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DR. GARY S. ARNOLD, Judge
DR. WILLIAM W. SAGER, Judge

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TABLE OF CONTENTS

OPENING STATEMENT:

MR. MARIOTTE, page 321

MR. WILSON, page 330

MR. SMITH, page 334

WITNESS

ANDY KUGLER/KATHERINE CORT 341

EXHIBITIDENTIFIEDRECEIVED

JNT-32, JNT-33 316 316

Applicant 61, 62 316 316

JNT-R1 317 317

JNT-2 through 23 318 318

JNT-25 through 33 318 318

JNT-30 319

NRC 1 through 46 320 320

Applicant 1 through 62 321 321

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P R O C E E D I N G S

9:30 A.M.

CHAIRMAN SPRITZER: We are here this morning in the matter of Calvert Cliffs 3 Nuclear Project and UniStar Nuclear Operating Services. This is NRC Docket No. 52-016. My name is Ron Spritzer. I'm an attorney and the chairman of this Licensing Board. I'll ask the other Judges to introduce themselves.

ADMIN. JUDGE ARNOLD: I am Gary Arnold. I am one of the Technical Administrative Judges.

ADMIN. JUDGE SAGER: My name is Will Sager. I am a part-time Technical Judge. I'm also a Professor at Texas A&M University in Earth and Environmental Sciences.

CHAIRMAN SPRITZER: Also with us to my left is our law clerk, Kirsten Stoddard. Our Information Services Technical Support person, Andy Welkie, and our Administrative Assistant, Matina Solomakos, is here somewhere, although I don't see her at the moment.

Let's have the parties and counsel identify themselves and we start first with the Joint Intervenors.

MR. MARIOTTE: This is Michael Mariotte,

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1 Executive Director of Nuclear Information Resource
2 Service speaking on behalf of the Joint Intervenors.
3 with me is Paul Gunter from Beyond Nuclear, one of the
4 Joint Intervenors. I want to inform you at this point
5 that our witness is not here yet. He was scheduled to
6 arrive on a flight from Central America at 6 this
7 morning. And I guess he's still making his way.

8 CHAIRMAN SPRITZER: All right.
9 Interesting issue.

10 (Laughter.)

11 Well, we'll proceed. I think we have
12 about -- with opening statements we'll be here at
13 least another half hour. I'll go ahead and admit the
14 evidence, the written exhibits that is, and the pre-
15 filed testimony. We'll probably be about 45 minutes
16 at that point. If we get to that point, I guess we
17 have the option -- well, let me ask -- let's go ahead
18 and do the introductions first and I'll come back to
19 that problem.

20 NRC staff.

21 MR. WILSON: Good morning, Your Honor, I
22 am Anthony Wilson, representing the staff of the
23 Nuclear Regulatory Commission. I'm joined at the
24 table by Adam Gendelman. Also in attendance is Deputy
25 General Counsel Sara Kirkwood. And also in attendance

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1 is Emily Monteith. We're joined by our witnesses,
2 Laura Willingham, Andrew Kugler, and Katherine Cort.

3 CHAIRMAN SPRITZER: And for the Applicant?

4 MR. REPKA: Yes, my name is David Repka
5 with the law firm of Winston and Strawn, counsel for
6 UniStar. And with me at the table is Mr. Tyson Smith,
7 my partner at Winston and Strawn. Mr. Smith will have
8 the lead on Contention 10-C. With me, of course, are
9 our witnesses who will be introduced at the
10 appropriate time and also Mr. Debbie Hendell, General
11 Counsel of UniStar is with us in the audience.

12 CHAIRMAN SPRITZER: Okay, thank you. And
13 for the State of Maryland?

14 MR. BOLEA: Good morning, Your Honors.
15 Brent Bolea on behalf of the State of Maryland.

16 CHAIRMAN SPRITZER: Going back to the
17 question of Mr. Sklar's presence, hopeful presence,
18 why don't we go through the opening statements and the
19 introduction of evidence. At that point, if he's not
20 here, I think the Judges will take a break and confer
21 and see what we, in fact, if anything we can come up
22 with as a solution. I suppose one possibility -- let
23 me ask the NRC staff about this would be to proceed
24 with your witnesses first. When we had the prehearing
25 conference I remember there was -- we sort of talked

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1 about alternatives either having your witnesses go
2 first or having the Intervenor go first. Is that
3 feasible from the staff's point of view?

4 MR. WILSON: Yes, Your Honor.

5 CHAIRMAN SPRITZER: Do you have any
6 objection to doing it that way if Mr. Sklar is not
7 here?

8 MR. WILSON: We don't object.

9 CHAIRMAN SPRITZER: Does anybody else
10 object to proceeding that way if that's what we have
11 to do?

12 MR. SMITH: No, Your Honor, we have no
13 objection to that.

14 CHAIRMAN SPRITZER: For members of the
15 audience and both of the parties, the State of
16 Maryland, we'd like to thank the Calvert County
17 government for allowing us to use the Albright
18 Building for this hearing. Also, again, thank you to
19 the Calvert County Marine Museum which we used
20 yesterday for the Limited Appearance Statement
21 Sessions and all the Calvert County employees of which
22 there have been a number of who have been helpful to
23 us in arranging this evidentiary hearing, especially
24 Ms. Debbie Shirley, but there have been a number of
25 others as well.

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1 We don't have an NRC facility down in
2 Calvert County, unfortunately. If we're going to hold
3 a hearing, as we prefer to do in the local community,
4 to use facilities such as this that are provided by
5 local government entities and we're very grateful for
6 that opportunity.

7 For members of the audience that are
8 members of the public and not witnesses or
9 representatives of the parties, let me briefly explain
10 who we are and what we're about. The Atomic Safety
11 and Licensing Board panel consists of independent
12 Administrative Judges appointed by the five-member
13 Nuclear Regulatory Commission. As members of the
14 Atomic Safety and Licensing Board panel, we are
15 designated to serve on three-Judge Licensing Boards
16 such as this. We do not work with or for the NRC
17 staff who is a party in this proceeding. We have the
18 authority to make an independent judgment as to
19 matters that have been -- such as the Final
20 Environmental Impact Statement that we're here about
21 today, to review that and make our own independent
22 assessment of whether it complies with applicable law.

23 Our decisions on hearing matters are
24 generally subject to review, first by the NRC, that
25 is, by the Commission, then potentially by Federal

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1 Courts, even all the way up to the Supreme Court if
2 they deem it appropriate.

3 We're here today to conduct a hearing on
4 Environmental Contention 10-C. Let me, just for
5 members of the public, give a brief statement of what
6 Environmental Contention 10-C alleges -- well, rather
7 than just reading it, let me summarize it. It is
8 basically alleging that a portion of the Final
9 Environmental Impact Statement is defective, that is
10 the portion that deals with something called the
11 combination alternative which is a combination of
12 power sources, wind, solar power, natural gas, and
13 several other sources. And the contention alleges
14 that this combination alternative was defective, that
15 is insufficient under the law because it failed to
16 include a sufficiently large contribution from wind
17 and solar power, thereby making the alternative overly
18 dependent on a natural gas supplement and the
19 resulting effects on the environment that the natural
20 gas supplement would cause.

21 And we are here, as I said, to hold a
22 hearing on that particular contention. There's at
23 least one other contention pending before the Board
24 dealing with foreign ownership, but we're not going to
25 be addressing that contention today.

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1 For those members of the public that may
2 have cell phones with them, please turn them off or
3 put them on vibrate. Please do not -- we have water
4 for counsel at their tables, but other than that no
5 food or drinks in this room. We will probably take a
6 break, we will take a break this morning and then
7 we'll break for lunch around 12:15. After that, we'll
8 see how it goes.

9 A couple of administrative matters.
10 First, we have two unopposed motions to file late-
11 filed evidence. One of those was filed by the Joint
12 Intervenors. The exhibits proposed for admission were
13 JNT-32 and JNT-33. That was an unopposed motion, so
14 we will grant that motion.

15 (Whereupon, the above-referred to
16 documents were marked as JNT-32 and JNT-
17 33 for identification and were received
18 in evidence.)

19 Similarly, the Applicant filed a motion to
20 file Applicant Exhibits 61 and 62. We will also grant
21 that motion.

22 (Whereupon, the above-referred to
23 documents were marked as Applicant
24 Exhibit 61 and Applicant Exhibit 62 for
25 identification and were received in

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1 evidence.)

2 MR. WILSON: Your Honor, at this time
3 staff was alerted to a technical error with one of its
4 exhibits it was unable to open and at this time we
5 would like to substitute what is marked as NRC 00033
6 with NRC 00033R which is the same exhibit, but it's in
7 its full form. We have sent it to the parties and
8 they indicated they did not oppose and we have
9 supplied an electronic copy here today.

10 CHAIRMAN SPRITZER: Any objection?

11 MR. MARIOTTE: No, Your Honor.

12 CHAIRMAN SPRITZER: That will be admitted.

13 (Whereupon, the above-referred to
14 document was marked as JNT-R1 for
15 identification and was received in
16 evidence.)

17 MR. WILSON: And we have paper copies if
18 you'd like.

19 CHAIRMAN SPRITZER: Let's proceed to admit
20 all the evidence that's been submitted by the parties.
21 We'll start with Joint Intervenors. There was one
22 question, I believe, on the Exhibit List. The version
23 of Joint JNT -- originally, you had JNT 000001, I'll
24 refer to that as JNT-1. The one that should be
25 admitted I take it is JNT-R1?

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1 MR. MARIOTTE: That is correct.

2 CHAIRMAN SPRITZER: That will be the one
3 we'll admit and propose for admission. We also have
4 JNT 2 through 23; 24 we are not admitting as a result
5 of the staff's motion in limine. So we have JNT-R1,
6 JNT-2 through 23; JNT-25 through 33, as well as --
7 yes, 25 through 33. Is there any objection to
8 admitting those exhibits at this time other than we
9 know the staff has a motion in limine.

10 I told you we're going to consider the
11 arguments made in your motion in limine after we've
12 heard the testimony. Subject to the objections made
13 in the staff's motion in limine, are there any other
14 objections to admitting the Joint Intervenors exhibits
15 that I've just listed?

16 MR. GENDELMAN: Beyond their motion, the
17 NRC staff does not have any additional objections.

18 MR. SMITH: UniStar has no objection.

19 CHAIRMAN SPRITZER: Very well, those will
20 be admitted.

21 (Whereupon, the above-referred to
22 documents were marked as JNT-2 through 23
23 and JNT-25 through 33 for identification
24 and were received in evidence.)

25 CHAIRMAN SPRITZER: Let's move on then to

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1 the NRC staff evidence. One other point I should
2 make. Joint Intervenors Exhibit 30, the rebuttal
3 testimony of Scott Sklar was not originally filed with
4 an exhibit number, but it will be marked as JNT-30.

5 (Whereupon, the above-referred to
6 document was marked as JNT-30 for
7 identification.)

8 CHAIRMAN SPRITZER: And as I indicated,
9 all exhibits from the Joint Intervenors will be
10 admitted subject to the Board's review of the NRC
11 staff's motion in limine.

12 Let's move on to the NRC staff evidence.
13 Those exhibits, as I understand them, consist of
14 Exhibits NRC 1 through 46. NRC 3 consists of two
15 parts, that's the Final Environmental Impact
16 Statement. And we'll include, as I mentioned, the NRC
17 -- the revised version of NRC 33 that was just
18 referred to.

19 With respect to those exhibits, is there
20 any objection having them admitted at this time?

21 MR. MARIOTTE: If I could just make a very
22 quick statement. Joint Intervenors believe in an open
23 hearing and believe that -- and have no interest in
24 preventing or objecting to anybody's testimony and so
25 I just want to say that we're disappointed that the

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1 NRC staff is continuing with its in limine motion. We
2 appreciate the Board's ruling on the motion, but they
3 are clearly the only ones trying to prevent some
4 testimony. So having said that, we have no objection.

5 MR. SMITH: UniStar has no objection.

6 CHAIRMAN SPRITZER: All right, let me just
7 go through that and make sure we're clear on the
8 numbers. NRC 1 through 46 including the revised
9 version of Exhibit 33 and also noted NRC 3 consists of
10 two parts, Part A and B, and that is the entire Final
11 Environmental Impact Statement, we'll have a complete
12 enumeration of your exhibits?

13 MR. WILSON: Yes, Your Honor.

14 CHAIRMAN SPRITZER: Okay, those will be
15 admitted.

16 (Whereupon, the above-referred to
17 documents were marked as NRC Exhibits 1
18 through 46 for identification and were
19 received in evidence.)

20 CHAIRMAN SPRITZER: And finally, the
21 Applicant's evidence, that's Applicant 1 through 62
22 noting that the Applicant 17 consists of four parts A
23 through D, any objection to admitting those exhibits
24 at the present time?

25 MR. WILSON: No, Your Honor.

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1 CHAIRMAN SPRITZER: Any objection from
2 Joint Intervenors?

