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NUCLEAR REGULATORY COMMISSION

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ENCLOSURE 2

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 PUBLIC MEETING

5 + + + + +

6 REGARDING LICENSE RENEWAL

7 + + + + +

8 Tuesday, December 16, 2003

9 The Park of the Quad Cities

10 1201 River Drive

11 Moline, Illinois

12

13 The NRC Public Meeting met at The Mark of the

14 Quad Cities, 1201 River Drive, at 7:00 p.m., Chip

15 Cameron presiding.

16 PRESENT:

17 Chip Cameron

18 John Tappert

19 Duke Wheeler

20 Bruce McDowell

21 Robert Palla

22 ~~Kimberly~~ Kimberley Corp

23

24

25

1 I N D E X

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

2 (7:00 P.M.)

3 MR. CAMERON: Good evening, everyone. And
4 welcome to the NRC's public meeting tonight. My name
5 is Chip Cameron. I'm the Special Counsel for Public
6 Liaison at the Nuclear Regulatory Commission. And
7 it's my pleasure to serve as your facilitator for the
8 meeting tonight. And in that role I'll just try to
9 make sure that all of you have a productive meeting.
10 And the topic tonight is the Draft
11 Environmental Impact Statement that the NRC has
12 prepared to assist it in its evaluation of the license
13 application that we got for renewal of the Quad Cities
14 operating license from the Exelon Company. Our format
15 for the meeting is fairly simple. We're going to give
16 you some background information. We have a number of
17 presentations tonight on the NRC process and also on
18 what the conclusions and findings and analysis are
19 that are contained in the Draft Environmental Impact
20 Statement.
21 We also want to hear from any of you who
22 want to make a more formal comment on the record for
23 us tonight on any of the issues in the Draft
24 Environmental Impact Statement. And ground rules, if
25 you have any questions or whatever, just signal me.

1 I'll bring you this cordless microphone. Tell us who
2 you are and your affiliation if appropriate. And
3 we'll capture that on a transcript. Mr. Ron LeGrand
4 is our stenographer tonight. That transcript of this
5 meeting will be available, publicly available for
6 anybody who wants to see it.
7 And the agenda is going to start out with
8 Mr. John Tappert, who is the Chief of the
9 Environmental Section in the Office of Nuclear Reactor
10 Regulation back at NRC Headquarters in Rockville,
11 Maryland. John's going to give you a formal welcome.
12 And then we're going to move to ~~Kimberly~~ Kimberley
13 Corp, who's here, who is also with the NRC at NRC
14 Headquarters in our Office of Nuclear Reactor
15 Regulation. ~~Kimberly~~ Kimberley is the backup Project
16 Manager on the evaluation of the Quad Cities license
17 renewal application, on the safety evaluation. And
18 you'll be hearing there's an environmental evaluation.
19 There's a safety evaluation to aid us in making a
20 decision on whether to grant the renewal. And
21 ~~Kimberly~~ Kimberley will tell us about the overall
22 license renewal process.
23 We're then going to focus in on the
24 environmental review process. And we do have the
25 project manager for the environmental review for the

1 Quad Cities license renewal and that's Mr. Duke
2 Wheeler. He's right here. Also, Office of Nuclear
3 Reactor Regulation. Then we'll go on to you to see if
4 there are any questions about the license renewal
5 process.
6 And then we're going to get into some
7 substantive conclusions. We're going to have Mr.
8 Bruce McDowell, who's right over here. And Bruce is
9 the team leader for the group of experts that the NRC
10 has helping us to prepare the Draft Environmental
11 Impact Statement. Bruce is from Lawrence Livermore
12 National Lab in California. And he leads the team of
13 experts from labs around the country who have been
14 looking at the environmental impact. He's going to
15 tell you what's in the Draft Environmental Impact
16 Statement. He's going to do a summary of that for you.
17 We have a short subject, so to speak,
18 something called Severe Accident Mitigation
19 Alternatives. That's part of the Environmental Impact
20 Statement and Bob Palla from the NRC staff, again
21 Office of Nuclear Reactor Regulation, is going to lead
22 us through that. And then we'll go for questions.
23 And then we'll go to those who might want to make a
24 formal comment. And if you decide to make a formal
25 comment, just let me know. We've asked people to sign

1 up in advance but we don't have a big crowd, so if the
2 moment seizes you during the meeting, just let us
3 know.
4 And thank you for being here tonight and
5 we'll try to do our best to answer your questions.
6 And we definitely want to listen to your comments.
7 And I'm going to ask John to start us up.
8 MR. TAPPERT: Thank you, Chip. And good
9 evening and welcome. And for those of you back from
10 this afternoon, welcome back. My name is John Tappert
11 and on behalf of the Nuclear Regulatory Commission I'd
12 like to thank everyone for coming out tonight and
13 participating in this process. I hope that you'll
14 find the information we will share with you tonight to
15 be useful and we look forward to receiving your
16 comments tonight and in the future.
17 I'd like to start off by briefly going
18 over the agenda and the purposes of tonight's meeting.
19 First of all, we're going to provide a brief overview
20 of the entire license for renewal process. This
21 includes both a safety review as well as the
22 environmental review, which will be the principle
23 focus of tonight's meeting. Then we're going to
24 present the preliminary findings of our environmental
25 review, which assesses the impacts associated with

1 extending the operating licenses, the Quad Cities
2 Units 1 and 2, for an additional 20 years. Then we'll
3 give you some information about the schedule for the
4 balance of our review and how you can submit comments
5 in the future. And then finally, really the most
6 important part of tonight's meeting where we receive
7 any comments that you may have tonight.
8 But first let me provide some general
9 context for the license renewal process. The Atomic
10 Energy Act gives the NRC the authority to issue
11 operating licenses to commercial nuclear power plants
12 for a period of 40 years. For the Quad Cities units,
13 those licenses will expire in 2012. And our
14 regulations also make provisions for extending those
15 operating licenses for an additional 20 years. And
16 Exelon has requested license renewal for both units.
17 As part of the NRC's review of that
18 license renewal application, we do an environmental
19 review to look at the impacts on the environment for
20 20 years of extended operation. And we held a
21 meeting here last April to seek your input early in
22 our review and now we've returned, as we indicated at
23 that earlier scoping meeting, to present the
24 preliminary results in our Draft Environmental Impact
25 Statement. And again, the real reason we're here

1 tonight is to receive any comments that you may have
2 on that draft.
3 And with that brief introduction, I'd like
4 to ask ~~Kimberly~~ Kimberley to give us more information
5 on the safety review.
6 MS. CORP: Thank you, John. As Chip said,
7 my name is ~~Kimberly~~ Kimberley Corp and I'm the NRC's
8 Backup Project Manager supporting the safety review of
9 the Exelon's license renewal application for both Quad
10 Cities in ~~Justin~~ Dresden. Before I get into the
11 discussion of the license renewal process, I'd like to
12 take a minute to talk about the Nuclear Regulatory
13 Commission in terms of what we do and what our mission
14 is.
15 As John said earlier, the Atomic Energy
16 Act of 1954 is the legislation that authorizes the NRC
17 to regulate the civilian use of nuclear materials. In
18 ~~caring~~ carrying out that authority, the NRC's mission
19 is threefold. One is to insure adequate protection of
20 public health and safety, two is to protect the
21 environment, and three is to provide for common
22 defense and security.
23 The NRC accomplishes its mission through
24 a combination of regulatory programs and processes
25 such as inspections, enforcement actions, assessment

1 of licensee performance and evaluation of operating
2 experience of nuclear plants across the country. The
3 NRC's license renewal review is similar to the
4 original licensing process in that it involves two
5 parts.
6 The safety review, which includes a safety
7 evaluation, plant inspections and independent review
8 by the ACRS or Advisory Committee on Reactor
9 Safeguards, as well as an environmental review, which
10 Duke will discuss later. First you might ask what
11 does the safety review consider? There are two types
12 of safety issues, current operating issues which are
13 dealt with now and aging management issues that are
14 dealt with in license renewal.
15 Under the current operating license, the
16 NRC's regulatory oversight deals with current safety
17 issues. We do not wait for a plant to come in for
18 license renewal before requiring them to address any
19 issue. Because the NRC has or is dealing with those
20 issues such as security or emergency planning, we do
21 not re-evaluate them in license renewal.
22 The license renewal safety review focuses
23 on aging management issues and the programs that the
24 licensee has already implemented or will implement to
25 maintain the equipment safely. The safety evaluation

1 report is independently reviewed by the ACRS. The
2 ACRS is a group of nationally recognized technical
3 experts in the nuclear safety area that serve as a
4 consulting body to the Commission itself. They review
5 each license renewal application as well as the Stat
6 staff's Safety Evaluation Report and form their own
7 conclusions and recommendations and report them
8 directly to the Commission.
9 The environmental review evaluates the
10 impact of license renewal on a number of areas. These
11 areas include, among others, ecology, hydrology,
12 cultural resources and socioeconomic issues. As I
13 said earlier, Duke will discuss the environmental
14 review in greater detail next.
15 The next slide will discuss the license
16 renewal process. You might ask, how does all this
17 come together? This slide really gives a big picture
18 overview of the license renewal process. And as you
19 can see from this slide, the process involves two
20 parallel paths; the safety review and the
21 environmental review.
22 The safety review involves the NRC staff
23 review and assessment of the technical information
24 that's contained in the licensee's application.
25 There's a team of about 30 NRC technical reviewers and

1 contractors back at the NRC Headquarters in D.C. who
2 are conducting the safety review right now. And the
3 team is also supported by the technical experts at
4 three different national laboratories including
5 Argonne, outside of Chicago, Brookhaven in Long Island
6 New York and Pacific Northwest in Washington State.
7 So there's a lot of expertise in the team conducting
8 this review.
9 The staff safety review focuses on the
10 effectiveness of the proposed aging management
11 programs for these plants systems, structures and
12 components that are within the scope of license
13 renewal. The NRC staff reviews the effectiveness of
14 these programs to insure that the plant safety can be
15 maintained throughout the license renewal term.
16 The safety review also focuses on the
17 application's time limited aging analysis. Each
18 original design analysis that had assumed a 40 year
19 life must be reevaluated to extend the 40 year term to
20 a sixty year life term for license renewal. This
21 safety review process also involves audits and on site
22 inspections. These inspections have been conducted by
23 a team of inspectors pulled together from both
24 Headquarters as well as NRC's Regional Office in
25 Chicago.

