

RAS 2492

Rejected INT-BCOC Summary Exh. 3
12/7/00

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RELATED CORRESPONDENCE

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UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of

:

: Docket No.

CAROLINA POWER & LIGHT COMPANY

: 50-400-LA

:

(Shearson Harris Nuclear Power

: ASLBP NO.

Plant)

: 99-762-02-LA

Deposition of EDWARD T. BURNS, Ph.D., held at
Harmon Curran Spielberg & Eisenberg, LLP, 1726 M
Street, N.W., Third Floor, Washington, D.C.,
20036, commencing at 9:40 a.m., October 20, 2000,
before DEBORAH K. WILKINS, RPR and Notary Public.

ORIGINAL

Template = SECY-028

SECY-02

NUCLEAR REGULATORY COMMISSION

Docket No. 50-400-LA Official Exh. No. 3

In the matter of Carolina Power & Light Co.

Staff _____ IDENTIFIED

Applicant _____ RECEIVED _____

Intervenor BCOC REQUESTED

Order _____ WITHDRAWN _____

DATE 12/7/00 Witness None

Clerk Paul Ballentine

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ORIGINAL

1 A P P E A R A N C E S O F C O U N S E L :

2 F O R T H E A P P L I C A N T C A R O L I N A P O W E R & L I G H T C O M P A N Y :

3 S H A W P I T T M A N

4 B Y : J O H N H . O ' N E I L L , J R . , E S Q U I R E

5 D O U G L A S J . R O S I N S K I , E S Q U I R E

6 2300 N Street, N.W.

7 Washington, D.C. 20037-1128

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12 F O R T H E I N T E R V E N O R O R A N G E C O U N T Y :

13 H A R M O N C U R R A N S P I E L B E R G & E I S E N B E R G ,

14 L L P

15 B Y : D I A N E C U R R A N , E S Q U I R E

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1 APPEARANCES (Cont'd.)

2 FOR THE NUCLEAR REGULATORY COMMISSION STAFF:

3 UNITED STATES NUCLEAR REGULATORY

4 COMMISSION

5 BY: SUSAN UTTAL, ESQUIRE

6 JENNIFER EUCHNER, ESQUIRE

7 United States Regulatory Commission

8 Washington, D.C. 20555

9 (301) 415-3897

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16

17 Also Present: Gordon Thompson, Ph.D.

18 Gareth W. Parry, Ph.D.

19 Edward L. Wills, Jr.

20 John R. Caves

21 Stephen LaVie

22

1 involved in the analysis of nuclear power plants
2 from an overall risk perspective.

3 Q. You consider yourself an expert in
4 probabilistic risk assessment?

5 A. I have extensive experience in
6 probabilistic risk assessment, I believe, that
7 would qualify as an expert in this case, yes.

8 Q. Do you believe it is necessary to have
9 designed a nuclear plant in order to be an expert
10 in probabilistic risk assessment?

11 A. No, ma'am.

12 Q. Do you believe it's necessary to have
13 operated a nuclear plant in order to be an expert
14 in probabilistic risk assessment?

15 A. No.

16 Q. Okay.

17 Looking back at your resume' again, I
18 would like to talk about the bullet here you have
19 which says manager and lead technical analyst of
20 the Duane Arnold Level 1 and 2 technical support
21 for response to the Severe Accident Policy
22 Statement, 1991 to 1995. Could you describe what

1 relative to that submittal.

2 Q. How many people worked on that PRA?

3 A. Would you like to know the number of
4 people who contributed or the number of man-years
5 that were involved?

6 Q. Well, why don't you give me both.

7 A. I would say that there were six
8 consultant contributors.

9 Q. When you say six consultant
10 contributors, you mean six individuals?

11 A. Six individuals.

12 Q. Okay.

13 A. And there were four individuals at Duane
14 Arnold who were primarily part of the team.

15 Q. So this was a team of people from the
16 consultant and Duane Arnold?

17 A. Yes, ma'am. Usually probabilistic risk
18 analysis would require a team of people drawing
19 from all disciplines to complete the effort.