3 MR. MARIOTTE: No objection.

4 CHAIRMAN SPRITZER: All right, those will
5 be admitted.

6 (Whereupon, the above-referred to
7 documents were marked as Applicant
8 Exhibits 1 through 62 for identification
9 and were received in evidence.)

10 CHAIRMAN SPRITZER: Did I get a complete
11 list of your exhibits?

12 MR. SMITH: You did. Yes, sir.

13 CHAIRMAN SPRITZER: All right, we'll now
14 move on and hear opening statements. Our original
15 proposal was to start with the Joint Intervenors for
16 15 minutes, maximum of 15 minutes I should say.

17 OPENING STATEMENT OF MICHAEL MARIOTTE, ESQ.

18 ON BEHALF OF JOINT INTERVENORS

19 MR. MARIOTTE: Thank you, Your Honor, and
20 I appreciate the opportunity for an opening statement
21 and I'll try not to take up the full 15 minutes.

22 As you mentioned, what this contention is
23 about is that we're alleging that the Environmental
24 Impact Statement prepared by the Nuclear Regulatory
25 Commission under estimates the potential contribution

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1 for solar and wind in the combination of alternatives.
2 And this is important because it leads to an
3 inaccurate conclusion about the potential
4 environmental effects of the combination of
5 alternatives versus the potential environmental
6 effects of the proposed Calvert Cliffs 3 Nuclear Power
7 Plant. And we believe that if the combination of
8 alternatives is done properly, a different
9 environmental conclusion may result. That's part of
10 the purpose of NEPA is to reach that kind of
11 conclusion and that's why this is an important
12 contention.

13 I should point out that the EIS and NEPA,
14 let's look at potential projects, feasible projects,
15 not necessarily just those that are already existing
16 or planned. In other words, the discussion on the
17 combination of alternatives does not need to be
18 limited to solar power and wind power projects that
19 are on the books, but in fact, we have to look at what
20 is feasible in this instance, what is potential in
21 this instance.

22 The Calvert Cliffs reactor that has been
23 proposed is admitted by its owners or by its Applicant
24 as a cost over \$10 billion. That can buy an awful lot
25 of solar and wind power if the money were redirected

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1 in that kind of technology. So we need to look at
2 what the actual potential for Maryland is and not
3 necessarily what is already on the ground.

4 With that said, we agree and have said so
5 in our testimony that the combination of alternatives
6 need not look at wild ideas, absolutely remote or
7 speculative type things. We agree with that, but
8 that's sort of a different standard than what is
9 feasible. We would argue that, in fact, Calvert
10 Cliffs 3 at this point is looking pretty remote and
11 speculative itself.

12 We have provided evidence of some of
13 Maryland's major private institutions, Washington
14 Redskins, Purdue Chicken, General Motors, which are
15 all building or have already built solar installations
16 in this state. That kind of response from major
17 companies in the state indicates that solar energy is
18 certainly taking hold here in Maryland. Constellation
19 Energy, which is the former partner to UniStar here,
20 they're building new solar plants.

21 A condition of the merger between
22 Constellation and Exelon that has come about since
23 this case began is that this merged company must build
24 even more renewables in this state. Since the merger
25 isn't finalized, we don't have -- at least I don't

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1 have exact numbers on what those are, but there's the
2 intent that this new company build more renewables.
3 And most importantly Maryland state law mandates
4 renewables; 20 percent of the state's electricity
5 provided by renewables by 2022. At least two percent
6 has to be provided by solar power. That 2 percent
7 equals about 250 megawatts of delivered power which is
8 already more than 3 times higher than the NRC's
9 Environmental Impact Statement says. And of course,
10 the rest of that -- and the two percent is a floor,
11 not a cap. So it certainly -- we can project more
12 solar than that coming up and most of the rest of that
13 is going to be met by wind.

14 So given the evidence that we've provided
15 about the existing projects, about the known, planned
16 projects, it's clear that this goal is feasible. It's
17 certainly attainable. Overall, actually, the
18 renewable sources by 2022 are supposed to by state law
19 contribute about 2500 megawatts to Maryland, more than
20 the Calvert Cliffs plant would produce.

21 The NRC is apparently assuming under the
22 EIS that Maryland state law will fail or will not be
23 implemented. We think that's an untenable assumption
24 for a federal agency to make. We also argue that 2022
25 is a reasonable time frame to look at alternatives to

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1 Calvert Cliffs 3. This plant doesn't have a license.
2 The design is not certified. Even under the most
3 optimistic schedule for the Applicant, we wouldn't be
4 looking at construction beginning until about 2014.
5 It takes a long time to build a nuclear reactor.
6 Certainly, the prototype for this reactor is being
7 built in Finland, as we speak. It was supposed to be
8 built in four years. The current projection is nine
9 years. And I think eight years from 2014, 2022 is a
10 pretty realistic time frame to look at the
11 alternatives. And so what we're trying to do is
12 project well, what -- how much solar and wind as
13 alternatives can be in place by that time.

14 And so the fact, and this is significant
15 on one project in particular which is Bluewater Wind
16 which recently announced that it's been put on hold
17 for now. That's the new evidence that the Applicant
18 submitted this week. And it is certainly true
19 evidence. We don't quarrel with the evidence, but it
20 remains within this time frame of the next ten years
21 that offshore wind in Maryland, whether it's Bluewater
22 Wind or another company, is certainly highly feasible.

23 This week I think perhaps yesterday, but
24 I'm not sure, our Governor, Martin O'Malley, is
25 submitting new legislation to encourage offshore wind

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1 development in the state. So I think offshore wind is
2 an idea whose time has come despite the Bluewater
3 setback. And it's going to happen in Maryland sooner
4 or later.

5 I wanted to talk for a second, a minute,
6 about baseload power because this has become an issue
7 in this contention. The NRC is arguing that well,
8 solar and wind don't provide their concept of baseload
9 power. So I think it's important to understand what
10 baseload power and what it is intended to do which is
11 provide reliable electricity.

12 So I want to quote from Amory Lovins, a
13 well known energy expert, and this is from admitted
14 testimony, an article called "The Nuclear Illusion"
15 and unfortunately I don't have the number with me
16 right now. But to quote this: "The word baseload is
17 often misused to describe the power plants that big
18 economies supposedly need. . But in utility load
19 dispatch parlance, baseload doesn't mean" --

20 CHAIRMAN SPRITZER: Are you quoting from
21 --

22 MR. MARIOTTE: This is from testimony that
23 was just admitted. It's an article called "Nuclear
24 Illusion."

25 CHAIRMAN SPRITZER: Do you remember the

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1 exhibit number?

2 ADMIN. JUDGE SAGER: Exhibit 18?

3 CHAIRMAN SPRITZER: Your Exhibit 18.

4 MR. MARIOTTE: Our Exhibit 18.

5 CHAIRMAN SPRITZER: Sorry for
6 interrupting.

7 MR. MARIOTTE: "But in utility load
8 dispatch parlance, baseload doesn't mean big, steadily
9 operating or dispatchable. It means plants that
10 generate electricity at the lowest operating cost so
11 they're dispatched whenever available, supplemented as
12 needed by costlier to run plants. Thus, any renewable
13 generator is run as a baseload resource because it has
14 almost no operating cost. It's capital cost which
15 must be paid whether it runs or not is irrelevant to
16 this calculus. As explained below, no sensible
17 criterion requires that a given power plant to be big
18 nor to run steadily since many small plants, even
19 variable ones, can add up to big and reliable supply
20 as they increasingly do in competitive power systems
21 that allow them."

22 Mr. Lovins goes on to point out that
23 "Recent University of Kassel" -- that's in Germany --
24 "few experiments have confirmed that just integrated
25 wind, photovoltaics, and biogas generation could

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1 reliably provide all German electricity. The north
2 German state of Schleswig-Holstein which got 39
3 percent of its 2007 electricity from wind power now
4 aims for 100 percent by 2020 as it already achieves in
5 windy months."

6 So the point here is that a properly
7 designed system, electrical system, can in fact, use
8 variable or intermittent power sources such as wind
9 and solar and provide the functional equivalent of
10 what's traditionally been thought of as baseload
11 power. Personally, I think that the error of these
12 large behemoth power plants from any kind of power
13 source, any kind of fuel source is nowhere near an end
14 because distributed, smaller scale systems are
15 actually more secure and more reliable than building
16 a 1,000 megawatt or more power plant of any kind that
17 then needs 1,000 megawatts of backup power for when it
18 doesn't operate because no power plant of any kind
19 operates 100 percent of the time.

20 In this case, although the Applicant has
21 stated that providing baseload power is, in fact, one
22 of the purposes of this plant, we have to remember
23 that this company has zero backup power capacity.
24 They don't own any other power plants. So when this
25 plant is down for repairs, down for refueling, and all

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1 plants are down for repairs and refueling at times,
2 they have nothing to replace it. So that throws into
3 some question that the concept of whether this is
4 truly a baseload power plant in the normal sense of
5 the word, normally, these kinds of plants are used by
6 companies such as Constellation Energy which owns the
7 other two reactors, the two existing reactors at
8 Calvert Cliffs.

9 And when one of those reactors goes down,
10 well, Constellation can make up for that because they
11 own other power plants. So that the people who are
12 buying electricity from them are, in fact, steadily
13 receiving electricity. In this case, this company has
14 nothing else it can sell. They don't own anything
15 else. So if you're in a deregulated marketplace, if
16 you're a steel company or something buying from this
17 plant and it goes down, what happens to you?

18 Now in some way that's UniStar's problem.
19 Maybe nobody will buy electricity from them because
20 they want that assurance of 24/7/365 power and it's
21 true, it is UniStar's problem. But in the context of
22 this contention because the NRC is arguing that solar
23 or wind cannot be seen as baseload power, we have to
24 argue two points. First, as we stated, a properly
25 managed grid, particularly when combined with other

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1 measures, other types of renewables like biogas with
2 energy efficiency measures as Maryland state law also
3 has, solar and wind can provide the functional
4 equivalent of baseload power which is steady, reliable
5 electricity 24/7 and 365. And second, if Calvert
6 Cliffs 3 is not really a baseload power provider in
7 the traditional sense, then why is the NRC holding
8 solar and wind power to this supposedly higher
9 standard?

10 So I don't want to take up any more time,
11 but to sum up, there's vastly more feasible solar and
12 wind power potential for Maryland than the NRC's
13 Environmental Impact Statement assumes. And this
14 means that the Environmental Impact Statement has made
15 inaccurate conclusion about the environmental impacts
16 of the likely combination of alternatives to Calvert
17 Cliffs 3 and thus to an inaccurate finding that
18 Calvert Cliffs 3 presents the least Environmental
19 Impact Statement. Thank you.

20 CHAIRMAN SPRITZER: Thank you, Mr.
21 Mariotte. We'll hear next from the NRC staff. And I
22 believe we allotted you ten minutes. Again, you're
23 not required to use all of that.

24 MR. WILSON: And we won't.

25 OPENING STATEMENT OF ANTHONY WILSON, ESQ.

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ON BEHALF OF THE NUCLEAR REGULATORY COMMISSION

MR. WILSON: Good morning. Again, Anthony Wilson, staff counsel for the Nuclear Regulatory Commission.

This hearing is about the Final Environmental Impact Statement as prepared by the staff. That was prepared as part of the review of the Applicant's request for combined operating license. Specifically, the issue at bar today is Contention 10-C. Contention 10-C focuses on whether the FEIS discussion of combination of alternatives is inadequate or faulty.

This hearing, this contention is not about baseload power. It's not about demand side management. It's not about the region of interest or construction costs. It's about staff's Environmental Impact Statement consideration of alternatives.

As set forth in staff's direct testimony, rebuttal testimony, and exhibits, in preparing the FEIS, the staff worked in a manner that was consistent with NEPA decisions as set forth by Federal Courts and this Commission. The staff used reasonably foreseeable estimates of the foreseeable contribution of alternative resources and not theoretical maximal potential for various resources. And that is a key

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1 point which we will bring forward.

2 Staff examined reasonable alternatives
3 within the range dictated by the nature and scope of
4 the Applicant's proposal and staff's developed Purpose
5 and Need Statement. Staff evaluated an array of
6 alternative sources including traditional sources such
7 as natural gas and involving resources such as wind,
8 solar, and biofuels. Staff also evaluated
9 combinations of energy alternatives.

10 Staff analyzed these alternatives as they
11 exist or as they are likely to exist. After
12 conducting a careful review, staff concluded that none
13 of the proposed alternatives or combinations of
14 alternatives would be environmentally preferable to
15 the proposed action. In reaching this conclusion,
16 staff was bounded by several important Commission and
17 Federal Court decisions on NEPA which limits staff's
18 review and considerations of alternatives.

19 Specifically, the Vermont Yankee decision
20 established that NEPA does not require detailed
21 discussion of alternatives being remote and
22 speculative or whose effects cannot be readily
23 ascertained. And what is considered remote and
24 speculative is something that is decided by the Agency
25 in light of the facts available to it at that time.