1 The results of their inspections were
2 documented in separate inspection reports. And the
3 results ~~have~~ of the staff's safety review as well as
4 the results of inspections will be documented in the
5 Safety Evaluation Report. And a copy of that will be
6 provided to the ACRS for independent evaluation. Both
7 the regional scoping and aging management review
8 inspections have been completed. And we are in the
9 process of writing the Safety Evaluation Report right
10 now.
11 The second part of the review process
12 involves an environmental review with scoping
13 activities and developing a draft supplement to the
14 GEIS, or Generic Environmental Impact Statement, for
15 license renewal of nuclear plants. And this has been
16 published for comment. And eventually we'll be
17 issuing a final supplement~~al~~ to the GEIS for license
18 renewal of nuclear plants which will address the
19 comments that we receive here today at this meeting or
20 in the future from any written comments.
21 So, as you can see from the slide, the
22 final agency decision on whether to approve or deny
23 the application will require a number of things. A
24 Safety Evaluation Report, which documents the results
25 of the safety review; the final supplement of the

1 Generic Environmental Impact Statement, which
2 documents the results of the environmental review as
3 well as inspection reports that documents the results
4 from the Regional inspections. All three of these
5 reports will be factored in as well as the independent
6 review of the ACRS into the final agency decision.
7 And that concludes the license renewal
8 process.
9 MR. WHEELER: Good evening. I'm Duke
10 Wheeler and I'm the Environmental Project Manager
11 responsible for the environmental review that's being
12 performed to support the license renewal application
13 ~~for Exelon~~ for Exelon for license renewal of Quad
14 Cities Units 1 and 2.
15 The National Environmental Policy Act of
16 1969 requires a systematic approach in evaluating the
17 impacts of proposed major Federal actions.
18 Consideration is to be given to environmental impacts
19 of the proposed action and mitigation for any impacts
20 believed to be significant. Alternatives to the
21 proposed action including taking no action on the
22 applicant's request are also to be considered. Our
23 environmental impact statement is a disclosure tool
24 and it does involve public participation. The NRC

1 regulations require that an environmental impact
2 statement be prepared for license renewals.
3 Our decision standard, stated perhaps a
4 bit more simply than what you read on ~~a~~ this slide, is
5 basically, ~~our~~ are environmental impacts of the
6 proposed action great enough that maintaining the
7 license renewal option for Quad Cities Units 1 and 2
8 is unreasonable. And I'd like to point out at this
9 time that we, the NRC, do not decide whether or not
10 Quad Cities will operate for an additional 20 years.
11 Other regulatory agencies and the licensee will
12 actually make that decision.
13 Now, this slide is just an expansion of
14 that bottom that you saw on ~~Kimberly's~~ Kimberley's, I
15 think it's Slide 5 that you have, the bottom line was
16 the path for the environmental review. This is an
17 expansion of that. And basically where we stand in
18 the process, the applicant did submit their
19 application back in January the 3rd of this year
20 through the *Federal Register* and other avenues. We
21 publicized our intent to prepare an environmental
22 impact statement.
23 One of the early phases of our process
24 that's laid out by the National Environmental Policy
25 Act was referred to as the scoping process. And there

1 is an opportunity there for public participation. And
2 basically the scoping process is, it's an activity
3 whereby we receive comments from interested members of
4 the public that help us to scope out the bonds of the
5 environmental review for the various disciplines that
6 we're going to be performing.
7 We also had a site audit. A team of
8 environmental experts came out and visited the site in
9 March. And also we had a public meeting in April, as
10 John mentioned a bit earlier, another opportunity for
11 public participation. And that was just a part of the
12 scoping process.
13 After the site audit, if it's determined
14 that we still don't have enough information for us to
15 prepare our environmental impact statement, then we
16 will send a formal request for additional information
17 out to the licensee. We did that. They responded.
18 We now have all the information we need. And we then
19 published a draft of our environmental impact
20 statement. And some of the alphabet soup here is
21 GEIS. This is a Generic Environmental Impact
22 Statement that we published several years ago. And it
23 addressed, it gave common conclusions related to a lot
24 of different environmental issues for license renewal
25 of power plants across the country.

1 As each plant comes in for license
2 renewal, we will publish a plant specific supplement
3 to that Generic Environmental Impact Statement. And
4 what I have published here in November is the
5 supplement for Quad Cities Units 1 and 2. That's
6 Supplement 16. And this meeting here is an
7 opportunity for the public to provide us their
8 comments on that Draft Environmental Impact Statement.
9 Once we get comments in from the public,
10 and we'll go back, and because it's a draft, we'll
11 take a look at it ourselves to see if there's any
12 parts of it that need to be tweaked to be put into
13 final form. And then July of 2004 we're going to be
14 on schedule to publish our final environmental impact
15 statement.
16 And I'd like to conclude my comments at
17 the moment at this portion of it, turn the meeting
18 back over to Chip. And then I'll be followed by our
19 team leader, Bruce McDowell, who will get right into
20 the real substance of what our environmental findings
21 are. Chip?
22 MR. CAMERON: Okay, thanks, Duke. And
23 before we get into the substance, let's see if there's
24 any questions about the NRC process or about the NRC
25 itself. ~~Kimberly~~ Kimberley gave us a little bit of

1 information on what our responsibilities are. And if
2 you can just give us your name and affiliation, if
3 appropriate.
4 MS. REGAN: Hi, my name is Molly Regan,
5 and I'm with ICAN. And you made a comment, Duke, that
6 other agencies and Exelon would be the ones that would
7 determine whether this license is renewed or not.
8 MR. WHEELER: Right.
9 MS. REGAN: So does that mean that the NRC
10 does not determine --
11 MR. WHEELER: Right, we do not.
12 MS. REGAN: What agencies then --
13 MR. WHEELER: State regulators have a ~~give~~
14 say in whether or not the plant will operate and under
15 what conditions.
16 MS. REGAN: But what other Federal
17 agencies are involved in the final determination of
18 issuing a license?
19 MR. CAMERON: I think that one thing we
20 need to make clear here is that Duke didn't say that
21 other agencies were involved in the decision to renew
22 the license but whether to continue operating. In
23 other words, the company needs an approval from the
24 NRC in order to operate. But it's the company's
25 business decision about whether they actually will

1 operate and the State agencies who have an influence
2 on whether the company will operate and at what rates.
3 What agency is that, Duke?
4 MR. WHEELER: I would have to defer to the
5 licensee, excuse me. If you're asking which State
6 agency is the one that determines whether or not they
7 can or cannot operate?
8 MR. CAMERON: Well, when you were
9 referring to the statement that Molly was asking about
10 and you said that other agencies and the licensee
11 would be involved in whether the plant actually would
12 operate.
13 MR. WHEELER: My real message was although
14 we issue the license to operate we are not the ones
15 who make the actual decision as to whether or not they
16 really do operate. It's our license that they must
17 have in order to operate. But it's not our decision
18 as to whether or not they actually will operate. That
19 decision is a very large part up to, among others, the
20 licensee.
21 MR. CAMERON: Is that clear, Molly? It's
22 a distinction perhaps between the safety aspects of
23 operation and the business economic aspects of
24 operation. Do you want us to go further?

1 MS. REGAN: So is it the State where it's
2 located? So it's just Illinois that has a
3 determination in this? It's not any of -- it wouldn't
4 be like Iowa agencies would have anything to do with
5 that?
6 MR. WHEELER: I would ask if there is a
7 representative from Exelon here that can shed some
8 light on who you have to deal with in order to get all
9 the permissions you need to operate the plant. Can
10 anybody --
11 MR. CAMERON: Fred, do you want to take a
12 shot at this or?
13 MR. STORMER: Molly, to answer your
14 question, I think the question that you're asking --
15 I'm Bill Stormer, Site Communicator from Exelon
16 Nuclear. I want to clarify your question. I think
17 the question that you're asking, Molly, is who makes
18 the decision whether to renew the license or not, who
19 gives us the final permission as Exelon to operate the
20 plant. Is that the question you're asking?
21 MR. CAMERON: You're going back to the NRC
22 statement again.
23 MS. REGAN: Maybe I should read what I
24 wrote down when Duke was speaking. Other agencies and
25 Exelon will determine whether or not Quad Cities 1 and

1 2 will have their license renewed. And my question
2 was what other agencies?
3 MR. CAMERON: Duke, and just to make sure
4 that we know what you were saying, did you say that
5 other agencies would make the decision about whether
6 the license was renewed or --
7 MR. WHEELER: No.
8 MR. CAMERON: -- they would operate.
9 Okay. First of all, --
10 MR. WHEELER: Right. The decision on
11 whether or not to renew the license is an NRC
12 decision. Does that clarify anything?
13 MR. CAMERON: That's one thing.
14 MR. WHEELER: Once the renewed license
15 then is issued, it's up to the utility and other
16 regulators to decide what they want to do with what
17 that renewed license will allow.
18 MR. CAMERON: John, do you want to try to
19 shed some light on this for us?
20 MR. TAPPERT: Yeah, I don't know if I can
21 or not but the point we're trying to make with that,
22 the NRC is a the sole regulatory authority for issuing
23 the license, okay? So we're going to make the
24 determination some time late next year whether to
25 extend their license for another 20 years or not. The

1 distinction that we're trying to make in the
2 presentation is just because we extend that license to
3 2032, they may or may not operate during that period
4 of time. They have a license to operate. You may
5 have a license to drive. You may chose not to drive
6 for any number of reasons. You don't have a car. You
7 don't have, you know. They may decide for economic
8 reasons it's not appropriate to continue to operate
9 the facility but they have a license.
10 That's not to say that the NRC just issues
11 a license and then walks away. There's a continuing
12 and ongoing oversight process to make sure that if
13 they do operate they will operate safely. I'm not
14 sure if that helps at all but that was the point we
15 were trying to make there.
16 MR. CAMERON: Okay. Thanks, Molly, for at
17 least allowing us to try to clarify what we were
18 talking about there.
19 How about other questions? Anything on
20 process or the NRC before we go on to the findings?
21 And if something comes up during the meeting, a
22 question, we'll deal with it then.
23 Duke, thank you and ~~Kimberly~~ Kimberley and
24 John.