20 Q. Why is that? Why do you have to draw
21 from so many disciplines?

22 A. Since the analysis involves an

1 integrated look at the plant, it uses information
2 associated with the engineering of the plant, the
3 testing of the plant, the operator interaction
4 with various pieces of the plant and its control
5 with the analysts who have done thermal hydraulic
6 calculations around the plant, so nearly all of
7 the disciplines that are associated with the
8 design and operation of the plant are called into
9 play as part of that analysis.

10 Q. You were going to tell me how many
11 man-hours. Is it all men?

12 A. The number of engineering person-hours
13 associated with the Duane Arnold work from the
14 consultant side was approximately five
15 person-years.

16 Q. How about from the utility side?

17 A. I wouldn't know the answer to that.

18 Q. And no way of making a reasonable
19 estimate?

20 A. No, I wouldn't be able to tell.

21 Q. Did the utility members of the team make
22 a substantial contribution to the effort?

1 A. Six consultants.

2 Q. Six consultants.

3 Did they represent different
4 disciplines? Can you tell me what they were?

5 A. Disciplines were the people who set up
6 the framework for the analysis to identify the
7 accident scenarios, to identify what the
8 containment failure probability would be for
9 different accident conditions, personnel to
10 identify the human reliability analysis portion of
11 that, of the Level 2, and then personnel to
12 perform the thermal hydraulic calculations to
13 support the radionuclide release calculations, the
14 thermal hydraulic conditions inside the
15 containment, the conditions inside the reactor
16 building if a containment failure occurred, and
17 then the radionuclide releases for each of the
18 pathways that could be identified through the
19 containment and through the reactor building.

20 Q. So were there four different disciplines
21 represented on this team, would you say?

22 A. I don't want to mislead you. The

1 probabilistic risk analysis includes a whole
2 spectrum of types of analysis that needs to be
3 performed in order to support any one of these
4 things. To say there are four disciplines is
5 probably an oversimplification --

6 Q. Okay.

7 A. -- because we draw on so many different
8 inputs. In some cases we rely heavily on the
9 people who are giving us the inputs. In other
10 cases we require the expertise to be part of the
11 team.

12 Q. So it might be more fair to say that
13 there are many disciplines represented in a team
14 like this?

15 A. Yes.

16 Q. Okay.

17 And how many people from the utility
18 were represented on the team?

19 A. Two.

20 Q. Two?

21 On the consultant's part, how many
22 person-hours did the effort take? I see it was --

1 it looks like a two-year project?

2 A. It was two years, two units. So in this
3 particular case the utility took on a substantial
4 fraction of the analysis, so the consultant time
5 was approximately six person-months per unit.

6 Q. So that was one person-year for both
7 units?

8 A. Approximately. Consultant time.

9 Q. You had said that the Limerick Level 2
10 PRA took your firm about one person-year of time.
11 Is the difference -- that was for one unit, the
12 Limerick?

13 A. Limerick is a two-unit site.

14 Q. So you looked at two units for Limerick?

15 A. We performed a calculation for one unit.

16 Q. I see. Okay.

17 It seems like from a total perspective
18 that Nine Mile Point, if you include the
19 compensatory time spent by the utility work that
20 you all weren't doing, took maybe twice as long.
21 Is that simply because there were twice as many
22 units being analyzed there or is that fair to say?

1 A. It would be a comparable amount of time.

2 Q. Were those amounts of time in addition
3 to the amount of time that you described for me in
4 relation to the bullets above for the Peach Bottom
5 and Limerick studies?

6 A. Yes.

7 Q. But they are related in the sense that
8 that is input into the same study, right?

9 A. Yes.

10 Q. The first bullet on your resume' under
11 work experience says: Led or participated in 11
12 BWR PSA peer review certifications in '96 to '97.
13 Could you describe what was involved there?

