.

13 Six, loss of pool water by evaporation.

14 Finally, initiation of a self-sustaining and

15 exothermic oxidation reaction.

16 In addition, any PRA must treat uncertainty and

17 should be subject to a peer review.

18 I'll leave that up there and I'll return to my

19 notes and go over each of those items because I think it

20 will lead to an understanding of what the parties did and

21 why the Board should rely on the results of the Applicant

22 and the Staff and discard the results of BCOC and Dr.

23 Thompson.

24 First, an expert team. We all agree that an

25 expert team is required.

1 Why an expert team? Because there are so many
2 different disciplines that are involved in doing a
3 comprehensive PRA.
4 The expert team that was brought to bear by the
5 Applicant is described in great detail in Dr. Burns'
6 affidavit and his attachments, and I won't repeat it here.
7 In addition to that, CP&L had on the order of ten
8 or twelve engineers and personnel, health physicists working
9 a substantial part of their time in order to support the PRA
10 that was done.
11 The affidavits that are included with our summary
12 include the statements and the results of their work that
13 supported the PRA analysis.
14 The Staff put an expert team on. Dr. Parry is one
15 of the top recognized experts in the entire world on PRA and
16 particularly in areas like human reliability analysis.
17 Consequently, again, this was established during
18 the depositions. An expert team was clearly brought to bear
19 with Mr. Powell, Mr. LeVie and Mr. Gratin, who all provided
20 a very substantial affidavit, which establishes what they
21 did.
22 It's very interesting. The Staff did something
23 different than ERIN Engineering and CP&L, yet it is
24 complimentary to be sure.
25 In other words, we came up with a best estimate.

1 We tried to. There's some exceptions to that because of
2 conservatisms that we couldn't take out. But that's what
3 the Board asked us to do.
4 If you'd asked us for a bounding analysis, we
5 would have given you a bounding analysis.
6 The Staff decided, for whatever reasons that it
7 would do a bounding analysis and where it had choices, it
8 made conservative decisions, and it came up with a number as
9 well.
10 Its team was an expert team. We had an expert
11 team.
12 Our experts understood how the plant operates,
13 understood health physics, understood accident analysis,
14 understood all of the issues that must be addressed,
15 understood how to use the codes.
16 BCOC had Dr. Thompson, and Dr. Thompson is no
17 expert in this area. Whatever he's an expert in, it's not
18 in PRA. He has not performed a PRA at a nuclear power plant
19 or anywhere else.
20 He's never been on a team that performed a PRA of
21 a nuclear power plant or anywhere else.
22 He's never performed a peer review for a PRA of a
23 nuclear power plant and indeed is not qualified under the
24 industry guidelines to be a member of a PRA peer review.
25 Notwithstanding that, he has asserted that he

1 could lead a team and supervise them.

2 He also said it would be humanly impossible to do

3 what the Applicant did and what the Staff did in the amount

4 of time given.

5 The fact is these people are not super-human.

6 They're experts, and they're able to do it in the amount of

7 time that we had.

8 Now, the documents that were cited to support

9 BCOC's statement that Dr. Thompson is extremely familiar

10 with PRA were all published or prepared in the mid to late

11 '80's, do not reflect current PRA practices, and indeed, are

12 more policy related than technical, exactly what the Board

13 noted the last time around when we challenged Dr. Thompson's

14 qualifications.

15 During his deposition, and we provided the

16 deposition for the Board to read, Dr. Thompson demonstrated

17 his lack of familiarity and understanding of even the basic

18 vocabulary of a PRA analysis.

19 He did not know there was an industry standard in

20 PRA. He incorrectly stated that a ten-year-old New Reg 1170

21 was state of the art for PRA.

22 He did not, himself, perform a PRA in response to

23 the Board's question, rather, he assumed additional

24 probabilities for six of the seven steps and assumed a

25 probability plucked from some of the documents he obtained

1 from CP&L for the other.

2 To make the assumptions and the judgments in a

3 complex PRA requires intimate familiarity with plant

4 technology.

5 Dr. Thompson has no such education, experience or

6 training. As the Board previously noted, Dr. Thompson's

7 expertise relative to reactor technical issues seems largely

8 policy oriented.

9 It was clear at his deposition on October 16th

10 where he had yet to perform any calculation, had yet to do

11 any analysis, that Dr. Thompson would not be able to produce

12 anything that would be particularly useful here today.

13 That's why in our summary we made the statement,

14 which we knew would be true, there would be nothing that

15 could be produced today that would be useful to the Board.

16 Indeed, if you go back and look at the information

17 that was submitted by BCOC with its proposed contention in

18 January, you have the exact same thing.

19 You have a number out of the PRA for certain

20 initiating events, you have an assumed number for

21 containment failure and you have nothing more.

22 And that's what you have today. Now it's

23 important that we have the Board recognize the limitations

24 on Dr. Thompson's expertise for the following reason.

25 There are very few facts that have been brought to

1 our attention today that could be assumed in dispute.

2 What we have are a lot of opinions that are

3 clearly in dispute. We have on the one hand Dr. Parry and

4 his team and on the other hand ERIN Engineering and its team

5 to be able to provide those opinions.

6 We do not believe that the opinions of a non-

7 expert should be weighed very heavily by the Board in

8 considering whether there are facts or issues in dispute.

9 Now, let's look at step 1.

10 JUDGE LAM: Before you go any further, Mr.

11 O'Neill, I have a question on what you just described about

12 Dr. Thompson's qualifications.

13 MR. O'NEILL: Yes.

14 JUDGE LAM: Dr. Harold Lewis, who chaired the

15 Lewis Committee review of the Reactor Safety Study, was no

16 nuclear engineer.

17 Dr. Seuss, the famous children's book author, had

18 no children.

19 Therefore, my question to you is how much weight

20 should we give Dr. Thompson, assuming what you described is

21 correct, that Dr. Thompson has not done any risk assessment

22 study?

23 However, I just gave you two examples of how

24 people of intelligence can make a contribution to the risk

25 assessment arena--not Dr. Seuss--just one example, but Dr.

1 Lewis.

2 But with those two examples in mind, how should we

3 weigh in balance what you just described to us?

4 MR. O'NEILL: I think you should weigh in balance,

5 notwithstanding that, and it is true that you don't have to

6 be a reactor operator or a nuclear engineer necessarily to

7 make contributions to probabilistic risk assessment,

8 although it would seem to me that you would have to know

9 something about the process, something about the

10 mathematical models and the fault trees and the cut sets and

11 exactly how PRA works.

12 Having said that, I submit to the Board that they

13 can--and the Board, fortunately, we have a Board that has

14 experts of their own.

15 You can look at the quality of Dr. Thompson's

16 report. You can look at the arguments that we will provide

17 you today as to the major failings in his analysis, and you

18 can make your own judgments as to what weight to give his

19 opinions based on, one, his experience and training or lack

20 thereof, and secondly, the quality of work, itself.

21 I submit, for example, that the report that he

22 submitted before with the calculation that approached one

23 point five times the temperature of the sun was a

24 calculation that was meaningless, yet it was the only

25 scoping calculation in that report.

1 And a little bit later we'll talk about the
2 scoping calculation, which by the way is not in his report
3 and cannot be found, is not transparent, but suggests that
4 you have this huge deposition of radioactive material in a
5 two-hundred-meter radius.
6 I suggest that the Board should give the same
7 degree of credence to that scoping calculation that it would
8 give to a temperature of spent fuel of ninety-eight hundred
9 degrees C.
10 JUDGE LAM: Thank you, Mr. O'Neill.
11 MR. O'NEILL: Now, I want to address before
12 starting step 1 the issue that has been raised that this is
13 brand new territory, never been done before.
14 And in some respects that's correct. The industry
15 has not taken a PRA analysis and extended it to the degree
16 we've done here to spent fuel pool cooling. That's true.
17 But as Dr. Burns points out, the methodology used
18 in the analysis of this particular scenario is compared to
19 reactor safety systems relatively straight-forward and the
20 techniques have been well established and can be applied
21 with care and with a fair amount of time and a team to work
22 it through.
23 The methodologies that were applied by ERIN are
24 methodologies and techniques that have been developed over
25 the years in the nuclear and aerospace industries to assess

1 the frequency and risks of accidents.

2 The updated PSA models, such as the Harris PSA,

3 are more realistic than the IPE, which were developed not

4 that many years ago, having incorporated advances in the

5 technology, plant specific data, computer code improvements

6 and additional model level of detail.

7 The Staff agreed with us that the PSA had provided

8 those advancements in technology, but since they had peer

9 reviewed the IPE, had decided to use the IPE numbers because

10 they would be able to stand behind them in a peer review.

11 They acknowledged that they were more

12 conservative.

13 That's one difference between the two, but the

14 difference doesn't mean anything in the context of the

15 overall approach that was taken.

16 In our submittal, you have Mr. Lars' affidavit

17 that describes the PSA that was used.

18 You have the--Dr. Burns' affidavit and report that

19 talks about the PSA that was used.

20 You have an independent peer review of the Harris

21 PSA. What does that mean? ERIN had not been involved in

22 the development of the PSA at any point in time.

23 They independently certified it. ERIN is the firm

24 that does the vast majority of independent peer reviews of

25 PSA's. There is no one who has more experience or is

1 better.

2 Consequently, the Harris PSA was independently
3 reviewed, certified, and indeed changes were made as
4 described by Dr. Burns to make it more realistic.

5 There were some deeply embedded conservatisms in
6 the PSA that really are not state of the art technology that
7 were changed based on that peer review, specifically the IS
8 loco probability, interfacing systems loca probability.

9 So number one, we start with a PSA that is
10 independently peer reviewed.

11 The PSA output combines steps 1 and 2. That is,
12 the PSA output that is on the visual, which I'll show you,
13 which is table 5.1 in Dr. Burns' affidavit and in his
14 report, the output combines what is over here steps 1 and 2.

15 Consequently we started with, as the Board
16 directed, site specific information. We started with the
17 PSA.

18 We peer reviewed the PSA, and we took the data
19 right out of the PSA and displayed it in this chart.

20 That's why it appears the way it does. These are
21 all the internal events that are analyzed in the PSA.

22 These are the sum of those internal events, the
23 total internal events contribution from the level 1 to
24 quantification, which includes containment failure bypass.

25 That's why the data was presented the way it was

1 presented.

2 Now, why the checks are up there with respect to

3 the degraded core accident, CP&L-- just remember this is Dr.

4 Thompson's checklist--CP&L and NRC Staff considered the

5 internal and external initiated events.

6 Dr. Thompson did too, but he only considered a

7 few. He plucked a few out of the PSA data, but he did not

8 consider all of them, and he did not consider it in any

9 rigorous way.

10 And then there was a state of the art analysis.

11 We gave a little triangle here to the NRC, because they did

12 not use the PSA. They used the IPE.

13 It's a little bit older, not quite state of the

14 art, but good enough for purposes of this analysis.

15 Looking at containment bypass, it built upon the

16 level 1 PRA, represents state of the art for level 2 PRA.

17 In fact, we gave them a little triangle, again,

18 because they used the old IPE.

19 Significant pathways for radioactive material

20 release identified. Transport and distribution of

21 radioactive material modeled. All of this was done by CP&L

22 and NRC Staff, but was not done by BCOC.

23 A little bit later I'll talk about what they did

24 do and why that was completely wrong. They looked at one

25 scenario for bypass, which was a secondary event for a

1 thermal induced steam generator tube rupture.

2 That event is included in the number in Table 5.1,

3 under both large steam generator tube rupture and small

4 steam generator tube rupture, which includes both the tube

5 rupture that occurs during operation that would initiate an

6 event.

7 For example, some of you on the Board may be

8 familiar with recently a steam generator tube ruptured at

9 DePointe, or years ago a larger one at Ginet.

10 That's a rupture. That does release some material

11 to the atmosphere, and in addition, in this same PSA

12 analysis that goes through the various cut sets is the

13 thermally induced steam generator tube rupture that was

14 picked up by Dr. Thompson.

15 Dr. Thompson's fifty percent number out of New Reg

16 1570 is inappropriate for Harris and does not apply, of

17 course, to all the initiating events.

18 This bypass scenario--

19 JUDGE MURPHY: (Interposing) By the fifty percent

20 number, do you mean the number for the containment failure?

21 MR. O'NEILL: Yes, yes. I'm sorry. It's actually

22 point four nine that he rounded to point five zero.

23 This bypass scenario is discussed in some detail

24 by the NRC Staff expert on containment failure. It's

25 modelled in the Harris PSA.

1 The NCR Staff notes how plant specific this
2 analysis must be.
3 And for example, when 1570 was performed, there
4 was an issue of whether or not during the scenario that this
5 thermally induced steam generator tube rupture represents
6 that there would be instructions to the operators to turn on
7 the reactor coolant pumps to try to circulate what by that
8 point is hot gas.
9 And if you do that, then you'll blow out the loop
10 seal, which in fact may be keeping the hot gas from getting
11 into the steam generator tubes.
12 And so there is now procedure, emergency operating
13 procedures to the operators not to do that.
14 That reduces the probability of that type of an
15 event.
16 I'm going to focus more specifically on that a
17 little bit later, but the fact is that this needs to be a
18 very site specific study, because of all of the dependent
19 types of inter-related scenarios that are involved.
20 And it cannot just take a number out and say, "Ah,
21 point five, that's good for every scenario."
22 This steam generator tube rupture, by the way,
23 assumes after an accident, such as a station black- out,
24 that the primary system heats dry, that the secondary system
25 loses feed water and becomes dry and depressurized, that you

1 have a reactor coolant pump seal which blows out water but
2 doesn't blow out all the pressure, that you have the steam
3 generator tubes fail, melt or something, and then after that
4 you get some of the source term, which has a problem being
5 carried because it's now just gas and very little steam or
6 water, through the steam generator tubes, then through the
7 secondary side.
8 And then you have to have a failure of a relief
9 valve or PORV, power operating relief valve, in order to get
10 gases to the atmosphere.
11 The probabilities that start to multiply on top of
12 all of those different independent and sometimes dependent
13 or interdependent scenarios is very complex.
14 It's embedded in the PSA that has been used by
15 ERIN Engineering and is only appropriate if it's considered
16 like that.
17 The Staff pointed that out in more detail than we
18 did.
19 Step 3. Step 3 is the loss of spent fuel cooling
20 and makeup. What Dr. Thompson says here is you need to
21 extend the level 1 PRA to address the interruption of spent
22 fuel pool cooling and makeup. What's that mean?
23 You have to look at all these scenarios and you
24 have to say, "OK, in this scenario, do I lose the pumps to
25 spent fuel pool cooling?"

1 And it's different for every initiating event.
2 That was done by ERIN Engineering. The Staff did that
3 somewhat more qualitatively. But they did the same thing.
4 Number 2, which is another interesting one, is you
5 have to extend the level 2 PRA, which is the consequences of
6 a degraded core accident.
7 Assuming that there is containment core bypass and
8 it gets into the reactor auxiliary building, is that going
9 to affect the CCW system or other systems that provide
10 cooling?
11 Once again, that was done by PRA analysis by ERIN
12 Engineering. It was done somewhat more qualitatively by the
13 Staff and, of course, was not done at all by Dr. Thompson.
14 Onsite radiation exposure, which is step 4. Now,
15 this is a complicated analysis in and of itself.
16 First of all, you have to get the right source
17 term.
18 Secondly, you have to figure out what kind of
19 containment or bypass you're going to have and where it's
20 going to go.
21 Once it escapes the containment, you have to
22 decide what--if it's going to be internal to a building,
23 what will it do to the building, or if it's external to the
24 building, what effect would it have?
25 In our case, we have Mr. Devoe, who established

1 what the source term was for the plant.

2 It was a somewhat more realistic source term than

3 the one that's used for all the accident analysis, which is

4 very conservative but still represents the fuel at Harris.

5 We have Mr. Morgan's affidavit, who calculated

6 doses, and you have Dr. Burns and ERIN Engineering and Mr.

7 Gaber, who is here today, who using the map model was able

8 to determine where it would go.

9 Now, let's talk a little bit about Dr. Thompson's

10 one scenario.

11 Actually, his scenario is not the one that's the

12 most difficult to deal with. It's actually a lot easier to

13 deal with than the, for example, interfacing systems, where

14 the bypass is into the reactor auxiliary building and can

15 get into the fuel handling building and can preclude in some

16 areas the access by workers to restore makeup.

17 But here we have at this level, 305 level, we have

18 the vents from the steam generator PORV's release, right

19 here.

20 This is the containment building. This is the

21 fuel handling building. It's a very long building. You'll

22 see a better picture of it later.

23 This is the reactor auxiliary building, which is

24 connected to or can be connected to the containment

25 building.

1 JUDGE MURPHY: Would you orient me to north/south?
2 MR. O'NEILL: Absolutely. North.
3 CHAIRMAN BOLLWERK: The top of the illustration is
4 north?
5 MR. O'NEILL: Correct. This is--so these are the
6 buildings. The control room is actually behind here. The
7 technical support center is right here.
8 The technical support center has--is in a big
9 concrete building that was originally designed to be part of
10 one of the other units and has at least two feet of concrete
11 for its ceiling, walls, a massive building, same as the
12 control room.
13 Assuming you have a release here, assuming that
14 you have some sort of release from the steam generator, what
15 Dr. Thompson has assumed is that it goes up and it all falls
16 down in a nice little circle two hundred meters uniformly,
17 no pluming, and it goes up and back down again very quickly.
18 It's impossible to happen. The models will show
19 that there will be at least some plume that's going to move
20 it up.
21 The models will show some dispersion. The models
22 will show some meteorological effects.
23 You can't have it both go over here on top of the
24 control room and hop over the containment building and hop
25 back down over the technical support center all at once.

1 So consequently there is no analysis. Dr.
2 Thompson's so-called analysis scoping calculation of the
3 deposition doesn't exist.
4 There is no scoping analysis. There is no
5 calculation. There's nothing but an assertion that you're
6 going to get this huge number that will fall down all over a
7 two-hundred-meter radius of the plant.
8 JUDGE MURPHY: The building where the steam
9 generator vents, the building that you were pointing to on
10 the site, does that have a name?
11 MR. O'NEILL: It's right on the turbine building.
12 (Pause.)
13 JUDGE MURPHY: That's part of the turbine
14 building?
15 MR. O'NEILL: The auxiliary building. There's a
16 disagreement amongst us.
17 JUDGE MURPHY: A containment auxiliary building or
18 a reactor auxiliary building?
19 MR. O'NEILL: Reactor auxiliary building. As a
20 matter of fact, I'll make sure I point this out again.
21 It is right here. All of these are a series of
22 stacks and vents. OK?
23 Three-0-five level, which is important because if
24 it goes up, it would have to drop pretty quickly to get on
25 top of the control room or the technical support center.

1 I want to talk for a moment about, however, even
2 assuming that you got a release from the steam generator
3 PORV, no matter what the probability of that occurring is,
4 is the major fallacy in Dr. Thompson's analysis here, his
5 scoping calculation.
6 And that is he has a source term that has fuel
7 fines that has particles or chunks. That has nothing to do
8 with the Harris fuel, absolutely nothing.
9 He assumes that a significant fraction of the core
10 is released as particles, which is somehow blown out of the
11 secondary side of the steam generator.
12 He has not explained to anyone how particles from
13 a dry reactor coolant system are going to pass through, be
14 carried through steam generator tube cracks through a
15 depressurized steam generator secondary system, through a
16 three-inch relief valve and out into the atmosphere.
17 It would be pretty interesting to find out what
18 his mechanism for transport is.
19 But this ignores a lack of any evidence that
20 there's a potential, a potential for such fuel
21 disintegration at Harris.
22 There is no evidence. So what does Dr. Thompson
23 rely on? A French report of an experiment on high burn-up
24 fuel.
25 He included that report, and I draw it to the

1 Board's attention and I suggest that you read it.

2 Smitz and Pappett are the authors. This report

3 reports on an experiment to simulate a reactivity insertion

4 accident involving a control rod injection in France in a

5 low pressure sodium cooled test reactor.

6 The fuel, according to the report, was not

7 representative of PWRs. The French have PWRs which by the

8 way are very similar to the Harris plant.

9 Their nine hundred megawatt PWR is very similar to

10 the Harris plant.

11 It was not representative of PWRs. Most tests

12 were carried out "in capsule, low temperature, low pressure,

13 low fission gas retention and fuel restructuring, central

14 hole formation due to high power level during

15 pre-irradiation," end quote.

16 One of the nine tests conducted--of the nine tests

17 conducted, three involved mix oxide fuel, that is plutonium

18 and uranium fuel.

19 Nevertheless, only one uranium fuel rod failed

20 with fuel disintegration. That rod was exposed to

21 sixty-four gigawatt days per ton.

22 Another rod exposed to sixty gigawatt days per ton

23 failed but without any fuel disintegration.