1 And now we're going to go to Bruce
2 McDowell who's going to talk about the findings in the
3 Draft Environmental Impact Statement.
4 MR. MCDOWELL: Good evening, I'm Bruce
5 McDowell from the Lawrence Livermore Laboratory and I
6 ~~was~~ am the team leader for the team of experts that
7 prepared the Supplemental Environmental Impact
8 Statement for Quad Cities license renewal.
9 In the Generic Environmental Impact
10 Statement for license renewal, the NRC identifies 92
11 environmental issues that are evaluated for license
12 renewal. 69 of these issues are considered generic or
13 Category 1, which means that the impacts are the same
14 for all reactors or the same for all reactors with
15 certain features such as plants that use water from
16 large rivers.
17 For the other 23 issues, referred to as
18 Category 2, the NRC found that the impacts were not
19 the same at all sites and therefore a site specific
20 analysis was needed. Only certain issues addressed in
21 the Generic Environmental Impact Statement are
22 applicable to the Quad Cities plant. For those
23 generic issues that are applicable to Quad Cities, we
24 accessed if there was any new information related to
25 the issue that might change the conclusion in the

1 Generic Environmental Impact Statement. If there is
2 no new information then the conclusions of the Generic
3 Environmental Impact Statement are adopted.
4 If new information is identified and
5 determined to be significant, then a site specific
6 analysis would be performed. For site specific issues
7 related to Quad Cities, site specific analyses were
8 performed. Finally, during the scoping period, the
9 public was invited to provide information on potential
10 new issues. And the team, during their review, looked
11 to see if there were any new issues that needed
12 evaluation.
13 For each issue identified in the Generic
14 Environmental Impact Statement, which I'm going to
15 call the GEIS, an impact level is assigned. These
16 impact levels are consistent with the Counsel on
17 Environmental Quality. For a small impact the effect
18 is not detectable or too small to de-stabilize or
19 noticeably alter any important attribute of the
20 resource. For example, the plant may cause loss of
21 adult and juvenile fish at the intake structure. If
22 the loss of fish is so small that it cannot be
23 detected in relation to the total population in the
24 river, the impact would be small.

1 For a moderate impact the effect is
2 sufficient to alter noticeably but not de-stabilize
3 the important attributes of the resource. Using the
4 fish example again, if losses of intake cause the
5 population to decline and then stabilize at a lower
6 level, the impact would be moderate. And finally for
7 an impact to be considered large, the effect must be
8 clearly noticeable and sufficient to de-stabilize
9 important attributes of the resource. So if losses at
10 the intake cause fish population to decline to the
11 point where it cannot be stabilized and continually
12 declines, then the impact would be large.
13 As Kim said earlier, there's a team with
14 a broad expertise that wrote this supplemental
15 environmental impact statement. And these are some of
16 the areas, these are the areas that we addressed in
17 our analysis. The staff has considered information
18 from a broad range of sources during the development
19 of this supplemental EIS. We have considered the
20 licensee's evaluation of environmental impacts that
21 was submitted with the license application.
22 We have conducted a site audit during
23 which the staff visited the plant and interviewed
24 staff personnel. We talked to Federal, State and
25 local officials as well as local service agencies. In

1 addition, we have also considered all the comments
2 received from the public during the scoping period.
3 These comments are listed in Appendix A along with the
4 NRC responses. The information received from all
5 these sources is the basis for the analysis and a
6 preliminary conclusions in the draft EIS that you have
7 in front of you.
8 In Chapter 2 of the draft supplemental
9 EIS, we discuss the plant and the environment around
10 the plant. In Chapter 4 we looked at the potential
11 environmental impacts for an additional 20 years of
12 operation for the Quad Cities nuclear station. The
13 team looked at issues related to the cooling system,
14 transmission lines, radiological impacts,
15 socioeconomic impacts, ground water use and quality
16 and threatened and endangered species. Each of these
17 issues are discussed in detail in the draft
18 supplemental EIS. I'll take just a few minutes to
19 identify the highlights of our review.
20 One of the issues we looked closely at is
21 the cooling system for the Quad Cities plant. This is
22 the layout of the cooling intake and discharge canals.
23 Although there are a number of Category 1 issues
24 related to the cooling system, and remember that we
25 said the Category 1 issues are those that have been

1 determined to have the same significance for all
2 plants. No new and significant information was
3 identified during scoping by the applicant or the
4 staff during the review of the issues.
5 The issues that the team looked at on a
6 site specific basis include intrainment and
7 impingement of fish and shellfish, heat shock and
8 enhancement of microbiological organisms. Potential
9 impacts in these areas were determined to be small and
10 additional mitigation is not warranted.
11 Radiological impacts are a Category 1
12 issue. As you recall, this means that NRC has made a
13 generic determination that the impacts resulting from
14 radiological releases during nuclear plant operations
15 are small. But because it is often a concern of the
16 public I wanted to take a minute to briefly discuss
17 it. During the site visit we looked at the effluent
18 release and monitoring program documentation. We
19 looked at how the gases and liquid ~~effluence~~ effluents
20 were treated and released as well as how the solid
21 waste were treated, packaged and shipped. This
22 information is found in Chapter 2 of the Draft
23 Supplemental EIS.
24 We also looked at how the applicant
25 determines and demonstrates that they are in

1 compliance with regulations for a release of
2 radiological effluence. The licensee monitors the
3 near site and on site locations for airborne releases
4 and direct radiation. There are other monitoring
5 stations beyond the site boundary including locations
6 where water, milk, fish and food products are sampled.
7 Releases from the plant and the resulting off site
8 potential doses are not expected to increase on a year
9 to year basis during the 20 year license renewal
10 period.
11 No new and significant information was
12 identified during the staff's review. The public's
13 input during the scoping process or other evaluation
14 or the evaluation of other available information.
15 The generic EIS determines that the
16 impacts of the 69 Category 1 issues were small based
17 upon the information known at that time. As part of
18 my team's review we looked at all information
19 collected during the scoping process to identify any
20 information that was both new and significant with
21 regard to any one of these 69 issues.
22 We looked at the information developed by
23 the licensee, information developed independently by
24 my team and information received during the public
25 comment process. We determined that none of the

1 information was both new and significant. Therefore,
2 the conclusions of the generic EIS are adopted in this
3 draft supplemental EIS.
4 The last issue from Chapter 4 I'd like to
5 discuss is that of threatened and endangered species.
6 The only Federally listed aquatic species that
7 currently occurs in the vicinity of the Quad Cities
8 plant is the Higgins eye pearly ~~Muscle~~ mussel. The
9 essential habitat for this species is located about
10 one mile downstream from the site.
11 There are a number of terrestrial species
12 listed as threatened or endangered that could occur in
13 the range of the Quad Cities site and transmission
14 lines. These include the bald eagle, Indiana bat, the
15 river otter, the Iowa ~~Plastering~~ pleistocene snail and
16 the western hognose snake. During winter migration,
17 bald eagles visit open water in the Mississippi River
18 caused by the plant's ~~thermo~~ thermal discharges. They
19 also use the area for summer nesting and there is a
20 known nest about eight miles north of the site.
21 The Indiana bat, river otter, Iowa
22 ~~Plastering~~ pleistocene snail and western hognose snake
23 could occur in the counties where the plant and the
24 transmission line are located. Since the licensee
25 does not plan any refurbishment or construction

activities as part of relicensing, the natural area where these species would be found would not be disturbed. This would also be true for the three threatened plant species; the eastern and western prairie fringe ~~Clover~~ orchid and the prairie bush clover.

Therefore, the staff's preliminary determination is that the impact of the operation on the Quad Cities plant during the license renewal period on threatened and endangered species would be small.

The staff also considered cumulative impacts. These are impacts that are minor when considered individually but significant when considered with other past, present or reasonably foreseeable future actions regardless of what agency or person undertakes the other actions. The staff considered cumulative impacts resulting from operation of the cooling system, operation of transmission lines, releases of radiation and radiological materials, sociological impacts, ground water use and quality impacts and threatened and endangered species impacts.

These impacts were evaluated to the end of the 20 year license term, license renewal term. The

1 geographical boundary of the analysis was dependent
2 upon the resource. For instance, the area analyzed
3 for transmission lines was of course different than
4 the area analyzed with the cooling water system. The
5 staff's preliminary conclusion is that any cumulative
6 impacts resulting from the operation of the Quad
7 Cities plant during the license renewal period would
8 be small.
9 The team also looked at the uranium fuel
10 cycle and solid waste management and decommissioning.
11 All issues for uranium fuel cycle and solid waste
12 management as well as decommissioning are considered
13 Category 1. And for these issues, no new and
14 significant information was identified and we
15 therefore adopted the conclusions of the Generic
16 Environmental Impact Statement.
17 Our team evaluated the potential
18 environmental impact associated with the Quad Cities
19 plant not continuing operation and replacing this
20 generation with alternative power sources. In 2001,
21 Quad Cities Units 1 and 2 generated 13 billion
22 kilowatt hours of electricity. The team looked at no
23 action alternatives, -- action alternative, new
24 generation from coal-fired, gas-fired and new nuclear,
25 purchased power, alternative technologies such as

1 wind, solar and hydro power and then a combination of
2 alternatives.
3 For each alternative we looked at the same
4 types of issues. For example, water use, land use,
5 ecology and socioeconomics that we looked at for the
6 operation of Quad Cities during the license renewal
7 term. For two alternatives, solar and wind, I'd like
8 to describe the scale of the alternatives that we
9 considered because scale is important in understanding
10 our conclusions.
11 First solar. Based on the average solar
12 energy available in Illinois and the current
13 conversion efficiencies of photopotanicks [?] panels,
14 these cells would produce about 100 kilowatt hours per
15 square meter per year. As such, about 120 million
16 square meters or about 46 square miles of cells would
17 be required to replace the generation from the Quad
18 Cities plant.
19 Regarding wind power, wind ~~turbans~~
20 turbines have capacity factors of between 30 and 35
21 percent. As such, at least 4,200 megawatts of wind
22 power would have to be developed to replace Quad
23 Cities 1800 megawatts. To put this in context, in
24 2002, total wind power capacity in the United States
25 was 4,500 megawatts. In other words, the total wind

1 power in the United States would have to double to
2 replace the generation of the Quad Cities.
3 Due to these scale issues and other siting
4 requirements of reasonable alternatives, the team's
5 preliminary conclusion is that the environmental
6 impacts of alternatives, at least in some impact
7 categories, reach moderate or large significance.
8 So to review; in their Generic
9 Environmental Impact Statement, NRC examined
10 environmental issues at all sites and found that the
11 same conclusion could be made for 69 Category 1
12 issues. In our analysis we found no information that
13 was new and significant and we adopted the GEIS
14 conclusions. We also performed site specific analysis
15 for Category 2 issues applicable to Quad Cities. And
16 lastly, we found no new impacts that were not
17 discussed in the GEIS.
18 To summarize our findings; for the 69
19 Category 1 issues presented in the GEIS, again we
20 found no information that was new and significant.
21 Our team analyzed the remaining issues in the
22 supplemental EIS and we found the environmental
23 effects resulting from these issues were also a small
24 significance with one exception. On one segment of
25 the transmission line the induced currents were

1 calculated to be six miliamps. Since this slightly
2 exceeds the national, the NESC standard of 5 miliamps,
3 we judge the impact to be a moderate significance.
4 Since this line is not owned by the licensee, NRC has
5 notified the owner of its findings.
6 Lastly, we found that the environmental
7 impacts of alternatives, at least in some impact
8 categories, reached moderate or low significance.
9 Now, I turn it back to Chip, see if
10 there's any questions.
11 MR. CAMERON: Okay, thanks, Bruce. Bruce
12 talked about the number of different categories of
13 environmental impacts that the NRC looked at,
14 including alternatives. Are there any questions about
15 some of the potential impacts, findings of the Draft
16 Environmental Impact Statement?
17 Yes, sir. And if you can just give us
18 your name, please.
19 MR. BROWN: My name is Bennett Brown. I'd
20 like to know more about how the directory expense
21 system of this plant in particular was considered in
22 the plant's specific environmental impact statement.
23 MR. MCDOWELL: The which?
24 MR. CAMERON: Can you just state that
25 again for us?