14 A. The industry recognized as part of
15 risk-informing regulation that the ability to
16 assure the public and the NRC that probabilistic
17 risk assessments were valid tools to be used in
18 risk-informing regulation applications that there
19 needed to be a method, an accepted method by the
20 NRC, by the industry and by the public that the
21 probabilistic risk assessments were performed in a
22 manner that could be considered high quality and

1 be reproducible, and so as a farther part of that
2 industry effort one of the first steps that was
3 done was for a peer review process to be
4 developed.

5 So a peer review process was developed,
6 and myself and Karl Fleming and Doug True
7 participated in the development of a peer review
8 process that could be used in evaluating a PRA to
9 see whether the principal elements were properly
10 incorporated, whether the methods used were of
11 high quality, and whether those methods had been
12 implemented in a way that produced a risk profile
13 that was realistic given the plant configuration
14 and the specific plant features that existed at
15 the plant.

16 As part of that process, we pilot tested
17 that at three plants in 1996, we fed back the
18 results of that pilot test into the guideline
19 development and then issued the guidelines in
20 1997, and then at that point we started
21 implementing the guidelines on the review of PRAs
22 to ensure that they had an adequate, I will say,

1 quality for use in risk-informing regulation.

2 Q. You mentioned PRA for risk-informed
3 regulation which is a term of art for an approach
4 to safety regulation that's going on within the
5 NRC right now; is that correct?

6 A. I am not sure what term of art means.

7 Q. Well, when you say risk-informed
8 regulation, I can almost put capital letters on
9 that because it's an approach that the NRC is
10 taking to safety regulation, and my ultimate
11 question is: Do you have a different standard for
12 PRAs depending on what their purpose is?

13 A. Are you asking my personal --

14 Q. Yes, your professional opinion.

15 A. My professional opinion is that
16 probabilistic risk assessments can be performed
17 for a number of different reasons. The
18 probabilistic risk assessments that were performed
19 as part of the original individual plant
20 examination evaluations for response to generic
21 letter 88-20 were those that were used to identify
22 whether vulnerabilities existed at the plant that

1 would characterize those uncertainties that most
2 influence the PRA relative to that specific
3 application. So there are compensatory measures
4 that could be taken for using the PRA under
5 certain circumstances.

6 Q. Do you consider that the provision for
7 peer review of a PRA is an important element for
8 assuring the quality of the PRA?

9 A. Yes.

10 Q. And why is that?

11 A. Because the number of analyses and
12 inputs that need to be treated and the number of
13 decisions that need to be made as part of a PRA
14 can be quite numerous. There is a possibility
15 that the PRA team themselves do make decisions
16 that are different than what the core
17 methodologies might dictate are appropriate, so it
18 is useful to have a group of experts come in to
19 examine the methods that have been used and how
20 they are implemented and to check the
21 reasonableness of the results to determine whether
22 the PRA makes good technical sense and is

1 supportable and that the results are traceable to
2 the inputs that are used as part of the PRA.

3 Q. And does peer review generally require a
4 team effort similar to or analogous to the team
5 effort that is required for a PRA in the sense
6 that no single discipline is adequate to evaluate
7 the PRA?

8 A. I believe that is a fair statement, yes.

9 MS. CURRAN: This would be a good time
10 for me to break for lunch unless you would like
11 to sit here and skip lunch.

12 MR. O'NEILL: Probably not.

13 (Luncheon recess -- 12:20 p.m.)

14 Afternoon Session (1:35 p.m.)

15 BY MS. CURRAN:

16 Q. Dr. Burns, I would like to ask you about
17 the work that you are doing on the Harris license
18 amendment case. I understand that you are
19 preparing an affidavit or evidentiary presentation
20 with a Subpart K proceeding for the applicant's
21 response to contention EC-6; is that correct?

22 A. I am not familiar with the --

1 A. Yes.

2 Q. Do you plan to have the study peer
3 reviewed?

4 A. Yes.

5 Q. By whom will it be peer reviewed?

6 A. Karl Fleming and Doug True.

7 Q. Are they employees of the same company
8 where you work?

9 A. Yes.

10 Q. Is it consistent with the peer review
11 guidance that's referenced in your resume' to have
12 a peer review done by the same company that
13 performed the study?