24 That's reported in the report. Dr. Thompson

25 admits that, in fact, it's true that at most Harris is

1 experiencing field exposures in the mid-50's, that is 50
2 gigawatt days per ton.
3 So there is no high burn-up fuel that is relevant
4 to the fuel in this experiment.
5 The authors of the study specifically address the
6 applicability of their results of PWR's, and they concluded,
7 "The study of this phenomenonology requires PWR
8 representative conditions, the study of channel conditions
9 in the current test facility do not allow to reach--" this
10 is French translated into English I believe-- "do not allow
11 to reach this representativeness of the reactor situation."
12 Consequently, the whole basis for this deposition,
13 the whole basis for the dose, the whole basis for the
14 conditional probabilities of one is based on one French
15 report, which is not representative in any way of the fuel
16 at Harris. So we have nothing.
17 Now, even with that, Dr. Thompson calculated
18 impossible dose rates, many times worse, for example, than
19 the dose rates at Chernobyl, because he doesn't understand
20 radionucleid material dispersion and the appropriate methods
21 of dose calculation.
22 He did his scoping calculation, which, by the way,
23 is not transparent. We've never seen it. We have no idea
24 how he did it other than a figure that shows a circle.
25 He assumes without any basis this five percent of

1 the tellurium isotopes, ten percent of the iodine isotopes
2 in the core are deposited in this area and stop. None of it
3 moves off of the two-hundred-meter boundary.
4 He neglects to consider the physical layout of the
5 Harris buildings. He took a tour. He knew where everything
6 was, but he neglected the physical layout of the buildings.
7 He assumes all the reactivity deposits in the
8 circle notwithstanding the fact that steam, no matter how
9 cold and wet, will rise when released, not fall in
10 deposition.
11 If the plume does not rise, if it just spilled
12 over somehow, which it couldn't do, then it could never
13 contaminate buildings high above it, such as the control
14 room at three hundred twenty-four feet or the technical
15 support center booth at three hundred thirty-seven feet.
16 The release point, in any event, was surrounded by
17 taller structures on all sides, except for forty- five
18 degrees, which are to the south, not the north.
19 Dr. Thompson's assumed deposition pattern requires
20 a release plume to rise and fall simultaneously, which we
21 haven't seen yet.
22 Further, the weight effects Dr. Thompson mentions,
23 tend to increase mixing, decreasing deposition and resulting
24 dose, and is only significant at higher wind speeds.
25 At such wind speeds, the plume would be

1 significantly narrowed and directed away from the site.
2 Finally, Dr. Thompson's scoping calculation
3 ignores the dominant meteorological effects.
4 We provided the wind compass to him that is in the
5 FSAR that is based on fire tenures data, which shows where
6 the prevailing winds are likely to be at any given time.
7 Even assuming fuel particles suddenly appeared at
8 the release point, they cannot travel in all directions
9 against the wind.
10 And as the Staff notes in its filing,
11 predominantly, the wind would be away from the fuel handling
12 building.
13 Neither Applicant nor the NRC Staff, which used a
14 Harris specific source term, the same source term with some
15 minor modifications that is used for accident analysis and
16 approved by the NRC, would come up with the dose rates that
17 have been calculated by Dr. Thompson.
18 He had to create this new source term phenomenon
19 so that the source term would include these small particles.
20 Now, let's talk about the next issue, command and
21 control.
22 Dr. Thompson invents a control room protection
23 factor that has no apparent scientific basis.
24 He uses the equation for a columnated beam. That
25 is, he assumes that several of two hundred meters of

1 uniformly dispersed particles of radioactivity will somehow
2 emit a columnated beam into the control room.
3 The correct calculations, using for example
4 microshield, which is used throughout the industry to
5 calculate dose rates in buildings, would show that the
6 control room protection factor is approximately ten
7 thousand.
8 That neglects the rebar. Not one hundred to one
9 thousand as assumed by Dr. Thompson without any basis
10 whatsoever.
11 He also uses the wrong average gamma energy for
12 his assumed radionucleid.
13 Now, when you do this, you come up with results
14 that are similar to one and a half times the temperature of
15 the sun.
16 For comparison, we took a look at the New Reg that
17 was published on the results of doses at Chernobyl and found
18 out for comparison the twenty- one workers receiving the
19 highest dose from the Chernobyl explosion and fire, those
20 who were firefighters received between six hundred and
21 sixteen hundred rem.
22 In other words, Dr. Thompson's assessment is that
23 the Harris control room worker in a sealed room constructed
24 with a minimum of two-foot thick concrete walls, door and
25 ceiling would receive as much radiation dose from release

1 through a small hole and a depressurized steam generator as
2 a person on the operating deck of the burning Chernobyl
3 reactor.
4 That's his scoping calculation. Further,
5 according to Dr. Thompson, a person standing two hundred
6 meters away from the Harris PORV vent would receive
7 approximately three times the total dose received by the
8 highest exposed Chernobyl worker in just one hour.
9 That is why, as I told Dr. Lam, the Board need not
10 rely on the expertise of Dr. Thompson.
11 Now, Dr. Thompson assumes away the probability of
12 restoration of makeup. He assumes that the radiation is too
13 high, therefore we never get to this step that he put on
14 his, "Assess the probabilities that the scenarios could be
15 implemented that would allow for pool cooling and makeup to
16 be restored."
17 We did that. NRC Staff did that. Dr. Thompson
18 talked about it, but he never assessed anything. He didn't
19 identify the scenarios and he never assessed it.
20 I want to take a minute because this is where when
21 we first looked at this scenario, everyone who had anything
22 to do with the Harris plant said it was remotely speculative
23 or words to that effect.
24 There are many, many ways to get makeup to that
25 spent fuel pool. Mr. McCartney's affidavit goes through all

1 of them. And I won't go through all fifteen.

2 There are ten ways to do it, plus there are five

3 more when you add spent fuel pools C and D fuel pool cooling

4 system.

5 So you actually add another five ways to get

6 makeup to the spent fuel pools by commissioning spent fuel

7 pools C and D.

8 And this is an important point that I'm going to

9 mention later when we talk about NEPA.

10 One of the things we learn from the PRA, and it's

11 ironic, is that the probability, the probability, as low as

12 it is, of this scenario, the seven-step scenario, is lower

13 with C and D commissioned than exists today at the plant

14 with pretty much the same consequences.

15 That is, with C and D commissioned, you have spent

16 fuel pool cooling and clean-up systems for C and D that you

17 don't have today.

18 You have five more paths to get makeup water to

19 the plant that you don't have today.

20 And in fact, because this is at the north end of

21 the building, if you'll look at this plan, you'll see this

22 is the north end, this is the fuel handling building,

23 containment, reactor auxiliary building, turbine building,

24 waste processing building.

25 This is the two eighty-six level, the top deck of

1 the spent fuel pool handling building. This is a cut-away,
2 OK.
3 You have actually--one of the best ways to get
4 into the building in order to restore spent fuel pool
5 makeup, which means to keep the water coming in if it's
6 evaporating away, is in this two sixteen level north end,
7 you open one valve in and out, and water will run, gravity
8 fed, into that pool.
9 Now, I'm not going to go over all fifteen of them.
10 Mr. McCartney did that, but I want to share a couple of
11 things.
12 One of the reasons that this is sort of a worst
13 case scenario for Dr. Thompson is because there are so many
14 ways to get in and out of this building.
15 This is a huge building. The buildings that often
16 will house spent fuel don't have anywhere near this degree
17 of elaborateness.
18 This is built for four plants, four units.
19 Access is shown in green. It's shown on each
20 level where there's access. Access is shown here as green
21 doors.
22 There's ten, ten different ways of getting in.
23 From the outside or from the inside.
24 This becomes very important, because when we did
25 our analysis, we looked at all these events. We then did

1 the model to determine where radiation might go if there was
2 containment failure or bypass.
3 If it went into the fuel handling--if it went into
4 the reactor auxiliary building, we analyzed if it could get
5 into the fuel handling building, where would it go.
6 You have sealed boundaries between a number of
7 these decks. We figured out where it would go, made some
8 assumptions about the ventilation system and calculated,
9 calculated from the period of time of release up to four
10 days--because we set four days, and we'll talk about that
11 later, as the success point--what the doses would be in any
12 of the rooms that we would have to access in order to return
13 makeup to that pool.
14 We took into account external radiation, we took
15 into account internal radiation from gases, and we went
16 through a detailed calculation.
17 Now, Ms. Curran said there's a five-hundred rem
18 number here and there's a twenty-five rem number.
19 The five hundred rem number was a cuff. We did
20 not allow anyone to go into a room if there was any source
21 in the room that was five hundred rem, even a walk-by, if it
22 took thirty seconds.
23 We just said that's a cut-off.
24 With respect to twenty-five rem, that was our
25 cut-off. We did not allow any worker to exceed twenty-five

1 rem.

2 That, of course, is a regulatory number, which in
3 emergencies you could allow a worker to achieve, and I'll
4 talk about that a little bit later.

5 So both the Staff--the Staff actually decided that
6 the probability of not being able to make up water to the
7 spent fuel pools was close to zero because of the many
8 different ways you could do it at this plant.

9 And when you have zero in your probability
10 calculation, it gets to be a pretty low number.

11 So this step, which is what is the effect of
12 on-site radiation exposure on plant operations, we did it,
13 it took a long time, it took a lot of people, detailed
14 analysis, map models, dose calculations, microshield, used
15 that program to do those calculations.

16 Do we have all of those calculations in the PRA
17 that we submitted? No. We thought that we submitted enough
18 documentation without all of that.

19 But we have the sworn testimony of Mr. Morgan who
20 did the dose calculations. We have the sworn testimony of
21 ERIN Engineering, Dr. Burns. All of that was done in the
22 peer review.

23 I also bring to your attention, and I'll talk
24 about this next, is the loss of pool water by evaporation.
25 That's the next step.

1 Why is that important? That tells you how much
2 time you have.
3 The analysis is how long will it take to begin
4 boiling and then to boil the water down to the top of the
5 storage racks, at which point you could possibly get to a
6 situation where you have some sort of oxidation reaction on
7 the cladding.
8 Now, we did an analysis, deterministic analysis
9 that was indeed accepted by the NRC Staff and reviewed by
10 it.
11 Dr. Thompson took a look at it and decided that
12 was too much time, I guess. And so he said, "Well, I'm
13 going to do another one. I'm going to assume that gate 4 is
14 shut, OK."
15 Now, look up here and see the gates. That's gate
16 4. That's the one that goes to spent fuel pool A. How are
17 these gates normally?
18 The only one shut over here is gate 2 and gates 5
19 and 6 are shut. And you can see that yellow is closed, and
20 blue is open.
21 Dr. Thompson assumes that gate is shut. It's got
22 the highest heat rate since pool A, and so he calculates a
23 heat-up that gets the boil off in four point seven days, I
24 believe.
25 And he says, "Ah, this is a better case," even

1 though he calls this a minimal probability.

2 I asked the folks at--we assume, by the way, that

3 this gate is closed one percent of the time.

4 JUDGE MURPHY: Which gate are you referring to?

5 MR. O'NEILL: Gate 4 on visual number 4. We

6 assumed that that gate is closed one percent of the time.

7 I asked the head of the spent fuel project how

8 often it had been closed since fuel racks were put in the

9 spent fuel pools, and he said never.

10 So one percent may have been a high number, but we

11 assumed one percent of the time.

12 And then Dr. Burns actually in a sensitivity study

13 did an analysis with even a higher heat rate in the air, and

14 that's where he came up with two days in a sensitivity

15 study.

16 But that is a very, very extreme case, and it was

17 just to show the sensitivity of that analysis to the

18 deterministic timing of the loss of pool water by

19 evaporation.

20 So there's no dispute here, by the way. We all

21 agree on it. We just would suggest that that analysis is

22 fairly irrelevant, certainly for the best estimate

23 probability because that gate's not closed.

24 JUDGE LAM: Mr. O'Neill, nothing is impossible,

25 you know. Now, if you assign a probability of one percent

1 to closure of gate number 4, are there administrative
2 procedures, is there anything to prevent its being closed
3 inadvertently?
4 MR. O'NEILL: Dr. Lam, I can't really show it
5 here, but this is a--these gates go all the way down from
6 the top to the bottom.
7 They are removed by bringing in a crane and
8 picking the gate up out of the pool. How long does that
9 evolution take, Steve?
10 MR. CARR: About one to two hours.
11 MR. O'NEILL: About two hours. So inadvertent
12 removal of that gate, I think, is pretty hard to do. And in
13 this case, we're talking about being closed, right?
14 JUDGE LAM: Yes.
15 MR. O'NEILL: So inadvertent insertion would be
16 even more difficult. You would only close that gate when
17 you would have to drain the pool next to it to do some sort
18 of maintenance.
19 And again, I asked the company, and they don't
20 drain the pool to do maintenance. They use divers to do the
21 maintenance because they don't want to drain the pool.
22 JUDGE MURPHY: Are you saying that during normal
23 operation when and if C and D become operational, that gates
24 5 and 6 would normally be closed?
25 MR. O'NEILL: That is correct. Gates 5 and 6

1 would normally be closed. Therefore you would have to
2 remove the gate to have a complete interconnection.
3 The fuel transfer pool is open to the transfer
4 canal and pools A and B.
5 Now, you may be thinking of a question that is
6 what if you were only able to provide makeup to C and D, how
7 does that makeup get to A and B, because A and B is actually
8 where the heat rate is, particularly for the license
9 amendment request that we have here, which is one BTU per
10 hour in spent fuel pools C and D.
11 And the answer is that the water will flood over
12 the gate. The gate is below the top of the pool. So that
13 you fill pools C and D, and the water will flood over and
14 will traverse the canal all the way to pools A and B.
15 Or if you can get someone into the 286 level, you
16 have pneumatic seals on these gates. Even if you didn't
17 have time to pull the gate up, if you wanted to open the
18 gate, you have pneumatic seals, and you can just disconnect
19 and open up a valve, and you can deflate the blotters, and
20 then essentially the water will flow by the gates.
21 OK. Step 7, Ms. Curran suggested we were in
22 agreement on step 7, and we couldn't be further from
23 agreement on step 7 or anything else.
24 We all assumed a conditional probability of one
25 point zero, that is, the Staff, BCOC and CP&L, for a

1 self-sustaining exothermic oxidation reaction.

2 The Staff and we say it's a very conservative

3 assumption. Why did we assume it one?

4 Because the models to do the analysis of the heat

5 removal under all conditions is spent fuel pool having been

6 developed. I know. We asked.

7 We asked people who are expert in this area.

8 And I did not want to put on evidence that could

9 be disputed. And I didn't need it. You know, conditional

10 probability of one, we are down in a range that's so low,

11 that it did not make sense to pick any number, whether it's

12 point nine nine or point five or point two five, even, which

13 is what 1353 assumes for PWR fuel.

14 We simply said for purposes of what you want, was

15 that number to take to the Commission on probability, and

16 we'll talk about that later as to whether the Commission

17 really was asking for that, but we assumed one simply

18 because we are not going to be able to come up with a number

19 that I can defend without some possible dispute.

20 Now, having said that, for spent fuel pools C and

21 D, which is what this case is all about, we believe the

22 probability is closer to zero that you would ever have a

23 self-sustaining exothermic oxidation reaction in those

24 pools.

25 Why? We looked very hard at heat rate. The Staff

1 assumed for a long period of time that the heat rate for
2 determining whether a zirconium reaction was possible was
3 six kilowatts per metric ton uranium.
4 When there were some questions about what exactly
5 the ignition temperature is and as this issue has been
6 discussed, they reduced that number in the technical study
7 on spent fuel pool accident risk at decommissioned nuclear
8 power plants to three kilowatts per metric ton uranium.
9 We asked Mr. Keneda to take a hard look at what
10 was known in the literature with respect to ignition
11 temperature and also, because he's an expert on Harris spent
12 fuel, what the heat rate would be of the fuel that would
13 have been shipping and storing in C and D.
14 And he did that, and his analysis is in his
15 affidavit. And what his analysis shows is that all of the
16 fuel stored in C and D would be below the staff's number of
17 three kilowatts per metric ton uranium.
18 Now, the next question, then, is do we know
19 exactly what the temperature is at which this reaction could
20 be self-sustained?
21 Mr. Keneda did point to research that was done on
22 actual spent fuel rods that were heated to eight hundred
23 degrees C, and nothing happened. That's a data point.
24 The Staff in various literature will use numbers
25 that will go as high as fifteen hundred and seventy degrees

1 C. The answer is we may not know the answer to that
2 question precisely.
3 The reason that we don't worry about it is because
4 the probability of getting to that point is so low.
5 And consequently, the resources to put into doing
6 that kind of modelling, that kind of experimental testing is
7 interesting, but not important for safety.
8 It's far below any safety belt. It's far below
9 what society believes is important to protect public health
10 and safety.
11 The number at the end of the day, assuming that's
12 one that we calculated, is two point six five times ten to
13 the minus eight.
14 And that's a conservative number for reasons that
15 we set forth in some detail in our summary.
16 That's three chances in a hundred million. That's
17 remote and speculative. That starts to get to in theology
18 as to how many angels can dance on the head of a pin.
19 It is a meaningless number almost. So
20 consequently, we don't worry about exactly what that
21 temperature is because you just simply don't get there.
22 Uncertainty. PRA, PSA analyses are inherently
23 uncertain because they involve assumptions, which is why I
24 began this talk about why you need experts in many
25 disciplines to do a PRA that's meaningful.

1 So how do you treat uncertainty? Well, the Board
2 is familiar with distributions that can be used to treat
3 uncertainty by giving a range.
4 But that doesn't provide particularly useful
5 information.
6 And as the NRC and its contractors in the industry
7 have committed substantial efforts to understanding
8 uncertainties in these types of risk analyses, these efforts
9 have led to the development and understanding of the
10 contributors to the uncertainty and the identification of
11 alternative ways available to decision makers with effective
12 ways of characterizing the risk spectrum.
13 The evolving consensus in the industry on the
14 treatment of uncertainties is the use of focused sensitivity
15 evaluations to characterize the change in results as a
16 function of change in the inputs provides a physically
17 meaningful method of conveying a degree of uncertainty
18 associated with the analysis.
19 Sensitivity analyses were done for this ERIN
20 Engineering, a study that was essentially commissioned by
21 the Board.
22 The results of these studies are described in
23 Section 5 of the report. There were twenty-five sensitivity
24 studies.
25 And yes, there were sensitivity studies on human

1 reliability analysis.

2 And there was a whole chapter on human reliability

3 analysis, which goes to the issue of whether or not workers

4 would go into a--would take instructions to go into a room

5 where they had a dose rate and whether or not there's a high

6 probability of success in turning one valve and coming out

7 again.

8 If you look at Figure 5-1 which I don't have made

9 up here, as opposed to Table 5-1, it displays its

10 sensitivity analyses which concludes, for example, assuming

11 that that gate is closed one percent of the time, what does

12 that do to your analysis?

13 And with one exception, all of them fall below ten

14 to the minus six.

15 So that gives you a confidence level in this

16 analysis that you were certainly well below the one in a

17 million type of probability with all the conservatives that

18 are built in.

19 Now, let me mention one more thing before I do

20 some comparisons.

21 Peer review. Dr. Thompson--remember, this is his

22 requirements that we're going down in this check list.

23 And by the way, on "Uncertainty," I put an

24 asterisk here. His uncertainty analysis is to assume

25 everything is one. And so that gives him a conservative

1 number.

2 That, we would say, is a meaningless uncertainty

3 analysis.

4 Looking at what the Staff did, they did a

5 conservative upper bound. They used conservative but

6 reasonably conservative numbers and reasonably conservative

7 assumptions and came up with a number that they say is an

8 upper bound, but is in the ballpark.

9 I want to point out a couple of things in the

10 results which are interesting.

11 And to finish up this chart, peer review, PRA plus

12 peer review by ERIN Engineering. They didn't do it. An

13 independent peer review. Best in the business.

14 The Staff actually peer reviewed the IPE. They

15 looked at it independently. They didn't do it. They found

16 it fine.

17 And the peer review of the PSA is in the summary

18 attached to Mr. Walker's affidavit.

19 Spent fuel heatup analysis. ERIN had some of

20 their experts who did not work on the analysis do an

21 independent peer review to make sure they didn't miss

22 anything.

23 Quite frankly, there wasn't time to send this out

24 to another shop and have them look at the whole thing

25 independently, nor for a best estimate analysis did that

1 make sense.

2 And I'm sure the Staff has peer reviewed what they

3 did. And if they disagreed with it, I'm sure that Dr.

4 Parry, who is not very shy, would let us know.

5 The NRC Staff had Dr. Parry, Mr. Palla and Mr.

6 LeVies and Mr. Gratin's analyses peer reviewed by experts in

7 the NRC.

8 And they came out to the numbers they came out

9 with that was peer reviewed.

10 And of course, Dr. Thompson didn't do anything to

11 peer review.

12 I want to explain this table a little bit because

13 it clearly confused Ms. Curran and Dr. Thompson

14 surprisingly.

15 This first number is taken directly from the PSA

16 at the Harris plant.

17 JUDGE MURPHY: Which number are you pointing to?

18 MR. O'NEILL: It's on visual 2. It's the first

19 column which is internal events input from level 1 and level

20 2 quantification.

21 The second column completes the next four steps.

22 Remember, we assume for purposes of this analysis that step

23 7 is one. So we only need through step 6.

24 These numbers then for each of the internal

25 events, which are part of the PSA that the plant maintains

1 in QA's, by the way, seven point four times ten to the minus
2 ten, all the way down, sums at two point six five times ten
3 to the minus eight.
4 That number was deemed to be and viewed to be in
5 the judgment of ERIN Engineering the best estimate of the
6 scenario to answer the Board's questions.
7 They specifically looked at external events. In
8 this case, fire induced events, which provided a very small
9 contribution to the probability.
10 Now, they looked at total seismic contribution.
11 We didn't fill in the blank there. Oh, my goodness. The
12 reason is because this is not in the PSA, which is one of
13 the problems that we have with Dr. Thompson's number.
14 He picked a number which he found somewhere in a
15 stack of papers that was not part of the PSA. Seismic is
16 not in the PSA, and he doubled it and said, "That's my
17 seismic number."
18 In fact, there is no seismic contribution in the
19 PSA. The seismic contribution is done in the IPEEE. OK.
20 The seismic discussion in the IPEEE does not come
21 up with a core damage frequency number. So what ERIN did
22 was they used the best information available both at Harris
23 and from generic information and came up with the best
24 analysis they could with a lot of conservatisms of this
25 contribution.

1 Seismic is a very difficult scenario for your
2 seven-step scenario because if it is below the design basis
3 safe shut down earthquake, then it can't cause the
4 initiative.
5 If it is too large an earthquake, it can't result
6 in step 6, because step 6 has to be evaporation, not a
7 breach of the spent fuel pool.
8 So it was very hard, by the way, to do a seismic
9 analysis. In fact, during his deposition, Dr. Thompson
10 admitted that seismic really wasn't worth talking about
11 here.
12 You can't do seismic very well. This was hard to
13 do. It was hard for us to do. It was hard for the Staff to
14 do.
15 We took a shot at it. That's why we didn't sum
16 these numbers, because you're really comparing apples,
17 oranges and pears.
18 We also looked at industry data to look at
19 shut-down events, which were not included in the PSA.
20 So we have the shut-down events. We have the
21 seismic contribution. We have fire-induced.
22 We did not sum these for best estimate because we
23 didn't think it appropriate. But if you want to sum them,
24 the number is one point three times ten to the minus seven.
25 Interestingly, it's very close to the Staff number

1 of two point zero times ten to the minus seven.

2 We don't think it's appropriate to sum, but in

3 fact, what we suggest is by doing it a very different way,

4 we get a confirmatory review of what we did is in the

5 ballpark.

6 And when we're talking about something this remote

7 and speculative, the ballpark is certainly close enough,

8 because the Staff is at the one or two in ten million

9 number. We're at three in a hundred million.

10 The Staff says their analysis is conservative

11 because they admitted they used numbers that were not best

12 estimates, not state of the technology.

13 I will not cover but refer you to in our summary

14 the detailed listing of conservatisms that were built into

15 this analysis.

16 The conservatisms included conservatisms on, for

17 example, and importantly here, the distribution of

18 radioactive material in the event of a containment failure

19 or bypass.

20 They were very conservative analyses.

21 For example, we assumed that the temperature of

22 the steam coming out in Dr. Thompson's scenario to be two

23 hundred and twelve degrees.

24 And we assumed that the outside temperature was a

25 hundred degrees.

1 That's worst case. If it is a higher temperature
2 steam, it's going to have much more energy for the plume.
3 If it is a lower temperature outside, once again,
4 it's going to move more rapidly.
5 So consequently, we were making along the way some
6 very conservative assumptions with respect to many of the
7 steps of the way.
8 I kept telling the engineers, "This is a best
9 estimate. Why are you using the most conservative
10 analysis?"
11 And they kept saying, "That's the way we do
12 things." So I had a hard time doing what the Board really
13 wanted, and consequently we ended up as close as we could
14 get the best estimate with a lot of conservatisms built in.
15 Now, if there are no questions on the analysis,
16 the results, the situation at Harris, the assumptions, I'll
17 move on to my first argument, which is BCOC has not
18 sustained its burden.
19 CHAIRMAN BOLLWERK: At this point, maybe we should
20 take a ten-minute break before you move into your arguments.
21 (Recess.)
22 CHAIRMAN BOLLWERK: You had suggested if the Board
23 had any questions. Dr. Lam would like to ask you a couple.
24 JUDGE LAM: Mr. O'Neill, if you go back to Table
25 5-1, I see that late containment failure is included in

1 internal events. Is that correct?

2 MR. O'NEILL: That is correct.

3 JUDGE LAM: May I ask you what containment failure

4 did you consider in doing these analyses? Specifically are

5 we talking about leak before break? Are we talking about

6 catastrophic failure? What are we talking about here?