1 MR. BROWN: The Quad Cities plants both
2 are Mark 1 Reactors from General Electric. And ~~they~~
3 their ~~are~~ containment system, that the primary
4 containment, is a concrete shell designed to contain
5 the reactor under high pressure. The secondary
6 containment is a one million gallon donut shaped tank
7 of water under ground. And in the '70's, after five
8 years of operation, these reactors were identified as
9 having been designed incorrectly. The tank was
10 recognized as being under sized and a recommendation
11 was made by the NRC that modifications needed to be
12 made to all of those 18 plants because there was a 90
13 percent likelihood that if called upon in the event of
14 an accident that that secondary containment system
15 would fail, the 90 percent likelihood that it would
16 fail.
17 To address that problem the Mark 1 owners,
18 the collaboration of companies that own Mark 1
19 reactors from General Electric, came up with a
20 solution which was approved by the NRC as a patch work
21 fix to the design of these plants to bypass
22 containment in the event of an accident by connecting
23 the torus, the donut shape tank of water, to the stack
24 so that if the pressure in the cooling, the secondary
25 cooling tank in the torus builds up above 30 PSI, the

1 reactor ~~operators~~ operates under several hundreds of
2 PSI, I believe. If the pressure in that donut shaped
3 tank rises above 30 PSI, then a plug is blown and
4 butterfly valve at the option of plant control
5 operators can be opened to the stack. And then the
6 emissions are released to the atmosphere directly
7 bypassing the containment.
8 I'm wondering how that modification, my
9 question then is how is that modification to the
10 original plant taken into consideration in your
11 analysis of the risk of radioactive release to the
12 public?
13 MR. CAMERON: Okay, and thank you,
14 Bennett. And I think there's at least two parts to
15 this and we're going to go to Bob Palla. But the
16 first part, Bob, is to comment on Bennett's
17 characterization of the issue. And I think the second
18 part is is that an issue that the NRC deals with under
19 the normal operating regulation framework or is it
20 something that would be looked at in terms of license
21 renewal either in the safety evaluation or the
22 environmental impact statement.
23 MR. PALLA: Yes, let me explain. And it's
24 a fairly accurate characterization of what this system
25 is. It may be called a Torus Vent system. And it's

1 true that the owners group at NRC's urging, all of the
2 Mark 1 plants with maybe some exceptions on -- there
3 may be an exception with an isolation condenser Mark
4 1 plants. But they implemented a venting system that
5 would allow the Torus pressure to be relieved in
6 certain events. And by relieving the pressure, in
7 essence you have a controlled release and you avoid a
8 catastrophic rupture of the containment, the primary
9 containment or the torus itself.
10 The types of sequences that this vent was
11 intended to address are beyond design basis. These
12 involve multiple failures of the containment heat
13 removal system. And the scenario that typically forms
14 a basis for this plant improvement is a scenario in
15 which the containment heat removal is completely lost
16 and for an extended period of time. And I'm talking
17 on the order of a day. It could be 24, 36 hours.
18 The reactor scrams. There's no heat
19 removal from the torus where the heat would normally
20 be drawn from and ~~put~~ removed through the heat
21 exchangers ~~in release~~. So over time the water in the
22 torus would heat up, boil, create a bunch of steam and
23 then gradually over pressurize the containment unless
24 it was vented. And all this time the core is still
25 being kept cool. Water's being injected to the core.

1 But it's being steamed into the containment and the
2 pressure's increasing. So this vent system was
3 installed to allow the containment to be vented
4 without a loss of the containment function.
5 And if you lost the containment and if you
6 lost the torus, you could drain the water out of the
7 torus ~~and lose,~~. Tthis is the water you want to have
8 so you can inject it to the core. So, this is, again,
9 it's beyond design basis accident. It's picked up
10 typically in a probablistic risk assessment study, you
11 would look at that class of accidents.
12 Before the vent was installed, these
13 accidents would go out to about 24 hours or so, ~~leave~~
14 ~~the~~ and lead to containment failure. The core is
15 cooled at that time but then, as a result of the
16 containment failure, you'd lose injection to the core
17 and then you'd have a core melt. So, you know, at
18 about a day, you know, a little after a day.
19 With this vent system installed, again,
20 you're going to have to lose containment heat removal
21 for over a day before you get into the situation. But
22 with the vent, you'd vent the containment and
23 conceivably would just keep injecting until eventually
24 you would recover containment ~~to your~~ heat removal and
25 you would not melt the core. You would just vent the

1 containment. It's a clean release, so to speak. Core
2 melt hasn't occurred yet.
3 MR. CAMERON: And this venting system, is
4 this something that's dealt within the license renewal
5 aging analysis, I guess is the next question or the
6 environment impact statement.
7 MR. PALLA: It's not really an issue for,
8 it's not an aging related issue. It's a facet of the
9 design now that has been implemented, taking into
10 account risk considerations and severe accident
11 analysis. So, it's in essence a system that would
12 prevent an accident from going ~~the~~ to core damage as
13 a result of containment failure. That's why that
14 system was put in place.
15 MR. CAMERON: Okay, so, Bennett, I think
16 that the answer to the question is, from what I
17 understand --
18 MR. PALLA: That was a short answer.
19 MR. CAMERON: -- it won't be dealt with in
20 the License Renewal Aging Program or the Environmental
21 Impact Statement. And perhaps, Bob, --
22 MR. PALLA: Let me just suggest how is it
23 -- it's not part of anything done in any of the
24 environmental review other than if you've looked at
25 just the severe accident mitigation alternative ~~right~~

1 write up in Chapter 5, or back in the Appendix G, we
2 look at the risk profile for the plan. And the risk
3 profile would include -- it has a, every plant has a
4 risk profile, which is in essence a number of unique
5 ways that you can end up with core damage and releases
6 to the environment. And each one of those is assigned
7 a frequency of occurrence and a source term, the
8 quantities of fission products that would be released.
9 And there is a class of accidents that
10 involve this loss of containment heat removal that
11 would be identified. There would be a certain
12 frequency assigned and a source term would be assigned
13 to that that would correspond to the release as it
14 would occur. So there is a source term and a
15 frequency assigned. And this is one of the components
16 of the risk profile.
17 That's the starting point for the SAMA
18 analysis. We look at that risk profile and then say,
19 is there some way we can identify a further way to
20 reduce the risk?
21 MR. CAMERON: You're going to talk about
22 not this particular problem, necessarily, or issue but
23 you're going to talk about the SAMA program in the
24 next presentation. And Bennett, let me ask you if you
25 have a follow up.

1 MR. BROWN: I had several questions, I
2 guess, that arises as a result of this. But before
3 proceeding I'd like to ask a procedural question. Are
4 my questions in this section recorded in the comment
5 section that will be appended to the SEIS?
6 MR. CAMERON: This is, this is on the
7 record. And the transcript will show this. Often
8 during the question and answer period someone will ask
9 a question that implies a comment about something that
10 we should look at. When that does happen, we treat
11 that as a comment. We look at that issue. So, in
12 other words, it doesn't have to be made formally
13 characterized as a comment.
14 Is that the question you're asking?
15 MR. WHEELER: I think, Bennett, possibly
16 before you came in, it was pointed out this meeting is
17 being transcribed. We have a transcriber that's
18 getting all this down. And I'll get a copy of the
19 transcripts. And first of all, I'll put those
20 transcripts in the public record. But then in
21 preparing the final Environmental Impact Statement
22 that will be issued in July, all of these comments
23 will appear in Appendix A of that final.
24 To the extent that it is practical, I will
25 just block feed right out of the transcript into the

1 Environmental Impact Statement. If it gets so long of
2 a project that the document becomes ~~unwheely~~ unwieldy,
3 then I reserve the right to summarize at least
4 somewhat. But the substantial substance of what is
5 being said here will go into the final Environmental
6 Impact Statement at Appendix A.
7 MR. CAMERON: Whether it's offered during
8 the formal comment part of the meeting or was offered
9 during the question and answer, right?
10 MR. WHEELER: Oh, absolutely, yes. Or any
11 one of other ways that I'll get into a little later.
12 MR. CAMERON: I think that's what the
13 concern is.
14 Do you want to ask -- okay, go ahead,
15 Bennett.
16 MR. BROWN: I'm grateful for your time
17 here and I don't want to take too much of it but it's
18 an issue that's important to me and I think it's a
19 critical question concerning this particular reactor.
20 So if you'll bear with me and dwell on the question
21 for a moment. I'm grateful for your help over the
22 last several months in understanding the process
23 related to this particular plant.
24 I have several questions that were raised
25 by your explanation. One is that, you mentioned that

1 it's a gradual build up of heat. And as I understand
2 the calculations, an 800 megawatt plant, if it fails
3 to scram for any reason, if there were any failure to
4 stop the reaction, and I'm not talking about a super
5 critical event. I'm simply talking about for one
6 reason or another the plant needs to scram, for
7 instance, the grid were to fail and the plant has
8 nowhere to deliver that power and therefore needs to
9 shut down the power so that the heat that is being
10 generated will not boil the cooling water. So the
11 plant needs to scram.
12 If that scram were to fail, how many
13 seconds will it take before the heat storage available
14 in the torus, in this million gallon tank, is
15 exhausted before the million gallons of water boils?
16 And as a physicist it's a back of the envelope
17 calculation. A million gallons of water is, you know,
18 four times that gets you liters, which is kilograms.
19 You multiply it by a thousand to get grams and you
20 multiply it by four to get ~~jewels~~ joules. And I think
21 it's five minutes.
22 So I think in the event of a failure to
23 scram, five minutes from that point, once blow down
24 begins, once the process of blowing pressurized
25 reactor steam into the torus begins, it would be five