14 A. I believe I wasn't precise enough in my
15 terminology when I responded to your question.
16 First, to answer your second question, is: It
17 would be inconsistent with peer review methodology
18 that we developed to have the person who performed
19 an analysis peer review it. It would not be
20 inconsistent or it would be consistent to have a
21 peer review even if it was a member of the same
22 company. That would be allowed under the peer

1 review process that's being developed by the
2 industry.

3 The previous question that you had asked
4 me about peer review, I should say we are
5 anticipating having an independent review done by
6 Karl Fleming and Doug True, and that would be our
7 submittal to the customer, in this case counsel,
8 and it would be up to the counsel or CP&L to
9 decide whether a peer review process would be
10 required, so I'm sorry I wasn't accurate when I
11 responded to you before.

12 Q. Okay.

13 And a review done by -- let me scratch
14 that.

15 Mr. Fleming and Mr. True, will they
16 participate in any way in the preparation of this
17 study?

18 A. They have given me some guidance, and
19 they have done some preliminary reviews of the
20 methods that we are going to use to make sure that
21 we are doing it in a manner consistent with their
22 technical expertise.

1 Q. Do you expect to be getting other input
2 or advice from them as you go along in the study?

3 A. One specific task has been identified as
4 part of their review thus far, and that is, that
5 the interfacing system LOCA frequency that had
6 been calculated previously as part of the PRA
7 appeared to be extremely high compared with sister
8 plants, and so they have identified that as an
9 analysis that may need to be updated as part of
10 this effort to make sure that it accurately and
11 realistically characterizes the plant.

12 Q. What are Mr. Fleming's and Mr. True's
13 positions in the company?

14 A. Mr. True is a senior vice-president and
15 Mr. Fleming is a vice-president in charge of PWR,
16 PRA risk -- probabilistic risk assessments.

17 Q. How much time have you budgeted for them
18 to do their review?

19 A. I am not the contractual project
20 manager, so I am not sure.

21 Q. So you don't know how much time has been
22 budgeted for their review?

1 A. No.

2 Q. The figure that you gave me of one
3 person-year for the effort, does that include
4 their review?

5 A. Yes.

6 Q. I believe you indicated to me before
7 that peer review certification guidelines that you
8 have participated in developing have a spectrum of
9 standards or criteria in terms of their rigor,
10 that there's a variation depending on the purpose;
11 is that correct?

12 A. They allow the peer review team the
13 flexibility to describe the PRA over a spectrum of
14 level of detail, scope and quality, yes.

15 Q. So depending on the purpose, the
16 guidelines might have a choice of what quality
17 standard would apply?

18 A. I'm sorry. Could you repeat that or
19 read it back?

20 Q. If you don't understand it, let me try
21 to rephrase it.

22 There isn't a single standard in the

1 peer review guidelines that you described to me,
2 right?

3 A. Peer review guidelines are not a
4 standard.

5 Q. But they express certain criteria or
6 goals, do they?

7 A. They express criteria upon which the
8 peer review team would make judgments relative to
9 the quality of the PRA.

10 Q. Okay.

11 Under these guidelines, will this PRA be
12 of the highest quality possible?

13 A. This PRA, meaning?

14 Q. The one that you are working on for
15 CP&L.

16 A. I would like to be a little careful
17 here.

18 We are doing a probabilistic risk
19 assessment of the analysis that was requested by
20 the ASLB in their order, so we are doing an
21 analysis, but it uses as input the probabilistic
22 risk assessment of the Shearson Harris plant that

1 the probability of each of these events in the
2 chain of events?

3 A. No.

4 Q. What have you been asked to do with
5 respect to this list?

6 A. We have been asked to answer question
7 number 1 relative to that list.

8 Q. Okay. So what will you be doing in
9 order to answer question 1 with respect to that
10 list?

11 MR. O'NEILL: You might want to make
12 that more specific because he can probably answer
13 the question for the next three hours. You need
14 to ask a question he can answer.