7 MR. O'NEILL: (Pause)

8 JUDGE LAM: And before you answer that, let me

9 lead you to my second question.

10 MR. O'NEILL: OK.

11 JUDGE LAM: What I'm driving at is this. Based on

12 the picture that you showed me, the large picture--

13 CHAIRMAN BOLLWERK: Illustration 5?

14 JUDGE LAM: Right.

15 CHAIRMAN BOLLWERK: No, that's picture 4.

16 JUDGE LAM: Number 4. The fuel handling building,

17 based on geometric consideration, maybe about thirty

18 degrees, if I'm sitting in the center of containment, I

19 would say about a thirty-degree angle of coverage somewhat.

20 What I'm getting at is if the containment were to

21 fail in a catastrophe, it would not anticipate a one percent

22 impact, because based on the number on Table 5-1, I see an

23 automatic reduction in probability from column 1 to column

24 2.

25 Right? In late containment failure, I see, you

1 know, four times ten to the minus six, and then I see one
2 times ten to the minus six.
3 MR. O'NEILL: Yes, right.
4 JUDGE LAM: So I see more than two reductions.
5 Now, the scenario I'm driving at is if, God forbid, the
6 containment were to go at three times the design rupture of
7 a hundred and fifty pounds per inch, with a six-foot-thick
8 containment structure, what kind of impact are we thinking
9 about?
10 MR. O'NEILL: The answer to that question is the
11 impact would be great. If you--at 2.44 at page 2-30 of the
12 ERIN report discusses the late containment failures.
13 JUDGE LAM: Give me that reference again, please.
14 MR. O'NEILL: The ERIN report, 2-30, Section 2.44.
15 And I refer you to there to find out all of the details of
16 what kind of failures.
17 The reason which gets to your bottom-line question
18 for the reduction in magnitude is the time that you have
19 before a late containment failure.
20 The calculation for a base mat melt-through is
21 ninety hours. That sometimes is characterized as a very late
22 containment failure.
23 Containment pressurization due to increased
24 temperature from core debris and pressurization from the
25 steam generation and core concrete interaction is at

1 thirty-eight hours.

2 They have various scenarios that have late

3 containment failure.

4 The assumption is, then, in here is that if you

5 have a situation which could lead to late containment

6 failure, you would pre-stage and would take into account

7 everything you would have to do to insure that water was in

8 the spent fuel pool.

9 You have--so it's--if you go through the analysis,

10 you'll find that the probabilities of the pre-staging and

11 the ability to open a valve and insure that water is going

12 to be in the spent fuel pools is within their thirty-eight

13 or ninety hours is something that can be done and would be

14 done.

15 So that there's a relatively high probability that

16 the pre-staging and the actions necessary before the failure

17 would occur.

18 JUDGE LAM: But why would you take credit for

19 pre-staging? If I am the plant operator, if I had a big

20 containment failure pending before me, I would be worried

21 about something else.

22 MR. O'NEILL: You would be worried about a lot of

23 things.

24 JUDGE LAM: But my job doesn't stop for a spent

25 fuel pool accident. My job doesn't stop if the containment

1 goes.

2 MR. O'NEILL: And that's exactly why you have a
3 technical support center and you have people who come in and
4 who are thinking of all the various things that would be
5 required to take place.

6 You would have already lost the spent fuel pool
7 cooling and cleanup system, you would have had alarms going
8 off.

9 The control and operators know that one of the
10 things you have to do is to make sure you have cooling or
11 water to the spent fuel pool so that you have time to do
12 what it takes.

13 And in that situation, even that situation, if you
14 didn't have pre-staging, the calculation from the models is
15 that you still would have sufficient access to the 216 level
16 to open one valve to get water to the pool within the period
17 of time within which the pool was boiled down.

18 JUDGE LAM: But what would be wrong with this
19 analysis, by just simply looking at a geometric ratio of
20 exposure of the spent fuel pool building with a containment
21 failure and assign a ten percent probability of failure for
22 probability of step 3 to 6?

23 What I'm driving at is if I had a containment
24 failure, a hundred and fifty pounds, nothing would stand in
25 its way.

1 And since the failure can be random, I draw a
2 circle of three hundred and sixty degrees, and my spent fuel
3 pool is roughly one tenth of that.
4 So I'm assuming random failure, so I would assume
5 ten percent of the chance it would take the spent fuel pool
6 with it. And without doing any analysis.
7 MR. O'NEILL: Right. Again, you're not taking
8 into account--in your analysis, you've ignored doing
9 something before that occurs, OK?
10 So remember you have a probability that you will
11 be able to do whatever it takes to get water flowing into
12 the pools before the rupture occurs. You've got a
13 probability there.
14 JUDGE LAM: Oh, that I agree. What I'm saying in
15 the scenario that I am postulating, not that I am doing
16 litigation for the Intervenor, but because you have done the
17 analysis here.
18 MR. O'NEILL: Right.
19 JUDGE LAM: Therefore, I thought it was fair game
20 to ask you what you have done, fully aware of what Dr.
21 Thompson has not done, because I asked him specifically,
22 "Have you considered containment failure," and he said,
23 "No."
24 MR. O'NEILL: Right, right.
25 JUDGE LAM: But you have. You have considered

1 containment failure. Containment failure in my mind is a
2 failure of a containment, a large dry containment at a
3 hundred and fifty pounds, which is a pressure you could
4 assume would be applicable here without knowing the specific
5 detail.
6 Assume that is the case. With that failure, there
7 would be nothing left in the spent fuel pool building, not
8 to mention cooling.
9 MR. O'NEILL: If you blow a hundred and fifty
10 pounds straight through? Is that what you're postulating?
11 JUDGE LAM: Right, right.
12 MR. O'NEILL: I mean, first of all, it's not into
13 the building, Dr. Lam. You have the reactor auxiliary
14 building first. So you've got to go through the reactor
15 auxiliary building before you get to the spent fuel handling
16 building.
17 JUDGE LAM: Right. My question there is would
18 that rupture of a large dry containment, would I see
19 six-foot-thick concrete slab the size of this room coming
20 down on the building, would the building be able to survive
21 that type of impact?
22 JUDGE MURPHY: Which building?
23 JUDGE LAM: The spent fuel pool building.
24 MR. O'NEILL: And I'm sorry, Dr. Lam. Where do
25 you assume in your analysis this is going to fail? Because

1 there's weak spots where the dominant failures are, so if
2 you're going to get that type of pressure, the analysis--and
3 I obviously haven't done the analysis-- but the analysis is
4 that they assumed that the failure would be at one of the
5 two weaker spots.
6 JUDGE LAM: That is exactly right. Therefore,
7 my--I was just leading you through my thought process.
8 Remember, my first question was what type of
9 containment failure are we talking about in "late
10 containment failure"?
11 MR. O'NEILL: And a dominant failure is base mat.
12 JUDGE LAM: Oh, so you're assuming base mat?
13 MR. O'NEILL: Yes, that's a dominant failure.
14 JUDGE LAM: Well, what happens to the upper
15 structure? Would there not be any pressure from a failed
16 base mat?
17 MR. O'NEILL: As I understand it, and I will turn
18 to the experts at some point, which I don't know all these
19 details, but I believe it's just because that's the weakest
20 point.
21 Mr. Lar and Mr. Gaber both say that the analysis
22 of that containment shows that the base mat interface there
23 is the weakest point.
24 That's why it is assumed it will be a base mat
25 failure. I understand what you're saying now. You're

1 blowing up the whole containment building.

2 JUDGE LAM: I'm not championing that possibility.

3 I'm just sharing with you my thought process for why am I

4 asking you the first question.

5 MR. O'NEILL: Right. Sure. And so to follow on,

6 given what that is, then the analysis assumes that base mat

7 failure, and in fact, I think conservatively we've assumed

8 it'd go to the RAB.

9 So we assume that it goes into the RAB and not

10 outside, which is one of our conservative assumptions,

11 because if it goes outside, then you don't have the same

12 problem you do if it goes into the RAB.

13 So we assume it goes in the RAB. You assume you

14 get all the material and radiation into the RAB and then

15 into the fuel handling building, you do the analysis. We

16 first take into account free staging and probability of

17 that.

18 But secondly, even with that analysis, the

19 calculations, you couldn't get into the 216 level.

20 So you still have a way of getting makeup water,

21 and one of the things I didn't point out, which I should

22 have, because it's--is that in these pathways for makeup

23 water, I didn't mention the source of the makeup water.

24 Dement water tank, normal source, five hundred

25 thousand gallon tank, back up, five hundred thousand gallon

1 tank.

2 Refueling water storage tank is four hundred and
3 sixty-nine thousand gallons. The emergency service water
4 system is basically the lake, which is large, a lot of
5 water.

6 And there is another smaller eighty-thousand-
7 gallon tank here that can be hooked up.

8 So you have many sources of water through may
9 different pathways to get to the spent fuel pools, which are
10 two million gallons boiled away in the first place.

11 JUDGE LAM: Thank you.

12 CHAIRMAN BOLLWERK: Just for the record, I'll note
13 you were pointing to figure 5 when you were making those
14 references.

15 MR. O'NEILL: Yes. I have not been disciplined in
16 doing that.

17 CHAIRMAN BOLLWERK: I have one question. Do you
18 have any questions, Judge Murphy?

19 MR. O'NEILL: Mr. Murphy had a question while I am
20 standing up that he asked me during the break to clarify.

21 I have pointed here consistently to where the
22 vents release at the 305 level. That is correct.

23 It is technically attached to but not part of the
24 reactor auxiliary building, so it is attached to it, but it
25 is open to atmosphere, as I understand. There's a steam

1 tunnel, and that is the building that the 305 level and its
2 vents are on top of.
3 Does that answer your question, Mr. Murphy?
4 JUDGE MURPHY: Yes.
5 CHAIRMAN BOLLWERK: I just had one question at
6 this point. Ms. Curran probably is going to delve into this
7 some more perhaps when she has her additional opportunity,
8 but this whole question of independent peer review,
9 obviously their position is that it wasn't independently
10 peer reviewed, and your position is that it is.
11 Is there something that I'm not understanding? Is
12 it what's meant by independent in this context?
13 MR. O'NEILL: Let's break it down into two parts.
14 You may recall we have two peer reviews. One is the PSA that
15 is the Harris PSA model that is maintained ongoing, was the
16 basis of the numbers for a level 1, level 2 analysis.
17 That is an extension of the IPE, which had
18 previously been independently peer reviewed by the NRC.
19 As step 1 in the ERIN Engineering scope of work,
20 ERIN Engineering, who had never been involved with the PSA,
21 provided an independent peer review pursuant to the industry
22 guidelines with independent peer review, which they do all
23 over the country and all over the world.
24 In fact, it's what Dr. Burns is doing now with an
25 NRC inspected peer review at a plant in Alabama. That was

1 independent.

2 That meets every standard of independent peer

3 review.

4 Now, in addition to that, this analysis for the

5 Board, this best estimate analysis, which used a

6 probabilistic safety assessment technique, which was done by

7 Dr. Burns and Mr. Gaber and people on their staff, the

8 results of that analysis were independently reviewed by ERIN

9 Engineering senior personnel.

10 Carl Fleming, whose name we mentioned previously,

11 is well-known in the industry, was one of the independent

12 reviewers.

13 Now, I would agree with Ms. Curran that if you

14 were looking at the strict definition of independence for

15 purposes of the industry standards of a PRA, that review

16 would not have met that definition.

17 But for purposes of the quality here, it does

18 provide additional, if you will, confirmation that what Dr.

19 Burns did was not only done once, but it was reviewed again.

20 It's very similar to when an engineer does a

21 calculation that's being used for safety analyses, he'll not

22 only do it himself, he'll have somebody else review it, do a

23 second review independently.

24 Now, is that an independent peer review? That

25 depends on your definition. But it is certainly a peer

1 review that's done independently because the person didn't
2 work on the calculation in the first place.
3 If you want it to be purely independent, I guess
4 you would have it done by somebody you don't pay to do it.
5 But I mean, you know, we've moved too far afield.
6 JUDGE MURPHY: And were the CP&L analyses that
7 went into your overall analysis, were they reviewed by
8 somebody also?
9 MR. O'NEILL: Yes. For example, let's take Mr.
10 Morgan's dose calculations.
11 JUDGE MURPHY: For example?
12 MR. O'NEILL: Yes, for example. Mr. Morgan's dose
13 calculations were performed by him. And his resume' is
14 there, and he is a highly qualified health physicist.
15 His calculations were reviewed by Mr. Wills, who
16 is his boss and is independently an expert. In fact, he was
17 deposed in this case.
18 And so he looked at those calculations and then
19 Mr. Gaber, who used that information in his PRA, looked at
20 those calculations as well to make sure that all of this
21 made sense.
22 And there was a lot of back and forth on this, as
23 you might guess, because this hadn't been done before.
24 So the answer to your question is Mr. Edwards'
25 calculations for spent fuel pool boil-off, he had that done

1 by an independent engineer. He did it independently
2 himself.
3 And by the way, the NRC reviewed it and said it
4 was right, and Dr. Thompson reviewed it and said it was
5 right.
6 So I guess that's been independently reviewed any
7 number of times.
8 JUDGE MURPHY: And the initial source term
9 calculations?
10 MR. O'NEILL: The initial source term calculation
11 done by Mr. DeVoe, did you have anyone to look at that?
12 (addressing Mr. DeVoe)
13 (Discussion off the Record.)
14 MR. O'NEILL: What Mr. DeVoe said is that the
15 initial source term calculation was done by Westinghouse and
16 it was reviewed independently as the owner's review by CP&L.
17 So the answer is yes, anything that we do that we
18 submit to the Nuclear Regulatory Commission is always
19 checked and cross-checked.
20 CHAIRMAN BOLLWERK: Are you going to have anything
21 further to say on the--what was framed as the, you know, the
22 legal issue about high rad doses to workers as part of what
23 you're going to be talking about in the next segment, I take
24 it?
25 MR. O'NEILL: Yes.

1 CHAIRMAN BOLLWERK: OK. Why don't we move on to
2 that, then?
3 MR. O'NEILL: BCOC has two burdens. Burden number
4 one, of demonstrating that there is a genuine, substantial,
5 material issue of fact in dispute which cannot be resolved,
6 which cannot be resolved without a hearing and is critical
7 to the decision of the Board.
8 They have to demonstrate that, and I submit that
9 they can't. In order to--and secondly, they have the burden
10 of going forward.
11 They have to at least put on the table facts which
12 if proved would demonstrate that it is not remote and
13 speculative.
14 That's two burdens they have.
15 Dr. Thompson did no more than he did when this
16 contention was admitted.
17 He has a different number here. He has a higher
18 number here. He has nothing here. There is no analysis.
19 There is nothing.
20 If this is off anywhere by a factor of ten, a
21 factor of a hundred or somewhere in between, it's off the
22 charts anyway into remote and speculative land.
23 This does not prove anything. It does not tell
24 this Board that we've got a real issue that we've got to
25 resolve.

1 His analysis is basically to not do what the Board
2 requested, for whatever reason. Whether he was incapable of
3 doing it, he didn't have the resources to do it, didn't want
4 to do it is beside the point.
5 This was an expensive analysis to do. It's a lot
6 of work. And the Staff and the Applicant basically said,
7 "OK, these are the rules. We'll go and do it." BCOC did
8 not.
9 Notwithstanding Ms. Curran's arguments, there are
10 no new genuine substantial material facts that are in
11 dispute.
12 There's different opinions. There're not facts in
13 dispute. You're not pointing to a fact and saying, "This
14 fact is in dispute and until we resolve that fact we'll not
15 be able to make a decision here."
16 Now, I submit that you cannot say, "I have a
17 French study on fuel that has a much higher burn-up than is
18 stored at Harris that was operated in sodium, and where the
19 authors of the experiment say, this isn't applicable to
20 PWRs."
21 Dr. Thompson cannot bring that study before this
22 Board and say, "Aha. We dispute the source term that CP&L
23 has used and uses for its own analyses."
24 It's been reviewed by the NRC and reflects the
25 fuel that's actually at Harris. That's not a fact in

1 dispute. That's simply inapplicable.

2 Dr. Thompson did not do a so-called scoping

3 calculation, which is impossible to come up with the result

4 that he has come up with and say, "Aha. I have a fact in

5 dispute.

6 "We're going to give the workers in the control

7 room a much higher dose than the workers fighting the fire

8 with a plant that is graphite fuel without a containment

9 received while fighting the fire at Chernobyl."

10 That's not a fact in dispute. That just makes no

11 sense.

12 Scoping calculations, assumptions, opinions are

13 not facts in dispute. We have not heard a fact in dispute.

14 The steam generator tube rupture bypass incident,

15 which has so many different complicated assumptions in it:

16 loss of safety injection, complete dry-out of the

17 reactor cooling system, removal of the loop seal, reactor

18 coolant pump loca, loss of auxiliary feed water, including

19 the steam turbine auxiliary feed water at Harris, steam

20 generator tube that's going to rupture, by the way, with

21 steam generator tubes that are going to be replaced this

22 October with new 690 tubes which obviously have a higher

23 integrity.

24 With operating procedures which are not considered

25 in New Reg 1570, it would say you don't start the main

1 reactor cooling pumps, he comes up with a very high
2 probability.
3 Inapplicable. That's not a fact in dispute.
4 That's an argument that simply is misinformed. He doesn't
5 understand. He doesn't understand the accident analysis,
6 can't rely on him.
7 That's our argument as to why there are no facts
8 in dispute. Unsupported assertions are not facts.
9 By the way, command and control. First of all, we
10 showed why the control room--by the way, we did the analysis
11 with the PSA.
12 Under all of the scenarios that we have analyzed
13 with the control room being habitable, there was only one
14 scenario where the control room operators would have to go
15 to the auxiliary control panel during this scenario, in
16 calculating the doses throughout the plant for any of these
17 scenarios.
18 And if they couldn't be in the control room, they
19 could be given direction from the technical support center.
20 And if they couldn't be in the technical support
21 center, they could be in the emergency off- site facility,
22 giving direction within the eight days under the worst
23 conditions that you have for boil-off of the fuel to put
24 makeup water.
25 These are practiced. Control room operators have

1 drills where they go to the auxiliary control panel to
2 operate the plant, where people come into the technical
3 support center and are given scenarios.
4 It's not something that would leave people
5 stumbling around. They know how to do it.
6 The dose calculation issue is not an issue of
7 fact. It's a question of law.
8 Five rem, of course, is an annual limit for
9 chronic radiation exposure. A person can receive five rem
10 per year for their entire career without adverse effects, as
11 set forth in 10 CFR 20.1201A.
12 The regulations contain an explicit exception for
13 plan special exposures under 20.1206. In turn, 10 CFR
14 20.1206 authorizes the licensee to permit a worker to
15 receive doses in addition to and accounted for separately
16 for the doses received under 20.1201A when alternatives are
17 unavailable or impractical.
18 NRC regulations do not specify upper limit doses
19 received in these planned special exposures.
20 However, personnel exposure in excess of
21 twenty-five rem is authorized under EPA guidelines to avoid
22 extensive exposure of large populations.
23 To violate the NRC and EPA regulations, an
24 exposure must exceed five rem unnecessarily.
25 This is under this highly improbable scenario

1 where restoring water to a spent fuel pool or spent fuel is
2 concerned would certainly be a scenario where a licensee is
3 authorized to exceed twenty-five rem.
4 But for success in our analysis, we did not allow
5 a worker to exceed twenty-five rem, to see if we were able
6 to be successful with that limit. And the analysis shows we
7 would.
8 So the legal argument simply makes no sense.
9 Furthermore, the Reg guide 8.29, which deals with
10 risk from occupational radiation exposure, discusses in
11 great detail that this type of twenty- five rem exposure one
12 time is not likely to be a safe or a necessarily safe or
13 unsafe limit, particularly if you don't exceed the dose for
14 the entire lifetime.
15 So the argument is speechless.
16 One of the issues that Ms. Curran claims is an
17 issue of fact is whether or not there was accessibility to
18 the 286 level in the fuel handling building with hot steam.
19 Two points. One, in all of our scenarios, you
20 actually never have to get to the 286 level if there's
21 radiation there and hot steam.
22 But even if for some reason you couldn't, we
23 looked at all the possibilities. And the answer is hot
24 steam would be at a hundred and ninety degrees.
25 Firefighters are able to, as Mr. McCartney

1 indicates in his affidavit where he discusses this in some
2 detail, would be able to run in there with their
3 firefighting outfit, breathing packs, without any problem at
4 a hundred and ninety degrees--they train in three hundred
5 degrees.
6 Also in Mr. McCartney's affidavit we talk about
7 where the fire pump is, where the fire engines are that
8 could pump water at twelve hundred gallons per minute, what
9 arrangements are with these fire companies, the drills that
10 occur periodically to make sure that the fire trucks can get
11 there.
12 And once again, this is not something that has to
13 be instantaneous, done instantaneously. There is time.
14 There is always time to get the fire truck there.
15 In fact, one of the executives was saying, "My
16 goodness, if we couldn't get in any other way, you could put
17 a helicopter up to the roof, you could bore a hole in and
18 stick a hose down."
19 I mean, there are all sorts of ways you could get
20 water to that pool.
21 The probability that under these scenarios with at
22 least eight days to spend time thinking up solutions that
23 you couldn't get water in the pool is, as the Staff
24 suggests, close to zero.
25 Ms. Curran says we have a dispute whether this was

1 an independent peer review. That's not a dispute of fact.
2 It's a dispute of definition.
3 And it certainly isn't central to the question
4 here.
5 She says we have a question about how we can
6 evaluate the reliability of the PSA because they didn't get
7 all of the second-tier documents which show over a period
8 between initiation of the event and four days what the
9 levels are in every single one of the compartments and every
10 single area around the plant.
11 "Therefore, how do we know that this is reliable?"
12 The answer is the information was done by
13 professionals, it was independently reviewed. It was peer
14 reviewed.
15 It's using calculational methodologies and models
16 that are used of the plant at all times, and quite frankly,
17 if we gave all that material to BCOC, they wouldn't be able
18 to review it and wouldn't be able to make any sense of it
19 with the one expert that they have.
20 And that's not necessary in order to do a PSA, to
21 see every bit of documentation.
22 And it is not important to the issue here, which
23 we'll get to, as to whether this is a remote and speculative
24 event.
25 For some reason, Ms. Curran suggests that we agree

1 that if there was a fire in A and B that a fire in C and D
2 would follow.
3 I have no idea where she got that. What we said
4 is that the effects of A and B dominate. The heat rate is
5 in A and B.
6 Remember, this license amendment was for one MBTU
7 per hour in C and D.
8 Consequently, we shut off the analysis at four
9 days. And we were able to show success in four days.
10 But we suggested that A and B, if you had a fire
11 there, you might have difficulty getting to C and D, and we
12 didn't take the analysis any further.
13 The analysis shows, however, that it would take a
14 hundred days to boil off the water in C and D, which gets to
15 the point under NEPA that this license amendment
16 application, which asks to commission C and D, which adds
17 another spent fuel pool cooling and cleanup system, really
18 doesn't add any risk for this scenario that's being
19 hypothesized by Dr. Thompson.
20 We submit that there are no facts in dispute, no
21 facts in dispute, and certainly no facts in dispute that
22 could not be resolved by the Board without a hearing.
23 And we submit that if there was any issue in
24 dispute it would both be inconsequential to the ultimate
25 decision and also could be resolved by the Board without a

1 hearing.