1 minutes before that torus boils. At that point
2 pressures would rise very rapidly. I'm sure you'd
3 agree and it would be a matter of seconds before the
4 direct torus vent system, the system that directly
5 vents the torus to the atmosphere would need to be
6 deployed. So I wanted to clarify your
7 characterization of gradual.
8 MR. CAMERON: Okay, let me, before you do
9 that, Bob, I know that for at least some of us in the
10 room that we are using technical terms like scram and
11 things like that that people probably, some people,
12 some of us don't understand exactly what that means.
13 And, Bob, this is an important issue and to answer the
14 question. And maybe if we do have one more follow up
15 from you, Bennett, you can, you know, bring us back up
16 to, you know, 50,000 feet sort of and tell us what the
17 implications are of what you're saying so that
18 everybody understands that.
19 Bob?
20 MR. PALLA: Now, the type of accident that
21 you're referring to, we call it an anticipated
22 transient without scram. And that could occur to
23 varying degrees. It could be a complete loss or it
24 could be a partial loss of shut down. So if you
25 completely lost the shut down function, you would be

1 dumping a large quantity of heat into a pool that can
2 only take so much. So it would be a matter of -- I'm
3 not sure that it would be five minutes or whether it
4 would be, you know, an hour. But it would be a
5 relatively short term event.
6 Now, let me go back to, I guess, just to
7 put this kind of an accident in the right kind of box,
8 this is, again, an accident that involves the failure
9 of multiple safety systems, systems that were put
10 there deliberately to prevent that kind of an
11 accident. And ~~that was~~ the ATWS rule that mandated
12 certain things be done to address that kind of event
13 because it would be a challenge to the containment
14 integrity. And it would be a challenge to the
15 integrity with or without this torus vent.
16 The torus vent is not large enough to, in
17 and of itself, relieve the pressure and have
18 everything just maintained at an adequately low
19 pressure. Even if the torus vent actuates, you're
20 still going to over-pressurize the containment in this
21 scenario. And so I don't think it really affects the,
22 ~~ultimately~~ time of release. It'll have some influence
23 but it won't have a radical impact on what happens in
24 that event. If it's a complete loss of shut down,
25 you're going to basically pump the containment up with

1 steam and not be able to control the pressure in the
2 containment with or without that vent. You'd have to
3 have a vent that it would probably be about three foot
4 in diameter to deal with the K decay heat levels that
5 I think you'd have in that accident.
6 MR. CAMERON: Thanks, Bob. And let me ask
7 John to try to put all of this and Bennett's questions
8 and concerns in a context.
9 MR. TAPPERT: Yes, I just want to bring it
10 back to what your original question was, was the vent
11 considered in the environmental review and things of
12 that nature. And the answer is, yes. I mean, Bob's
13 next presentation up here is going to be about severe
14 accident mitigation charges. And he looks at these
15 beyond design basis. These very rare but potentially
16 high consequence events. So that as in the Chapter 5
17 analysis, in the review. And in the Generic
18 Environmental Impact Statement, we also looked at
19 severe accidents.
20 So, obviously Bob can go into bone
21 crushing detail in all these scenarios. He'd be happy
22 to do that with you after the meeting, if you'd like.
23 But the short answer is these scenarios were, in fact,
24 considered and Bob's next presentation's going to
25 cover some of that.

1 MR. CAMERON: Okay. So, after Bob's
2 presentation, if you have more questions on this,
3 let's go to those at that point, okay?
4 MR. BROWN: Thank you.
5 MR. CAMERON: All right. Yes, madam, and
6 could you just tell us your name, please?
7 MS. MONAHAND: Dorothy Monahand. I just
8 had a question about how you determine fatigue value
9 of the properties over the 20 year period. I know
10 personally that 20 years can be very debilitating.
11 MR. CAMERON: Okay. I think that's an
12 aging issue for perhaps ~~Kimberly~~ Kimberley. And
13 ~~Kimberly~~ Kimberley, is the question clear to you?
14 MS. CORP: Right, she's asking about the
15 fatigue analysis. And they reevaluate all of those
16 figures and the staff does an independent calculations
17 of their own from the data that is from the plant.
18 They use actual plant data to -- they use ~~a~~ Reg Guide
19 ~~of~~ 1.99 sets out the guidelines for their fatigue
20 analysis. And the results of that will be in the
21 Safety Evaluation Report, which will be, the draft
22 will be published in March of next year. So,
23 currently that's under review right now.
24 MR. CAMERON: So, if someone wanted to see
25 more details on how we do the fatigue analysis, they

1 could look, first of all, at this regulatory guide
2 that we have --
3 MS. CORP: Right.
4 MR. CAMERON: -- 1.99.
5 MS. CORP: Yes, that is correct. But
6 it'll be specifically in Chapter 4 of the SER when
7 it's published, the Time and Aging Analysis.
8 MR. CAMERON: Does that give you somewhat
9 of an answer? I mean, we have documents and analysis
10 that deal with it. But does that answer your question
11 or can we provide some more?
12 MS. MONAHAND: Yes.
13 MR. CAMERON: All right. And we'll make
14 sure that we talk to you after the meeting, too, to
15 make sure that we have given you as much information
16 on that as possible.
17 Anything else on the Draft Environmental
18 Impact Statement at this point?
19 Okay. We're going to go to Bob -- well,
20 Bennett, do you have a question that's not going to be
21 addressed in this presentation? In other words, you
22 have another question on the Environmental Impact
23 Statement?
24 MR. BROWN: Not having heard your
25 presentation yet, I have no way of being able to say

1 that obviously. But I wanted to ask a brief
2 straightforward question so that you could be sure to
3 include this information in your presentation. In
4 considering alternatives and comparing the option to
5 continue the ~~licensor~~ license of this plant versus
6 other power sources, I just want to know where the
7 consideration of this design flow is taken into
8 consideration. So when you look at, for instance,
9 building a new nuclear power plant that would not have
10 this flaw, which is, I understand, it would be easy
11 enough to build a new one that would not have this
12 flaw from these early nuclear power plants. Just if
13 you would, please, point out how the risk factor of an
14 accident and the exposure levels to the public are
15 reduced in that model versus the existing models.
16 MR. PALLA: You~~'re~~ would probably have to
17 come back to me with a more, you know -- I probably
18 won't hit that enough to satisfy you.
19 MR. CAMERON: Just let me ask a question
20 of the staff before we go on there. In terms of
21 Bruce's discussion, the discussion in the Draft
22 Environmental Impact Statement on looking at
23 alternative sources, I think at least we can answer
24 the question of when you look at alternatives, for
25 example, another nuclear plant, did you consider doing

1 that analysis any specific design issues related to
2 the nuclear plant or did you only, Bruce, look at --
3 what did you look at when you look at an alternative
4 for another nuclear plant?
5 MR. MCDOWELL: The alternatives, what our
6 task was is to evaluate the environmental impacts of
7 alternatives. We analyzed the environmental impacts
8 of the operation of Quad Cities. We looked at the
9 environmental impacts of the new nuclear plant, a
10 coal-fired plant, a gas-fired plant and all the
11 different range of alternative technologies. And we
12 came to a conclusion on the environmental impacts of
13 each one of those.
14 For probably part of the reasons that Bob
15 is going to tell you about, the accident that you're
16 considering I think is dealt with to the NRC
17 satisfaction in the safety space and we didn't
18 consider that specific thing you're thinking about to
19 be an impact area. It was, it's a flaw that I think
20 Bob can talk more about how it's being addressed.
21 So, I just leave that up to him.
22 MR. PALLA: Yes, I'll try to hit on that
23 but we can talk some more if I don't.
24 Okay, you want to go to the next slide
25 there?

1 My name is Bob Palla. I'm with the
2 Probablistic Safety Assessment Branch of NRC. And
3 I'll be discussing the environmental impacts of
4 postulated accidents. These impacts are described in
5 Section 5 of the Generic Environmental Impact
6 Statement or GEIS. The GEIS evaluates two classes of
7 accidents; design basis accidents and severe
8 accidents. The design basis accidents are those
9 accidents that both the licensee and the NRC staff
10 evaluate to ensure that the plant can safely respond
11 to a broad spectrum of postulated accidents without
12 risk to the public.
13 The environmental impacts of design basis
14 accidents are evaluated during the initial licensing
15 process and the ability of the plant to withstand
16 these accidents has to be demonstrated before the
17 plant's granted a license. Most importantly, a
18 licensee's required to maintain an acceptable design
19 and performance capability throughout the life of the
20 plant, including any extended life operation.
21 Since the licensee has to demonstrate
22 acceptable plant performance for the design basis
23 accidents throughout the life of the plant, the
24 Commission has determined that the environmental
25 impact of design basis accidents are of small

1 significance. Neither the licensee nor the NRC is
2 aware of any new and significant information on the
3 capability of the Quad Cities plant to withstand
4 design basis accidents. Therefore, the staff
5 concludes there are no impacts related to design basis
6 accidents beyond those discussed in the GEIS.
7 The second category of accidents evaluated
8 in the GEIS are severe accidents. Severe accidents
9 are, by definition, more severe than design basis
10 accidents because they could result in substantial
11 damage to the reactor core. The Commission found in
12 the GEIS that the risk of severe accident in terms of
13 atmospheric releases fall out onto bodies, open bodies
14 of water and releases the ground water and societal
15 impacts. These are all small for all plants.
16 Nevertheless, the Commission determined
17 that alternatives to mitigate severe accidents must be
18 considered for all plants that have not done so. We
19 refer to these alternatives as severe accident
20 mitigational alternatives or SAMA's, for short. The
21 SAMA evaluation is a site specific assessment and is
22 a Category 2 issue as explained earlier. The SAMA
23 review for Quad Cities is summarized in Section 5.2
24 and described in detail in Appendix G of the GEIS
25 supplement.