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1 In the Headwaters case versus the Bureau
2 of Land Management that decision established an
3 agency's consideration of alternatives is sufficient
4 if it considers an appropriate range of alternatives
5 even if it does not consider every available
6 alternative. Then we point to the Carolina
7 Environmental Study Group which held that decisions on
8 alternatives may deal with circumstances as they exist
9 and are likely to exist.

10 Now there's a role here for the
11 consideration of the Applicant's needs and goals.
12 Staff is not free to simply ignore the Applicant's
13 request. In a Commission decision in Private Fuel
14 Storage, in considering alternatives under NEPA, an
15 agency must take into account the needs and goals of
16 parties involved in the application. And in a recent
17 Commission decision in USBC, it said that in
18 considering alternatives, the Commission has held that
19 it is appropriate to consider the stated purpose and
20 means of the project.

21 Taking all that guidance into account,
22 staff went through it and carefully evaluated, as we
23 said, these alternatives and combination of
24 alternatives and staff concluded none were preferable
25 to the proposed action. Thank you.

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1 CHAIRMAN SPRITZER: You're welcome. And
2 we'll now hear from the Applicant.

3 OPENING STATEMENT OF TYSON SMITH, ESQ.

4 ON BEHALF OF THE APPLICANT, UNISTAR NUCLEAR ENERGY

5 MR. SMITH: Good morning. As you heard
6 from the Intervenors and from the NRC staff,
7 Contention 10-C challenges one small piece of the FEIS
8 for Calvert Cliffs 3, specifically the portion that
9 deals with the combination of energy alternatives. As
10 you'll hear from UniStar's expert witnesses and those
11 from the NRC staff, and as you read in their prefiled
12 testimony, the combination used in the FEIS is based
13 on the contributions of wind and solar power in
14 conjunction with natural gas and other renewables that
15 can reasonable be expected to satisfy the purpose and
16 need for Calvert Cliffs.

17 The FEIS does not understate the
18 contribution of wind and solar, nor does it overstate
19 the need for natural gas supplement.

20 Now at the outset, the purpose of the
21 project is to produce approximately 1600 megawatts of
22 baseload power in Maryland. UniStar has already
23 received a Certificate of Public Convenience and
24 Necessity from the Maryland Public Service Commission
25 and the Maryland PSC determined that there is a need

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1 for the baseload power from Calvert Cliffs in
2 Maryland. And also that Calvert Cliffs is a positive
3 effect on the reliability and stability of the
4 electricity system in Maryland. That is not in
5 dispute as part of Contention 10-C.

6 As required by NEPA, the NRC staff
7 considered a range of energy alternatives that could
8 satisfy that need for the baseload power that was
9 identified to state appropriately taking into account
10 technological availability, the regulatory and
11 economic environment for renewable development and the
12 time period of interest.

13 UniStar's expert witnesses concur with the
14 NRC staff's assessment of those energy alternatives.
15 Based on the Maryland Renewable Portfolio Standard,
16 the Maryland Longterm Electricity Report, Department
17 of Energy projections, and information on current and
18 planned renewable projects in Maryland, UniStar's
19 expert witnesses concluded that the combination
20 alternative reflects a realistic assessment of the
21 technologically feasible and economically viable
22 contribution of wind and solar to Maryland's energy
23 mix over the 10 to 15 years.

24 In contrast, the Intervenor's witness
25 takes an overly simplistic view of the potential

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1 contribution of wind and solar generation, at least
2 within the context of NEPA. It does not account for
3 the commercial, the technical, or even the practical
4 limitations associated with development of these
5 resources. For instance, the Intervenor's witness
6 discusses theoretical maximums rather than what is
7 realistic. It is not any more possible to cover
8 Maryland's solar panels than it is to put wind
9 turbines on every ridge top. The Intervenor's contend
10 that there is tremendous potential for offshore wind,
11 but in fact, there has been zero concrete progress
12 towards converting that potential into reality.

13 Likewise, even considering further
14 decreases in the cost of solar, solar development is
15 contingent on the Maryland renewable portfolio
16 standard and other incentives. The Intervenor's
17 incorrectly state that the FEIS is assuming that the
18 Maryland state law will fail or not be implemented.
19 That law is specifically addressed in the NRC staff
20 and UniStar expert testimony.

21 The Intervenor's also failed to grapple
22 with the need for energy storage to support renewables
23 as baseload power and there's no evidence or testimony
24 that would undermine the overall conclusion that none
25 of the energy alternatives are environmentally

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1 preferable to Calvert Cliffs 3.

2 The Intervenors' testimony and exhibits
3 simply do not call into question the reasonableness of
4 the combination alternative used in the FEIS. The NRC
5 staff, as supported by UniStar's experts, has met its
6 obligation to use reasonable forecasts and they have
7 come to grips with all important environmental
8 considerations. The NRC staff even performed a
9 sensitivity analysis or bounding analysis to provide
10 further support for the robustness of their
11 conclusions.

12 But regardless of the exact mix of
13 renewables used in the combination alternative, it's
14 important to keep the big picture in mind. None of
15 the energy alternatives are environmentally preferable
16 to the proposed action. Nuclear power has the lowest
17 direct impact of any energy source on the environment.
18 That includes impacts on land use, on air emissions,
19 water, and on ecological resources. And that's
20 because it does not emit carbon dioxide or other
21 harmful gases. It isolates its waste from the
22 environment and because it requires less area to
23 produce the same amount of electricity when compared
24 to other sources. In short, nuclear has a smaller
25 footprint and less emissions than the alternatives.

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1 In the end, the hypothetical combination
2 of energy alternatives used in the FEIS which includes
3 a very large contribution of wind and solar in
4 conjunction with energy storage and supplemented by
5 natural gas satisfies the need for baseload power. As
6 confirmed by UniStar's expert witnesses, the
7 combination alternative is based on a realistic
8 assessment of technological availability and
9 commercial viability over the period of interest. And
10 the combination alternative is not environmentally
11 preferable to Calvert Cliffs 3 even taking into
12 accounts some uncertainty regarding the precise
13 combination used in the FEIS.

14 As a result, the FEIS satisfies NEPA and
15 Contention 10-C should be resolved in favor of UniStar
16 and the NRC staff. Thank you.

17 CHAIRMAN SPRITZER: Thank you. Does the
18 State of Maryland wish to make any opening remarks?

19 MR. BOLEA: Thank you, Your Honor. The
20 State does not have an opening remark other than to
21 say we appreciate the opportunity to participate
22 today.

23 CHAIRMAN SPRITZER: All right. We're glad
24 to have you.

25 All right, the next matter will be to

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1 swear the witnesses that are here. Let me ask, is Mr.
2 Sklar here?

3 MR. MARIOTTE: No, our staff person is
4 still trying to contact him.

5 CHAIRMAN SPRITZER: All right. Quick
6 conference.

7 (Pause.)

8 CHAIRMAN SPRITZER: All right, I think
9 we'll proceed with the staff witnesses. Let me just
10 ask staff counsel in the event Mr. Sklar does appear,
11 he testifies after your witnesses are finished.

12 Will your witnesses still be available
13 assuming we're talking about today and not tomorrow?

14 MR. WILSON: Yes, Your Honor. Our
15 witnesses will be available both today and tomorrow.
16 Your Honor, our only concern to ensure that the Joint
17 Intervenors' witness is scheduled to appear at this
18 proceeding rather than going forward and having that
19 witness not appear at all.

20 CHAIRMAN SPRITZER: Well, the only thing
21 that seems logical to me at this point is to proceed
22 now with your witnesses. If we get to a point where
23 we're done with your witnesses and there's no
24 Intervenors' witness, that is Mr. Sklar, we may be in
25 a position to having to reevaluate. Is that an

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1 acceptable approach to everyone? I don't see any
2 other alternative right now.

3 MR. MARIOTTE: Yes, Your Honor. We are
4 still trying to reach him.

5 CHAIRMAN SPRITZER: All right.

6 MR. MARIOTTE: Have not been successful.

7 CHAIRMAN SPRITZER: All right, for the
8 witnesses that are here, I think it would be simplest
9 if we just swore all of you in at once and I'll swear
10 in Mr. Sklar in if we see him.

11 Can the witnesses who are going to testify
12 for the staff and for UniStar please rise? I'm going
13 to read you the witness oath. Please answer yes or
14 no, affirmatively, nods of the head, and you can do
15 this collectively.

16 Do you swear or affirm that the testimony
17 you are going to give in this proceeding is the truth,
18 the whole truth, and nothing but the truth?

19 (The witnesses were sworn.)

20 CHAIRMAN SPRITZER: Very good. Why don't
21 we proceed then with the staff witnesses. We'll get
22 started with you and we'll take a break in about 20
23 minutes or so.

24 (Pause.)

25 Does staff counsel wish to introduce your

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1 witnesses?

2 MR. WILSON: Yes, Your Honor. At this
3 time appearing for the staff of the Nuclear Regulatory
4 Commission, we have Mr. Andy Kugler and Ms. Katherine
5 Cort.

6 CHAIRMAN SPRITZER: Good morning. I think
7 in asking questions we'll direct questions to you,
8 generally. Both of you may respond to the same
9 question or one of you, whatever you consider most
10 appropriate.

11 I think your qualifications were generally
12 covered in your prefiled testimony. I guess the only
13 question I for both of you, do either of you have
14 professional experience evaluating the technical
15 feasibility of wind power or providing a required
16 amount of electricity other than your work on this
17 case?

18 MR. KUGLER: Well, Your Honor, I've worked
19 on evaluations for several of the applications in
20 front of the Commission, so it's not limited to just
21 this case. I've worked on energy alternatives for --
22 I'm not sure of the number, six or seven of the
23 applications that we have before us.

24 CHAIRMAN SPRITZER: And are those Final
25 Environmental Impact Statements that you were working

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1 on where you were evaluating alternatives?

2 MR. KUGLER: Yes, Your Honor. Some were
3 final, some are still in draft.

4 CHAIRMAN SPRITZER: Okay.

5 MS. CORT: I have also worked on a number
6 of applications, relicensing, and new licenses related
7 to alternatives. In addition, I have some experience
8 supporting the Energy Efficiency Renewable Energy
9 Office of the Department of Energy on some of their
10 small wind projects, assessing the costs and
11 viability.

12 CHAIRMAN SPRITZER: Okay. At this time
13 let me ask counsel whether anyone has any objections
14 to the staff witnesses' qualifications, both of them,
15 to provide the expert opinion testimony that is
16 contained in their prefiled testimony?

17 MR. MARIOTTE: We have no objections.

18 CHAIRMAN SPRITZER: And I take the staff
19 has no objection either?

20 MR. SMITH: We have no objection, Your
21 Honor.

22 CHAIRMAN SPRITZER: Very good. Well, let
23 me ask again by asking you a question that seems to be
24 raised frequently. What is your understanding of
25 baseload power, what does that mean?

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1 MR. KUGLER: Your Honor, our understanding
2 is baseload power is power that is provided on a
3 fairly steady basis. We say basically a power, but
4 that may not actually be the term, but a baseload
5 power plant is a plant that can generate electricity
6 steadily over extended periods of time.

7 In our testimony, we talked about a couple
8 of references, one from the Department of Energy where
9 it defined baseload in terms of typically fairly large
10 steam electric plants. And in addition, from the
11 renewable energy world we found a source that talked
12 about it in terms of capacity factors. And typically,
13 it said capacity factors in excess of 75 percent,
14 although in excess of 90 percent would be better; and
15 the capacity being defined as the average output of
16 the plant versus what its theoretical capacity would
17 be, if it was running 100 percent of the time.

18 CHAIRMAN SPRITZER: When you were
19 preparing the Calvert Cliffs FEIS, did you have a
20 particular capacity factor in mind for what Unit 3
21 would produce?

22 MR. KUGLER: Well, we did look at nuclear
23 plants in general and typically in this country,
24 capacity factors are around 90 percent or better. The
25 plant itself, we don't have a specific number in mind

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1 for Calvert Cliffs Unit 3, but we consider that it is
2 designed to operate in that manner, to operate
3 steadily for extended periods of time at full power.

4 CHAIRMAN SPRITZER: Can we bring up
5 Applicant's Exhibit 10, APL000010? And we'll start
6 with page 1.

7 (Pause.)

8 CHAIRMAN SPRITZER: Are you able to see
9 the exhibit?

10 MR. KUGLER: Yes, Your Honor. We can see
11 it here.

12 CHAIRMAN SPRITZER: This states -- it's a
13 little further down, I think it's the -- yes, third
14 paragraph on page 1. Yes, I think we got that. The
15 paragraph that begins "While Maryland will soon be
16 generating land-based wind power" -- see that?

17 MR. KUGLER: Yes, Your Honor.

18 CHAIRMAN SPRITZER: The last sentence says
19 "Offshore wind power holds much promise for the Mid-
20 Atlantic and Northeast States including Maryland
21 because it is an abundant resource proximate to
22 electric load centers." I realize this is not a
23 statement about any specific amount of power at any
24 specific time, but you generally agree with this
25 statement or not?