15 BY MS. CURRAN:

16 Q. Are you giving a best estimate for the
17 probability for each of the events listed on page
18 13?

19 A. We are using the best technical
20 information that we have available to us and can
21 develop within the time frame available to answer
22 the question posed by the Board, that as engineers

1 will do and we will be forced most likely to do in
2 this case is that some estimates may be
3 conservative, although we will try to characterize
4 that level of conservatism in the response so as
5 not to mislead the Board.

6 Q. So I am trying to -- let me just
7 articulate what I hear you implying to me, is that
8 at least for some of these scenarios you don't
9 feel that there's enough time to prepare a
10 realistic probability estimate, so that you are
11 going to give a conservative estimate to somehow
12 compensate for that? Do I understand that
13 correctly?

14 A. I can't agree with the premise that you
15 are giving me. We will give a -- as the question
16 asks, a best estimate overall probability of the
17 sequence, that's what we will provide to the
18 Board, provide to counsel anyway, and that best
19 estimate will have information in it that is of
20 course limited by our current state of knowledge.

21 I think the principal example of that is
22 in step number 7, the initiation of an exothermic

1 oxidation reaction in pool C and D. I currently
2 don't have all of the technical facts as of this
3 time, so at this point in time I can't make the
4 statement that we will be able to provide the best
5 estimate evaluation of that, and we may have to
6 provide a sensitivity evaluation along with
7 characterizing the uncertainties in that so that
8 those decisionmakers who need to know what effect
9 that has on the overall sequence evaluation will
10 be able to understand what we have done, but we
11 will in fact have a best estimate evaluation
12 characterized by those uncertainties.

13 Q. Will your work involve looking at each
14 of these seven scenarios and making a best
15 estimate of conditional probability for each one
16 of them?

17 A. I don't believe these are seven
18 scenarios.

19 Q. Or seven accident steps. Would that be
20 a better way to describe it?

21 A. We will look at each of the contributors
22 to the overall scenario because one of the

1 because I don't believe that there have been
2 extensive differences associated with the
3 difference between 1995 and 2000.

4 MS. CURRAN: I would like to ask counsel
5 if these calculations have been produced to us.

6 MR. O'NEILL: I can tell you that the
7 PSA folks, PRA folks at CP&L put every shred of
8 paper that they could find that supported the PSA,
9 and that was their instructions, and they have
10 gone back to check it and they have gone back
11 again to get all of the peer reviews of even the
12 early, now outdated, IPE and even a precursor to
13 it which was presented in the stack that you got
14 today, so at least the instructions, and I believe
15 since they are very thorough, careful, precise
16 engineers, that you have everything that they
17 could identify, either you have it or you had an
18 opportunity to elect to have copies made of it.

19 BY MS. CURRAN:

20 Q. You had said that you intend to have an
21 independent peer review performed; is that
22 correct?

1 A. Of?

2 Q. Of the PSA? Is that what you said? Of
3 the latest PRA for the Harris plant?

4 A. That looks at step number 1 of degraded
5 core accident? The PSA from 1995 updated by the
6 calculation?

7 Q. Is that what you are referring to that
8 is going to be peer reviewed?

9 A. Yes.

10 Q. Okay.

11 And how, when and by whom is that going
12 to take place?

13 A. It's going to be done by a team of PWR
14 experts as part of this process -- of the process
15 that we are going through to produce the overall
16 probability of these seven steps.

17 Q. Is this the same team of experts that
18 you referred to me before, Mr. Fleming and Mr.
19 True?

20 A. Mr. Fleming is the head of the peer
21 review process, and he has a team that's working
22 for him separately.

1 Q. And this team is in-house, within your
2 company?

3 A. Yes, ma'am.

4 Q. Do you plan to look at any other source
5 besides the PSA for Harris for the first
6 contributor in the list?

7 A. Mr. Fleming is looking at this portion
8 of the overall development as part of input to the
9 process, so he will identify to us whether the PRA
10 meets that, meets the needs of input to this
11 seven-step process or whether additional pieces of
12 information will be required to characterize
13 degraded core accidents.