1 Now, the purpose of performing the SAMA
2 evaluation is to insure that plant changes with the
3 potential for improving severe accident safety
4 performance are identified and evaluated. The scope
5 of plant improvements that were considered include
6 hardware modifications. And along that line ~~of~~ are
7 things like filter vents, which would be a similar
8 type of vent for this hardened torus vent that we're
9 talking about. But it would include an added filter.
10 Large vents, larger sized vents that could accommodate
11 anticipated transients without scram. These are the
12 kinds of things, the hardware mods that we looked at.
13 Also looked at procedure changes, training
14 program improvements as well as additional changes.
15 Basically a full spectrum of potential changes. And
16 the scope includes SAMA's that would prevent core
17 damage as well as SAMA's that improve containment
18 performance given that core damage event were to
19 occur.
20 The SAMA evaluation process consists of a
21 four step process. The first step is to characterize
22 the overall plant risk and the leading contributors to
23 risk. This typically involves the extensive use of
24 the plant specific probabilistic risk assessment study
25 or PRA. The PRA is a study that identifies different

1 combinations of system failures and human errors that
2 would be required for an accident to progress to
3 either core damage or containment failure.
4 The second step in the process is to
5 identify potential improvements that could further
6 reduce risk. The information from the PRA, such as
7 dominant accident sequences, is used to help identify
8 plant improvements that would have the greatest impact
9 in reducing risk. Improvements identified in other
10 NRC and industry studies, as well as SAMA analysis for
11 other plants are also considered.
12 The third step in the evaluation is to
13 quantify the risk reduction potential in the
14 implementation costs for each improvement. The risk
15 reduction and the implementation cost for each SAMA
16 are typically estimated using a bounding analysis.
17 The risk reduction's generally overestimated by
18 assuming that the plant improvement is completely
19 effective in eliminating the accident sequences it is
20 intended to address. And the implementation costs are
21 generally underestimated by neglecting certain cost
22 factors such as maintenance costs and surveillance
23 costs that would be associated with the improvement.
24 The risk reduction in the cost estimates
25 are used in the final step to determine whether

1 implementation of any of the improvements can be
2 justified. In determining whether an improvement is
3 justified, the NRC staff looks at three factors. The
4 first is whether the improvement is cost beneficial.
5 In other words, is the estimated benefit greater than
6 the estimated implementation cost of the SAMA. The
7 second factor is whether the improvement provides a
8 significant reduction in total risk. For example,
9 does it eliminate a sequence or a containment failure
10 mode that contributes to a large fraction of plant
11 risk. And the third factor is whether the risk
12 reduction is associated with aging affects during the
13 period of extended operation. In which case, if it
14 was, we would consider implementation of the
15 improvement as part of the license renewal process.
16 Preliminary results of the Quad Cities'
17 SAMA evaluation are summarized on this slide. 280
18 candidate improvements were identified for Quad Cities
19 based on review of the plant specific PRA, relevant
20 industry and NRC studies on severe accidents and SAMA
21 analysis performed for other plants. Exelon reduced
22 this set to a set of 15 potential SAMA's based on a
23 multi-step screening process.
24 Factors considered during this screening
25 included whether the SAMA is not applicable to Quad

1 Cities due to design differences, would it involve
2 major plant modifications that would clearly exceed
3 the maximum obtainable benefit or would provide only
4 a minimal risk reduction based on review of the PRA.
5 A more detailed assessment of the conceptual design
6 and costs was then performed for each of the 15
7 remaining SAMA's. This is described in detail in
8 Appendix G of the GEIS supplement.
9 The cost benefit analysis shows that four
10 of the 15 SAMA's are cost beneficial when evaluated in
11 accordance with NRC guidance for performing regulatory
12 analysis. All four cost beneficial SAMA's involve
13 procedural improvements rather than hardware
14 modifications.
15 As shown on the next slide, the cost
16 beneficial SAMA's involve developing procedures to
17 operate equipment locally following loss of 120 volt
18 bust by using temporary connections to the second
19 unit. The second procedure involves, that would be
20 developed involves procedures to manually control
21 feedwater given the loss of a 120 volt DC control
22 ~~power~~ bus. 120 volt DC losses are important in the
23 risk profile in this plant. That's why these
24 improvements come to the top.

1 The third procedural enhancement involves
2 developing procedures to terminate reactor
3 depressurization prior to loss of the steam driven
4 reactor injection pump so that core cooling can be
5 maintained. And the fourth improvement involves
6 developing procedures to control containment pressure
7 during venting in order to assure adequate suction
8 head for the pumps that are used for core injection.
9 So of these four, for all of the four,
10 none of these four SAMA's are related to aging or
11 managing the effects of plant aging. And therefore,
12 none of them are required to be implemented as part of
13 license renewal.
14 So, to summarize, the NRC~~'s~~ staff's
15 preliminary conclusion is that additional plant
16 improvements to further mitigate severe accidents are
17 not required at Quad Cities as part of license
18 renewal. It's necessary for me to point out, however,
19 that even though they're not required as part of
20 license renewal, the staff intends to pursue these
21 improvements further with Exelon under the current
22 operating license.
23 So, I can take any additional questions.
24 MR. CAMERON: Okay, thanks, Bob. Bennett,
25 with that perspective, do you want to ask some more

1 questions about the particular design feature that
2 you're talking about?
3 MR. BROWN: I think I understand how you,
4 to what extent you included the directory expenses to
5 --
6 MR. PALLA: There were some specific
7 enhancements targeted in that area. ~~These, w~~When one
8 looks at the cost estimates for doing hardware fixes
9 like that, they're hugely expensive. When you look at
10 the probability of the accidents that you're dealing
11 with, and let's take these ~~atwis~~ ATWS events, for
12 example. Their frequency's quite low. Like ten to
13 ~~tine is~~ the minus eighth. In Appendix G there's a
14 listing of ~~dominate~~ dominant contributors and this one
15 isn't labelled as well as it might have been. But in
16 Table G1 on Page G3, Appendix G, manual shut down,
17 initiating events/accident class is the heading and
18 there's an entry Manual Shut Down. I believe this is
19 a failure to manually shut down the reactor. It's
20 something like basically ten to the minus seven events
21 per year.
22 You have to account for the frequency in
23 accessing what is the, you know, how much benefit are
24 we going to derive from spending a certain amount of
25 money. So, you've got a combination of an event that

1 could, in fact, have a large consequence associated
2 but it's probabalistically weighted. And then the
3 costs are compared to that. And these are very
4 expensive mods. These are multi million dollar fixes.
5 So that is one of the mods that would be screened out
6 in the early phases of this process.
7 MR. CAMERON: Bob, I hate to, I hesitate
8 to ask but is there any way that when you talk about
9 a frequency of ten to the minus seven, can you give
10 the people an idea of what that means?
11 MR. PALLA: One in ten million years.
12 MR. CAMERON: Okay, thank you.
13 Any other questions on this SAMA's or on
14 Bruce's presentation on the other types of
15 environmental impacts at this point?
16 Okay, well, Duke is going to give us a few
17 words on how you submit comments. And then we're
18 going to on to you for some more formal comments.
19 Duke?
20 MR. WHEELER: Thank you. First of all, to
21 summarize what our preliminary conclusions are in this
22 Draft Environmental Impact Statement, first of all,
23 the environmental impacts of license renewal is
24 considered to be small for all impact areas with the
25 one exception of the North Nelson Line that Bruce had

1 pointed out where the induced current was 6 miliamps
2 compared to the National Electric Safety Codes
3 specification of 5 miliamps.
4 The impacts of alternatives to license
5 renewal range anywhere from small to large and we end
6 up with our preliminary recommendation is that the
7 environmental impacts of license renewal for Quad
8 Cities 1 and 2 are not so great that preserving the
9 option of license renewal is unreasonable.
10 This slide just has a couple of key
11 milestones in our schedule here that are related to
12 the environmental review portion of our schedule. I
13 did publish the Draft Environmental Impact Statement
14 on November the 4th. We are now pretty much in the
15 middle of our public comment period, which will expire
16 on January the 27th of next year.
17 And by the way, one comment that I'd like
18 to say is that I'm not going to slam the door shut the
19 close of business on January the 27th. Anything that
20 I do receive by that date I will include in the final
21 environmental impact statement and the comment will be
22 addressed in the final. If I do receive a comment
23 after January the 27th, then I will try to address it.
24 But we get to a point where it becomes
25 impractical because for me to publish by July, there's

1 a certain time when I have to get the manuscript over
2 to publication. And backing up from there, there's
3 preparation of the manuscript. Getting it staffed
4 through all the people that need to review it and
5 concur in it. And after January the 27th, I'll just
6 give it my best shot but can't make any promises. And
7 yet the last item on the slide there is that we do
8 have a schedule that does provide for issuance of the
9 final environmental impact statement in July.
10 This slide just identifies myself as your
11 primary point of contact with the NRC staff for
12 matters related to the environmental impact statement
13 and our environmental review. The slide also
14 indicates where in the local community copies of our
15 Environmental Impact Statement can be found. The
16 Cordova District Library, the River Valley District
17 Library and then also the Davenport Public Library.
18 And after we mailed this out, I did get on the phone
19 with all three libraries and did verify that they had
20 received their copies of it so it's there if you want
21 to take a look at it.
22 The last item on this slide also indicates
23 how if you want to get on the Internet, you can access
24 our Environmental Impact Statement. And that link
25 that's on the slide is a pretty long one but it works.

1 I tried it. It works just fine. However, if you have
2 any difficulties with it or for some reason just are
3 frustrated at the keyboard, give me a call and we will
4 go through it one small step at a time until you get
5 what you're looking for.
6 Other ways that we can receive comments,
7 you can certainly send a letter into the NRC staff
8 that'll end up on my desk by so called snail mail. I
9 would ask that you address that letter though to the
10 Chief of our Rules and Directives Branch. And what
11 that does is that guarantees that your letter will be
12 put in the public record. Whether or not it goes to
13 Rules and Directives or directly to me, I will
14 nevertheless make sure that all comments that come in
15 do get put in the public record.
16 It's a long shot but if by chance anybody
17 happens to be in the Washington D.C. or the Rockville,
18 Maryland area where our Headquarters is located, you
19 can certainly stop by and visit with us personally.
20 And I will receive your comments. Whether I write
21 them down or you write them down, though, the
22 comments, before you leave, will end up being put on
23 paper, again, so that I can get them into the public
24 record. Or you can send in comments to the NRC staff
25 at the e-mail address that is at the bottom of the

1 slide. This address was created for the expressed
2 purpose of providing the public another avenue of
3 communicating with the NRC staff on this environmental
4 review.
5 Now, it's an e-mail address. It is not a
6 bulletin board. So if somebody who makes a comment
7 wants to see what other comments have been made by
8 other people, you wouldn't be able to get that
9 information directly off of, you know, by coming into
10 us at that e-mail address. There are ways, though,
11 that you can find out what other people have said.
12 And that is we do have a document management system
13 that I will feed all of this into which can be
14 accessed through our web site and all the information
15 can be found through that system. If you want to know
16 what's been said either by e-mail or other letters
17 that have come in. And, of course, the transcripts of
18 this meeting will also be on that web site. If you're
19 not real familiar with our system and are planning to
20 play with it for the first time, my strong
21 recommendation is that you just call me first. It
22 might save a lot of frustration.
23 That concludes my prepared remarks and if
24 there are no questions, I'll turn it back over to
25 Chip.