2 Indeed, most factual disputes and in some agencies

3 all factual disputes are resolved by administrative law

4 judges without hearings. They're done with papers.

5 And so it's pretty hard to really come up with a

6 scenario that must have a hearing, or other agencies are not

7 doing their job.

8 Perhaps you could argue if there was a clear issue

9 where opinion was the key to a dispute that you would have

10 to cross-examine the experts to try to get to the bottom of

11 it.

12 But here, you have consistency between the experts

13 of the Applicant and the NRC Staff.

14 And as we've taken some pains to point out, they

15 have no expert on their side.

16 That goes to the question of Ms. Curran saying,

17 well, maybe they'd hire another expert.

18 We haven't had a hearing under Subpart K, but I

19 submit that if we had a hearing, the evidence is already

20 here. There would be no more experts. There'd be no more

21 discovery.

22 We'd go to hearing and cross-examine our witnesses

23 and try to resolve the issues. This is an expedited

24 proceeding.

25 This is a proceeding that's supposed to be

1 fast-track.

2 And that doesn't allow for retaining other experts

3 to go out and do three or four months of additional study.

4 This application has been on file for two years

5 this December. We have a policy statement by the Commission

6 as to how quickly these license amendment proceedings should

7 be resolved.

8 We have direction by Congress as to how quickly

9 spent fuel storage license amendment proceedings should be

10 resolved.

11 That would not be consistent with another round, a

12 few more experts, more time.

13 Let me turn to my final argument, that the NRC

14 Staff has complied with NEPA. No EIS is required in this

15 case.

16 BCOC's position here is that severe spent fuel

17 pool accident probability estimate on the order of ten to

18 the minus 5 should be a trigger for an EIS for the reasons

19 that it has a close order of magnitude to a reactor accident

20 which requires an EIS and emergency planning;

21 that by its very nature, it's a new area of study,

22 it's subject to considerable uncertainty;

23 and the environmental impacts of a large release

24 of radioactive material from spent fuel pools in terms of

25 intradiction of vast areas of land that have not been

1 evaluated by the NRC in EIS.

2 First of all, you don't look at point C when

3 you're looking at the standard of remote and speculative.

4 If it's remote and speculative, it doesn't matter

5 what the consequences are.

6 So the only points then are, well, is ten to the

7 minus fifth a trigger, and is it a new area of study?

8 It's not a new area of study. We've been studying

9 spent fuel storage for a long time.

10 In fact, while Dr. Thompson asserts that he has

11 turned the NRC around on the partial drain down, I refer you

12 to New Reg CR0649, where the NRC Staff talked about that the

13 spent fuel heatup in the event of an incomplete drainage may

14 be a worse accident.

15 It's nothing new here. Dr. Thompson has not

16 invented the internet.

17 NEPA requires no more than a hard look by the NRC,

18 a hard look.

19 The NRC has given environmental consequences of

20 extended spent fuel storage a very, very hard look. BCOC

21 ignores the significant effort by the NRC to evaluate every

22 conceivable aspect of spent fuel storage over the past

23 twenty to thirty years.

24 The Commission has given the potential

25 environmental impacts of wet, dry, long-term, short- term

1 storage of spent fuel in various, different proceedings for
2 operating plants, decommissioning plants, independent spent
3 fuel storage facilities, spent fuel storage casts, a very,
4 very hard look.
5 Just last year in August the NRC issued the
6 generic environmental impact statement for nuclear power
7 plant license extensions, New Reg 1437, which addresses the
8 environmental impact of storage of spent fuel at reactor
9 sites for an additional twenty years.
10 The Commission concluded that its regulatory
11 requirements provided adequate mitigation incentives for
12 on-site storage of spent fuel.
13 No further EIS on this issue is required for any
14 license renewal proceeding.
15 Those issues are no different than they are here.
16 In 1984, the Commission issued its Waste
17 Confidence Decision, Codified 10 CFR 5123.
18 The Rule specifically states that no discussion of
19 the environmental impact of spent fuel storage facilities
20 for the period following the term of the reactor operator
21 license is required in any environmental report,
22 environmental assessment or other analysis.
23 Admittedly that doesn't have to do with an
24 operating plant, but once again, we're looking at the
25 impacts of spent fuel storage, the potential for a spent

1 fuel pool accident.

2 The NRC has conducted over fifty reviews of the

3 expansion of the fuel pool capacities.

4 Each review has found no significant environmental

5 impact.

6 That also is set forth in the Generic EIS in

7 Section 6.4.6.3, for that particular number, over fifty

8 reviews.

9 In addition, the NRC examined the generic risk of

10 spent fuel storage in numerous safety studies, including

11 generic issue 82.

12 Generic Issue 82 evaluates the need for additional

13 protective measures for safe storage of spent fuel in high

14 density storage racks in spent fuel pools at light water

15 reactors.

16 1353, referenced by this issue in 1989 concluded

17 that any safety gauge would not justify the cost to backfit

18 it.

19 Ms. Curran says--and the number there is two times

20 ten to the minus six. That number has no relationship, no

21 relevance to this proceeding.

22 It has to do with sabotage and other issues that

23 are not before this Board on this specific scenario,

24 specifically excluded, in fact.

25 The one number there that might be relevant which

1 has something to do with an accident that begins with a
2 seismic event, even though it's a seismic event that would
3 drain down the pool, was in the ten to the minus eight
4 range, which I submit is certainly remote and speculative.
5 The Commission today continues to today to take a
6 hard look at potential accidents and consequences of the
7 long-term storage of spent fuel.
8 Just last month in the ACRS meetings, it was
9 reviewing the work on the decommissioning nuclear power
10 plants and spent fuel storage.
11 And these studies are in addition to the Harris
12 FES and the 1999 environmental assessment for this licensing
13 matter.
14 NRC Staff has taken and continues to take a hard
15 look at spent fuel storage issues.
16 That's all that NEPA requires. And that's why I
17 say that even if you couldn't make a decision as to whether
18 this was remote and speculative, as a matter of law, you
19 could find that NEPA has been complied with, because NEPA
20 requires no more than has already been done.
21 It would be incongruous to consider the
22 possibility that EIS for a license amendment request to
23 follow the dictates of Congress in the Nuclear Waste Policy
24 Act to expand spent fuel storage on- site pending the
25 Government's ability to take spent fuel for permanent

1 storage and disposal where the Commission has already found
2 that no EIS need be considered for expanded spent fuel
3 storage in connection with licensing renewal or in
4 connection with the waste confidence decision.
5 That would make no sense.
6 It's important to recall that the existing Harris
7 FES contemplates the storage of more spent fuel including
8 spent fuel from Robinson and Brunswick that can be stored
9 pursuant to the license amendment request that is before
10 this Board.
11 Those numbers are set forth in our summary and
12 show that the license would have allowed the seventy-six
13 hundred forty spent fuel assemblies to be stored.
14 And what we've shown with A, B, C and D in service
15 with the one MBTU maximum, we wouldn't be able to store more
16 than seventy-three fifty-nine.
17 Remember that the Harris FES was written for a
18 two-unit operation, which certainly bound one unit
19 operation, and they didn't redo it.
20 So the environmental impacts have already been
21 considered of storing more spent fuel than we're asking for
22 here.
23 Did it consider this scenario? No. Did it
24 consider accidents in the spent fuel pool? Yes.
25 And you don't have to redo EIS's because someone

1 brings up a new issue.

2 Furthermore, this PRA shows, PSA shows that

3 consequences from the postulated scenario are bounded by the

4 consequences of what would happen in spent fuel pools A and

5 B.

6 The scenario drives an accident in A and B. It

7 never gets there. But to the extent that there's a

8 probability, certainly the boil-off is going to be in A and

9 B well before C and D.

10 Even, because we don't want to segment anything,

11 even assuming one point fifteen point six MBTU, which is the

12 maximum capacity--and we never applied for that amount, and

13 we may not in the future--but in the analysis that was done,

14 it was fifteen point six MBTU, the heat rate from A and B

15 drives the analysis.

16 So where are we?

17 We have CP&L's conservative best estimate

18 calculation of probability, the first six steps of the

19 seven-step sequence on the order of three in one hundred

20 million.

21 The NRC's conservative upper bound calculation of

22 two in ten million.

23 Those numbers are remote and speculative.

24 But wait. The NRC has never established a number.

25 In fact, in the Vermont Yankee case, which the Board

1 referred to to bring us to this point, the NRC's commission
2 said ten to the minus four might be remote and speculative.
3 But they didn't say what the number was. So going
4 back to what the Board has asked, what is the trigger for
5 remote and speculative? Do we have a trigger?
6 The Commission, I believe, has recognized that
7 nuclear plant safety cannot be guaranteed and not all
8 adverse environmental impacts from the operation of nuclear
9 power plants can be completely eliminated.
10 The Commission, NRC Staff, ACRS all agree that one
11 times ten to the minus fifth per reactor year is the
12 appropriate frequency for large early releases of reactivity
13 and prompt fatalities.
14 That's a bad result. That's a big consequence.
15 That's the number that's acceptable for design and for
16 safety.
17 Applicant concluded that for purposes of NEPA,
18 because we are mindful, as is Judge Bollwerk, of the
19 Limerick Environmental Action case that said that you can't
20 automatically assume that because it's a beyond-design basis
21 accident you don't have to look at it for NEPA's purposes.
22 But we believe that in the order of a value of one
23 times ten to the minus six per reactor year or less should
24 be considered too remote and speculative to require any
25 consideration pursuant to NEPA.

1 This value conservatively is within the bounds of
2 values considered remote and speculative by appeal boards,
3 the Commission and federal courts.
4 And we've cited to a number of those court cases
5 in our brief, and I won't repeat them.
6 It's also commonly understood by the average
7 person as so unlikely as that no one takes it into account
8 in their personal life-making decisions about risks.
9 It's one in a million. It's not something that we
10 worry about in the ordinary course of life.
11 Now, risk is, of course, the product of
12 probability and consequences.
13 We've been talking only about probability because
14 that's what this analysis is all about.
15 A severe reactor accident with a large release,
16 which are steps 1 and 2 of this postulated scenario, itself,
17 produces unacceptable consequences.
18 If a severe reactor accident satisfies the
19 regulatory threshold of acceptable risk, then identifying
20 the consequences beyond those which are unacceptable becomes
21 an interesting theoretical exercise, but not one that
22 provides useful information for the decision maker.
23 Even if one considers consequences that are ten
24 times greater than that from a severe reactor accident with
25 a safety hole of a large early release frequency of one

1 times ten to the minus 5th, the acceptable probability of
2 occurrence would be a factor of ten less or one times ten to
3 the minus six.
4 And Dr. Thompson during his deposition agreed with
5 that proposition.
6 Now, Dr. Burns, who has participated in a high
7 percentage of all nuclear plant PSA's, describes in the ERIN
8 report a diminimous point or the point in which events may
9 be so remote and speculative as to be beyond what could be
10 rationally considered.
11 He has indicated that for practical purposes that
12 frequency is one times ten to the minus six per year.
13 Risk reduction below the diminimous point might be
14 accomplished by eliminating a product or service, the
15 automobile.
16 However, in most cases, society has determined
17 that it is not suitable because it interferes with
18 individual freedom and may, in fact, introduce newer
19 competing risks that may be larger than the risk being
20 eliminated.
21 Dr. Burns concludes that events with frequencies
22 below one in a million can be considered sufficiently low in
23 frequency such that additional efforts by society to reduce
24 the frequencies below this level are not considered
25 warranted.

1 And those risks can be referred to as remote and
2 speculative.
3 One in a million appears to be a cut-off for the
4 Commission as well.
5 The Commission approved a frequency of one times
6 ten to the minus six as the cut-off for evaluating low risk
7 accidents associated with the shipment of the Trojan reactor
8 vessel, and I've cited to that in my summary.
9 No EIS was required. In evaluating the
10 environmental impacts from the current license renewal, the
11 licensee used four point five times ten to the minus seven
12 for screening internal events, eight point five times ten to
13 the minus seven for external events.
14 The Staff accepted these values, which are
15 certainly very close to one times ten to the minus six.
16 Events with lower probabilities were not included
17 in the EIS.
18 The Staff in its summary coincidentally chose the
19 same number, one times ten to the minus six.
20 Now, having said that, we would be concerned if
21 the Commission were to formally adopt a quantitative
22 definition of one times ten to the minus six for remote and
23 speculative.
24 Certainly it has avoided doing so to date.
25 And even the Vermont Yankee decision expressly

1 reserved whether ten to the minus four might be remote and
2 speculative.
3 If one times ten to the minus six became a trigger
4 number, the EIS contention phase of proceedings would turn
5 into probabilistic debates regarding whether or not that
6 threshold was reached and with what degree of certainty.
7 We believe that the Commission has moved from any
8 thought of risk space regulation to risk informed
9 regulation.
10 PSA is a tool to evaluate the direction of change,
11 increasing or decreasing the margin of safety.
12 The numbers, themselves, are not magical. Having
13 said that, we submit that an Intervenor should be required
14 to provide with some basis and specificity, which we submit
15 they do not do, and we respectfully disagree with the Board
16 admitting this contention.
17 We respectfully submit that they did not do that
18 when this contention was proffered.
19 They came up with three times ten to the minus
20 fifth for steps one and two, and provided nothing for the
21 rest of the steps.
22 We believe that the basis and specificity
23 requirements should have required that they come up with
24 some at least facts with basis and specificity, which, if
25 proved, could come up with a number that's not remote and

1 speculative.

2 And we submit that number would have to be

3 considerably at least ten to the minus six.

4 The NRC Staff, which of course, has the obligation

5 to comply with NEPA, and then the Applicant who wants the

6 license amendment, otherwise is unfairly required to prove

7 the negative.

8 The circuit cases cited by the NRC Staff stand

9 squarely for the proposition that the petitioner has the

10 burden of attacking with facts the Agency's no- impact

11 decision.

12 With all due respect, we believe that not only has

13 BCOC failed to meet its burden here under the requirements

14 of Subpart K, but also failed to provide a sufficient basis

15 and specificity in the first instance.

16 Now, in our summary, we tried to put the numbers

17 that we came up with in perspective, and I'll just point out

18 two of them.

19 They're in Table--page V-6, I believe, of the ERIN

20 report, Appendix B, the last page is a table.

21 And we compared the numbers that ERIN came up with

22 for this scenario to other highly improbable events.

23 The probability of the annual frequency of the

24 recurrence in some publications is estimated to be one times

25 ten to the minus four, ten thousand times more probable than

1 this scenario.

2 The probability of a meteor strike causing

3 world-wide havoc is two orders of magnitude greater than the

4 postulated scenario.

5 What probabilistic risk assessment does is allows

6 society to make informed decisions where to expend time,

7 energy and resources.

8 We submit that this is not the place with a

9 probability this low.

10 The Board asked us to address in question number

11 two New Reg 1353. I'll be happy to answer any questions

12 about it. Our view is it's irrelevant for this scenario.

13 In any event, the probability there of a self-

14 sustaining exothermic oxidation reaction of a zircoid cloud

15 was assumed to be one. We did the same thing. So there's

16 no difference there

17 The two times ten to the minus six number has no

18 relevance to the scenario.

19 But it's interesting that the ACRS, which has been

20 looking at some issues that relate to the possibility of an

21 accident in spent fuel pools, has very recently resolved

22 them all, at least the ones that were raised and you asked

23 us to comment on.

24 The hydrating and the fuel or the ruthenium

25 release, which in Mr. Keneda's affidavit you'll see that the

1 ruthenium has decayed off before this fuel is even put in
2 spent fuel pools C and D.
3 Certainly the ACRS should ask questions. And
4 certainly it's legitimate to ask us to address those
5 questions.
6 But the fact is that the Commission has
7 established methods for requiring licensees to address
8 emergent issues, potentially impacting already licensed
9 activities, including orders 10 CFR 50.54, Generic Issues.
10 With respect to question three, we respectfully
11 submit it's simply moot.
12 The Applicant requests the Board to do the
13 following, and pursuant to 10 CFR 2.1115, quote, "promptly
14 by written order," determine that no issue of law or fact
15 shall be designated for resolution in an adjudicatory
16 hearing.
17 Applicant respectfully suggests that due to BCOC's
18 utter failure to comply with the Board's directions in this
19 matter, this ruling could appropriately be issued today from
20 the Bench with written order to follow.
21 Number 2, dispose of contention EC-6. The license
22 amendment application to permit commissioning of spent fuel
23 pools C and D for storage up to one MBTU of spent nuclear
24 fuel increases neither the probability nor the potential
25 consequences of the accident scenario that is postulated

1 here.

2 In fact, as I noted before, the addition of the
3 redundant spent fuel pool cooling and clean-up system for
4 spent fuel pools C and D provides alternate makeup water
5 paths from the spent fuel pools and reduces the probability
6 of the postulated scenario.

7 The postulated scenario is highly remote, highly
8 speculative and the incremental environmental risk is
9 insignificant and is bounded by the existing environmental
10 risk of a licensed activity, which is already covered by the
11 final environmental statement.

12 We submit that the Board should find as a matter
13 of fact and conclude as a matter of law that the NRC Staff
14 has satisfied its obligations pursuant to NEPA and need not
15 prepare a supplemental environmental assessment or
16 environmental impact statement.

17 And the one thing that I forgot to mention was
18 that the analysis that was done for seismic was based on a
19 margin analysis that looked at the possibility of two times
20 the safe shut-down earthquake as part of that analysis.

21 Thank you very much for your attention.

22 CHAIRMAN BOLLWERK: Questions from the Board?

23 JUDGE LAM: Mr. O'Neill, I find that the Applicant
24 has done a huge amount of work on the risk assessment area
25 pertaining to this issue. And I find that useful, and I

1 commend you for doing that.

2 Now, in your study, a lot of assumptions were made
3 involving a lot of technical operational data, as well as
4 judgmental assignments of probabilities.

5 With that in mind, why do we not have material
6 dispute of facts here, if the fact is interpreted as the
7 probabilities?

8 We do have a genuine disagreement here. I see on
9 one hand, you, the Applicant, have done a great deal of
10 work, down to great detail, down to a level of specificity
11 that, I would say, gives basis to your work.

12 But again, that involves a considerable amount of
13 judgmental value. I see that on one hand.

14 And on the other hand, Dr. Thompson has come
15 forward and was making assertions based on his expert
16 opinion that some of these probabilities are very different
17 than what you have evaluated.

18 Therefore, the question is why do we not have a
19 material dispute of fact which meet the threshold for going
20 to evidentiary hearing and letting the maker of litigation
21 bring the truth out?

22 MR. O'NEILL: There's a couple of answers to that
23 question. Let's start with PSA/PRA.

24 No one involved in PRAs would assert that there's
25 not uncertainties. No one involved in PRAs would assert

1 that there are not judgments.

2 There are variabilities. There are assumptions.

3 And so how do you deal with that?

4 And the answer to that is the sensitivity analyses

5 and uncertainty analyses.

6 If you read Chapter 5 of the PSA, that's done for

7 this specific question. You have an answer that says that

8 varying these assumptions does not change the conclusion

9 that this is remote and speculative. OK?

10 So first of all, dealing with that fact.

11 Secondly, that's why they're peer reviewed.

12 And to the extent that you have the parameter firm

13 for PSA's and nuclear power plants which perform this

14 analysis, and you have the NRC Staff who has done an

15 analysis of their own that is different in some respects but

16 is confirmatory on upper bound, you have very powerful fact

17 and opinion that this is the best that the PSA technology is

18 going to provide you as far as a number.

19 The Board asked for a number. I'm not sure if the

20 Commission really meant it wanted a number.

21 I think that the Commission in Vermont Yankee

22 wanted that number substantiated. But we never found out

23 because the case was settled.

24 But remember the Commission thought that ten to

25 the minus four might be remote and speculative.

1 And that's why I gave my little homily as to why
2 I'm not sure this is a good idea to establish a trigger
3 number and then get into the business of doing a PRA anytime
4 you want to decide what's remote and speculative.
5 The fact is, Dr. Lam, we knew the answer to this
6 question before we started, because you take engineers who
7 work at that plant and you ask them, "What is the
8 probability of once you get through a severe accident which
9 has a very low probability to begin with a containment
10 bypass, which has a very low probability, because that has
11 consequences that are simply unacceptable, and you layer on
12 top of that the probability that you will not be able to get
13 makeup water, and therefore you're going to have an accident
14 that's going to be in the spent fuel pool on top of that?"
15 And they all said, "It can't happen."
16 We knew the answer to this question before we
17 started. The problem is to come up with a number. And
18 that's why I submit that you don't have to come up with
19 quantifications to prove something is remote and
20 speculative.
21 You have a burden to come up with some facts that
22 say here is a logical scenario that really could happen with
23 some probability that makes sense, and here is my analysis
24 and here is my basis and specificity.
25 That was never done. And here at this hearing

1 that's not done.

2 The only thing you have is Dr. Thompson saying,

3 "Uh, I think it would all fall in two hundred meters."

4 Well, that doesn't work. That isn't something

5 that this Commission should be basing technical decisions

6 on, I submit.

7 So I think the answer is, first of all, you have

8 the information you need.

9 Now, Subpart K, which is to expedite this

10 proceeding, says that the burden is on the Intervenor to

11 show that there are no genuine, genuine, real, not French

12 studies on sodium, but real facts in dispute, in dispute

13 that are material to your decision and without resolving

14 them, you can't make a decision, and you need to cross-

15 examine-- you have to have me cross-examine Dr. Thompson to

16 be able to make that decision.

17 I submit that this Board can make a decision

18 without going through that exercise.

19 I think that's what Subpart K is all about. So I

20 submit that there are no facts in dispute that meet the

21 standard here for Subpart K.

22 I also submit, and I say this respectfully--you

23 know, we can disagree--I don't think this contention should

24 have been admitted in the first place because we never had

25 basis and specificity for steps 3, 4, 5, 6 or 7.

1 JUDGE LAM: I hear you loud and clear.

2 (Laughter.)

3 JUDGE LAM: To go back to your statement about

4 sensitivity analysis resulting from uncertainty, I don't

5 know how helpful that would be to you or me.

6 I mean, certainly it's good to have them, but the

7 key element in any uncertainty is the issue of completeness.

8 It's not sensitivity.

9 I mean, you can do all the sensitivities you want

10 to do, but if the issue of completeness is not addressed,

11 then we do have the problem of not resolving uncertainty.

12 Now, I also maintain I don't know if going to

13 evidentiary hearing would take care of that problem either.

14 MR. O'NEILL: Recall that the Board asked us to do

15 a best estimate. We felt that if we were going to do a PRA,

16 we have to deal with uncertainty.

17 The state of the art industry is to deal with

18 uncertainty in a sensitivity analysis. And that's what was

19 done here.

20 There was--and I pressed our experts, I pressed

21 other experts, "Is there any better way of doing this?" And

22 the answer is no.