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1 MR. KUGLER: Yes, Your Honor. I would
2 agree. There is certainly offshore wind potential for
3 Maryland.

4 CHAIRMAN SPRITZER: What about the
5 statement in the same paragraph that "Offshore wind is
6 poised to take off."

7 MR. KUGLER: Well, in general, regarding
8 the statement itself, regardless of the location. I'm
9 not sure I would use the word "poised." It is
10 certainly an alternative that is possible. It's
11 something that could be built.

12 At this time as DOE has indicated in some
13 of its reports, there are still a number of barriers
14 to building offshore wind power in this country.
15 Power companies are trying to work through those
16 barriers. Cape Wind appears to be the first project
17 that's likely to actually be built, but it has been a
18 very long process getting there. They've been about
19 ten years in licensing and they're really not quite
20 out of the woods yet. But they are pretty close to
21 the point where they could build. I believe they're
22 dealing with legal challenges to the permits that they
23 currently have.

24 But in terms of offshore Maryland, right
25 now there really are no proposals to build offshore

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1 wind in Maryland. The one proposal that had been
2 aired by NRG, they have now backed away from at this
3 time, but could it be done at some point in the
4 future? It's possible. Right now, there's really
5 nothing on the horizon that we can see for certain.

6 In our process, we look to see what the
7 good sources such as the Department of Energy or the
8 State of Maryland what they think is likely to happen.
9 And in looking at that, the Department of Energy
10 currently predicts about 200 megawatts of offshore
11 wind power somewhere in the Mid-Atlantic, somewhere
12 within the next decade. It's not clear whether it
13 would be at Maryland or not. It could be somewhere
14 else in the Mid-Atlantic, but that's a relatively
15 small contribution and less than what we assume for
16 the total contribution of wind power being built in
17 this period.

18 CHAIRMAN SPRITZER: The first sentence in
19 the second paragraph beginning -- it says "Although no
20 offshore wind turbines have been installed in the
21 Americas" -- I take it that means North and South
22 America -- "offshore wind power is a proven technology
23 with more than 15 years of operating experience in
24 Europe." Do you agree with that?

25 MR. KUGLER: Yes, Your Honor. That's

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1 correct.

2 CHAIRMAN SPRITZER: The operating
3 experience in Europe, do you know who in Europe --
4 what do you call them, wind farms. Are they operated
5 by private companies that sell to a private market or
6 by government-controlled utilities or do you know?

7 MR. KUGLER: Honestly, I haven't looked at
8 it. I believe at least in the one case I do recall
9 looking at a proposed project that's not been built
10 yet. It's a private company. I'm not sure of the
11 extent of government supports in Europe. It probably
12 varies from one country to another. But there are
13 several places where they have wind farms in place.

14 CHAIRMAN SPRITZER: Do you have any
15 knowledge whether the technology that exists in
16 Europe, whether it's economically competitive with
17 other sources of power, that is, can they produce
18 power at a price that is competitive with other
19 sources?

20 MR. KUGLER: I've not studied Europe,
21 Europe's specific situation. What I can tell you is
22 that the cost of offshore wind is typically viewed as
23 being twice what it would be for onshore wind and in
24 the United States onshore wind is marginally
25 competitive in some places and fairly well competitive

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1 in other places. It depends on the resource, the wind
2 resource in a given location.

3 CHAIRMAN SPRITZER: What you said was
4 marginally competitive, onshore or off?

5 MR. KUGLER: Onshore. So typically
6 offshore is going to be a fair bit more expensive than
7 that. The basic situation that happened with the
8 Delaware project for NRG, they were looking to get
9 financing. They did have a power purchase agreement,
10 but only for a portion of the power from that wind
11 farm. They did not have a power purchase agreement
12 for the full output. But in that situation they were
13 not able to get the financing that they needed to
14 proceed. I think that is some indicator that
15 financially, investors looking at it did not feel that
16 it was going to be a good investment for them.

17 CHAIRMAN SPRITZER: Well, Intervenors in
18 their opening statement raised the point that
19 financing is also a problem for nuclear. Is that a
20 fair statement?

21 MR. KUGLER: I think that probably is a
22 fair statement. Yes, sir.

23 CHAIRMAN SPRITZER: That would include
24 Calvert Cliffs Unit 3?

25 MR. KUGLER: I would assume so, sir.

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1 CHAIRMAN SPRITZER: All right. My
2 understanding at least from earlier proceedings in
3 this case was that they were seeking -- what is it
4 called -- a loan guarantee from the Department of
5 Energy. Do you know anything about that?

6 MR. KUGLER: I'm aware of it. I don't
7 really know any of the details.

8 CHAIRMAN SPRITZER: Ms. Cort, do you have
9 anything to add on these points?

10 MS. CORT: No, I have nothing to add.

11 JUDGE ARNOLD: You mentioned 15 years of
12 experience with offshore wind in Europe. Does that
13 give them enough information to determine things like
14 longevity of an offshore wind turbine and the type of
15 maintenance costs they may incur later in life?

16 MR. KUGLER: I don't know that -- I'm not
17 sure I could characterize it accurately. I believe
18 they have certainly gotten information on the
19 maintenance up to this point and how it proceeds.
20 Certainly, offshore wind turbines present special
21 challenges for maintenance purposes that onshore wind
22 turbines don't.

23 So they have information on how much it
24 costs to maintain, but whether what the life spans
25 will be, I don't know that they've really proven it

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1 out because I believe they're built to last longer
2 than 15 years. So none of them will have reached
3 their theoretical end of life yet. Whether they
4 operate beyond that or not, I don't know that they
5 have enough information yet.

6 CHAIRMAN SPRITZER: Can we move to page 19
7 of this document? There's a table that appears here,
8 refers among other things to power generation
9 potential by at a depth of I believe 0 to 35 meters.
10 Would you agree that there is existing proven offshore
11 wind power technology for use in waters of that depth,
12 0 to 35 meters?

13 MR. KUGLER: Yes, Your Honor.

14 CHAIRMAN SPRITZER: What about beyond 35
15 meters, the next level depth they talk about is 35 to
16 50 meters.

17 MR. KUGLER: I believe in Europe there are
18 at least some turbines installed in waters that might
19 be in that range. I'm not certain of the depths of
20 all the installations in Europe. I know they've been
21 working on some installations that could go as deep as
22 100 meters, but I'm not sure any are installed yet.
23 But in the 35 to 50 meter, I'm not certain what depths
24 are all set at.

25 CHAIRMAN SPRITZER: Maybe I should make

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1 this general statement, we don't want you to speculate
2 here. I don't know or I'm not sure of the answer is
3 perfectly acceptable.

4 Now this table provides various figures
5 for offshore wind power generation potential by water
6 depth. Looking at the 0 to 35 meter depth, it states
7 -- again, with the understanding this is simply
8 potential and not something that they are predicting
9 -- will be developed with any particular finding at
10 any particular time, a potential of 2,925 wind
11 turbines if I'm interpreting that correctly. Do you
12 read the table the same way?

13 MR. KUGLER: Yes, I do, Your Honor.

14 CHAIRMAN SPRITZER: Do you dispute that
15 figure as being a reasonable approximation?

16 MR. KUGLER: I'm trying to recall. The
17 Department of Energy did its own study looking at each
18 state's wind potential. I think actually in our
19 testimony, we may have given a number if you could
20 give me just a moment.

21 CHAIRMAN SPRITZER: Sure, take your time.

22 (Pause.)

23 MR. KUGLER: On page 27 of our testimony
24 in our answer 33, we talk about that report which is
25 NRC Exhibit 24.

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1 CHAIRMAN SPRITZER: Okay.

2 MR. KUGLER: And in that exhibit on page
3 -- let's see page 60 to 63, there's a table that
4 provides data for the states and for Maryland, it
5 actually attributes -- now this is out to all the
6 depths about 54,000 megawatts. So the table -- I'm
7 sorry, he's going to get that one.

8 (Pause.)

9 I think you have to go a little further up
10 for Maryland.

11 (Pause.)

12 CHAIRMAN SPRITZER: Just so the record is
13 clear, the exhibit you're looking at now is Exhibit --

14 MR. KUGLER: Exhibit NRC 24.

15 CHAIRMAN SPRITZER: Okay, go ahead.

16 MR. KUGLER: If you could scroll to
17 Maryland. Okay. So the far right-hand side gives the
18 totals and on the left side or -- I'm sorry. If you
19 look at the center of the table it talks about
20 capacities at different depths or different distances
21 from shore. It's actually a combination of those two.

22 In the 0 to 30 meter range, I'd have to --
23 we have to add the numbers up, but it looks like a
24 little bit over 10 gigawatts or 10,000 megawatts. So
25 the numbers are not significantly different between

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1 this study and the study that was being referenced.
2 They're in the same ballpark.

3 But certainly, it's a substantial number
4 when you look at the pure potential in excess of --
5 let's say at least in excess of 10 gigawatts.

6 CHAIRMAN SPRITZER: Now returning, if we
7 could go to -- and the two exhibits were -- just so
8 we're clear is Table 3 on APL-10 and what is this --
9 Table --

10 MR. KUGLER: 4-3.

11 CHAIRMAN SPRITZER: NRC 24. Okay. Now
12 returning if we could to APL-10, again on page 19.
13 That's the same page we were on. There we go. It's
14 got two figures or two columns, one for nameplate
15 capacity and one for -- the second for -- the next one
16 over, for average output. Nameplate capacity, is that
17 the same as installed capacity?

18 MR. KUGLER: Yes, Your Honor.

19 CHAIRMAN SPRITZER: What does that
20 represent?

21 MR. KUGLER: That would be if you install
22 a 5 megawatt turbine, it's a 5 megawatt capacity.
23 That was designed as its maximum output.

24 CHAIRMAN SPRITZER: Okay, and when you say
25 nameplate capacity, of 14,625 megawatts, is that a

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1 rate or something else?

2 MR. KUGLER: It's the maximum output. If
3 you build turbines in every location you possibly
4 could and you put them all out there, I'm not sure
5 what size turbines they were assuming, but if you
6 build all the turbines out there you could, what
7 they're saying is the total capacity at full power of
8 all those turbines combined would be over 14,000
9 megawatts.

10 CHAIRMAN SPRITZER: And the next figure,
11 or the next column over gives us a figure for average
12 output. I take it that's also in megawatts?

13 MR. KUGLER: Yes, Your Honor.

14 CHAIRMAN SPRITZER: Do you have an
15 understanding of what this table is referring to when
16 it talks about average output?

17 MR. KUGLER: Yes, Your Honor. This would
18 be on average how much you would actually get out. So
19 if you've installed over 14,000 megawatts of capacity,
20 which is on your absolute best day, theoretically,
21 that's the most you would get. But on average what
22 your output would be is a little bit under 5,000
23 megawatts, 4,982 megawatts. So that's your average
24 output. And so when you looked at capacity factors we
25 talked about earlier, you would take that 4,982

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1 megawatts average output, divide it by the 14,625
2 megawatts of installed capacity and that would be your
3 capacity factor.

4 So round numbers, it's probably about 34
5 percent is what that looks like, 35 percent, in that
6 range. It may be -- well, I don't want to speculate
7 as to how they came up with their numbers, but that's
8 what they believe they would be able to get out of it.

9 ADMIN. JUDGE SAGER: Pardon. I wanted to
10 ask a quick question of clarification. So in the
11 staff documents, they use megawatts with a little e.
12 Is that what we're referring to as average?

13 MR. KUGLER: Actually, not necessarily.
14 We use megawatt e just meaning megawatts electric. So
15 you could have a capacity of megawatts electric and
16 you could also have an actual average output. I think
17 typically and hopefully we were clear in our testimony
18 when we were talking capacity and when we were talking
19 average output.

20 CHAIRMAN SPRITZER: Okay, now is there any
21 relationship between the concept of average output as
22 you define the term and baseload power? Are they in
23 any way related?

24 MR. KUGLER: I would say there is some
25 relationship. A plant that typically is used to

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1 provide baseload power is a plant whose average output
2 is fairly close to its rated output. So for example,
3 average for nuclear power plants in this country is a
4 little bit over 90 percent capacity factor. So if you
5 have a 1,000 megawatt plant, it doesn't run all the
6 time at 100 percent capacity. But it's average output
7 over time is about 900 megawatts.

8 So when we look at this, if you look at
9 say wind turbines, right now typical onshore
10 installations if you've got a good location, you might
11 be talking around 34 percent capacity factor. So if
12 you have 1,000 megawatts of wind turbines installed
13 which would be a pretty big wind farm, you would get
14 on average 340 megawatts out of it.

15 Offshore wind usually you can get a better
16 capacity factor because the winds tend to be steadier
17 offshore, but typically we'd be looking more in the
18 range of 40 percent on average, depending on location.
19 So there if you install 1,000 megawatts offshore, you
20 would get on average about 400 megawatts out.