1 MR. CAMERON: Okay, thanks, Duke. And
2 that part of the meeting where we ask any of you who
3 want to make a more formal comment on the Draft
4 Environmental Impact Statement to come up and talk to
5 us.
6 And Molly, did you want to make a comment,
7 Molly Regan? You weren't sure at the beginning. I
8 was just checking in with you.
9 MR. REGAN: No, I'm fine.
10 MR. CAMERON: Okay. Let's go to Bennett,
11 Bennett Brown to come up and talk to us. Or you can
12 do it from your seat. Okay, thank you, Bennett.
13 Anybody else have a comment at this point?
14 Are there any final questions about schedule or
15 commenting or anything like that that people need
16 answers to?
17 Okay, I just want to emphasize that we're
18 ending early but the NRC staff, and we're going to go
19 to Bennett in a second here, is the NRC staff will be
20 here after the meeting to talk about any of these
21 subjects informally. And we talked about
22 environmental review, we talked about the safety
23 evaluation. I just wanted to mention, just introduce
24 some people on the inspection side of the NRC staff.
25 And, of course, we do have resident, resident

1 inspectors at every plant. And I wanted to introduce
2 our residents at Quad Cities. Senior Resident Karla
3 ~~Studdard~~ Stoedter and I'll probably never get that
4 right, and Mike ~~Kirth~~ Kurth and they're our residents.
5 And we do in every region or at least in
6 this region we do have a lead inspector for all the
7 plants in the Region for license renewal and that's
8 Laura Kozak, who's right here. And do we also have
9 our Branch Chief from the Region 3 Office, Mark Ring,
10 who is right here. And we have other NRC staff with
11 us from Headquarters. So if you have some questions,
12 we have the people here to answer them.
13 And let me go to see if Bennett has
14 another question or comment for us. Bennett?
15 MR. BROWN: I do have a couple other
16 comments. I just wanted to give other people the
17 opportunity to speak first since I had spoken during
18 the presentation.
19 My comments fall into two categories and
20 I'm really speaking under two different hats. The
21 first is simply as a physicist interested in energy
22 and safe reliable energy production. I studied
23 physics at MIT. I had the opportunity to work briefly
24 in a reactor. I'm by no means afraid of nuclear
25 reactors but I think it's extremely important that

1 they be operated safely and that safe designs, that we
2 restrict ourselves to safe designs.
3 The design of the Quad Cities plant
4 concerns me, not the design, the Quad Cities plant at
5 this point concerns me really on two different
6 grounds. The first one I've spoken to. It's a design
7 issue. And I think it's simply an outdated design.
8 I think there were mistakes made when the design was
9 implemented. I think that the best attempt made
10 possible has been made to correct those design
11 problems so that the plant can live out its 40 year
12 license period.
13 And I don't feel as a physicist that it's
14 appropriate to renew the license for a plant that
15 bypasses such a fundamental component of its
16 containment and safety systems. To give you an
17 example, it was just this last April there was a
18 scram. I found it shocking that you thought not many
19 people in here don't know what a scram is. How many
20 of you know what a scram is? Come on. Okay, okay, so
21 significant. Forgive me for the antics. And it's
22 appropriate. Everybody should be on board with the
23 conversation.
24 Last April there was a scram at one of the
25 two Quad Cities reactors. Scrams are hard on the

1 plant's valves. The assert pressure transients.
2 They're rapid changes in temperature and pressure
3 throughout the reactor that's hard on materials just
4 like it's hard if you heat up a piece of cookware and
5 then stick it in the sink, it's likely to shatter
6 under the sudden changes in temperature.
7 Now, the plant is designed to be able to
8 withstand a scram. But it still ages the plant and
9 there are a number of scrams that have occurred at
10 this plant over the years. The most recent one that
11 I'm aware of, though I imagine it's probably not the
12 most recent one considering the frequency with which
13 they occur, was in April.
14 And in that incident a valve that connects
15 the reactor core to the torus, that I was speaking of
16 earlier, was open and stuck open. I'm not privy to
17 the reasons that that valve was open or the reason
18 that it was stuck open. It's a couple of systems to
19 close it, both failed and a manual attempt to close
20 the valve, as I understand, also failed. So the
21 reactor was scrammed because steam was venting into
22 the torus and that torus water was heating up.
23 At the time that the reactor was scrammed,
24 the torus water had already heated up from what I
25 presume is its normal temperature of ground

1 temperature, which would be in the 50 Fahrenheit or 20
2 degree Celsius and it had already heated up to 95
3 degrees Celsius. Now, boiling of water occurs at 100
4 degrees Celsius.
5 The torus is designed to be able to not
6 boil, to not have to vent to the atmosphere as long as
7 the scram is initiated at a temperature that's 110
8 degrees or less. So it was already at 95 and rising
9 and they scrammed and they were successful in
10 scramming. A scram, if everything goes correctly,
11 takes just a few seconds. So no release occurred and
12 it was business as usual and the plant returned to
13 full power after the NRC returned to control the plant
14 to Exelon the following day.
15 I believe all my details there are correct
16 but I don't work at the plant. I see a couple of you
17 shaking your head. Please --
18 MR. RING: There's probably several people
19 that can talk to this. My name is Mark Ring and I'm
20 the Regional Branch Chief and I think you got your
21 Celsius and Fahrenheit values a little bit mixed up.
22 I'd have to ask Carl or Mike probably but I think it
23 started in the 70's somewhere, went to about 90
24 degrees or so. Actions were being taken and I think

1 the high point was maybe around 110, 120, something
2 like that.
3 MR. BROWN: Fahrenheit?
4 MR. RING: Right.
5 MR. BROWN: So the scram was initiated 95
6 degrees Fahrenheit and water -- oh, this is the NRC
7 log of the event. Okay, so the scram was initiated at
8 95 Fahrenheit. Water boils at 212 Fahrenheit and the
9 plant is designed to be able to contain the problem as
10 long as the scram is initiated at 110 Fahrenheit or
11 less. And the water peaked at 118 Fahrenheit and
12 there was no problem. Now I have the details correct.
13 I'm not going to speak anymore about the
14 incident. I don't think it was a particularly unusual
15 incident. I only raise it because I think that this
16 is a serious problem with this reactor. Here we had
17 one valve that failed, stuck open. And we were within
18 15 degrees Fahrenheit of the limit at which had we
19 gone above that we would had to have vent the torus to
20 the atmosphere, as I understand it.
21 I think it's unnecessary to continue
22 operating a reactor beyond the year 2012 given that it
23 has a fundamental design flaw. So that's the first of
24 my objections to this particular reactor. And I would

1 like to see the torus vent system addressed in the
2 SEIS.
3 The second concern that I have is actually
4 more alarming to me. As I say, I'm not an alarmist
5 about nuclear power. I worked for many years with
6 radioactive tracers in a biology lab. And this plant
7 is aged. It's part of a fleet of boiling water
8 reactors that have shown unexpected stresses due to
9 radiation. After the first surprise event at which
10 cracking of a core shroud was observed, I believe that
11 that was in Ohio. Does anybody know, they can fill in
12 the blank for me there? I think it was Davis Bessie
13 but I just don't want to be citing things. I'm not
14 speaking off of notes on this event.
15 So a boiling water reactor was observed on
16 inspections that weren't particularly routine to look
17 for this so it was a surprise that there were cracks
18 in the core shroud, the shroud that contains the core.
19 And it was identified that they were of serious
20 concern and a survey was undertaken by the NRC of
21 other boiling water reactors in the country.
22 The cracking was found to be widespread in
23 the core shrouds and was a result of radiation
24 exposure of the metals to the radiation from the core.
25 This particular plant, the core shroud on one of the

1 reactor cores exhibited severe cracking. The NRC
2 classifies the cracking in this study as none, slight,
3 moderate and severe. And at the Quad Cities plant the
4 core shroud cracking was severe, in some cases with
5 fissures up to a half of an inch in the core shroud
6 wall and they hadn't yet penetrated through the wall
7 but if they did, that would be a disastrous event.
8 The core shroud is not the only component
9 of the core that is subjected to this radiation and
10 it's subjected to the type of aging that I'm speaking
11 of. The components that concern me the most are the
12 plates which keep the rods, both the control rods and
13 fuel assembly rods in place so that if sudden
14 insertion of a control rod is necessary, as it is
15 every time a plant scrams, if those plates are worked
16 or have creeped or have buckled, all of these are
17 consequences of radiation exposure of metals, then
18 it's completely plausible that the control rods will
19 be unable to insert as expected during a scram. If a
20 plant fails to scram, the reaction continues and the
21 heat has to go somewhere. That would be the torus,
22 which brings me back to the design flaw of this
23 particular plant.
24 So, to summarize, I think there are two
25 problems with the Quad Cities plants. Number one,

1 they utilize an old flawed design that should be
2 retired. And number two, they are subject to aging.
3 That aging will be 40 years by the time of this
4 license expiration. And the NRC study fairly clearly
5 showed that reactors that were greater than 20 years
6 old exhibited an unexpected spike in their aging
7 characteristics.
8 To back up, when they look at the plant
9 and looked at whether there was none, slight, moderate
10 or severe cracking in the core shroud and presumably
11 in other internal components of the core that were not
12 so easily examined without full removal of all the
13 fuel assemblies, they found the plants that were
14 younger of 20 years mostly exhibited no aging of this
15 type and plants that were more than 20 years old
16 almost all of them exhibited cracking of this type.
17 So I think to operate this for 40 years is
18 ify and I think to extend the license for 20 years is
19 unnecessary. So that's the first category of my
20 assignments and it's the first hat I'm wearing as a
21 physicist.
22 The second comment that I would like to
23 make to the NRC and to be included in the SEIS
24 concerns specifically alternatives considered in the
25 impact statement. And I'd like to address

1 specifically Section 8.2. So, in Section 8.2.3 you
2 consider new nuclear power generation. And I think it
3 should be mentioned that there's a specific site being
4 considered that Exelon has applied for an advance site
5 permit for the construction of a new nuclear reactor
6 in Illinois. And as you consider alternatives to this
7 aged plant, I think it's relevant to mention that
8 there is an alternative site already being accessed
9 and considered by the NRC.
10 The second category of alternative I'd
11 like to address is Section 8.2.5.2 and for those of
12 you that have the appendix here, the SEIS draft,
13 that's Pages 8-49 to 8-50. And that's about wind
14 energy. And it's in this regard that I speak not as
15 a physicist necessarily but as a board member and
16 treasurer of the IWORLD [?] Renewable Energy
17 Association. I have been monitoring wind speeds in
18 Iowa for a number of years. I live about 50 miles
19 west of here, slightly north. And I'm part of an NSF
20 funded study that looks at wind correlation.
21 And I find a section on considering wind
22 energy as a replacement for the Quad Cities plants
23 incomplete and in some cases misleading. So
24 specifically what I would like to see you include in
25 that assessment, you cite four reasons that wind is

1 not an alternative to consider for nuclear power. And
2 I'd like to address each one of those in turn, if you
3 will give me the time needed to address that. I won't
4 speak for long and I will be concise.
5 MR. CAMERON: Go ahead.
6 MR. BROWN: Thank you. The four arguments
7 against wind that are advanced in the SEIS, in the
8 plant specific environmental impact statement, the
9 first one is that the power required to replace the
10 Quad Cities plant is marginally present in Illinois.
11 Specifically, this was the one point mentioned in
12 today's presentations. Specifically that 4,200
13 megawatts would be needed to replace the plant
14 capacity at Quad Cities.
15 And to be clear, with wind you have to
16 distinguish between what is name plate on the turbine,
17 you know, at the base of the tower, a one megawatt
18 turbine, that's not what that turbine produces all the
19 time because wind blows at varying rates. So that's
20 the name plate capacity. And as was stated in your
21 presentation, it would require 4,200 megawatts of name
22 plate capacity of turbines to replace this nuclear
23 power plant. That would, in effect, only be about
24 1,000 megawatts of consistent power production on
25 average through the year.