23 So I submit, and as Judge Bollwerk said that you

24 have some personal expertise in PRA, so I submit that if we

25 had a hearing, there's nothing more you would hear that

1 would be particularly helpful as a Board in making the
2 decision as to whether this is remote and speculative.
3 My point about this scenario, it's not a close
4 call. It's not a close call because you look at the numbers
5 we come up with and then you start looking at the
6 conservatisms built in, you can see that if we had wanted to
7 come up with, quote, a "real best estimate," we could have
8 kept driving the numbers to a much lower one.
9 For what purpose? This is not going to happen
10 with any degree of probability for NEPA or the commission to
11 be concerned about.
12 This is not a close call at ten to the minus four.
13 JUDGE LAM: You're suggesting no deference should
14 be given to Dr. Thompson's testimony.
15 MR. O'NEILL: I'm saying that absolutely no
16 deference should be given to Dr. Thompson's testimony, yes,
17 sir.
18 JUDGE LAM: You're saying that?
19 MR. O'NEILL: Yes. Or the deference that it
20 deserves. He was able to come up with the right list of
21 things that had to be done after listening to Dr. Burns and
22 listening to Dr. Parry testify.
23 He came up with a list, these are all the things
24 that have to be done.
25 I began my presentation by saying, OK, he says

1 this is what has to be done. He didn't do them. We did.
2 So is that the burden of going forward? I don't
3 believe so, sir.
4 JUDGE LAM: Thank you.
5 CHAIRMAN BOLLWERK: Anything else? Judge Murphy?
6 JUDGE MURPHY: No.
7 CHAIRMAN BOLLWERK: All right. I have nothing.
8 At this point, Ms. Uttal, are you ready to proceed, or do
9 you want to take a five-minute break?
10 MS. UTTAL: Take a five-minute break.
11 CHAIRMAN BOLLWERK: All right. We'll take a
12 five-minute break and come back at a quarter after.
13 (Recess.)
14 CHAIRMAN BOLLWERK: Why don't we go back on the
15 record. Ms. Uttal.
16 MS. UTTAL: Thank you, Your Honor. Good
17 afternoon, Members of the Board.
18 I will be presenting the Staff's position
19 regarding the analysis of the probability of the seven-step
20 sequence.
21 Ms. Euchner will be discussing the NEPA issues.
22 Other than rebutting the written presentation, the
23 oral argument, what was said here today, and answering any
24 questions, I don't believe that I can add anything to the
25 Staff's thorough and detailed presentation of its analysis

1 of the sequence in its affidavit. Staff Argument 207.
2 And the Staff's affidavit speaks for itself. And
3 we rely on that to support our analysis.
4 CHAIRMAN BOLLWERK: Let's go off record for a
5 moment.
6 (Discussion off the Record.)
7 MS. UTTAL: In addition, Mr. O'Neill has touched
8 many of the points that I was prepared to rest on regarding
9 the insufficiency of BCOC's submittal.
10 But there are a few issues that have been raised
11 during the oral argument that I will now address.
12 I hope that I will not be replowing territory
13 that's already been plowed.
14 The NRC does not accept that the burden of proof
15 in a Subpart K proceeding is on the NRC.
16 I think it has been made clear during this
17 proceeding and in the Board's prior orders, and of course,
18 by Regulations that the burden is on the Intervenor to
19 demonstrate that there is a genuine and substantial issue of
20 material fact as to this environmental contention.
21 The issue presented here is whether the seven-
22 step sequence is remote and speculative. Staff Argument
23 208.
24 If it is, then an EIS need not be prepared to
25 address it. The burden is therefore on BCOC to demonstrate

1 the existence of a genuine and substantial issue of material
2 fact as to the probability of the seven-step sequence.
3 As has been stated earlier, BCOC has completely
4 failed to meet its burden to demonstrate the existence of
5 such genuine and substantial issue, and therefore, this
6 proceeding should go no further.
7 In support of its arguments, BCOC presents the
8 report of Dr. Gordon Thompson. In supporting his conclusion
9 that the sequence is not remote and speculative, Dr.
10 Thompson in his report makes many unsubstantiated
11 conclusions and statements, and he provides very little in
12 the way of factual information.
13 Many of his conclusions are based upon faulty
14 assumptions and are not supported in his report.
15 The Staff believes that his report should be given
16 very little credence because it does not contain sufficient
17 analysis. It contains mischaracterizations in the analysis
18 therein.
19 Dr. Thompson has never been able to nor does he
20 here back up his major premise, that a spent fuel Staff
21 Argument 209 pool accident will almost certainly follow a
22 degraded core accident with containment bypass or failure.
23 In fact, the Staff has demonstrated that it is
24 unlikely that any of the incidents will lead to an
25 uncovering of the fuel in an exothermic reaction.

1 The Staff experts have reviewed Dr. Thompson's
2 report and have found that it contains nothing that affects
3 the Staff's analysis.
4 Dr. Thompson admits that PRA techniques provide
5 the best available methodology for estimating the overall
6 probability of the sequence in question.
7 But then he demonstrates that his understanding of
8 the evolution of PRA is not by any means up to date.
9 He cites reports and studies completed more than
10 ten years ago.
11 For example, when discussing an NRC perspective on
12 page 13 of his report, he relies on findings in a
13 sixteen-year-old study.
14 That document that he relies on pre-dates New Reg
15 1150 and the IPE, IPEEE program.
16 More recent NRC statements, such as the final
17 policy statement, as cited in the Staff's brief, and Staff
18 Argument 210 Reg Guide 1.174 would have yielded a more
19 current picture of the NRC's position regarding PRA.
20 Since the time that the documents cited by Dr.
21 Thompson were published, there has been considerable
22 progress in PRA methodologies, standards and applications
23 guidance, to the degree that PRA now plays a much greater
24 role in reactor regulation as reflected in the final policy
25 statement in the Staff's affidavit.

1 There's little value to citing such old sources to
2 support the thesis that PRA has not progressed since New Reg
3 1150.
4 The use of such old references and reliance on
5 them to discuss modern PRA and the NRC's position on PRA
6 demonstrates Dr. Thompson's real lack of knowledge regarding
7 the present state of PRA.
8 The Staff disagrees with Dr. Thompson's statement
9 that the initial application of PRA sequence cannot provide
10 results which can be accepted with a high degree of
11 confidence.
12 The Staff has presented its analysis as a bounding
13 analysis, which gives confidence. In addition, the Staff
14 has characterized the results and its uncertainties. Staff
15 Argument 211.
16 As stated in the Staff's affidavit, PRA is a
17 structured approach to the use of judgment. Any evaluation
18 of the judgments made has to take into consideration not
19 only the assumptions used and the data relied upon but also
20 the expertise and the experience in the persons making the
21 judgment.
22 BCOC has chosen to rely upon the judgment of Dr.
23 Thompson who has admitted he does not have the requisite
24 experience in the disciplines involved in the sequence and
25 has made a series of judgments regarding the sequence.

1 Many of the judgments are based, as I said before,
2 upon faulty data and faulty assumptions.
3 Due to his lack of expertise in the areas,
4 including his misunderstanding of accident progression, he
5 has made faulty judgments.
6 Compare that with the Staff's and the Licensee's
7 efforts in this case, using judgments, as has been stated
8 numerous times, of a variety of experts in the various
9 disciplines involved.
10 Dr. Thompson stated in his report the application
11 of PRA to the sequence breaks new ground. He alleges that
12 Level 2 PRA is inadequate to address the on-site effects of
13 containment Staff Argument 212 releases because it typically
14 focuses on off-site releases.
15 While it is true that PRAs have not addressed
16 on-site effects, the methodology is the same and can be used
17 to model on-site effects as demonstrated in the licensee
18 submittal.
19 BCOC states that there is no basis for providing
20 an estimate of uncertainty for the probability studies.
21 In the next sentence, it asserts that there is a
22 high level of uncertainty. BCOC has no basis for stating
23 that the level of uncertainty is high.
24 In fact, the Staff has accounted for the
25 uncertainties and characterized the conclusion in the

1 affidavit.

2 The Staff used conservative assumptions and
3 bounding analyses where there were uncertainties in order to
4 reach its upper bound of two times ten to the minus seven.

5 Dr. Thompson in his analysis for containment
6 bypass or failure analyzed only the temperature- induced
7 steam generator tube rupture event.

8 The analysis of that he then mischaracterizes.
9 His characterized postulated sequence is a, as I Staff
10 Argument 213 said, a temperature induced SGTR, and he claims
11 that for this sequence the flow entering the environment
12 will be comparatively cool and wet.

13 He provides no support for that statement. The
14 on-site deposition would occur uniformly within a
15 two-hundred-meter radius, and the material deposited would
16 include ten percent of the iodine and cesium inventory and
17 five percent of the tellurium inventory in the core.

18 These claims, which are central to BCOC's
19 subsequent assertions, are not accompanied by any supporting
20 technical analyses and are at odds with the results from
21 Staff and industry studies.

22 Specifically, the releases from a temperature
23 induced SGTR would be highly superheated since fission
24 product releases in this sequence occurs during the core
25 degradation process.

1 The high temperatures in the reactor cooling
2 system are actually what causes the steam generator tube
3 rupture.
4 The high energy of release would provide
5 substantial lift to the plume and would tend to disperse the
6 release and reduce the quantities of fission products that
7 would be deposited near the Staff Argument 214 release
8 point.
9 In other words, because these scenarios involve
10 core melt-down, all the equipment and other surfaces would
11 be hot.
12 Therefore, any water would turn to very hot steam
13 and when released to the atmosphere would rise in a plume
14 that would not be dispositioned in a circle two hundred
15 meters in radius around the stack.
16 There would be a high energy of release and the
17 fission products would be dispersed at much greater
18 distances than two hundred meters.
19 The quantity of the fission products assumed to be
20 deposited within the two-hundred-meter radius significantly
21 overstates the amount that would most likely be deposited
22 this close in, and is not supported by any analysis in Dr.
23 Thompson's report.
24 Essentially, most all of the fission products
25 released to the environment would need to be deposited

1 within the two hundred meters if the BCOC deposition
2 assumptions were to be valid.
3 Such a large deposition rate is not realistic.
4 Finally, the BCOC assumption regarding uniform
5 deposition within a two-hundred-meter radius ignores Staff
6 Argument 215 the fact that the wind generally blows in a
7 predominant direction and it will contaminate land equally
8 in all directions.
9 In fact, a deposition is defined by the wind
10 direction. A more realistic consideration of wind
11 direction, such as taken in the Staff's assessment, would
12 show that while some plant areas may be adversely impacted
13 by a particular weather pattern, other areas would not.
14 In addition, there's no technical basis offered
15 for the assumption that all of the material would fall out
16 at the same time.
17 The deposition would occur over time and over
18 different areas depending on the behavior of the plume.
19 Ms. Curran made a statement regarding the Arcon
20 program that the Staff used to model deposition, indicating
21 that it was straight line and it did not deal with building
22 length.
23 In fact, the Arcon model was developed in order to
24 deal with the building length issues. Therefore, it is most
25 appropriate to have been used in this case.

1 Dr. Thompson makes several assumptions Staff
2 Argument 216 regarding control room habitability. The Staff
3 has assumed that the control room is not available, although
4 the Staff has calculated that it would be available about
5 sixty percent of the time.
6 Dr. Thompson states that the control room will be
7 uninhabitable very soon after release, but provides no
8 credible support for this statement.
9 Dr. Thompson and BCOC argue that GDC 19 and the
10 technical specifications would be violated during a severe
11 accident and that the NRC cannot permit violation of the
12 Regulations to prevent the accident from progressing.
13 The Staff disagrees. GDC 19 is a design criteria
14 that requires adequate radiation protection be provided for
15 the control room during normal operation and operation
16 during design basis accidents.
17 It is not a dose limit. Radiation exposure of
18 control room personnel is controlled under part twenty.
19 Unless as provided in 20.1001, such limitations would limit
20 actions necessary to protect public health and safety.
21 Licensees are not required to design against other
22 than design basis accidents. The sequence Staff Argument
23 217 under consideration is a very severe accident.
24 During a severe accident, GDC design limits would
25 be inapplicable.

1 BCOC also asserts that SAMGs, Severe Accident
2 Mitigation Guidelines, would violate tech spec's and
3 regulations.
4 And that is not true. The SAMGs are intended for
5 use during the response to emergency conditions associated
6 with severe accidents.
7 It may be necessary for a licensee to deviate from
8 tech specs or to implement necessary immediate action to
9 protect public health and safety.
10 Such deviation is explicitly provided for in 10
11 CFR 50.54 X and Y.
12 These permit tech specs--wait--I lost my place-
13 -50.54X states that "A licensee may take reasonable action
14 that departs from a licensed condition or a technical
15 specification contained in a license and issued under this
16 part in an emergency when this action is immediately needed
17 to protect the public health and safety, and no action
18 consistent with licensed conditions and technical
19 specifications that can provide adequate or equivalent
20 protection is immediately apparent." Staff Argument 218 10
21 CFR 50.54Y states that, "Licensee action permitted by
22 paragraph X of this section shall be approved as a minimum
23 by licensee or operator or at a nuclear power reactor
24 facility prior to taking the action.
25 "Therefore, deviations from the tech specs in

1 order to take the actions provided in the SAMG's do not
2 violate the regulations so long as they are taken in
3 compliance with 50.54X and Y."
4 Regarding the habitability of other areas, Dr.
5 Thompson states without any support that the Technical
6 Support center and other locations in the plant would suffer
7 the same general outcome as the control room and be
8 uninhabitable a hundred percent of the time.
9 He provides no analysis or data to back up this
10 claim.
11 The Staff noted that the TSE has its own diesels
12 and separate ventilation system, separate from the control
13 room.
14 Nowhere in his discussion does he analyze the
15 actual conditions at Harris, such as meteorology.
16 Nonetheless, if the control room and the TSC are
17 unavailable, the licensee's activities will be Staff
18 Argument 219 directed from the emergency operations
19 facility, which is required by the Regulations and which is
20 off site but in communication with the operators at the site
21 and with the NRC.
22 Dr. Thompson postulates that three conditions must
23 be analyzed in order to determine the effects of on-site
24 radiation on plant operation.
25 Function and command structure, ability of

1 operators to overcome a variety of factors such as stress,
2 misunderstanding, miscommunication and radiation doses.
3 It is demonstrated in the Staff's affidavit that
4 the Staff did, in fact, analyze these conditions.
5 Dr. Thompson concludes that it is appropriate to
6 assume that a person will not perform his functions if
7 exposure exceeds normal regulatory levels.
8 He does not provide any support for this
9 statement. And he, in fact, contradicts it by his example
10 of the heroic actions of the Chernobyl firefighters.
11 Dr. Thompson states that the maximum occupational
12 radiation dose permitted for its seven- Staff Argument 220
13 step sequence is five rem for the duration of the exposure.
14 He states that the twenty-five rem EPA guidance
15 for emergency services during an accident are not
16 applicable. The Staff disagrees with his assumptions.
17 In its analysis, the Staff assumed that an area
18 would be accessible if the dose was less than twenty-five
19 rem to the person accessing the area.
20 The basis for this is contained in paragraph 127
21 of the affidavit.
22 The use of twenty-five rem is lawful and its use
23 does not represent an unacceptable risk to the health of the
24 exposed person.
25 Part 20 establishes standards for protection

1 against radiation resulting from activities conducted under
2 the licenses issued by the NRC.
3 20.101B states that "Nothing in part 20 shall be
4 construed as limiting actions that may be necessary to
5 protect health and safety."
6 In the statement of considerations for the final
7 rule, part 20, found at 56 Federal Register 23365, the
8 Commission stated that the regulations-- I'll quote
9 it--"It's the Commission's intent that Staff Argument 221
10 the Regulations be observed to the extent practicable during
11 emergencies but that conformance to the regulation should
12 not hinder any actions that are necessary to protect public
13 health and safety such as life saving or maintaining
14 confinement of radioactive materials."
15 In this regard, the Commission notes that the
16 Federal Guidance on Occupational radiation exposure states
17 that those dose standards only apply to normal operating
18 conditions.
19 The Commission believes that the dose limits for
20 normal operations should remain the primary guidelines in
21 emergencies.
22 However, the Commission also recognizes that in an
23 emergency operations that do not conform to the Regulations
24 may have to be carried out to achieve the high priority
25 tasks of worker, public and facility protection.

1 The purpose of the addition to this section is to
2 assure licensees that their first priority should be to
3 carry out those actions that are necessary to protect the
4 public from radiation exposure, to perform life-saving
5 activities, to prevent or eliminate the spread of
6 radioactivity contamination Staff Argument 222 or the
7 release of radioactive materials into the environment and to
8 preserve an adequate margin of safety.
9 It is clear that the Regulations provide for
10 greater occupational limits when necessary to provide for
11 public health and safety.
12 The regulations contemplate the relative impacts
13 of increased exposure versus the benefits to be gained, that
14 is protection of the public.
15 10 CFR 50.47, regarding emergency plans, permits
16 the use of EPA, emergency worker, and life saving authority
17 protective action guides.
18 These are exposure guidelines for emergency
19 workers. The use of these exposure guidelines clearly are
20 accepted by the Commission and they are appropriate in
21 determining accessibility in this sequence.
22 Those guidelines permit workers to receive
23 different doses in order to assure protection of life and
24 property if the exposures are justified, if the maximum
25 risks permitted are acceptably low and the risks or costs to

1 others that are avoided outweigh the risks to workers.

2 Therefore, doses of up to twenty-five rem are

3 Staff Argument 223 permitted to save large populations and

4 will be permitted during this very low probability severe

5 accident.

6 JUDGE LAM: Are you saying, Ms. Uttal, the

7 Regulations permit twenty-five rem?

8 MS. UTTAL: Yes.

9 JUDGE LAM: Do you think anybody would be willing

10 to take that dose?

11 MS. UTTAL: Why not? The people in the facility

12 are trained--they understand what they were getting into.

13 It's not a dose that would provide any more risk

14 to them. It's not a dose that would harm them.

15 It is well within limits--there's a lifetime limit

16 that they have to stay under, but they're permitted to go

17 somewhat above that.

18 But twenty-five rem is far under what a lifetime

19 --what the lifetime limit is.

20 You are permitted to have five rem--the worker

21 dose is five rem per year.

22 Under special circumstances exposure, you're

23 permitted to have another five rem per year for a total of

24 ten, up to an extra twenty-five rem in a lifetime. Staff

25 Argument 224.

1 The five rem per year that you're permitted,
2 depending upon how many years you work, you know, it could
3 be five times thirty, plus another twenty- five.
4 Therefore, having a twenty-five rem dose wouldn't
5 be harmful. And yes, I believe that they would put
6 themselves in that position in order to save large
7 populations, and in order to contain the materials.
8 BCOC claims that five rem is the amount that was
9 assumed in the FEIS for Harris, and that's true, but that
10 was only for normal operations.
11 BCOC's extension of this limit to emergencies is
12 supported by the Regs and Guidance.
13 In addition, the use of criterion greater than
14 five rems does not establish presumption of harm.
15 Dr. Thompson's conclusion that the command
16 structure would be non-functional, his conclusion that the
17 occurrence of a temperature-induced steam generator tube
18 rupture release would preclude any human action at the site
19 for a period of time far exceeding seven days is again
20 entirely without support by data or credible analysis.
21 Dr. Thompson in his example presumes that there
22 Staff Argument 225 would -- excuse me -- he only analyzes
23 the temperature induced steam generator tube rupture
24 analysis.
25 The Staff looked at the steam generator tube

1 rupture and decided that it was not a very big concern
2 because the release would be outside the building.
3 As I explained, it would come out with steam and
4 such and be in a plume and the plume would be -- the
5 footprint of the plume would be whatever the prevailing
6 winds would be.
7 Therefore, the interior portion of the plant would
8 not be contaminated at that point and all operator actions
9 could be taken to preserve the makeup in the pool as
10 necessary.
11 Dr. Thompson's discussion of the value of RWST
12 makeup method is wrong, and it demonstrates his lack of
13 understanding of accident progression.
14 He talks about the thirty-three thousand cubic
15 feet of water available in the RWST.
16 He concludes that the availability of this water
17 through gravity flow would have a small effect on the timing
18 of dry-out of the pools.
19 But because the makeup flow would be initiated
20 soon after heatup, or when boiling occurred, and the Staff
21 Argument 226 maximum boil-off rate would be fifty-six GPM,
22 the water available from the RWST gravity feed would add
23 another seventy-three hours or three days before the water
24 level would begin to drop.
25 This is a significant increase in time.

1 Dr. Thompson suggests that the heat transfer
2 implications of a partial drain down are relevant to the
3 sequence.
4 In fact, as demonstrated by the Staff and the
5 Licensee, it is not relevant.
6 First, the standards give the probability of an
7 exothermic reaction and conditional probability of one.
8 That is, given the loss of pool coolant to the top of the
9 pool assemblies, the Staff assumes an exothermic reaction
10 will occur.
11 Thus, the partial drain down analysis does not
12 come into play.
13 Second, the partial drain down scenario does not
14 affect the probability of an exothermic reaction. It does
15 affect the estimation of the age of fuel at which an
16 exothermic reaction is no longer possible.
17 The age of the fuel played no part in the Staff's
18 analysis due to the assumption that the Staff Argument 227
19 conditional probability is one.
20 Dr. Thompson has mentioned that--the fact that the
21 Staff considered partial drain down in what we've been
22 calling the TWG report. That is the Technical Working Group
23 report on decommissioning reactors in spent fuel pool
24 accidents.
25 It bears some significance in the Staff's

1 assessment of his expertise in this matter.

2 Dr. Thompson admitted a comment in June, 1999,

3 regarding the partial drain down. The comment was not

4 addressed in the February, 2000 report.

5 In its presentation to the ACRS, the Staff has

6 indicated that it has subsequently analyzed the partially

7 drain down sequence.

8 As Mr. O'Neill noted, this sequence has been

9 looked at before, but because the NRC Staff found that they

10 felt it was bounded by other conditions, it wasn't

11 thoroughly analyzed.

12 I think that Dr. Thompson overstates his effect.

13 He made a comment that "Eventually the Staff looked into the

14 same thing."

15 The fact that he raised an issue does not make him

16 an expert in that issue. He spotted an issue.

17 Nothing has been demonstrated that makes him an

18 Staff Argument 228 expert in any of the disciplines required

19 to make the assessment of probability in this case.

20 But more importantly, the issue of partial drain

21 down has no applicability to this case where the parties

22 have been asked to provide a probability of a seven-step

23 scenario.