14 As I said, he's already identified as
15 one of those pieces the potential change for the
16 interfacing system LOCA, there is extensive
17 documentation available on how that analysis is
18 supposed to be done, it's been developed by EPRI,
19 and that he's also performed as part of other PWR
20 risk analysis, so that information would be part
21 of -- in addition to the PRA that existed, would
22 also be an example of things that will be part of

1 that input to characterize step number 1.

2 Q. Okay. Looking at step number 2, will
3 you be applying PRA analysis technique to this
4 step?

5 A. Step number 2 is characterized by the
6 existing probabilistic risk assessment of the
7 Shearson Harris plant, so this information is
8 available for input into the overall process.
9 CP&L has already expended a substantial amount of
10 effort to identify what step 2 is, and that would
11 be part of Mr. Fleming's review to verify that
12 that information is usable for us in this process.

13 Q. If there is no uncertainty analysis
14 accompanying the results for step 1 and step 2,
15 how is Mr. Fleming going to deal with that?

16 A. I am not currently able to answer your
17 question because I am not sure that I know that
18 there's no uncertainty analysis.

19 Q. Assuming hypothetically that there were
20 none, how would you as a professional approach
21 that?

22 A. In step 1 and 2, Mr. Fleming, in

1 addition to being an expert in PWR risk
2 assessment, is also a recognized expert in the
3 area of uncertainty analysis and uncertainty
4 characterization, probably second only to Dr.
5 Parry who I think you talked to yesterday. I am
6 relying on Mr. Fleming to provide me with the
7 characterization of the uncertainty associated
8 with the degraded core accident container failure
9 bypass mechanisms.

10 Q. Is that not your area of expertise?

11 A. By comparison with the two gentlemen
12 that I said, no, I would certainly not be in the
13 same league with either of those two, but I think
14 that the main purpose of Mr. Fleming providing
15 that information is that he is an expert in PWR
16 parts of the analysis, and we are using the
17 extensive work that CP&L has already performed
18 trying to make sure that that is consistent with
19 the current state of the technology and then using
20 that as an input to this process.

21 Q. Okay, let's look at step number 3, loss
22 of all spent fuel cooling and makeup systems.

Date Taken: 10/20/00

Witness: Edward T. Burns

Case: In the Matter of Carolina Power & Light Co.

ERRATA

I, Edward T. Burns, the witness herein, have read my deposition and request that the following changes be made:

<u>PAGE</u>	<u>LINE</u>	<u>CHANGE</u>	<u>REASON FOR CHANGE</u>
1	9	Change "Shearson" to "Shearon"	Typographical
8	19	Change "BWR" to "BWRs"	Typographical
11	17	Change "enterprise" to "Enterprise"	Typographical
13	9	Change "generic letter" to "Generic Letter"	Typographical
13	18	Delete comma between "analysis" and "techniques"	Accuracy
15	16	Change "generic letter" to "Generic Letter"	Typographical
20	3	Delete "were, could and did - -"	Clarification
31	12	Change "was" to "were"	Typographical
31	13	Change "on" to "in"	Typographical
33	15	Change "generic letter" to "Generic Letter"	Typographical
37	22	Change "area were moved from those locations," to "area,"	Clarification
56	15	Change "area" to "error"	Typographical
58	11	Change "could take" to "could not take"	Accuracy

Date Taken: 10/20/00

Witness: Edward T. Burns

Case: In the Matter of Carolina Power & Light Co.

<u>PAGE</u>	<u>LINE</u>	<u>CHANGE</u>	<u>REASON FOR CHANGE</u>
69	11	Change "." to "?"	Typographical
73	1	Change "farther" to "further"	Typographical
77	6	Change "criteria, so" to "criteria. So"	Clarification
81	8	Change "Shearson" to "Shearson"	Typographical
88	22	Change "Shearson" to "Shearson"	Typographical
95	1	Change "Shearson" to "Shearon"	Typographical
102	7	Change "Shearson" to "Shearon"	Typographical
103	8	Change "container failure" to "containment failure and"	Clarification/ Typographical
114	9	Change "Shearson" to "Shearon"	Typographical
119	15	Change "Shearson" to "Shearon"	Typographical