1 So, 4,200 megawatts; that's a lot of
2 power. Illinois only has 3,000 megawatts of Class 4
3 Wind Sites it says in the SEIS. That's probably not
4 part of your field of knowledge since I see that most
5 of you are within the nuclear realm. The Patel Class,
6 the Department of Energy has classified U.S. land by
7 how windy it is. The higher the number, the more the
8 wind. A Patel Class 4 right now is developable. Wind
9 farms are being built in the United States in Class 4
10 sites. Illinois has only 3,000 megawatts of Class 4
11 capacity.
12 That's not enough. There are an
13 additional 6,000 megawatts of Class 3 sites but those
14 aren't as windy and therefore averaged over the year
15 the cost per kilowatt hour is a little higher if you
16 were to develop that wind. And utilities aren't
17 interested in developing that wind for a good reason.
18 They can put the turbine elsewhere to get more bang
19 for their buck.
20 What's misleading is to use Illinois
21 numbers. This plant, after all, is on the border of
22 Iowa and Illinois. Illinois has a pathetic wind
23 resource. I don't mean that to any detriment of
24 Illinois but it's not a windy state despite Chicago's
25 monitor.

1 Iowa is a windy state. In fact, Iowa has
2 enough Class 4 and better sites to replace the Quad
3 Cities, both of the Quad Cities plants 20 times over.
4 Furthermore, north of Iowa, in the Dakotas, we could
5 easily power the entire midwest on turbines. The only
6 issue would be how do you get the power to the
7 population centers? The areas that are easily
8 developed in the Dakotas are not on transmission lines
9 so part of the cost of developing those turbines would
10 have to include transmission.
11 So the first point here that sufficient
12 power is marginal I think is incorrect. There is more
13 than enough wind power in the vicinity to replace the
14 Quad Cities.
15 Second, the NRC document mentions that it
16 is enormously, and this is a quote, enormously
17 expensive to develop these wind resources. I had the
18 opportunity on Friday to attend the Midwest Regional
19 Wind Collaborative. It was a meeting of about 15
20 people that included utility commissioners from
21 Montana, the Dakotas, Minnesota. It also included
22 legislators from as far south as Kansas. And the
23 purpose of this meeting was to develop a regional plan
24 for developing our wind energy resources and
25 delivering them to market.

1 The subjects were broad ranging from how
2 to develop it to how to monitor tradeable permits and
3 so on. At that meeting were many utilities. I spoke
4 with a person from Bason [?] Electric, a fairly large
5 rural electric cooperative within what was formally
6 the Map Region. It's a portion of the grid. And this
7 fellow confided in me that a price that they were able
8 to bring wind energy to market. So I will share with
9 you what he gave to me as a public figure, which is
10 that they are currently producing wind at two cents to
11 two and-a-half cents per kilowatt hour.
12 That figure is flat for 20 years. So for
13 the next 20 years they will be able to produce, and
14 their total production is in the hundred megawatt
15 range of wind. So it's sizeable. Two to two and-a-
16 half cents of kilowatt hour is small when you consider
17 that that includes capitalization of the turbine, it
18 includes the transmission and roads necessary. It
19 includes the interest on the capitalization. It
20 includes the operation and maintenance. And it
21 includes the fuel, which of course is free.
22 So, two to two and-a-half cents is
23 definitely cost competitive with even a gas turbine,
24 let alone a new nuclear power plant particularly if
25 you omit the Price Anderson Act under which the

1 nuclear industry has collectively said that nuclear
2 power would not be economically feasible to develop if
3 the nuclear industry had to carry liability for any
4 accidents that were to occur.
5 So, I think to say that it is enormously
6 expensive to develop is only correct in a silly
7 expense. It is expensive. Power's expensive. It
8 takes a lot of money to build a new nuclear power
9 plant. It takes a lot of money to operate a nuclear
10 power plant and it takes a lot of money to develop
11 wind. But to compare it to other fuel sources I think
12 is simply false. It's not economically expensive to
13 develop in comparison with other fuels. It is
14 economically viable.
15 The third point that the NRC document
16 brings up is that the land use of turbines would be
17 significant. And I bring this up because it is, after
18 all, an environmental impact statement. Wind may be
19 cheaper. It may not have the risk of accidents. We
20 may not have to deal with the tailings from uranium
21 mining or the terrorist problems with a power plant
22 nor the storage problems with the waste. But wind
23 turbines will take up land. A two megawatt turbine
24 takes up about a quarter of an acre of land that you
25 can farm right up to the turbine.

1 If you were to replace the Quad Cities
2 plants, they would take about a square mile. It's not
3 a significant consumption of land and it is an
4 environmentally responsible consumption of land. It
5 is a good neighbor to the farmers. In fact, farmers
6 are clamoring to have wind turbines on their farms.
7 I don't see a line of farmers here clamoring to have
8 caskets on their farms. So, I think that the NRC
9 needs to develop that section quite a bit more.
10 And finally the fourth point that SEIS
11 brings up is that wind, I forget the wording, that
12 wind can only provide intermittent power. That the
13 Quad Cities plants provide a base load power that
14 simply cannot be replaced by wind. This statement is
15 inconsistent with a variety of conclusions that
16 utilities both within the United States and
17 internationally have reached.
18 To be specific about wind, I feel like
19 there needs to be some education on this point so I'm
20 going to belabor it a little bit. There are three
21 ways in which the wind fluctuates. You get the gust.
22 That's less than one second transience. Then you get
23 the fluctuations that are from a second to ten
24 minutes. And then there are fluctuations that are

1 longer than that, the very short and medium term
2 fluctuations.
3 Studies have been commissioned by the
4 independent system operators that maintain the grid.
5 And the conclusion is that the use of wind does not
6 represent any change necessary to the grid of the
7 United States as long as penetration is up to 25
8 percent. We could replace 25 percent of our
9 electricity generation with wind and not have to
10 change the grid at all. If we were to go beyond 25
11 percent penetration, we would have to address the fact
12 that wind gusts.
13 The fluctuations in the wind, today it
14 flows, tomorrow it doesn't, that's at one turbine. If
15 you're talking about replacing two plants that are
16 each hundreds of megawatts, you're talking about many,
17 many turbines at different locations, some of them
18 grouped in a farm so that when a gust hits one turbine
19 it's not at another and averaged over that wind farm,
20 it's a steady output power. And averaged over days,
21 one farm, one wind farm is not particularly windy,
22 another wind farm is. So the output power on a day to
23 day basis even is fairly constant. It is a feasible
24 base flowed production of energy.

1 One issue, however, is that it's not windy
2 in August. It is windy in January. August is when we
3 need power. It's when people turn on their air
4 conditioners. And as such you have to design the wind
5 production so that you build enough wind turbines so
6 that even in low August wind power generation months
7 you're generating enough power to service August
8 demands. But that's simply a cost issue and when you
9 do out the numbers, as I said, it is economically
10 viable.
11 So, in conclusion, wind energy, I believe,
12 is a very viable replacement for the Quad Cities
13 plants. In neighboring Iowa, it could be done very
14 easily. In the Dakotas it would require some
15 transmission. The Lady Foundation has done some
16 research on what transmission would be necessary to
17 bring Dakota power to Chicago. It comes out to about
18 two cents a kilowatt hour averaged over the lifetime
19 of those transmission lines. It's not significant
20 even to use Dakota power with new transmission.
21 So thank you for your attention.
22 MR. CAMERON: Thank you, Bennett, for
23 those specific suggestions and comments.
24 Does anybody else have a comment or
25 question before we adjourn for the night? Yes.

1 MS. ~~PARRIGO~~ PERRIGO: I'm Leslie ~~Parrigo~~
2 Perrigo, again. I'm from ICAN and I'm actually, I'm
3 also on the Board of IRENEW and as a follow up to one
4 of Bennett's point about transmission lines and where
5 the power comes from, we have contacted the Iowa
6 Utility Board and they could not speak for the
7 Illinois Quad Cities. But the Iowa Quad Cities only
8 receives 23.6 percent of our power of total net
9 generation from nuclear sources. Of those nuclear
10 sources, they come from two separate power plants.
11 One is in Nebraska and the other one is the Quad
12 Cities plant.
13 MR. CAMERON: Thank you, Leslie.
14 Bennett, can you just make this short? I
15 mean, your comments are very thought provoking and
16 appreciated.
17 MR. BROWN: Thank you. I realize that
18 I've taken more than my share of the air time if you
19 divide the hours by the people in here. But the
20 primary comment in the SEIS statement was that it
21 would represent a doubling of U.S. wind capacity if we
22 were to replace the Quad Cities plants with wind.
23 That's true but it's, again, it's a irrelevant
24 statistic. In fact, the Senate, as I'm sure you're
25 well aware, considered a law that were required us to

1 bump up to ten percent of our generation from
2 renewables, primarily wind, by 2010. This plant
3 expires in 2012 with its existing license. So already
4 the Senate was considering mandating going from 0-
5 something percent of our capacity up to ten percent,
6 which would be like a 20 fold doubling before the
7 plant is even up for its new license period.
8 MR. CAMERON: All right, thank you.
9 John, do you want to close us out?
10 MR. TAPPERT: Just want to thank everyone
11 for coming out tonight and sharing your thoughts with
12 us. And just to remind everyone, if you have some
13 comments that you would like to share with us in the
14 future, our comment period does extend till January
15 27th. So, you have our e-mail addresses and our phone
16 numbers. So, please send those to us.
17 And thanks for coming out again tonight
18 and have a good evening.
19 (Whereupon, the above public hearing was
20 adjourned at 8:50 p.m.)