21 CHAIRMAN SPRITZER: Okay, now if I took
22 this 4,982 megawatt figure and multiplied it by the
23 capacity factor for offshore wind, let's say 40
24 percent, does that give me a figure in baseload power
25 or not?

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1 MR. KUGLER: Actually, the number 4,982 is
2 the average output.

3 CHAIRMAN SPRITZER: Okay.

4 MR. KUGLER: Now one of the challenges for
5 sources like wind and solar is they are intermittent
6 in nature. They're not controllable by the dispatcher
7 in the same way other plants typically are. So if the
8 dispatcher needs power and there's no wind at that
9 moment, he can't get the wind power. So that creates
10 a challenge for them. But what this number indicates
11 is that on average over the course of time this is how
12 much energy you could get out of that 14,600 megawatts
13 of installed capacity. You would get around a little
14 under 5,000 average output, but some days you might be
15 getting the 14,000. Other days you may be getting
16 zero. So it's going to vary depending on the
17 availability of wind at that location.

18 CHAIRMAN SPRITZER: So the 4,982 average
19 output already reflects multiplying the nameplate
20 capacity by the estimated --

21 MR. KUGLER: Capacity factor. Yes, Your
22 Honor.

23 CHAIRMAN SPRITZER: Again, I'm trying to
24 get clear in my own mind, you understand I'm not an
25 electrical engineer or a nuclear engineer, what

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1 connection there is, if any, between this 4,982 and
2 quote baseload power? If I was looking at this table,
3 could I say let's assume hypothetically that 2,925
4 wind turbines were installed at a depth of 0 to 35
5 meters, with this nameplate capacity of 14,625, that
6 I could be confident of having 4,982 megawatts of
7 baseload power from such an installation?

8 MR. KUGLER: No, that wouldn't be correct.

9 CHAIRMAN SPRITZER: Okay, explain why not?

10 MR. KUGLER: Okay, I'll explain why.
11 Again, what that is is an average output. Now you've
12 got over 14,000 megawatts installed. So on a really
13 good day, you're going to have over 14,000 megawatts
14 of output from those wind turbines. You may not be
15 able to use all that. One of the challenges, for
16 instance, in West Texas, there's a lot of wind farms
17 in West Texas, great output, they're a good wind.
18 They can't always get the power where they need it
19 because the power's needs is in the eastern part of
20 the state and the transmission system often limits
21 them. So there are times when they actually have to
22 reduce the output of the wind turbines below what they
23 could be getting out of them because they simply don't
24 have the transmission capacity.

25 Other times when they need the power, they

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1 may not be getting any from the wind turbines if the
2 wind doesn't happen to be blowing at that time.

3 Now we talk about in both the EIS and in
4 the testimony about there are ways you can try and
5 smooth that output and one possibility is compressed
6 air energy storage. What would you do there is when
7 you've got a lot of wind blowing and you've got a lot
8 of output, but you don't need it all, you would store
9 energy and then when you needed it and the wind wasn't
10 blowing, you could recover that energy and you could
11 basically smooth the output. So although wind
12 turbines by themselves don't work well for baseload
13 power, coupling it with energy storage would allow it
14 to act a lot more like baseload power.

15 CHAIRMAN SPRITZER: If I'm understanding
16 what you're telling me, the 4,982 average output could
17 have a lot of variability built into it?

18 MR. KUGLER: Yes, Your Honor.

19 CHAIRMAN SPRITZER: On average I drink two
20 cups of coffee a day, but one day I might drink one,
21 the next day five, the next day two, and so forth.

22 MR. KUGLER: Right.

23 CHAIRMAN SPRITZER: So the average output
24 figure doesn't address, doesn't incorporate the
25 variability. Is that at least part of the problem?

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1 MR. KUGLER: It doesn't really show you
2 how much it varies, that's correct. You can't really
3 see it in that number, although you get a sense of it
4 from the total installed capacity and the large
5 difference between the installed capacity and the
6 average output.

7 CHAIRMAN SPRITZER: Is there some way that
8 engineers use to measure the variability as well as
9 the average? I mean in statistics you have a mean and
10 then you have a standard deviation, something like
11 that. Do you use equivalent-type data in evaluating
12 electric systems, electric supply systems?

13 MR. KUGLER: I have not done anything of
14 that nature. I suspect they do. I know in some of
15 the studies that I've looked at they do talk about
16 studying how they expect the wind to vary and how well
17 can they forecast the variability of the wind, what
18 can they expect out of a wind farm and then how do
19 they accommodate that in the grid?

20 This is probably one of the greatest
21 challenges facing the grid operators right now because
22 around the country we're trying to incorporate
23 renewables. But incorporating wind and solar presents
24 some real challenges to the grid operators in how they
25 compensate for this variability over which they really

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1 have no control.

2 There's always built-in reserve in the
3 grid. You have to have reserve margins in order to
4 accommodate a power plant going down suddenly. So you
5 have to have something behind it that you can start
6 up. It doesn't necessarily belong to the company
7 whose power plants shut down. It may belong to some
8 other company, but the grids are all interconnected
9 and there are grid operators who will order resources
10 to fill in for unexpected occurrences or for expected
11 occurrences. If a plant is planning to shut down,
12 then the grid operators will lay out ahead, all right,
13 how am I going to compensate for that? What am I
14 going to start up in its place? So there has to be
15 margin. A typical reserve margin may be 15 or 17
16 percent of the grid.

17 CHAIRMAN SPRITZER: Now you mentioned
18 compressed air storage is one way of dealing with the
19 variability of wind. Would the mechanism you just
20 described also be a way of dealing with the
21 variability problem?

22 MR. KUGLER: It's another way you could do
23 it. It is more difficult for the grid operators I
24 think to deal with. It depends on how much wind
25 you're try to integrate into the grid. If you're only

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1 integrating a small amount, like right now in Western
2 Maryland there's 120 megawatts of wind farms. One
3 hundred twenty megawatts for the size grid we're
4 talking about in ReliabilityFirst East area, they can
5 probably accommodate that without too much of a
6 challenge. They have enough small reserve plants that
7 can come up quickly or go down quickly that they can
8 probably accommodate that. It becomes more of a
9 challenge the more wind or the more solar you're
10 trying to integrate into the grid because the bigger
11 those contributions become, the more you have to try
12 and compensate for.

13 CHAIRMAN SPRITZER: Now I believe the
14 figure you used in the FEIS for Calvert Cliffs was in
15 the neighborhood of 300 or 350 installed capacity. Do
16 you remember the precise number?

17 MR. KUGLER: For wind we were talking 100
18 megawatts on average and so we said 250 to 300
19 megawatts installed capacity.

20 CHAIRMAN SPRITZER: And that was to all be
21 onshore wind, I think.

22 MR. KUGLER: Actually, we didn't specify.
23 It could have been -- and actually, the range, the 250
24 would really be offshore because that's about a 40
25 percent capacity factor. And the 300 was -- if you

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1 were building onshore because that has a lower
2 capacity factor. You need more installed capacity.

3 CHAIRMAN SPRITZER: So in the FEIS, you
4 didn't differentiate between -- your figure did not
5 focus on onshore versus offshore. It was total wind
6 --

7 MR. KUGLER: No, Your Honor.

8 CHAIRMAN SPRITZER: Total wind capacity.

9 MR. KUGLER: Yes, Your Honor.

10 CHAIRMAN SPRITZER: Now for a supply on
11 the order of -- an installed capacity on the order of
12 300 megawatts, would this reserve approach that you've
13 been describing be a feasible approach for dealing
14 with the variability?

15 MR. KUGLER: The grid operator would have
16 to look at that. I can't tell you for certain. When
17 a new plant of any sort is going to be connected to
18 the grid, the owner has to work with the grid operator
19 and go through a process in which they will look at
20 what they expect the output of the plant to be, how
21 it's going to be integrated into the grid, how loss of
22 plant will be compensated for and you have to look at
23 a number of different aspects beyond just the amount
24 of power. They have to look at where the power is
25 entering the grid.

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1 Some places you have a lot of congestion
2 and it may be hard to get power in there if a plant
3 goes down. Other places it wouldn't be as difficult.
4 So they look at all of those factors in determining
5 whether to approve adding a plant to a given location
6 in the grid.

7 So in this case, if such wind power were
8 proposed, the grid operator would work through how
9 they would compensate for it. Compressed air energy
10 storage is one way to do it which will give you the
11 smoother output. Compressed air energy storage is
12 environmentally better than the typical methods that
13 the power company might use to compensate because
14 you're using the air pressure from the compressed air
15 energy storage as part of your energy to drive a
16 generator. Now there's also combustion of gas in the
17 typical case facilities, the two that exist today.

18 If you instead said well, I'm not going to
19 do CAES. We've talked to the grid operator. They're
20 going to cover us probably with gas turbines because
21 they react quickly. Then there will be a little bit
22 more of an environmental impact because you'll have
23 more gas burned to compensate for the lost power than
24 you would if you had CAES. It's not a large
25 difference. So it probably could be done if it can be

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1 worked out with the grid operator.

2 CHAIRMAN SPRITZER: Now with respect to
3 the combined alternative that you looked at for
4 Calvert Cliffs Unit 3, assuming you could have, let's
5 assume hypothetically that you could have a total of
6 installed capacity for wind of 1600 megawatts
7 electric, equivalent to Calvert Cliffs. I'm not
8 saying that's true. I'm just saying let's assume that
9 hypothetically.

10 MR. KUGLER: Okay.

11 CHAIRMAN SPRITZER: Could you use a
12 natural gas plant cycling up and down as the need
13 arose to compensate for the variability in the wind
14 production?

15 MR. KUGLER: You could do that. You would
16 need a large natural gas plant to do that. And it
17 becomes rather expensive because in essence what
18 you're going to do is you're going to build two power
19 plants. You're going to build a wind power plant of
20 1600 megawatts and a gas power plant of 1600
21 megawatts. And the wind plant will operate at let's
22 say it's offshore 40 percent of its capacity which is
23 all you're going to get out of it and then the gas
24 power plant will run at about 60 percent capacity
25 because it's only going to be supplying power when you

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1 compensate for the wind.

2 So it gets a little expensive to do it
3 that way.

4 CHAIRMAN SPRITZER: You're in effect
5 building double the capacity you need.

6 MR. KUGLER: When you start having large
7 penetrations of these renewables, that's in essence
8 what you end up having to do in order to compensate.
9 It's not really quite as simple as that because again,
10 you have these large grids that are integrated with a
11 lot of different sources tied to it. So when you go
12 to that grid operator and say I'm going to build 1600
13 megawatts of wind power here, they may be able to
14 compensate for a part of it with existing reserves,
15 but you would almost certainly still have to build
16 something to compensate for some of that power because
17 it's just such a large component that's going to be
18 very variable.

19 CHAIRMAN SPRITZER: In Europe where they
20 told us they use wind, offshore wind farms, do they
21 combine? Are there any systems there that you know of
22 that combine offshore wind with a natural gas plant in
23 the manner we've just been talking about?

24 MR. KUGLER: I actually don't have any
25 information on exactly how they compensate for their

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1 wind over there. They obviously have come up with
2 some ways to integrated it into the grid, but I'm not
3 sure if they've built gas plants or something else.
4 The reason I tend to look at gas plants, gas plants
5 can respond quickly. So if you have a fairly sudden
6 change in your wind power output, the gas plants are
7 able to come up quickly to respond to that. Coal
8 plants tend to be fairly slow coming up. Nuclear
9 plants are fairly slow coming up. Hydropower plants
10 can also respond quickly. So if you have hydropower
11 available, that's another option.

12 CHAIRMAN SPRITZER: Now the FEIS for
13 Calvert Cliffs Unit 3, again when you're looking at
14 combined alternative, as I understand it, you assumed
15 a baseload contribution, baseload, not installed
16 capacity from the various renewables, wind, solar, and
17 I think there were several others, also for
18 conversation and demand-side management. The total of
19 all those added together expressed in terms of
20 baseload power was 400 megawatts electric?

21 MR. KUGLER: Yes, Your Honor.

22 CHAIRMAN SPRITZER: And you assumed a
23 continuously operating gas plant producing the
24 remaining 1200 megawatts electric that you would need
25 to get up to the total baseload provided by Calvert

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1 Cliffs Unit 3.

2 MR. KUGLER: Yes, that's correct.

3 CHAIRMAN SPRITZER: Now did you look at
4 the possibility of increasing the contribution from
5 the total renewable sources including wind and solar
6 above 400 and using that to reduce the amount of time,
7 if that's the appropriate phrase, that the gas plant
8 would have to operate?

9 MR. KUGLER: Well, let me back up a little
10 bit and talk about how we approach this. The basic
11 approach following our guidance is to look for various
12 alternatives that individually could replace the
13 proposed project and possible combinations of
14 alternatives.