24 Nothing about a partial drain down sequence

25 affects this probability. In addition, Dr. Thompson and

1 BCOC have misstated what the Staff said at the ACRS meeting
2 regarding the TWG report.
3 BCOC incorrectly states that the Staff now
4 considers the probability of a fire of an agent fuel to be
5 within the same range as the probability of a severe reactor
6 accident, as predicted--as predicated by New Reg 1150.
7 The Staff stated that the risk of a spent fuel
8 pool fire could be comparable to that for a reactor accident
9 if the accident is assumed to take place shortly after final
10 shut-down and results in a large upper bound release of
11 ruthenium.
12 But if the accident occurs sometime, like two
13 years, following shut down or involves a lower release of
14 ruthenium, the risk of fire will be one or two orders of
15 magnitude lower than the Staff Argument 229 corresponding
16 values for a reactor accident.
17 Risk is not the same as frequency or probability,
18 but is an equation including frequency and consequences.
19 Probability of an S field fire is lower than the
20 probability of a severe accident, reactor accident.
21 In closing this portion of my argument, I would
22 like to say that the report done by BCOC and the submittal
23 made in this case is inadequate to the task of meeting the
24 burden that BCOC has to meet.
25 It completely fails to show anything that would

1 raise an issue--raise a question regarding any issue that is
2 material to these proceedings.
3 The analyses are flawed. Many of the statements,
4 if you'll read the report carefully, you'll see that many of
5 the statements are just out there.
6 When he's discussing the SGTR, he says, and
7 sometimes it'll be a cool and wet release, but he provides
8 no support for these statements.
9 The reports are replete with these kinds of
10 statements. I think based on that and based on the
11 corresponding work done by the Staff and the Staff Argument
12 230 Licensee, that the Board will be able to find that there
13 is no genuine and substantial issue of material fact
14 regarding the probability of this sequence.
15 CHAIRMAN BOLLWERK: All right. Let me stop at
16 this point and see if there are any questions on what you've
17 just presented. Judge Lam?
18 JUDGE LAM: Ms. Uttal, let me ask you to look at
19 page 35 of your summary.
20 MS. UTTAL: Of the affidavit or the--(pause)--
21 JUDGE LAM: Of the NRC Staff Summary of Relevant
22 Facts and Data. Paragraph 3.
23 The first sentence states, "The level of detail of
24 the Staff's analysis as evidenced by the Staff's affidavit
25 and supporting documentation demonstrates that the Staff

1 will produce a detailed and authoritative analysis of the
2 seven step sequence, utilizing site specific evidence in
3 their PRA analysis."
4 Is that true?
5 MS. UTTAL: Well, we didn't analyze the last step.
6 We assumed that it had a conditional probability of one.
7 But we--there was an analysis done. Staff Argument 231.
8 I'm not saying that it was all PRA analysis, but
9 there were analyses done of the radioactive releases, of the
10 core severe accident, and the core degradation based upon
11 the information given to us by CP&L and other studies as
12 indicated in the affidavit.
13 JUDGE LAM: Right. And then I'd like to ask you
14 to go to page 13 in your own submittal.
15 Look at the accident sequence as submitted. Right
16 in the middle of the page, do you see the seven step
17 sequence?
18 MS. UTTAL: Yes.
19 JUDGE LAM: My question is has the Staff looked
20 into sequences that--in which containment failure would
21 permanently disable the spent fuel pool cooling and makeup
22 systems, thereby leading to a certainty in the probability
23 as Dr. Thompson has asserted in steps 4, 5 and 6?
24 MS. UTTAL: Permanently? Would you repeat that
25 again? I'm sorry.

1 JUDGE LAM: Permanently disable all the spent fuel
2 cooling and makeup system.
3 Basically, I'm asking has the Staff looked at a
4 sequence where step 2 and step 3 are coupled, by Staff
5 Argument 232 which I mean, they're not independent steps.
6 Would step 2 have led to step 3, and then all
7 these steps, 3, 4 and 5 would have the probability of one or
8 zero as Dr. Thompson has asserted?
9 MS. UTTAL: (Pause) We looked into whether the
10 containment failure/bypass would fail with respect to
11 cooling and found that we didn't think that it did, and
12 certainly we found that none of the--that under all
13 circumstances of containment failure or bypass, that there
14 would at least be one or perhaps more makeup systems
15 available.
16 JUDGE LAM: So the answer is you have not
17 identified--you have not identified any sequence in which
18 the containment failure or bypass would cause a permanent
19 non-recoverable function of spent fuel pool cooling, is that
20 correct?
21 MS. UTTAL: No. We haven't identified anything
22 like that.
23 JUDGE LAM: Thank you.
24 CHAIRMAN BOLLWERK: Anything else? Judge Murphy?
25 JUDGE MURPHY: Just to follow up on these peer

1 review questions we had earlier, the analyses that the Staff
2 did in addition to the PRA, per se, the Staff Argument 233
3 ancillary analyses, were they peer reviewed?
4 MS. UTTAL: The (pause)--
5 JUDGE MURPHY: Let me be specific. Your Staff
6 Exhibits 63, 65 and 72.
7 MS. UTTAL: The radiation release and those? I
8 believe that they were looked at by hierarchy, you know, but
9 I don't believe they were looked at--
10 JUDGE MURPHY: (Interposing) They received a CA
11 review within--
12 MS. UTTAL: They didn't receive a formal peer
13 review.
14 But they were reviewed by superiors.
15 JUDGE MURPHY: You mentioned the TWG report. Is
16 that an exhibit?
17 MS. UTTAL: No. No. But it is mentioned. There
18 are several letters that are in the record regarding the TWG
19 report, and it is mentioned in our response to the question
20 at the end of the affidavit.
21 CHAIRMAN BOLLWERK: I just had a question about
22 this question of burden of proof. I want to make sure that
23 I'm straight on what you're saying.
24 As I've always understood it, there have been two
25 burdens that we're talking about here. Staff Argument 234.

1 One is the burden to go forward with an
2 evidentiary hearing.
3 The second is the overall burden, having admitted
4 a contention, to prevail on the merits of that contention.
5 And I guess I just want to make--allow you an
6 opportunity to make clear to me what your position on those
7 two different burdens is.
8 MS. UTTAL: OK. The burden of going forward--
9 CHAIRMAN BOLLWERK: (Interposing) In the context,
10 I should say, of a NEPA contention, which is different than
11 a technical contention.
12 MS. UTTAL: I can address the first part of it,
13 and Ms. Euchner will address the second part.
14 CHAIRMAN BOLLWERK: All right.
15 MS. UTTAL: In the posture that we are in right
16 now, Subpart K, the burden is on the Intervenor, the burden
17 to go forward to show that there is something genuine and
18 substantial in the issue.
19 CHAIRMAN BOLLWERK: All right. To go to an
20 evidentiary hearing.
21 MS. UTTAL: To show whether an evidentiary
22 hearing, within the confines as specified in Subpart K,
23 which is different from Subpart G or something Staff
24 Argument 235 like that, for them to go forward, they must
25 show that an evidentiary hearing is necessary.

1 CHAIRMAN BOLLWERK: All right. Then in terms of
2 the sufficiency of the Staff's determination in its
3 environmental assessment stated no EIS is required, who has
4 the burden there?
5 MS. EUCHNER: Once we reach an adjudicatory
6 hearing and if this Board decides that we need some sort of
7 evidentiary hearing, then the burden does shift to the Staff
8 to defend its environmental assessment.
9 But at this point in the proceeding, the burden is
10 solely on the Intervenors to demonstrate that the
11 environmental assessment was inadequate.
12 In other words, the cases that Ms. Curran cited,
13 they're correct cases, that the Staff does have the burden
14 in an adjudicatory hearing. But right now we are not in an
15 adjudicatory hearing. We're in a Subpart K proceeding.
16 Only if this panel decides that we need to have an
17 adjudicatory hearing will the burden shift to the Staff.
18 CHAIRMAN BOLLWERK: All right, then, let me put it
19 in a slightly different context. Staff Argument 236.
20 If we were in a Subpart G proceeding and this were
21 a motion for summary disposition, where would that burden
22 lie?
23 MS. EUCHNER: The burden would lie with the Staff.
24 CHAIRMAN BOLLWERK: And how is this different?
25 MS. EUCHNER: This is different because the final

1 rule for Subpart K specifically says that the burden of
2 demonstrating a substantial and genuine issue of material
3 fact is on the party requesting adjudication, in this case
4 Orange County.
5 CHAIRMAN BOLLWERK: True, to go to an evidentiary
6 hearing, but it also says that the Board is supposed to
7 dispose of the issue, which I understand to mean-- or at
8 least correct me if I'm wrong-- to mean we look at the
9 merits of the case and dispose of the issue.
10 Then we're back into the merits, are we not?
11 MS. EUCHNER: To the extent that the Board is
12 going to consider the merits of the case, then the Staff has
13 some burden to establish that its environmental assessment
14 is adequate, and as I will discuss in my part of the
15 presentation, the environmental assessment was adequate, and
16 this Staff Argument 237 accident sequence is remote and
17 speculative and therefore it did not have to be considered
18 in the NEPA requirements.
19 CHAIRMAN BOLLWERK: All right. Two other quick
20 questions.
21 I take it that what you said about the TWG report
22 and Dr. Thompson's problems with it, you're making the point
23 that there's a difference between probability and risk. Is
24 that essentially correct?
25 MS. UTTAL: Yes.

1 CHAIRMAN BOLLWERK: All right. And that his
2 concern is based upon risk?
3 MS. UTTAL: I think the point I was trying to make
4 was that in his brief he states that the Staff has said that
5 the probability of an SFP accident is within the ballpark of
6 a reactor accident.
7 And that's not what the Staff said. The Staff
8 said the risk under certain circumstances may be the same.
9 CHAIRMAN BOLLWERK: Which takes into account
10 consequences, as I understand?
11 MS. UTTAL: Yes. Consequences and probability.
12 But what we're deciding here is not risk. It's probability.
13 So consequences are irrelevant. Staff Argument 238.
14 CHAIRMAN BOLLWERK: And I guess from your answer,
15 you were, as I understood it, you were basically saying that
16 his input into that had really nothing to do with it?
17 MS. UTTAL: I don't know whether it had nothing to
18 do with it.
19 He commented, like a lot of other people comment
20 on our things, and the Staff eventually addressed the same
21 issue.
22 Whether it had anything to do with him or not, I
23 don't think it did.
24 CHAIRMAN BOLLWERK: But you don't know?
25 MS. UTTAL: No.

1 CHAIRMAN BOLLWERK: All right. Any other
2 questions? Go ahead, Judge Lam.
3 JUDGE LAM: Ms. Uttal, I'll go back to Dr.
4 Thompson's testimony.
5 Why should we not give deference to Dr.
6 Thompson's testimony?
7 MS. UTTAL: Well, by his own admission, he doesn't
8 have expertise in the disciplines needed to do a proper
9 analysis.
10 I think more important than that is the fact that
11 his report, itself, is inadequate because it Staff Argument
12 239 contains a lot of statements without support, because it
13 mischaracterizes things, because it displays a lack of
14 understanding of certain of the processes.
15 JUDGE LAM: But if I frame my evaluation of Dr.
16 Thompson's testimony in the framework of expert testimony,
17 among expert opinions, would that change your outlook a
18 little bit?
19 MS. UTTAL: No.
20 JUDGE LAM: We deal with expert opinions all the
21 time in risk assessment.
22 MS. UTTAL: Yes. And expert opinion, how much
23 weight you give an expert opinion should be based on the
24 expertise of the person giving that opinion.
25 I think if you look at the expertise that the

1 Staff has brought to the table, the expertise that the
2 Licensee has brought to the table and compare that with the
3 expertise that BCOC has brought to the table, there is a
4 huge difference.
5 JUDGE LAM: Well, in different disciplines, of
6 course. But in terms of opinion, everybody's entitled to an
7 opinion.
8 MS. UTTAL: I have an opinion too.
9 JUDGE LAM: Right, right. And some of these--
10 Staff Argument 240 the issue here is in risk assessment. It
11 does involve the genuine opinion of some sort.
12 For example, the view that the Staff has expressed
13 that twenty-five rem is permissible under the Regulations
14 and that it believes--if I may quote what your statement
15 was--that the Staff believes there will be volunteers, there
16 will be people who will be more than willing and able to
17 absorb that twenty-five rem, which amounts to five hundred
18 whole body X-rays, to save the plant, which is one view.
19 Now, Dr. Thompson happens to have another one,
20 which is, no, you ain't going to find anybody to go near
21 that for twenty-five rem.
22 MS. UTTAL: But up to twenty-five rem is not the
23 volunteer criteria. It's over twenty-five rem when you have
24 to ask for volunteers.
25 We're not getting into an area where we're going

1 to be asking for volunteers.

2 JUDGE LAM: Well, is it also true that somebody

3 could refuse to go when he already had gotten five rem on an

4 annual dose? He could refuse to go, right?

5 MS. UTTAL: I don't--anybody can refuse any

6 exposure. But there are conditions of their Staff Argument

7 241 employment that they have, and twenty-five rem and under

8 is not when we ask for volunteers.

9 But the other question is it's a matter of law as

10 to what is the permissible dose. It's not a matter of

11 opinion.

12 It's regulations and guidance that the Staff is

13 permitted to use in assessing these kinds of things.

14 And twenty-five rem is permitted under the

15 regulations. And that's what we assumed.

16 JUDGE LAM: Well, you know, what I am trying to

17 get at is I want to know if there is a material dispute of

18 fact here

19 And I have heard both the Applicant's and the

20 Staff's view as to the level of expertise in their opinion

21 doing these analyses, which would support the probability.

22 And I also hear Dr. Thompson came up with a

23 probability based on his "expert opinion," quote, end quote.

24 And I'm trying to resolve and weigh the balance

25 between these two different sides of the story.

1 And I'm trying to get some help from you.

2 MS. UTTAL: Excuse me for one moment. (Pause)

3 There may be two sides to a story. But in this case, Staff

4 Argument 242 there's one side that is more heavily weighted.

5 The burden is on BCOC to show that there is

6 something material and something genuine and substantial

7 here that the Board needs a hearing on.

8 They have not shown it. The Staff has shown that

9 there is none. But the burden is not on the Staff to show

10 that there is no issue. The burden is on BCOC.

11 They have not met that burden based upon the

12 materials that they have presented to the Board.

13 And the issue of whether somebody will go into an

14 area that has twenty-five rem in it, I think you could look

15 at the example that Dr. Thompson uses of the firefighters at

16 Chernobyl or at TMI, people went in there.

17 JUDGE LAM: Yes, thank you. I hear you on that.

18 But my question is the Staff does have a position,

19 a technical position on this seven-step sequence of remote

20 and speculative?

21 MS. UTTAL: Yes.

22 JUDGE LAM: Thanks.

23 CHAIRMAN BOLLWERK: All right. I guess we're

24 ready to move on to your co-counsel. Staff Argument -

25 Euchner 243.

1 MS. EUCHNER: Good afternoon, Your Honors. My
2 name is Jennifer Euchner, and as Ms. Uttal stated, I will be
3 presenting the Staff's position on the issues raised under
4 the National Environmental Policy Act, or NEPA.
5 The Staff maintains that the accident sequence
6 postulated by the Intervenors is of such a low probability
7 as to be remote and speculative.
8 Therefore, no further environmental analysis of
9 this license amendment is required by NEPA.
10 I'm going to briefly touch on four points. First,
11 one that we've already discussed, the Intervenors bear a
12 burden of establishing that the Staff's environmental
13 assessment of the license amendment was inadequate and that
14 an environmental impact statement is required.
15 Neither the Staff nor the Applicant has any burden
16 at this stage of the Subpart K proceeding.
17 Second, the Staff has followed appropriate NEPA
18 procedures in evaluating this license amendment.
19 The Staff's environmental assessment of the
20 amendment meets all applicable NEPA requirements.
21 Third, the accident sequence posed by the
22 Intervenors is remote and speculative, and therefore Staff
23 Argument - Euchner 244 it does not require evaluation under
24 NEPA in either an environmental assessment or an
25 environmental impact statement.

1 Finally, should this Board determine that further
2 environmental analysis of this accident sequence is
3 necessary, the Staff will re-evaluate its environmental
4 assessment to determine if the finding of no significant
5 impact that it issued remains valid.
6 If the Staff does find significant impacts could
7 result from this accident sequence, then it would prepare an
8 environmental impact statement limited in scope to the
9 impacts from this license amendment.
10 As both Mr. O'Neill and Ms. Uttal stated, in a
11 Subpart K proceeding, the burden of proof is on the
12 Intervenors.
13 That comes straight from the final rule for
14 Subpart K, that the party requesting adjudication has to
15 introduce a genuine and substantial material dispute of
16 fact.
17 One of the points that Ms. Curran made during her
18 oral presentation is that the questioning of the expert
19 witnesses in this case is something that will Staff Argument
20 - Euchner 245 be very useful because there's differing
21 opinions here.
22 And that sort of goes against what Subpart K was
23 designed to do.
24 The purpose of Subpart K is to avoid an
25 adjudicatory hearing unless there's a substantial and

1 material dispute of fact that can only be resolved through
2 an adjudicatory hearing.
3 It is the Staff's position that the Licensing
4 Board does not need an adjudicatory hearing to resolve any
5 issues of fact in this case, that it can rely on all of the
6 submissions by the three parties in this case.
7 Additionally, all of the parties here are in the
8 same boat basically. We've also lacked the opportunity to
9 question Dr. Thompson.
10 However, that did not stop us or the Applicant
11 from doing a very detailed and complete analysis of the
12 accident sequence as the Licensing Board requested us to do.
13 Despite the fact that the Staff does not have a
14 burden here, the Staff did consider the full range of
15 potential scenarios for this accident sequence, applied
16 appropriate models in judgment and fully Staff Argument -
17 Euchner 246 explained all the assumptions, judgments and
18 uncertainties made in their affidavit.
19 This fully supports the conclusion that this
20 accident sequence is remote and speculative.
21 Now I'm going to briefly go through what the legal
22 requirements of the National Environmental Policy Act are.
23 Section 102-C of the Statute requires an
24 environmental impact statement only for major federal
25 actions that have significant effects on the environment.

1 The NRC has implemented NEPA requirements in its
2 Regulations at 10 CFR part 51, which include a number of
3 provisions.
4 Section 51.21 discusses when an environmental
5 assessment is required. Section 51.22 sets forth
6 categorical exclusions to an environmental impact statement.
7 Section 51.30 describes what must appear in an
8 environmental assessment.
9 And Section 51.32 discusses when a finding of no
10 significant impact is permitted.
11 CP&L requested that this action be considered a
12 categorical exclusion under section 51.22 (C)(9). Staff
13 Argument - Euchner 247 But the NRC as a matter of discretion
14 decided to prepare an environmental assessment anyway as it
15 is done for other spent fuel pool expansions.
16 Under section 51.30 of the Regulations, an
17 environmental assessment must identify the proposed action,
18 discuss the need for the action, the environmental impacts
19 and alternatives to the action.
20 If the impacts are determined to be significant,
21 then the Regulations require preparation of environmental
22 impact statements.
23 If there are no significant impacts, then the
24 Staff may issue a finding of no significant impact or FONSI.
25 The Staff did prepare an environmental assessment

1 for this license amendment, and it contained all of the
2 required environmental information and did include a
3 discussion on severe accidents.
4 It did not discuss the accident sequence proposed
5 here because this is not an accident that has been
6 considered by an environmental assessment for a spent fuel
7 pool expansion, mainly because the Staff qualitatively
8 considered it to be an extremely Staff Argument - Euchner
9 248 low probability.
10 As Mr. O'Neill stated, the folks at CP&L felt the
11 same way, just qualitatively that this was of such low
12 probability of occurrence that it didn't need to be
13 determined.
14 Therefore, the Staff issued a FONSI, because it
15 determined that there would be no new significant impacts
16 from this license amendment that weren't already considered
17 and discussed in a 1983 final environmental statement for
18 the Harris plant.
19 The Intervenors have argued that the EA fails to
20 take a hard look at the question posed by Dr. Thompson and
21 fails to reflect the concerns of the NRC Technical Staff on
22 a partial drain down scenario.
23 The Staff concern about which they are talking is
24 accepting a comment from Dr. Thompson in an unrelated form
25 and addressing it in an unrelated study on risk perspectives

1 for decommissioning plants.

2 Additionally, both NRC and federal court cases

3 have concluded that simply because the NRC inquires into or

4 performs research on a beyond design basis accident does not

5 make an agency determination that Staff Argument - Euchner

6 249 those accidents are remote and speculative unreasonable.

7 NEPA does not require consideration of remote and

8 speculative accidents.

9 Beyond design basis accidents are often excluded

10 from environmental reviews because they are deemed to be of

11 low probability.

12 The Intervenor has the burden of alleging facts

13 that show that the license amendment would significantly

14 affect some human environmental factor and is therefore not

15 remote and speculative.

16 In Millstone earlier this year, the Licensing

17 Board in that case rejected a similar accident scenario also

18 posed by Dr. Thompson, finding that the scenario was a

19 beyond design basis accident and therefore, the Licensing

20 Board rejected the contention that was based on that

21 accident scenario.

22 There is no set definition in either Regulations

23 or in court cases of what qualifies as remote and

24 speculative.

25 But the NRC and the Federal Courts have looked to

1 both quantitative and qualitative factors in reaching our
2 remote and speculative determination.
3 There is no number that's a cut-off for when an
4 Staff Argument - Euchner 250 accident is automatically
5 considered to be remote and speculative.
6 Instead, the Commission in Vermont Yankee said
7 that you should do a case by case analysis.
8 However, examining what other cases have
9 determined to be remote and speculative, the numbers there
10 can be instructive.
11 In Vermont Yankee, the Commission was not willing
12 to say that ten to the minus four either was or was not
13 remote and speculative.
14 They merely wanted more information on why the
15 appeal board determined that an accident of that probability
16 was remote and speculative.
17 They said that the keys to determining whether
18 something is remote and speculative is low probability and
19 consideration of the facts on a case by case basis.
20 In the Saint Lucy case, an appeal board did not
21 require a consideration of a loss of all a/c power and an
22 inability to restore it within the proper time because the
23 probability of the accident was lower than ten to the minus
24 seven.
25 Additionally, in approving a Trojan shipment for

1 disposal, the Staff did not consider the Staff Argument -
2 Euchner 251 probabilities of accident that were lower than
3 ten to the minus six, and the Commission approved that
4 shipment.
5 The Staff's bounding estimate that they found in
6 this case was two times ten to the minus seven.
7 CP&L's best estimate is two point six five times
8 ten to the minus eight. Even the Intervenors' witness found
9 a range from two times ten to the minus six to one point two
10 times ten to the minus four.
11 And that was with assuming a probability of one
12 for three of the final or for four of the final five steps.
13 These numbers plus the qualitative considerations
14 explained in detail in the Staff's affidavit are well within
15 the range of accidents previously determined to be remote
16 and speculative.
17 Ms. Curran noted in both the summary and in her
18 oral presentation today that there's a high level of
19 uncertainty about this accident sequence, and that a high
20 level of uncertainty weighs in favor of preparing an
21 environmental assessment and required a rate of return on
22 environmental impact statement.
23 This is an inaccurate interpretation of the Staff
24 Argument - Euchner 252 Regulations and court cases.
25 40 CFR 1508.27, which is a regulation issued by

1 the Counsel for Environmental Quality, lists a number of
2 qualitative considerations for the determination of what
3 constitutes a significant impact. And uncertainty is only
4 one of ten factors to consider.
5 Nowhere does the Regulation or any of the court
6 cases cited indicate that this particular factor must be
7 given greater weight than any of the other factors.
8 Second, there is no longer any extremely high
9 level of uncertainty because both the Staff experts and the
10 experts from the Applicant have a very detailed analysis of
11 the probability of this sequence.
12 Now, of course, with any probabilistic risk
13 assessment, there's going to be some uncertainty, but the
14 Staff affidavit explains where it made assumptions and what
15 its judgments are, and the Licensing Board should be able to
16 determine that those judgments are reasonable.
17 The Staff also addressed uncertainty by adopting a
18 number of conservatisms which make it Staff Argument -
19 Euchner 253 even more certain--make the number more reliable
20 than it otherwise would have been.
21 In their summary, the Intervenors argued that
22 there's no technical basis for this Licensing Board to look
23 at the uncertainty of spent fuel pool accidents and that it
24 would be impossible to do a state of the art PRA on this
25 particular accident in the short time that the parties were

1 permitted.

2 There is an appropriate way for the Board to

3 examine the uncertainties. And that is to read very, very

4 carefully the submissions of all of the parties.