15 So the way we approached the renewables
16 was looking at reports from the Department of Energy
17 and reports from Maryland, we developed what we
18 thought were reasonable contributions from wind,
19 solar, biomass, hydro, and we added everything
20 together and we came up with that 400. And then we
21 replaced the balance with the 1200 natural gas plant.

22 We believe that that's a reasonable
23 combination of alternatives. Actual renewables may be
24 less than 400 or it could be more, but we think 400 is
25 in about the right range. We did in the Environmental

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1 Impact Statement and in response to comments we
2 received on the draft, we did include a scenario where
3 we quadrupled the amount of wind power, so it would
4 have been 400 megawatts baseload equivalent of wind
5 power, equivalent to 1,000 to 1,200 megawatts
6 installed capacity, depending on where it was built.

7 Now we didn't consider that to be an
8 actual alternative because we don't foresee that as
9 actually happening in the time frame we're looking at,
10 but we felt it would be useful to decision makers to
11 see well, what would that look like?

12 When we included that scenario, it reduces
13 the size of a natural gas plant down to 900 megawatts
14 which is still a pretty big natural gas plant. You
15 now increase the impacts from the wind farms. If
16 they're built on shore, you increase the land area
17 that has to be cleared for these wind farms. If you
18 do it offshore, you're taking up a very large area.
19 I believe in our testimony, we spoke to what it would
20 look like and I think it was 55 square miles that you
21 would cover with wind turbines offshore somewhere.
22 So you increase those impacts. You marginally
23 decrease the impacts of a natural gas plant, but it's
24 the emissions of the natural gas plant are still
25 pretty significant.

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1 CHAIRMAN SPRITZER: Did you calculate how
2 much the emissions from the natural gas plant would go
3 down under the scenario you just mentioned?

4 MR. KUGLER: We didn't do it in the EIS.
5 We recognize it would be roughly three quarters, so we
6 knew what it would be. We didn't actually put that
7 calculation into the Environmental Impact Statement.

8 CHAIRMAN SPRITZER: What would be three
9 quarters?

10 MR. KUGLER: I'm sorry, the emissions
11 would be roughly -- in going from a 1,200 megawatt gas
12 plant down to a 900 megawatt gas plant, you would be
13 at roughly three quarters of the emissions of what we
14 have calculated for the combination alternatives. But
15 it's still very significant. I believe the number, I
16 believe it's in our testimony, but it's over three
17 million tons per year for CO₂ and various other
18 emissions as well. CO₂ is obviously a pretty
19 significant one right now.

20 CHAIRMAN SPRITZER: Now if -- I would take
21 it that if the natural gas plant were operating in the
22 scenario you just described, the natural gas plant is
23 still operating full time, 100 percent of the time.

24 MR. KUGLER: That's correct.

25 CHAIRMAN SPRITZER: And just applying a

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1 lower wattage, 900 instead of 1,200. Is that correct?

2 MR. KUGLER: That's correct.

3 CHAIRMAN SPRITZER: If we have a 900
4 megawatt natural gas plant and it's cycling up and
5 down as needed because we have even more,
6 hypothetically again, I'm not saying this statement is
7 feasible. Assuming hypothetically that we had even
8 more contribution from the renewables, would that
9 further tend to reduce the emissions that the natural
10 gas plant is operating intermittently rather than full
11 time?

12 MR. KUGLER: Certainly if you reduce the
13 amount of time it's running, it would reduce the
14 emissions, but at the same time you're going to be
15 increasing impacts from whatever you're adding,
16 whether it be wind or solar. Those impacts continue
17 to go up.

18 CHAIRMAN SPRITZER: Okay.

19 ADMIN. JUDGE SAGER: One quick question.
20 Why quadruple? You picked the number quadruple for
21 sensitivity analysis. Why not five times or ten
22 times?

23 MR. KUGLER: I don't think there was a
24 specific reason we picked that number. We felt that
25 was going well beyond what we thought was reasonable

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1 without getting completely ridiculous. I really don't
2 see with what's happening right now that we could see
3 a 1,000 megawatts of wind power in Maryland any time
4 in -- anywhere in this timeframe. Things would have
5 to change dramatically to drive growth like that, but
6 we just felt that that was showing that even with this
7 significant change beyond what we thought was
8 reasonable, it really didn't affect the outcome
9 because you're still going to need a big natural gas
10 plant and you're still going to have -- you're going
11 to have more impacts associated with that expansion of
12 the wind farm.

13 CHAIRMAN SPRITZER: But when you said
14 change the outcome, from what I've understood your
15 testimony so far it would change in a downward
16 direction the quantity of emissions if we just look at
17 the number of the amount of emissions, if we just look
18 at the number of amount of emissions.

19 MR. KUGLER: Yes, sir. What I'm saying is
20 it wouldn't bring you to the point where that option
21 would be environmentally preferable to the proposed
22 action.

23 CHAIRMAN SPRITZER: Okay. I just wanted
24 to clarify your testimony. Okay.

25 We're 5 of 11. Let me just ask the

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1 Intervenor, any word about the whereabouts of Mr.
2 Sklar?

3 MR. MARIOTTE: No, Your Honor.

4 CHAIRMAN SPRITZER: All right. This might
5 be a good time to taken a ten minute or so break.
6 We'll resume about 11:05.

7 (Whereupon the above-entitled matter went
8 off the record at 10:55 a.m. and resumed at 11:11
9 a.m.)

10 CHAIRMAN SPRITZER: Witnesses, of course,
11 are still under oath. You used the term during your
12 testimony, I believe it was, time table -- time frame,
13 I believe is the term, what time frame were you
14 referring to?

15 MR. KUGLER: Well, in looking at the --
16 using the application as a starting point for our
17 review, actually the environmental report and in terms
18 of what was done for the Environmental Impact
19 Statement, we were looking at a completion of
20 construction at the end of 2015. In the most recent
21 revision to the application in Part 1, UniStar
22 indicates revised date for the completion of
23 construction of 2017. Our testimony talks about both.
24 But the Environmental Impact Statement was done in
25 terms of 2015. But in writing our testimony knowing

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1 now the 2017 date, we did consider 2017 in our
2 considerations.

3 CHAIRMAN SPRITZER: All right, when in
4 2017?

5 MR. KUGLER: End of December, end of the
6 year.

7 CHAIRMAN SPRITZER: But in terms of the
8 FEIS itself, when it talks about the amount of wind
9 power generation that was considered foreseeable, that
10 was based on the December 2015 figure. Is that
11 correct?

12 MR. KUGLER: That's correct.

13 CHAIRMAN SPRITZER: Do you know the
14 construction time required to install a wind turbine
15 at 0 to 35 meters, that's an offshore wind turbine,
16 obviously?

17 MR. KUGLER: I don't know specifically the
18 construction time. I have seen in one of the exhibits
19 and I'll be honest, I don't recall which one. I don't
20 think it was one of ours, but it talked about it was
21 possible to take a project from beginning of
22 permitting to completion of construction within a
23 couple of years. It's possible. It doesn't
24 necessarily always work that way. I believe maybe in
25 one of the Intervenor exhibits, but I cannot recall

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1 which one at this point.

2 CHAIRMAN SPRITZER: And that's for
3 offshore wind or onshore?

4 MR. KUGLER: That was onshore.

5 CHAIRMAN SPRITZER: For offshore wind?

6 MR. KUGLER: I don't have a number for
7 offshore.

8 CHAIRMAN SPRITZER: Okay. What about
9 cost, the cost of installing a wind turbine today in
10 0 to 35 meters of water?

11 MR. KUGLER: We didn't actually get into
12 the cost figures and I'll explain why. The way our
13 guidance has us approach this review, the first thing
14 we do is we look for feasible alternatives that could
15 meet the purpose of the project. And then we compare
16 them to the proposed action and determine whether any
17 are environmentally preferable. If none are found to
18 be environmentally preferable, we're done. We don't
19 ever look at cost because the cost isn't relevant at
20 that point. The only time we would look at cost would
21 be if we had determined that there was an
22 environmentally preferable alternative. We would then
23 look at other factors as to whether there was some
24 other reason it might not be practical as an
25 alternative. So we really didn't get into costs when

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1 we were evaluating these alternatives.

2 JUDGE ARNOLD: Along that line, do you
3 have specific criteria that you use to decide whether
4 or not an alternative is reasonable and needs to be
5 evaluated in the EIS?

6 MR. KUGLER: We do. In the Environmental
7 Standard Review Plan, we talk about it being
8 commercially viable and available in the region,
9 something that is a proven technology. I'm sure we
10 have it in the testimony, if you give me just a
11 moment.

12 JUDGE ARNOLD: Wouldn't commercially
13 viable also include cost?

14 MS. CORT: Yes. I'll address that. When
15 we are doing the review of the energy alternatives, as
16 Mr. Kugler mentioned, we look generally at the
17 technical feasibility and the commercial viability in
18 a given region of interest. And certainly cost plays
19 a role in the commercial viability of a given
20 technology. So in a broad and general sense we look
21 at cost, but in terms of comparing, doing a detailed
22 cost comparison of one technology with another, that
23 wouldn't come into play unless we were to determine
24 that the energy alternative was environmentally
25 preferable to the proposed action.

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1 That said, however, when in deriving the
2 contributions, individual contributions to the
3 combination of energy alternatives, we relied on
4 projections from the State of Maryland and from the
5 Department of Energy, U.S. Department of Energy, and
6 these analyses and projections did specifically and
7 explicitly consider the cost of technologies. And so
8 in relying on some of these projections we've
9 indirectly considered the cost of various
10 technologies.

11 CHAIRMAN SPRITZER: All right, let me make
12 sure I understand. So the projections you were
13 relying on from the Department of Energy and others,
14 they would reflect information about the comparative
15 cost of, for example, wind versus alternatives.

16 MS. CORT: That is correct.

17 CHAIRMAN SPRITZER: To what extent today,
18 if you know, did the Department of Energy projections
19 compare the cost of building a new nuclear power plant
20 such as Calvert Cliffs Unit 3 and the cost of
21 installing offshore wind turbines, for example?

22 MS. CORT: It's pretty complicated to
23 answer that in some respects because this is all
24 compared in a rather complex modeling system, referred
25 to as the National Energy Modeling System. And that's

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1 the model that produces the results to the Department
2 of Energy's The Annual Energy Outlook. And it's the
3 regional supplemental tables to The Annual Energy
4 Outlook that we relied on to inform the process.

5 But to get back to how is cost considered,
6 within the model, they'll look at the capital costs of
7 installation and those are termed as overnight capital
8 costs, but those are all moderated with considerations
9 of investment certainty and the productivity
10 improvements in a given industry through a series of
11 scalars which take into consideration technical
12 optimism and learning and contingencies in financing.
13 So the actual costs, the effective costs that are
14 compared are embedded in the model and so it's a
15 little difficult to compare one to the other.

16 In addition to the costs, they will
17 consider tax incentives and credits and regulation,
18 policy factors such as renewable portfolio standards,
19 for example.

20 CHAIRMAN SPRITZER: I guess what I'm
21 trying to get at it sounds to me what DOE was doing
22 was comparing costs in a very broad nationwide sense,
23 looking at all kinds of different technologies. Is
24 that a fair --

25 MS. CORT: No, actually, it's at a

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1 regional basis, so all regional multipliers are
2 applied to 22 different regions throughout the U.S. so
3 that they have a more specific regional outlook to the
4 costs.

5 CHAIRMAN SPRITZER: What region is
6 Maryland a part of?

7 MS. CORT: In The Annual Energy Outlook,
8 for the electricity capacity expansion module, they're
9 considered the RFC East region which --

10 MR. KUGLER: ReliabilityFirst Corporation.

11 MS. CORT: East Region. That includes
12 four states: New Jersey, Delaware, most all of
13 Pennsylvania, and Maryland.

14 CHAIRMAN SPRITZER: Okay, if I was trying
15 to do a cost comparison of offshore wind power to the
16 cost of constructing Calvert Cliffs Unit 3, do you
17 believe that type of information provides a reliable
18 basis for making that very specific comparison?

19 MS. CORT: I believe that the projections
20 that we relied on include and consider most of those
21 factors, but I myself wouldn't be able to compare one
22 cost with another and come up with my own projection.

23 CHAIRMAN SPRITZER: The reason I ask that
24 is I understand we're looking at the question what
25 would be a reasonable alternative to Calvert Cliffs

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1 Unit 3? Let me ask just one more point of
2 clarification on this issue. Did the staff ever do a
3 direct side-by-side comparison of cost of Calvert
4 Cliffs Unit 3 versus the cost of new wind turbines
5 installed in shall offshore waters side by side?

6 MS. CORT: No.

7 MR. KUGLER: No, Your Honor. We never did
8 that.

9 CHAIRMAN SPRITZER: All right. If we
10 could go back briefly to Applicant's Exhibit 10 and it
11 would be on page 20, Table 4. Now the top row gives
12 us estimates of annual generation in megawatts hour
13 per year at 0 to 35 depth. This is for Maryland
14 offshore wind potential, gives us, I believe, the same
15 figure we were looking at before for average output.
16 And it's telling us, I believe, in the column labeled
17 percentage of load that this level of output would
18 provide 67 percent of load. Do you understand what
19 load means or how it was used in this document?

20 MR. KUGLER: Yes, Your Honor. Looking at
21 the paragraph above, it explains it a bit.

22 CHAIRMAN SPRITZER: Okay, all right.

23 MR. KUGLER: So in other words, what
24 they're saying here, if you look at that paragraph
25 above, they say in Maryland in 2007, the State

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1 consumed a little over 65 million megawatt hours.
2 That's how much energy was actually used in
3 electricity. And theoretically, offshore wind in the
4 0 to 35 meter realm, again, if you fill the entire
5 space with wind turbines, you could theoretically get
6 a little over 43 million megawatt hours out of the
7 wind turbines which would be roughly two-thirds of all
8 the energy consumed in Maryland.

9 CHAIRMAN SPRITZER: Now understanding that
10 this is purely a theoretical estimate, do you have any
11 problem with that as a realistic projection?

12 MR. KUGLER: That's actually two different
13 questions. I don't think it's a realistic projection,
14 but it's probably a reasonable theoretical projection
15 of what could be done. Again, you would have to fill
16 the entire area with wind turbines.

17 CHAIRMAN SPRITZER: All right.

18 MR. KUGLER: And I'm trying to recall, I
19 don't recall this report offhand, whether it
20 considered things like shipping lanes and other areas
21 you have to avoid. I can't recall whether this
22 particular report did. It may have. Let's see. Yes.
23 It looks like this report did consider that. So that
24 was taken into consideration by the authors.

25 CHAIRMAN SPRITZER: Okay.

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1 ADMIN. JUDGE SAGER: Let me jump in while
2 Judge Spritzer is looking for other questions. It
3 appears that you've based your analysis on the DOE
4 report. Part of the impression that I get is that the
5 Intervenors have based their analysis on other
6 reports, so what makes the DOE report definitive?

7 MS. CORT: Well, we based our review both
8 on analyses coming from the State of Maryland and from
9 the Energy Information Administration Annual Energy
10 Outlook. And the Energy Information Administration is
11 the analytical and statistical agency within the U.S.
12 Department of Energy that has a responsibility of
13 independently and impartially analyzing and collecting
14 energy information for the U.S. and for the purposes
15 of policy making.

16 We find that to be an authoritative and
17 impartial objective source of information particularly
18 for these projections looking into the future. And
19 with the State of Maryland as well, information from
20 the Maryland Public Service Commission, they being in
21 charge of ensuring that their customers have
22 sufficient and reliable power and part of that is to
23 conduct these analyses on current and expected
24 generation capacity and we found that to be, again, an
25 authoritative source.

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1 ADMIN. JUDGE SAGER: Would you say these
2 are standard sources for this type of analysis?

3 MS. CORT: Yes.

4 MR. KUGLER: I would like to add something
5 else in regard to that, if I could. There's a
6 fundamental difference between looking at what the
7 potential is and what is likely to happen. Our
8 guidance is for us to look at what's reasonable
9 foreseeable, what we think will happen in the region.

10 The report here, and DOE has a similar
11 report that we refer to where they looked at what is
12 the potential and the potential is quite large. Even
13 in the DOE report, the potential is over 10 gigawatts
14 of installed capacity. But what the Energy
15 Information Administration does in these projections
16 in The Annual Energy Outlook is they look into the
17 future as best they can and say based on all the
18 factors we're looking at in the modeling that Ms. Cort
19 talked about, this is what we see coming. This is
20 what we think will actually happen in terms of what
21 will be built versus what could theoretically be done
22 based on the total potential. And we think that's a
23 very important distinction. It takes us to what our
24 guidance tells us to do. If we base everything just
25 on what the potential is, I don't know how you would

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1 approach it because there's big potential for lots of
2 different sources, but how likely are they actually to
3 be built? That's what we try and get at through the
4 DOE reports and the State reports.

5 CHAIRMAN SPRITZER: One point I found
6 somewhat -- your direct testimony and your testimony
7 here today, you continuously use the term reasonably
8 foreseeable. And you say that's derived from your
9 guidance, correct?

10 MR. KUGLER: Yes, Your Honor.

11 CHAIRMAN SPRITZER: One thing I'm trying
12 to understand is how does the concept of reasonable
13 foreseeability, as you use it, relate to the question
14 whether a particular alternative to Calvert Cliffs
15 Unit 3 is technologically feasible and commercially
16 viable?

17 Were you assuming when you prepared the
18 FEIS that if a particular amount of particular level
19 of wind, installed wind capacity was not reasonable
20 foreseeable according to the reports you looked at,
21 that it was therefore not technologically feasible and
22 commercially viable as an alternative to Calvert
23 Cliffs Unit 3? Are they one and the same?

24 MR. KUGLER: I don't think they're quite
25 one and the same. Wind power is certainly possible in

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1 Maryland, both onshore and offshore. Commercially
2 viable, I think at the moment offshore wind what we're
3 seeing it's not competitive, but at some point that
4 might change.

5 CHAIRMAN SPRITZER: At what point?

6 MR. KUGLER: Well, the economics would
7 have to change significantly. Carbon tax, perhaps.
8 If a carbon tax drove power companies away from coal
9 and natural gas, perhaps. At that point, the cost of
10 electricity would be rising in response to that and
11 other sources of energy that currently aren't very
12 competitive economically might become competitive. So
13 things would have to change, I think, before offshore
14 wind would become very competitive.

15 But what we're looking to do here because
16 we're doing a NEPA analysis, so we're looking at the
17 reasonable man-type approach. What do we think
18 reasonably can be expected to happen in this area?

19 Now when you get into that if you start
20 talking different sources, you can get any number of
21 different answers and a lot of what we've seen in the
22 Intervenor's information goes to discussions of here
23 is the potential that's there and therefore that's a
24 really big number and so we should be able to get big
25 numbers out of that. Even if we don't harness all of

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1 it, if you harness half of it that's a lot.

2 But what we're doing in looking at what
3 DOE has written in The Energy Information
4 Administration Reports and in the State reports, is to
5 get a better sense of okay, what is likely to actually
6 happen in this area and? So if you look at Department
7 of Energy, they do their projections. And that's
8 really what they're saying, here's what we think is
9 likely. Could be higher, could be lower in the end,
10 but this is what we think is likely at this point.

11 The State in looking at the Long Term
12 Electricity Report which is the Applicant's Exhibit 5,
13 they went through and did their own projections of
14 what they think will happen just in Maryland. And
15 both their projections and their reference case and
16 the DOE projections in their reference case are
17 consistent with what we have put in our Final
18 Environmental Impact Statement. So we're not saying
19 that more wouldn't be technically feasible. But we're
20 saying this is what is most likely to happen.

21 CHAIRMAN SPRITZER: I didn't understand
22 that you were saying that more wind was not
23 technically feasible. I guess the focus for me is
24 more on the question on commercial viability in
25 deference to the argument that Mr. Mariotte raised

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1 earlier, let me ask again about nuclear.

2 Is nuclear -- let me ask it this way, do
3 you have an opinion today whether Calvert Cliffs Unit
4 3 is commercially viable?

5 MR. KUGLER: I'll be honest. I don't
6 really get into whether it's commercially viable in my
7 evaluation. It is the action proposed for us and so
8 what we're doing is comparing what has been proposed
9 to be done versus what the alternatives are. So I
10 don't really look at whether or not it's -- well, we
11 know it's technically feasible. We know nuclear power
12 is something that currently exists in the State. So
13 in terms of being commercially viable, it is at least
14 in theory commercially viable as well. But we're not
15 saying it will be built. We're not claiming that.
16 But this is what's proposed.

17 CHAIRMAN SPRITZER: I guess the problem
18 I'm having there is what -- if I understand your
19 analysis correctly, the amount of wind, offshore wind,
20 for example, that we could expect to be built is
21 connected with the time frame that we're talking
22 about. Are we talking about 2015, 2017, 2020, 2025?

23 I certainly understand that normally for
24 purposes of doing alternatives analysis, the
25 commercial viability of the proposed action is

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1 ordinarily not at issue. But if we're looking at
2 finding a reasonable timeframe for a project that at
3 least based on some of the evidence I've seen seems to
4 have a fair amount of uncertainty associated with it,
5 don't we have to take that into account to define a
6 reasonable time frame?

7 MR. KUGLER: Well, the approach we take in
8 our evaluation is to work with the action that is
9 proposed in front of us. And in this case, at the
10 time that we prepared the Final Environmental Impact
11 Statement, we were using the year 2015. By the time
12 we were working on our testimony that date had been
13 revised to 2017 and we did consider that in our
14 testimony. So we looked out to 2017.

15 To go beyond that I don't think would
16 really conform with the way our guidance is set up,
17 but even if we wanted to do something like that, I'm
18 not sure how we would speculate as to what date to
19 use.

20 CHAIRMAN SPRITZER: All right. Can we
21 look at this document again, APL-10, page 23,
22 somewhere in here it refers to a 25-year power
23 purchase agreement. There we go. The report states
24 -- you can see the next to the last paragraph, "the
25 Delaware Bluewater Wind Project bid which won out over

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1 a coal bid and a natural gas bid suggests that large-
2 scale offshore wind projects can be cost competitive
3 with new fossil fuel generation after accounting for
4 future fossil fuel prices and likely costs to emit
5 carbon into the atmosphere." Do you see that
6 statement?

7 MR. KUGLER: Yes. Your Honor.

8 CHAIRMAN SPRITZER: Apparently, this was
9 written before the recent developments affecting the
10 Bluewater Wind Project. But irrespective of that, you
11 can take that into account if you want, I guess my
12 question basically is this statement -- do you have
13 any problem with this statement, if you think that's
14 a reasonable conclusion?

15 MR. KUGLER: I'm not sure one could be
16 drawn from the other directly. But I must admit I'm
17 not an expert in that particular area. I'm not sure
18 I could -- it would be somewhat speculative on my
19 part. But I will point out a little further down at
20 the end of that page it talks about the cost of energy
21 from the offshore wind as 11.4 cents per kilowatt
22 hour.

23 CHAIRMAN SPRITZER: Okay.

24 MR. KUGLER: And I believe we have our
25 estimates for nuclear in the Environmental Impact

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1 Statement and they would be lower than that.

2 CHAIRMAN SPRITZER: Do you recall what
3 they were?

4 (Pause.)

5 MR. KUGLER: This is in Chapter 9 -- I'm
6 sorry, Chapter 10, Table -- I believe it's 10-4.
7 Table 10-4 in the Environmental Impact Statement on
8 page 10-24. I don't know if he wants to try to get
9 that up on the screen.

10 CHAIRMAN SPRITZER: That would be helpful.

11 MR. WELKIE: The exhibit number?

12 MR. KUGLER: It's Exhibit 3A, 3A. For
13 some reason it isn't there.

14 CHAIRMAN SPRITZER: We seem to be having
15 some problem with the technology -- wait a minute,
16 there it is.

17 MR. KUGLER: Go to almost the very end, so
18 you might just want to go to the end and move up.
19 This is Table 10-4 and it provides data in different
20 areas. You've got the overnight costs, the cost of
21 operation and fuel and decommissioning. And actually,
22 I think it's probably more clearly discussed -- you
23 have to give me a moment. This isn't a section that
24 I wrote.

25 (Pause.)

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1 If you go to page 27 toward the top, that
2 first paragraph, it talks about the levelized cost
3 which includes the capital cost as ranging from 3.8 to
4 8.6 cents per kilowatt hour for operation costs and
5 then to that you would have to add the fuel cost and
6 decommissioning costs which would put you in the range
7 of another .6 cents, so something like 4.4 to 9.2
8 cents per kilowatt hours is the estimated range.

9 Now I guess if we accept the number at
10 11.4 cents per kilowatt hour and I don't know the
11 basis behind it exactly, so it's difficult for me to
12 say for sure. It certainly is higher than the
13 estimate for nuclear, but it's not double. So could
14 it be done? Yes, I think it possibly could be done.
15 But again, it will depend on the economics.

16 In the end, whatever gets built is going
17 to be driven by economics. That's going to be the
18 factor that really determines what will really happen.

19 CHAIRMAN SPRITZER: Okay. Could we bring
20 up Mr. Sklar's testimony? That would be Intervenor
21 Revised Exhibit 1, page 8.

22 Let's go down to the bottom of the page.
23 He refers at the bottom to an October 2010
24 announcement by Google and GoodEnergies that "they
25 have established a consortium and a \$5 billion

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1 transmission backbone to bring offshore wind in the
2 region to the shore. Such large investments and
3 transmission are not made to transmit small amounts of
4 electricity."

5 Do you have any response to that argument,
6 I guess you would call it?

7 MR. KUGLER: I guess what I would have to
8 say is that this is an idea at this point. It's a
9 proposed project. I don't know that it has progressed
10 very far and at the moment with the only wind projects
11 that were planned in the region, basically on hold
12 indefinitely, I would be very surprised if this
13 project moved forward. I mean they're going to want
14 to know that they have some power to move.