5 Look at the assumptions and judgments made and the

6 conservatisms, and extremely importantly, to look at the

7 level of expertise of the people making those judgments.

8 And as both Mr. O'Neill and Ms. Uttal have stated,

9 the weight of the expertise lies very, very strongly with

10 the Staff and with CP&L.

11 This accident sequence has now been considered in

12 detail by both the Staff and the Applicant, both of which

13 have concluded that the sequence is of such low probability

14 as to be remote and speculative.

15 Therefore, the Staff respectfully requests the

16 Staff Argument - Euchner 254 Board to find for the Licensee

17 on this matter.

18 While the Staff does maintain that no further

19 environmental analysis is necessary, the Licensing Board

20 specifically requested in its third question that we inform

21 you what the scope of any further environmental analysis

22 would be, should you determine that it is necessary.

23 If such an analysis is necessary, the first step

24 would be for the Staff to re-evaluate the environmental

25 assessment and the finding of no significant impact.

1 The reason for this is because an environmental
2 assessment considers environmental impacts, in other words,
3 consequences.
4 And despite the fact that we have studied this in
5 detail, we have been studying the probability of this
6 accident sequence and have not yet looked at the
7 consequences.
8 So an environmental assessment is the appropriate
9 vehicle for looking at the consequences initially.
10 Now, if that environmental assessment finds that
11 there are no significant impacts or that the impacts from
12 this accident sequence are bounded by Staff Argument -
13 Euchner 255 the impacts discussed in the final environmental
14 statement, then the Staff may re-issue the finding of no
15 significant impact.
16 However, if the environmental assessment does find
17 significant impacts would result from this sequence that are
18 not discussed in the FES, then the Staff would be required
19 to prepare an environmental impact statement.
20 Both Federal courts and NRC cases have held that
21 an environmental impact statement for a license amendment
22 would be limited to the impact from the amendment and would
23 not address continued operations of the reactor.
24 Therefore, an EIS in this case would only need to
25 discuss new impacts from the spent fuel pools C and D.

1 Additionally, any environmental impact statement
2 would be required to consider alternatives to on-site
3 storage of spent nuclear fuel in a spent fuel pool. And
4 those alternatives would likely be alternatives that were
5 discussed in the environmental assessment.
6 In conclusion, the Staff maintains that the
7 accident scenario issued in this case is remote and Staff
8 Argument - Euchner 256 speculative and does not require
9 further environmental analysis under NEPA.
10 The Intervenors have not demonstrated a material
11 and substantial issue of fact on any of the issues raised in
12 this proceeding.
13 Therefore, the Staff respectfully requests this
14 Licensing Board to find for the Applicant and terminate this
15 proceeding.
16 Thank you, Your Honors.
17 CHAIRMAN BOLLWERK: All right. Judge Lam, any
18 questions?
19 JUDGE LAM: No.
20 CHAIRMAN BOLLWERK: Judge Murphy?
21 JUDGE MURPHY: No.
22 CHAIRMAN BOLLWERK: I'm going to go back to one
23 question I had before, just so it's clear.
24 I would like to know how you, if you would, look
25 at Section 2.115A.2, Subpart A2.

1 And I'm going to be asking you, Mr. O'Neill, and
2 Mrs. Curran, to respond also, so you can be looking at it.
3 It says "Dispose of any issues of law or fact not
4 designated for resolution in an adjudicatory hearing." Staff
5 Argument - Euchner 257.
6 MS. EUCHNER: Yes.
7 CHAIRMAN BOLLWERK: How do you read that "dispose
8 of"? What are we disposing of? How do we do it? Do we
9 make a ruling on the merits in favor of one party on those
10 issues, or do we simply dispose of them without saying
11 anything about who wins and who loses?
12 MS. EUCHNER: You could actually read it either
13 way. If the Board does decide to make a determination on
14 the merits.
15 CHAIRMAN BOLLWERK: Well, there's the problem.
16 The question is does the Regulation require us to make a
17 determination on the merits?
18 MS. EUCHNER: I would say yes, you're going to
19 have to make a decision on the merits for anything that you
20 don't want to have an adjudicatory hearing for, because if
21 you don't, then the issues would sort of be left out there
22 with no decision.
23 CHAIRMAN BOLLWERK: All right. And given that,
24 doesn't some party have a burden of proof to prove to us one
25 way or the other or show us one way or another as to how we

1 should dispose of those issues?

2 MS. EUCHNER: Yes.

3 CHAIRMAN BOLLWERK: And in a NEPA case, who has

4 Staff Argument - Euchner 258 that burden?

5 MS. EUCHNER: To show that an accident sequence is

6 not remote and speculative, the Intervenors have that

7 burden.

8 In--let me find my case--in Yankee Atomic Electric

9 Company, the Licensing Board held that the Intervenor had to

10 submit information that indicates that an accident sequence

11 crosses the threshold of remote and speculative.

12 And after that, then the Staff has the burden.

13 Once they establish that it's not remote and speculative,

14 the Staff will have the burden of saying, "Well, even though

15 it's not remote and speculative, either A, we don't have to

16 consider it anyway, or B, we're going to consider it but

17 it's not going to have any significant impacts other than

18 those that have already been discussed."

19 MS. CURRAN: What case was that?

20 MS. EUCHNER: It's Yankee Atomic Electric Company,

21 and that can be found at 43 NRC 61.

22 CHAIRMAN BOLLWERK: All right. Anything further

23 you want to say on that point?

24 MS. EUCHNER: No.

25 CHAIRMAN BOLLWERK: Mr. O'Neill, anything you

1 Staff Argument - Euchner 259 want to say on that point?
2 MR. O'NEILL: If the Board would go back to our
3 summary of facts that we filed in January, we went through
4 carefully the legislative history and the regulatory history
5 of Subpart K and specifically focused on the word,
6 "dispose," because the word "dispose" changed between the
7 proposed rule and the final rule.
8 And it changed in connection with comments that
9 were submitted by the Edison Electric Institute.
10 And the reason for that was that the proposed rule
11 required detailed findings of fact and conclusions of law,
12 and we said, actually I wrote these comments, we said that,
13 "Wait a second. This is supposed to be an expedited
14 proceeding. Didn't Congress say that this was supposed to
15 be fast track?
16 "It takes Boards often a lot of time to right a
17 proposed findings of fact and conclusions of law.
18 "And that takes a lot of time. We want a fast
19 track proceeding."
20 The Commission changed, acknowledging that
21 comment, changed to make it clear that you need not do
22 detailed findings of facts and conclusions of Staff Argument
23 - Euchner 260 law, and changed the word to "dispose" from
24 "decide."
25 And I don't remember precisely what the language

1 was. That's why I refer you back to that history that we
2 set out in that earlier brief.
3 Now, it was not crystal clear exactly what the
4 Commission did other than to say, "You don't have to do the
5 detailed findings of fact and conclusions of law, so that
6 you can do it more quickly."
7 That was pretty clear. But the word is now
8 dispose. I submit that that gives you an option.
9 It gives you an option to dismiss the contention
10 without actually deciding it in the following respect.
11 And that is to determine that the Intervenor has
12 not met its burden of going forward.
13 So you've got two burdens. One is the burden that
14 is set forth in Subpart K as to whether there should be a
15 hearing.
16 That is, are there any material facts that are
17 genuine, substantial, in dispute that can only be resolved
18 by a hearing?
19 It can't be resolved in any other way and are
20 central to your decision. Now, that's one burden. Staff
21 Argument - Euchner 261 They have that burden.
22 The second burden, and Ms. Uttal cited this in her
23 brief, is in NEPA cases, and I refer you to Citizen
24 Advocates for Responsible Expansion, Inc., versus Dole,
25 which is in Ms. Uttal's brief, State of Louisiana v Colonel

1 Robert E. Lee, et al.

2 And those cases established that the initial

3 burden of alleging facts that show the project would affect

4 significantly some human environmental factor.

5 The initial burden of moving forward is on the

6 Intervenor, the person that's attacking the Agency's

7 environmental assessment in that case. OK.

8 In this case, I submit that the Intervenor has so

9 utterly failed in that burden--in other words, they have

10 failed, as I've said a couple of times, to provide a

11 scenario of facts to you that has any chance of being proved

12 that could say this is not remote and speculative.

13 I begin with their conclusion, which is already at

14 ten to the minus five, and with any sort of thoughtful

15 qualitative analysis of the probability of being able to

16 recover from one of those accidents and get water in that

17 pool, that immediately drops Staff Argument - Euchner 262 by

18 a factor of ten to the two.

19 So you're already at ten to the minus seven if you

20 simply logically look at their low number.

21 I submit that they have not met the burden of

22 going forward and that this Board could today simply dispose

23 of this contention by saying they haven't met their burden,

24 haven't met their burden for here, haven't met the burden

25 for going forward.

1 You could also decide that they did somehow meet
2 that threshold burden, and at that point, I submit that the
3 burden would shift for purposes of the submittals.
4 You would evaluate the Staff's submittals, which
5 of course has to defend its decision on NEPA.
6 We, of course, have supported it as best we can,
7 and you can look at that evidence.
8 And you would have to determine whether the Staff
9 had met its burden supported by the Applicant.
10 But I think that "dispose" allows you to have
11 three options here. That's my reading of it.
12 And Mr. Rosinski, I think, found our earlier brief
13 and the discussion just for your reference, and I won't read
14 it, but it is on page 13, footnote 2. Staff Argument -
15 Euchner 263.
16 So we haven't had any cases to enlighten us as to
17 what precisely "dispose" means here.
18 But it's got to mean something different than
19 findings of fact, conclusions of law and formal finding.
20 It is clearly something different than summary
21 judgment.
22 CHAIRMAN BOLLWERK: And in the context of a
23 technical contention case, does it mean the same thing, or
24 does it mean something different, given the case you've
25 cited is a NEPA case for this kind of burden?

1 MR. O'NEILL: Correct. On a technical contention
2 case, again, the Intervenor has the burden of establishing
3 to require a hearing.
4 If you've admitted a contention that needs to be
5 disposed of, I think at that point the burden falls on the
6 Applicant to convince you that the pipes aren't going to
7 crack.
8 CHAIRMAN BOLLWERK: One other question. To my
9 recollection, Ms. Curran, did you discuss those cases and
10 maybe point out that these were done with an agency
11 determination rather than a Staff determination? Staff
12 Argument - Euchner 264
13 MS. CURRAN: There were cases cited by CP&L in its
14 brief that involved court review of agency decisions. Is
15 that what you're asking?
16 MR. O'NEILL: That was a different set of cases.
17 CHAIRMAN BOLLWERK: OK. Anything else you want to
18 say on this point to what Mr. O'Neill said?
19 MS. EUCHNER: Well, he stole my thunder. I was
20 just about to cite "Citizen Advocates versus Dole."
21 CHAIRMAN BOLLWERK: All right.
22 MS. CURRAN: Do I get to comment?
23 CHAIRMAN BOLLWERK: Yes, you can do that right
24 now, or we can take a break and then we can do it. Which do
25 you prefer?

1 MS. CURRAN: Well, while the iron is hot, I'd--
2 CHAIRMAN BOLLWERK: (Interposing) I figured you
3 wanted several minutes to probably get your notes together.
4 MS. CURRAN: Well, I don't want to launch into my
5 whole rebuttal here, but I would while we're all thinking
6 about this, like to address it.
7 CHAIRMAN BOLLWERK: That's fine. Absolutely.
8 MS. CURRAN: I think Mr. O'Neill just said in a
9 technical contention, it'd be clear that once a Staff
10 Argument - Euchner 265 contention was admitted, the Licensee
11 has a burden of demonstrating that the license amendment is
12 justified.
13 And that would hold true in a Subpart K
14 proceeding.
15 I think things get a little confused here because
16 of--because of the posture that an intervenor is in that the
17 intervenor gets in in the course of getting a contention
18 admitted, which under the Commission's practice were NEPA
19 contentions.
20 If an intervenor wants to litigate issues about
21 risk or probability of some accident scenario, the
22 intervenor has to postulate an accident scenario and show
23 some degree of plausibility in order to get admission of the
24 contention.
25 Then the question is once that's done, what

1 happens?

2 Here, Orange County submitted a contention, laid
3 out each step of a plausible accident scenario, explained
4 how it could happen, explained the probabilities, came up
5 with a probability figure that was in the realm of
6 plausible, and the Licensing Board admitted the contention.

7 In my view, at that point, the same thing Staff
8 Argument - Euchner 266 happens as happens in a technical
9 contention.

10 At that point, the NRC Staff and the Applicant
11 have the burden of demonstrating that the license amendment
12 is justifiable in a NEPA context.

13 In other words, the license amendment is supported
14 by an adequate Staff determination that it doesn't involve
15 any significant impacts.

16 If you look at it any other way, essentially the
17 burden of proof, which nothing that Congress did has shifted
18 the ultimate burden of proof away from the License Applicant
19 and the NRC Staff in a spent fuel pool expansion case, the
20 ultimate burden of proof.

21 So if you take the Subpart K proceeding and say
22 that the burden is completely on the Intervenor to show that
23 an accident is not remote and speculative in the Subpart K
24 proceeding, the burden of proof on the Staff effectively
25 falls down the rabbit hole.

1 It's gone. And that's not meant to happen.

2 Our burden in this Subpart K proceeding is to show
3 that the Staff's analysis in the environmental assessment is
4 inadequate to support the license amendment, just as it
5 would be in a technical contention to show that the
6 Applicant's analysis of Staff Argument - Euchner 267 whether
7 the pipes would crack, as the example that Mr. O'Neill gave,
8 would be done.

9 So that the --in deciding how to dispose of the
10 issues, in our view, the Licensing Board can't dispose of
11 the issues in favor of the NRC Staff without finding that
12 the Staff has met its burden of persuasion in this case.

13 Otherwise, the burden of persuasion is completely
14 evaded.

15 MS. EUCHNER: May I respond to that?

16 CHAIRMAN BOLLWERK: Yes, as long as Ms. Curran
17 gets the last word.

18 MS. EUCHNER: OK. In a normal Subpart G
19 proceeding, I believe Ms. Curran is correct that once the
20 contention is admitted, the burden shifts to the Staff to
21 defend its environmental assessment.

22 However, Subpart K instituted an additional
23 burden, and that burden is one of establishing substantial
24 and material disputes of fact such that they can only be
25 resolved in an adjudicatory hearing.

1 Now, if the Intervenors meet that burden, yes, I
2 agree, then the burden does shift to the Staff.
3 But they do have to meet that initial burden.
4 Staff Argument - Euchner 268 Just because this Licensing
5 Board has admitted their contention for the purposes of this
6 Subpart K proceeding does not make the burden shift to the
7 Staff.
8 MS. CURRAN: I wasn't suggesting that the
9 Intervenor has no burden in a Subpart K proceeding.
10 Clearly, the Intervenor has a burden of demonstrating that
11 there are material and substantial deficiencies in the NRC
12 Staff's analysis such that these issues ought to go to a
13 hearing.
14 And that's what we've done. We've provided an
15 analysis showing defects in that analysis.
16 If Dr. Thompson hadn't done his seven--the
17 seven-part analysis of the accident scenario in LBP 00-19,
18 we could still obtain a hearing by coming into this oral
19 argument and showing significant defects in the NRC Staff's
20 and CP&L's analyses, because that's really what's at issue
21 here.
22 What's at issue is not whether Orange County can
23 come up with proof that there is a plausible scenario.
24 The issue is whether the Staff can make a
25 defensible claim that such an accident is not foreseeable.

1 Staff Argument - Euchner 269.

2 CHAIRMAN BOLLWERK: All right. At this point,

3 we'll take a --how long do you need? Five minutes or ten

4 minutes?

5 MS. CURRAN: How about fifteen?

6 CHAIRMAN BOLLWERK: All right. We'll be in recess

7 until 5:50.

8 (Recess.)

9 CHAIRMAN BOLLWERK: All right. Please come to

10 order. We're back on the record.

11 Ms. Curran now has an opportunity for a reply on

12 behalf of the County.

13 MS. CURRAN: I'd like to talk a little bit about

14 checkmarks on Mr. O'Neill's chart number 1 here.

15 Mr. O'Neill puts an awful lot of checkmarks down

16 the column for CP&L. They pretty much fill it up.

17 But that is not our analysis of the situation. He

18 does have an expert team.

19 As a point of introduction, Dr. Thompson never

20 claimed that he was going to do a PRA in this case. His

21 purpose in this was to set forth what's required for an

22 adequate PRA, suggest what ought to go in it, and make some

23 calculations and judgments as to what would be indicative

24 results from such an analysis that would point the way to

25 whether a full-scale PRA is required and whether an EIS is

1 required.

2 But CP&L did purport to do a full-scale PRA. So

3 they need to be held to that standard for what it entails.

4 And apparently, Mr. O'Neill has adopted what Dr.

5 Thompson sets forth in his prescription in section three of

6 his report.

7 Well, here on "Degraded Core Accident at Harris,

8 Level 1 PRA," as I was saying before, if we look at Table

9 5-1, which I think is over here, we don't have a figure for

10 a Level 1 PRA. We don't know what it is.

11 Level 1 and Level 2 are mixed together. That

12 violates one of the first principles of PRA preparation that

13 each step in the accident sequence ought to be separately

14 addressed so that an independent review can figure out how

15 the preparer did the PRA.

16 So I'd take the check mark off here. OK. These

17 two check marks come down.

18 All right. Let's go to "Containment Failure or

19 Bypass."

20 Well, they had a Level 2 PRA and results reflected

21 at least to some extent here, although there is a blank for

22 total seismic contribution.

23 And although that is a significant factor in this

24 analysis, we don't know what it is here.

25 Even though CP&L is perfectly capable of telling

1 us what it is, we really don't know.

2 So CP&L may have done some of this work, but it

3 hasn't completed its homework, so I think the checkmark

4 needs to be taken away.

5 Now when we get down here for "Transport and

6 distribution of radioactive material modeled," CP&L has not

7 provided us with a single shred of data on what was

8 calculated to be the radiation levels at that plant or what

9 the doses would be.

10 We know nothing, and we heard Mr. O'Neill say,

11 "Well, that was a lot of information and if we had given it

12 to Orange County, they wouldn't have understood it."

13 Well, thank you very much, but we would have liked

14 to have seen it and it belongs in the PRA. It's essential

15 information that's needed to figure out whether CP&L's

16 analysis is any good.

17 And we frankly don't understand why CP&L filed

18 mountains and mountains of paper talking about this analysis

19 and was unable to come up with a single number representing

20 radiation levels or dose consequences under severe accident

21 conditions.

22 That isn't a defensible PRA. So we need to take

23 that check mark down.

24 Over here, under "Loss of Spent Fuel Pool Cooling

25 and Makeup," as I was saying earlier, those two things got

1 mixed up in CP&L's analysis.

2 So we really don't know what is the probability of

3 a loss of spent fuel pool cooling.

4 We don't have an independent calculation for that

5 that could be evaluated.

6 Again, when you get to "Extend Level 2 PRA to

7 address onsite distribution of radioactive material impact

8 on spent fuel pool cooling and makeup," we don't have any

9 idea of what the onsite distribution of radioactive material

10 is.

11 So we can't really evaluate that aspect of the

12 PRA.

13 And when we get down to the next category, that

14 deficiency affects this whole next step of the analysis

15 because we really don't know how ERIN or CP&L characterized

16 the radiation environment critical locations.

17 All we know is how they ultimately concluded that

18 we have some representations about the amounts of time they

19 concluded would be needed to go in and perform certain

20 activities.

21 But we have no idea what assumptions about

22 radiation doses or radiation levels went into that.

23 Now, that's not a PRA that an expert could

24 evaluate and verify and determine whether it was adequate or

25 not.

1 So checkmarks need to come off for this category
2 here.
3 And then, of course, it also affects the whole
4 next set of actions or considerations down here, because we
5 don't have any idea how the personnel at the plant would be
6 affected by the radiation environment.
7 CP&L just didn't tell us.
8 The next category, "Loss of Pool Water by
9 Evaporation," is an issue.
10 I just want to go back to this category of "Effect
11 of Onsite Radiation Exposure on Plant Operation."
12 Here's a category, "Scenarios whereby cooling and
13 makeup may be restored identified." Now, CP&L has got that
14 one checked off.
15 In fact, CP&L or ERIN has identified a whole lot
16 of makeup actions and has lumped them all together into a
17 single probability calculation without looking at the
18 individual actions, without evaluating whether they were
19 subject to common mode failure, without looking at the
20 reliability of each one.
21 And some of them are extremely ad hoc. We've
22 heard about fire trucks. We've heard about pumps. Today
23 we've heard about a helicopter landing on the roof of the
24 plant.
25 As long as CP&L is going to rely on those things,

1 it needs to address each one in turn and give us some idea
2 of what the reliability of those individual makeup functions
3 are.
4 As Dr. Thompson has stated in his report, the
5 number of makeup actions that are feasible gets reduced a
6 great deal when you consider that many of them require
7 electricity to operate.
8 And there are others that are significantly
9 affected by what the radiation doses are going to be in the
10 area.
11 Since we don't know what the radiation doses are
12 for those individual makeup actions, we can't really
13 evaluate whether they're capable of being performed.
14 Now, down here on step 7, you've got "Initiation
15 of Exothermic Oxidation Reactions."
16 And for "Assessing the potential for self-
17 sustaining exothermic reaction," CP&L has checked itself off
18 with a parenthetical notation that the assumed probability
19 is one.
20 This is alleged to be a conservatism. As we have
21 said before, it's not conservative. It's a deterministic
22 calculation and it's realistic.
23 To claim it as a conservatism is inappropriate.
24 So we don't agree that CP&L gets all these
25 categories checked off over here. There's a long way to go

1 before CP&L gets those checkmarks.

2 We've heard the argument here today that

3 twenty-five rems is an acceptable dose for purposes of

4 analyzing the likelihood that workers are going to be able

5 to perform restorative or makeup actions with respect to the

6 spent fuel pools.

7 And we've already briefed the question of what is

8 the appropriate legal standard here.

9 I'd just like to point out the distinction between

10 --perhaps not so much the distinction but the limitation on

11 the assumption that can be made here that is imposed by the

12 purpose of this analysis.

13 It's certainly very possible that in a real

14 accident people would volunteer or be required to take

15 twenty-five rems or more.

16 It's also possible that if a full-scale EIS were

17 done that one might analyze in the EIS this particular

18 factor as a mitigating measure;

19 if we'd sacrifice some individual, if we give him

20 a slightly higher dose than we would normally allow,

21 then--or not slightly but somewhat higher dose than we

22 normally allow and this could be an acceptable mitigating

23 measure because the harm to that one person would be

24 outweighed by the dose savings to many, many people.

25 But that's not the purpose of this analysis. The

1 purpose of this analysis is to avoid doing an environmental
2 impact statement, to avoid preparing a detailed evaluation
3 of what are the impacts of this particular action.
4 It's just not legitimate.
5 And it's also for the same reason not legitimate
6 to assume that CP&L is going to take all kinds of ad hoc
7 actions that aren't even in the procedures, let alone the
8 tech specs, in order to mitigate the accident when this is
9 not part of the design or what was originally reviewed in
10 the EIS.
11 It's throwing in a whole lot of new factors, new
12 information in order to avoid grappling with the fundamental
13 problem here.
14 And it doesn't work legally.
15 I'd like to go back briefly to the issue of Dr.
16 Thompson's qualifications.
17 What CP&L and the NRC Staff would like the Board
18 to do is to completely disregard Dr. Thompson's
19 qualifications, because that is really the only way that it
20 could conceivably be justified to ignore what he's got to
21 say.
22 And we submit that that approach is just
23 completely unjustified.
24 Not only have we documented Dr. Thompson's
25 expertise on the issues, but Dr. Thompson has prepared his

1 report with extraordinary thoroughness and care.

2 He has attempted to document every single

3 assertion that he makes in his report.

4 It's thoroughly footnoted. The data is identified

5 and his calculations can be reproduced.

6 As we were discussing earlier with Judge Lam, most

7 of the calculations in his seven-part scenario that he

8 addresses are deterministic calculations. And he stands by

9 those calculations.

10 They're high quality calculations and they deserve

11 to be credited and examined.

12 Some of the calculations are based entirely on NRC

13 Staff documents, such as New Reg 1570.

14 Having presented a credible and documented

15 analysis, Dr. Thompson deserves the opportunity to present

16 his views in a full adjudicatory hearing.

17 And the only way that that could be avoided would

18 be for the Board to make some kind of arbitrary

19 determination that he is completely unqualified to testify

20 in this case.

21 And that's what CP&L and the NRC Staff are trying

22 to do, and they simply don't have the grounds to do it.

23 I think an important concession has been made in

24 the arguments made by Mr. O'Neill and Ms. Uttal, which is

25 that PRA has not been taken to this point previously either

1 by the NRC Staff or the nuclear industry.

2 This is a new area for PRA. Now, Mr. O'Neill and

3 Ms. Uttal both claim that the techniques exist for

4 evaluating this issue at the level to which we are here.

5 However, especially with respect to CP&L, we have

6 no way of knowing what those techniques are to a major

7 degree, because CP&L has not shared the information about

8 one of the most crucial aspects of its analysis, which is

9 what is the radiation environment going to be on the Harris

10 site in the event of an accident.

11 Mr. O'Neill makes a great deal out of the fact

12 that Dr. Thompson did not do some kind of a model of the

13 deposition of radioactivity on the site and instead he did a

14 scoping calculation and drew a circle around the location of

15 the release and made some assumptions about the deposition

16 of material there.

17 That was his--that was his way of addressing an

18 issue for which the County had neither the time nor the

19 money to do the kind of sophisticated analysis that was

20 required.

21 We don't have any idea what CP&L did at all. So

22 for Mr. O'Neill to criticize Dr. Thompson seems absurd.

23 We've also heard a lot today about how the ERIN

24 analysis was peer reviewed. And once again, we have heard

25 nothing that would indicate that the parties who reviewed

1 the ERIN analysis were anything else but employees of ERIN
2 who had a vested interest in making the probability results
3 come out as low as possible, which was the interest of the
4 client.
5 And in fact, the one or two instances in which the
6 peer reviewers or alleged peer reviewers revised the PSA,
7 they revised the probability figures downward so that the
8 probability of the accident would come out lower than the
9 PSA had previously predicted.
10 Now, Mr. O'Neill said that is removing unnecessary
11 conservatism, but in fact, the only change the reviewers
12 made to the PSA was to revise the predictions downward.
13 This just cannot be under any conceivable notion
14 considered an independent peer review. It's an in-house
15 review by an interested party.
16 And that's what it has to be taken for. The
17 standards for a PRA are rigorous ones, and independence is
18 important in conducting a review.
19 Plus, as I was saying earlier, it would be very
20 difficult to conduct a peer review of the CP&L analysis if
21 one were an actual independent outside observer, because
22 it's difficult to reconstruct exactly what they do.
23 Finally, I think that one of the most important
24 indicators here of why a hearing ought to be granted in this
25 case is the amount of testimony that has been given in this

1 oral argument by the attorneys.

2 And I think that the Board needs to be very

3 careful in weighing the statements that have been made by

4 attorneys here to make sure that they represent statements

5 that have been made in affidavits by the experts.

6 And that they refer to actual citations of what

7 the experts have said.

8 There has been a lot said here today that sounded

9 to me very much like expert testimony being given by an

10 attorney, and that, of all things, is a strong indicator

11 that these are factual issues that need to be debated by the

12 real experts, and can't be thrown out by testimony provided

13 by attorneys.

14 And that's all I have.

15 CHAIRMAN BOLLWERK: Let me just ask one question.

16 In terms of the peer review, how would they do it

17 if they didn't hire someone to do it for them?

18 MS. CURRAN: OK.

19 CHAIRMAN BOLLWERK: Are there people out there

20 that do this for free? I don't know. I mean, I'm trying to

21 understand.

22 MS. CURRAN: No. I had planned to address that,

23 and I'm glad you reminded me.

24 CHAIRMAN BOLLWERK: OK.

25 MS. CURRAN: Well, you can hire someone else who

1 isn't intimately involved in preparing the product that's
2 being put out for a certain purpose.
3 I mean, here ERIN had a purpose, which was to come
4 up with a probability estimate that would satisfy the
5 client, CP&L.
6 Now, what CP&L should have done was to go out and
7 hire some other consulting firm that has no particular
8 interest in making that result come out a certain way to
9 look over the work.
10 The people who were involved in the peer review
11 were high officials in ERIN. There's no indication that
12 they were separate from the preparation of the whole study.
13 In fact, they actually advised ERIN as they went
14 along as to how to do the study.
15 So they were intimately involved with the whole
16 study, and yet, they also performed a peer review of the
17 PSA.
18 That can't be considered independent.
19 CHAIRMAN BOLLWERK: All right.
20 MS. CURRAN: And another way to do it is to have
21 the government read it, which was done in the case of the
22 IPE.
23 CHAIRMAN BOLLWERK: By that do you mean the NRC?
24 MS. CURRAN: The NRC.
25 CHAIRMAN BOLLWERK: I just want to ask Mr.

1 O'Neill, factually, that's what happened?

2 This is an accurate representation of what

3 happened? Just so I understand.

4 MR. O'NEILL: Absolutely not. ERIN Engineering

5 was not hired to satisfy the client. Perhaps that's the

6 experts that she's dealing with.

7 But ERIN Engineering was hired for a very specific

8 purpose. They were hired to answer the Board's questions.

9 And that was what their mandate was.

10 In doing that, the first thing they were asked to

11 do is have someone else who is not involved in this process

12 do an independent peer review of the PSA, step one.

13 That was done. And in fact, as I mentioned and is

14 in the affidavit, no one does more peer reviews of PSA in

15 this country and perhaps in the world than ERIN Engineering.

16 CHAIRMAN BOLLWERK: And that was the PSA that was

17 prepared by CP&L?

18 MR. O'NEILL: Prepared by CP&L some time ago,

19 updated periodically because the state of technology

20 changes, and ERIN looked at that. That was step one.

21 After they did that, then they began--actually it

22 began somewhat simultaneously but with different teams--to

23 familiarize themselves with the plan and determine how they

24 would extend PRA Level 1, Level 2, to loss of spent fuel

25 pool cooling and to recovery of makeup, radiation effects of

1 bypass and all these other issues over in this seven-step
2 scenario.
3 The other peer review was done by ERIN Engineering
4 senior personnel. But that was done as a peer review just
5 to make sure that Dr. Burns and Mr. Gaber working on it
6 hadn't missed something, didn't make an assumption that
7 didn't make any sense.
8 As I answered the question earlier, I qualified it
9 to say, the first peer review would certainly meet the
10 industry standards for, quote, "independent peer review."
11 The second one was a peer review that was the only
12 one that could be done in the amount of time that we had.
13 But it was done because ERIN Engineering is not
14 hired just to satisfy clients. ERIN Engineering has a
15 reputation that it will want to maintain for the high
16 quality of its work or it will not be hired by the vast
17 majority of utilities to do peer reviews, to assist in PSA's
18 that are accepted by the NRC routinely as being of a high
19 quality.
20 That's why it takes so long, because of the
21 careful checks and cross-checks.
22 JUDGE LAM: How long has it taken?
23 MR. O'NEILL: The number of man hours--I mean, we
24 only had from August 7th until November 20th. It took that
25 period of time.

1 The number of man hours that Dr. Burns estimated
2 in his affidavit was over two thousand of thirteen ERIN
3 employees.
4 We did not keep track of the CP&L hours. We
5 anticipate that it would be somewhere close to that, because
6 over ten to twelve people were also working on this a
7 significant amount of their time, some of them full time.
8 So this is a major undertaking, and it is done
9 with the care that has established reputation.
10 And I submit that on behalf of CP&L and ERIN
11 Engineering, I would resent the idea that they were hired to
12 satisfy the client to come up with a number that was going
13 to be the number that we wanted.
14 In fact, it wasn't hard to come up with a number
15 that was going to be pretty low, because that's where the
16 scenario will drive you.
17 But it was done with degrees of conservatism that,
18 quite frankly, I challenge.
19 CHAIRMAN BOLLWERK: All right. Ms. Curran,
20 anything else you want to say on that subject?
21 MS. CURRAN: No.
22 CHAIRMAN BOLLWERK: Or any other subject, for that
23 matter?
24 MS. CURRAN: Yes, we would like to just mention
25 one or two things.

1 At one point in his argument, Mr. O'Neill was
2 criticizing Dr. Thompson for relying on a French report that
3 had nothing to do with PWR fuel for the notion that high
4 burn-up fuel would be fragmented and would be released in
5 particulate form during an accident.
6 This completely ignores the fact that Dr.
7 Thompson also relied on a report by the NRC Staff, which is
8 quoted on page 28 of his report.
9 The report is by Soffer in 1995, which is listed
10 in Dr. Thompson's bibliography, and I think it's included as
11 an attachment.
12 The quote from the NRC Staff is, "Recent
13 information has indicated that high burn-up fuel, that is,
14 fuel irradiated at levels in excess of about forty gwd/mtu
15 may be more prone to failure during design basis-free
16 activity insertion accidents than previously thought.
17 "Preliminary indications are that high burn-up
18 fuel also may be in a highly fragmented or powdered form so
19 that failure of the cladding could result in a significant
20 fraction of the fuel itself being released."
21 So he doesn't rely solely on the Smitz report.
22 I think Mr. O'Neill also made a statement about
23 New Reg 1353 being concerned with a sabotage accident, and
24 that's contradicted by a quotation from New Reg 1353, which
25 appears at page 44 in Dr. Thompson's report.

1 The accident that was looked at or "the seismic
2 event contributes over ninety percent of the PWR spent fuel
3 damage probability and nearly ninety-five percent of the
4 BWR." So that's incorrect.
5 Just give me one moment.
6 (Pause.)
7 MS. CURRAN: In his oral argument, Mr. O'Neill
8 also stated that Orange County or Dr. Thompson was-- or that
9 there was no agreement, contrary to what I argued, that a
10 fire in pools A and B would result in a fire in pools C and
11 D.
12 And I just want to quote from the ERIN report on
13 that because I think the report speaks for itself.
14 At page 2-36, the report states, "The consequences
15 of loss of water inventory in pools A and B would in turn
16 adversely impact both access and further prevention actions
17 related to pools C and D."
18 Essentially the same statement is made at D-1.
19 The NRC Staff affidavit in paragraph 29 says, "Loss of water
20 in pools A and B would almost certainly result in an
21 exothermic reaction.
22 "At that point it is not likely that cooling could
23 be restored to pools C and D."
24 There was a question earlier, I think, about the
25 pre-staging of an accident response in the situation of a

1 late containment failure.

2 And I wanted to point to the statement at pages

3 4-8 and 4-9 of the ERIN report that "Operator actions are

4 essential to successful response and that loss of pool

5 cooling may not be viewed as an immediate threat."

6 So that it appears from that statement that in the

7 case of a late release the restoration of the spent fuel

8 pools will not necessarily be high priority in the accident

9 response.

10 I think that was a concern of yours, Dr. Lam.

11 (Pause.)

12 CHAIRMAN BOLLWERK: Is that all that you wanted to

13 say, Ms. Curran?

14 MS. CURRAN: I have one more point that I'd like

15 to address.

16 CHAIRMAN BOLLWERK: All right.

17 MS. CURRAN: And that is that one of the important

18 issues in this case revolves around CP&L's calculations of

19 what the--what conditions, radiation conditions workers

20 would be exposed to and how much time they would have to go

21 back in and perform their makeup actions.

22 I think Mr. O'Neill made an error in suggesting

23 that they had a window of eight days.

24 I believe that based on Dr. Burns' work, it was

25 down to four days, but a more important point is that this

1 depends a lot on the calculations of Mr. Morgan, who put in
2 an affidavit in this case.
3 According to Mr. O'Neill, Mr. Morgan's dose
4 calculations were reviewed by Mr. Wills, his boss, and that
5 they were in turn reviewed by Mr. Gaber, who is an employee
6 with ERIN.
7 But we still don't know what Mr. Morgan's
8 calculations were.
9 He gave a summary to ERIN. That's what he says in
10 his affidavit. The summary isn't reported. At least no
11 dose calculations are reported in the ERIN report.
12 And we have never seen them. So whether or not
13 CP&L did some kind of internal review and then ERIN
14 participated in an internal review of Mr. Morgan's work, it
15 still remains hidden from view.
16 CHAIRMAN BOLLWERK: All right. Judge Lam, do you
17 have a question?
18 JUDGE LAM: Yes. Thank you, Judge Bollwerk. Ms.
19 Curran, you acknowledged earlier that the Intervenor has the
20 ultimate burden to demonstrate that this postulated sequence
21 would not be remote and speculative.
22 MS. CURRAN: I don't think that's what I said to
23 you. I want to make it clear that I believe it is the Staff
24 that has the burden of showing that the accident sequence is
25 remote and speculative.

1 We have a burden of showing that the Staff has
2 made mistakes or ignored important factors.
3 But that's different.
4 JUDGE LAM: All right. All right. Then, let me
5 rephrase my question in another way.
6 Assuming we accept all the numbers that you have
7 proposed in your pleading, which is this particular sequence
8 has the probability of one point six times ten to the minus
9 five, what guidelines would you propose to us?
10 I mean, assuming that we accept that number as
11 true and valid over the Applicant's number and over the
12 Staff's number, what guidelines do you have for us to make a
13 determination as to read this is remote and speculative or
14 not?
15 (No Response.)
16 JUDGE LAM: My thought of what we had said in our
17 earlier ruling, in LBP 00-19, we said ten to the minus five
18 should not be dismissed automatically per se as remote and
19 speculative.
20 What guidelines do you propose we would employ to
21 determine whether one times ten to the minus five is remote
22 and speculative or not?
23 (Pause.)
24 MS. CURRAN: I am hesitating a little bit, because
25 I think that one gets into some very dangerous territory

1 when one starts to look exclusively at numbers and make
2 important decisions about whether or not to take a close
3 look at environmental impacts solely on the basis of a
4 probability number without looking at the context of the
5 problem.
6 So if you're asking me to give you a general rule
7 of thumb--
8 JUDGE LAM: Yes.
9 MS. CURRAN: --I would say that--I would say that
10 when you're at ten to the minus five, you're in the area
11 where an environmental impact statement should be prepared.
12 It's high enough, or ten to the minus six is high
13 enough to warrant that.
14 But I also in saying that would not like to
15 suggest to the Licensing Board that there is some automatic
16 rule of thumb that could be applied out of the context of
17 the proceeding.
18 And here I think it also needs to be taken into
19 account the nature of this problem, the degree of
20 uncertainty that's involved.
21 And I also think it's relevant to consider the
22 consequences that are involved.
23 Because this is, as I was saying before, if we're
24 wrong, then the consequences are very significant.
25 And another factor that's really important is

1 we're not looking here at whether or not to go ahead or not
2 go ahead with one proposal for which there's only the two
3 alternatives of action and inaction.
4 This involves decision making about what is a wise
5 strategy for managing a growing inventory of spent fuel at
6 the Harris site.
7 And there are other options for doing it. This is
8 the kind of problem where it's appropriate to look at the
9 whole picture and see if enormous consequences with
10 reasonable foreseeable probability could be completely
11 avoided by some other alternative.
12 JUDGE LAM: Thank you.
13 CHAIRMAN BOLLWERK: Any questions, Judge Murphy?
14 JUDGE MURPHY: No.
15 CHAIRMAN BOLLWERK: All right. I have nothing
16 further.
17 At this point, we can conclude the proceeding
18 tonight, unless any of the other parties have anything they
19 want to say at this point.
20 MR. O'NEILL: Just a couple of comments on the
21 things she's raised for the first time, and I'll be very
22 brief. She can reply if she wants.
23 CHAIRMAN BOLLWERK: All right.
24 MR. O'NEILL: I just refer you to New Reg 1353 at
25 4-13 to 4-28, where the accident sequences include

1 structural failures due to missiles.

2 I think missiles generally are assumed to be

3 sabotage.

4 Aircraft crashes, heavy load drops, beyond design

5 basis earthquakes, rafter, cavity and transfer gate

6 pneumatic seal failures and inadvertent draining.

7 So consequently, that's not applicable, because

8 none of--very few of those things would apply to this

9 sequence.

10 And most of the seismic that Ms. Curran referred

11 to is a large seismic event, which would breach the pool and

12 drain it down, which once again is not the sequence.

13 So I think Ms. Curran was confused on that.

14 Also, on confusion, eight days versus four days.

15 Let me be very clear.

16 The analysis--the deterministic analysis shows

17 CP&L Rebuttal 296 that worst case, fuel has just been placed

18 into spent fuel pool A, highest heat load possible.

19 We could have integrated, by the way, the heat

20 load over a period of a cycle, but instead we picked the

21 highest heat load in A, full pool, did the calculation,

22 eight point some days.

23 For purposes of the ERIN analysis, because they

24 had to run a lot of models and a lot of calculations, we

25 picked four days as a cut-off.

1 I suspect that if in four days we couldn't show
2 that all of these could be done, we might have picked five
3 days.
4 But you had to pick some period of time and run
5 lots of numbers, because during this period of time Mr.
6 Morgan is running his microshield calculations as to what
7 the dose rates and doses are if someone enters a particular
8 building.
9 So continuously there is the computer runs on
10 doses and dose rates.
11 In order to come up with a point we said, "OK,
12 four days. Twenty-five rems is the maximum we're going to
13 allow anyone."
14 We could go beyond that, but we just said, "Let's
15 look at it for twenty-five rem, and we're not CP&L Rebuttal
16 297 letting anyone go into a compartment with a five hundred
17 rem dose."
18 We found out that that works and comes up with a
19 low enough probability.
20 That's what the four days comes from.
21 French report. Now we have another report which
22 had something to do with a rod drop, which adds a lot of
23 energy, and there's no analysis of it.
24 And there's not very much we can say. Once again,
25 there's no basis for the idea that this fuel is going to be

1 fragmenting.

2 Also, by the way, we know there's no way, as Ms.
3 Uttal notes, for the gasses to take fragments and get them
4 through the steam generator tubes out the valve, in any
5 event.

6 Dr. Seuss and Dr. Thompson. I forgot to mention
7 the one case that Ms. Curran cited which stands for the
8 proposition that neither Dr. Seuss nor Dr. Thompson would
9 be admitted to be an expert in a proceeding before the
10 Nuclear Regulatory Commission.

11 That cite is ALAP 669. It's Duke Power Company v
12 McGuire, where someone who's claimed expertise on the
13 subjects at issue rested mainly on his asserted ability to
14 understand and evaluate matters of a CP&L Rebuttal 298
15 technical nature due to his background in academic and
16 practical training and years of reading AEC and MRC
17 documents was not allowed as an expert by the Board, the
18 Fuel Board in that particular proceeding.

19 That's not good enough.

20 Finally, twenty-five rem, Dr. Lam asked the
21 question about whether or not people would be willing to go
22 into a twenty-five rem--and receive a dose of twenty-five
23 rem, and how was that taken into account?

24 The answer is it was taken into account. Appendix
25 C to the ERIN report is called "Human Reliability Analysis."

1 Lots of different things go into that analysis.
2 One of them was the willingness of workers to do actions
3 under extraordinary conditions.
4 It is modelled. It is taken into account.
5 And I believe Dr. Parry is considered to be one of
6 the world experts on human reliability analysis.
7 It is in there.
8 The other thing is we have lots of time. If one
9 person wasn't willing to do it, tell somebody else to do it.
10 This is not a big dose for purposes of people who
11 understand radiation.
12 You're not going to have a problem finding a
13 worker who is willing to run down to the 216 level and open
14 a valve and run back up again.
15 And that's all it takes to get makeup water.
16 I will not respond to Ms. Curran's interesting
17 erasing of my checkmarks. I believe I've covered all of
18 that in more than enough detail.
19 But we're not at all surprised that Ms. Curran has
20 no idea what CP&L has done or Dr. Thompson has no idea what
21 they've done.
22 We suggest that if you'd read the report
23 carefully, you'd have a very good idea, if you could
24 understand it.
25 Thank you.

1 CHAIRMAN BOLLWERK: Anything the Staff wants to
2 say?
3 MS. UTTAL: No, sir.
4 MS. EUCHNER: No, sir.
5 CHAIRMAN BOLLWERK: Ms. Curran?
6 MS. CURRAN: Two comments.
7 CHAIRMAN BOLLWERK: All right.
8 MS. CURRAN: In the military, missiles might be
9 military missiles, but I think in New Reg 1353 they are
10 missiles that come off the turbines.
11 And I don't think New Reg 1353 is about sabotage
12 events.
13 As far as my not understanding or Dr. Thompson not
14 understanding what is in the ERIN report, there's been a
15 number of opportunities today for Mr. O'Neill to point to
16 some kind of data in the ERIN report that would show
17 radiation levels or doses to workers. And he hasn't done
18 that.
19 So if there's something that I don't understand
20 and I haven't seen, as far as I know, it's not there.
21 JUDGE LAM: You have no comments about my favorite
22 children's author, Dr. Seuss?
23 MS. CURRAN: Well, I know that Dr. Thompson told
24 me that if he could go into the same Hall of Fame with Dr.
25 Seuss, then he would feel very honored.

1 CHAIRMAN BOLLWERK: All right. Anything further,
2 then?
3 (No Response.)
4 CHAIRMAN BOLLWERK: If not, I'd like to thank
5 Counsel for your presentations today.
6 It's been a very long day. We started at 9:30.
7 It's now almost twenty 'til 7:00.
8 We appreciate your thoroughness and your
9 obvious--the obvious amount of work that all of you have put
10 into the presentations that you've made today.
11 This is a significant contention that we have to
12 deal with, and we appreciate everyone's efforts.
13 That goes also for Dr. Thompson, the folks from
14 CP&L who are here and also the Staff experts that are here.
15 We do appreciate your efforts to help the Board
16 resolve this matter.
17 In line with 2.115A, which says that we shall
18 promptly issue a written order, we'll prepare that and
19 promptly issue a written order dealing with the matters that
20 are at issue in this case.
21 If there's nothing else from either of the parties
22 on any procedural matters, then we stand adjourned.
23 And again, we thank you for your efforts and for
24 your time.
25 (Whereupon, at 6:40 p.m., the meeting was

1 adjourned.)

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

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

NAME OF PROCEEDING: CAROLINA POWER & LIGHT COMPANY (Shearon Harris Nuclear Power Plant)

CASE NO:

PLACE OF PROCEEDING: Raleigh, North Carolina

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Gale Gray

Gale Gray
Official Reporter
Ann Riley & Associates, Ltd.