15 CHAIRMAN SPRITZER: In other words, this
16 may be a naive question on my part, but you don't
17 build a transmission facility before you build the
18 power generation facility normally.

19 MR. KUGLER: Generally not, unless you
20 feel pretty certain that the power facility is going
21 to be there.

22 CHAIRMAN SPRITZER: Let's assume again,
23 hypothetically though that such a facility is built.
24 How, if at all, would that affect the variability
25 problem with offshore wind power?

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1 MR. KUGLER: Well, it's rather
2 theoretical, but what I guess I would see as the value
3 of such a backbone would be the ability to move power
4 up and down the coast, so if the wind is not blowing
5 in one region, but it's blowing somewhere else, you
6 could potentially move the power around. But for the
7 most part, honestly, every state needs more energy.

8 And if you build wind turbines off the
9 coast of New Jersey, while you could ship the power
10 down to Maryland, I would think the people in New
11 Jersey are probably going to want that power. So I
12 don't know how much movement of power you would have.
13 But my understanding of that backbone is the way it
14 would tie in I guess you could move any power, it
15 wouldn't necessarily have to be offshore wind. You
16 could also move power from onshore to offshore down
17 the backbone and back on shore. So it might have
18 other uses beyond just moving offshore wind power
19 onshore.

20 But again, I'd be surprised if we saw much
21 progress on that until there are some solid proposals
22 moving forward on wind projects where they're actually
23 moving to construction.

24 CHAIRMAN SPRITZER: Can we bring up -- I
25 don't really have a specific page for this, Joint

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1 Intervenor's Exhibit 12?

2 This is cited in Mr. Sklar's testimony.
3 Have you had a chance to review this document?

4 MR. KUGLER: I did look at it briefly.

5 CHAIRMAN SPRITZER: Now the conclusion is
6 sort of indicated by the colorful diagram on the cover
7 is that there's been a crossover between solar and
8 nuclear costs as of 2010 where as of 2010 the cost of
9 solar power as compared to nuclear was equal and
10 apparently this projects that trend to continue with
11 nuclear continuing to rise and solar continuing to
12 decline.

13 Do you have an opinion on the credit, if
14 any, we should give to this study?

15 MR. KUGLER: Well, I think first I go back
16 to the basic approach we take. Cost was not really a
17 direct factor in our evaluation, so we didn't consider
18 it in our comparison.

19 I suspect, but I don't know all of the
20 details behind this report, so it's very difficult for
21 me to comment on it.

22 CHAIRMAN SPRITZER: You didn't review it
23 in enough detail to have an opinion on it?

24 MR. KUGLER: No, sir.

25 CHAIRMAN SPRITZER: Whether its

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1 conclusions are valid or not?

2 MR. KUGLER: No, sir.

3 MS. CORT: I would add though that again
4 the projections on which we rely do consider the cost
5 of solar and in particular, the rapidly declining cost
6 of solar is embedded in the models that produce the
7 projections on which we based our contributions to the
8 combination of energy alternatives.

9 CHAIRMAN SPRITZER: But what is your
10 understanding of the trend in costs in solar? You
11 said it's declining. Can you give a little more
12 quantitative information on that?

13 MS. CORT: Again, it's kind of difficult
14 to look at cost because you have to figure out the
15 cost if installed or the operations cost, the
16 levelized cost. There a lot of different cost factors
17 that are thrown out there, but there was one study I
18 looked at that pulled data from The Annual Energy
19 Outlook, the underlying National Energy Modeling
20 System for the on-site, in-use, photovoltaic solar
21 installation costs declining on the order of 40
22 percent over the projection period. So pretty
23 significant costs.

24 CHAIRMAN SPRITZER: What was the
25 projection period?

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1 MR. KUGLER: That was 20 years.

2 CHAIRMAN SPRITZER: Starting from when?

3 MS. CORT: This came from AU 2009, so it
4 was 2008 out to -- the projection period was out to
5 2030.

6 CHAIRMAN SPRITZER: Okay, do you consider
7 that relevant to determining the commercial viability
8 of the solar prices declining on the order that you
9 just described?

10 MS. CORT: That is one thing that we
11 certainly considered in our evaluation of solar.

12 CHAIRMAN SPRITZER: And how did it affect
13 your conclusions?

14 MS. CORT: That it was a commercially
15 viable alternative and that it should be considered as
16 part of a contribution to the combination of energy
17 alternatives.

18 CHAIRMAN SPRITZER: But I take it only up
19 to the amount that you included in the FEIS?

20 MS. CORT: That's correct, when deriving
21 the contributions, then we relied on these
22 authoritative sources and these projections, since we
23 were looking, a forward-looking analyses, we relied on
24 the projections that do consider again these declining
25 costs as part of their analysis and how they rate

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1 relative to other technologies.

2 CHAIRMAN SPRITZER: Based on the cost
3 trend described, I would think that the longer the
4 time frame we're looking at in terms of Calvert Cliffs
5 Unit 3, the more solar costs are going to decline. Is
6 that a fair interpretation of what you told me?

7 MS. CORT: Well, that cost that you'll see
8 in the Energy Information Administration Projections
9 has a pretty substantial cost declining out to about
10 2016. This is, in part because of some of the tax
11 credits, the investment tax credits that are coupled
12 and factored into that cost which -- and then they
13 sunset in 2016. So after that time period I think it
14 levels off a bit in terms of declining costs.

15 CHAIRMAN SPRITZER: That's in the DOE
16 projection?

17 MS. CORT: That's in the DOE projections.

18 CHAIRMAN SPRITZER: My recollection of
19 this report, JNT-12 though, it seems to project
20 continually declining costs over time. Would that be
21 relevant to assessing the commercial viability of
22 solar in outlying years, I guess you'd call them,
23 after 2020?

24 MS. CORT: We would again rely on the
25 projections of the Department of Energy and Maryland,

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1 the State of Maryland and their view of the costs and
2 the trends of the costs over time.

3 CHAIRMAN SPRITZER: Let's assume for
4 purposes of my next question that the NRC were to
5 decide not to license Calvert Cliffs Unit 3, it's
6 hypothetical, not claiming, not stating the result by
7 any means, but let's assume that were the decision.
8 Do you have an opinion whether that decision, not to
9 license Calvert Cliffs Unit 3, would affect the demand
10 for renewable sources of energy such as wind and solar
11 power?

12 MR. KUGLER: If this plant were not built,
13 the company and the State would be looking for other
14 alternative means to get the power that it needs. In
15 the current situation, this State is already a very
16 large importer of power. It imports about 30 percent
17 of its power. And the transmission grids are not
18 capable of importing really much more than that. So
19 with needs growing, they would have to pursue building
20 something else.

21 Again, looking at the analysis done by the
22 State, by the Public Service Commission and looking at
23 their Certificate of Public Convenience and Necessity,
24 they determine that this State needs baseload power
25 sources. They felt this Unit 3 would be a good

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1 baseload source. So I would think in all likelihood
2 they would be looking to pursue other baseload
3 sources, potentially I would tend to say most likely
4 natural gas. Natural gas in the past usually was not
5 baseload; but it's getting very difficult to license
6 a coal plant or to get permits for a coal plant. So
7 one of those two though, coal or natural gas, would
8 most likely be the backbone of anything else that they
9 did. They could try and fit other sources in, but
10 because they are looking for baseload power sources,
11 renewables such as wind and solar would probably not
12 be large players in whatever they would end up with.

13 CHAIRMAN SPRITZER: What about a combined
14 alternative such as you described in the FEIS?

15 MR. KUGLER: Well, certainly a combined
16 alternative, but even in the combined alternative that
17 we believe would be likely, the renewables are not the
18 big player. It ends up being the natural gas plant
19 that carries most of the load because it can run
20 steadily.

21 CHAIRMAN SPRITZER: Let's look at NRC-4
22 which I believe is your direct testimony and that's
23 page 5, paragraph A7.

24 You state that "the approach used to
25 develop a combination of energy alternatives included

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1 the maximum contribution for renewable sources that
2 could be reasonably expected within the region of
3 interest and within the time frame of the proposed
4 project."

5 What was the region of interest you
6 considered?

7 MR. KUGLER: The region of interest was
8 the State of Maryland. It's discussed in the
9 Environmental Impact Statement.

10 CHAIRMAN SPRITZER: Okay. How does that
11 relate to the estimate of wind and solar power that
12 you used in the combination of alternatives, the fact
13 that you were looking at the State of Maryland as the
14 region of interest?

15 MR. KUGLER: Well, if you look at the
16 estimates done by the Energy Information
17 Administration, they don't necessarily do estimates
18 state by state. As Ms. Cort mentioned, they do it
19 based on these regions. So in this case Maryland is
20 in the ReliabilityFirst Corporation, East Region. So
21 when we look at those projections, we have to consider
22 that we're looking at a number, four states, not one
23 state. And so we made adjustments in looking at that
24 to consider the relative contribution of Maryland.

25 In our testimony, we talked about -- we

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1 considered Maryland to be a third of the output of
2 that region to be conservative. That's pretty much
3 certain to be high. I've looked at other numbers that
4 would indicate it's probably more like a quarter of
5 the region. But in order to -- we are trying to be
6 conservative. We said a third. So when we were
7 looking at the projections, we would take the
8 projection by the Department of Energy and take a
9 third of that number to bring it down to what we would
10 consider to be the contribution of Maryland.

11 CHAIRMAN SPRITZER: Why does the -- do you
12 know why the Department of Energy defines that the
13 region of interest that Maryland is in -- I think you
14 indicated include part of Pennsylvania, Delaware and
15 --

16 MR. KUGLER: And New Jersey.

17 MS. CORT: And New Jersey. For this
18 particular submodule of the model they follow some of
19 the divisions that are part of the North American
20 Electricity Reliability Councils. So they're just --

21 MR. KUGLER: It's just how the grid is
22 broken up into these different regions. They don't
23 necessarily follow state lines. So it's not all of
24 Maryland and it's not all of Pennsylvania.

25 CHAIRMAN SPRITZER: Is the way they've

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1 created this region of interest reflect the
2 availability of power within that area?

3 MR. KUGLER: I'm not sure I follow that
4 question.

5 CHAIRMAN SPRITZER: It was probably not
6 very precise. In defining a region of interest, let
7 me put it this way, does the fact that Maryland is in
8 a region of interest that includes those four areas,
9 Maryland, Pennsylvania, New Jersey, and Delaware, in
10 any way have a bearing on -- for example, does that in
11 any way suggest that power generated within
12 Pennsylvania or Delaware or New Jersey could, in fact,
13 be imported, if that's the right term into Maryland?

14 MR. KUGLER: Okay, I understand that
15 question. As I mentioned earlier, Maryland already
16 imports a very large portion of its power from other
17 states. And in fact, if you look at the list of the
18 top five states in terms of how much power they
19 important, they're all in this region. So the
20 transmission system is already pretty loaded down in
21 terms of importing power during periods of peak
22 demand.

23 When the Maryland Public Service
24 Commission was looking at Calvert Cliffs and whether
25 to approve the Certificate of Public Convenience and

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1 Necessity, this is one of the factors they considered
2 was they want to get power sources built in Maryland
3 to support the grid in Maryland. They don't want
4 Maryland to become even more dependent on outside
5 sources because they're competing with other states
6 around them and their grid is already pretty strained.
7 So they specifically were looking for sources to be
8 built inside Maryland.

9 I think this is one of the reasons in
10 relation to renewables that the State has also taken
11 a position in their renewable portfolio standard that
12 solar resources to meet the renewable portfolio
13 standard must be in Maryland. If you look at that
14 renewable portfolio standard for all of the other
15 renewables, the power companies in Maryland can buy
16 credits from companies outside Maryland to satisfy the
17 RPS. That power does not come to Maryland. They're
18 just getting credit for it.

19 CHAIRMAN SPRITZER: Can you explain in a
20 little more detail how that works? What exactly would
21 they be buying from a utility located outside
22 Maryland?

23 MR. KUGLER: They're buying a credit which
24 satisfies the RPS. It's the way the systems work.

25 CHAIRMAN SPRITZER: How does the utility

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1 outside Maryland that's selling a credit to a utility
2 inside Maryland, how does it get the credit in the
3 first place?

4 MR. KUGLER: By generating renewable
5 power. Let's say you've got a wind farm up in
6 Pennsylvania somewhere. I mean some of the renewable
7 energy credits I saw in one of the recent reports were
8 from as far away as Iowa. You've got a wind farm in
9 Iowa. A power company in Maryland needs credits.
10 They purchase the credits from you, so you make money
11 off it that way. But you're still generating the
12 power in Iowa and you're selling the power to
13 somebody.

14 CHAIRMAN SPRITZER: Sounds like an
15 interesting system. Can a utility in Iowa sell
16 credits to more than one state?

17 MR. KUGLER: Yes. Yes.

18 CHAIRMAN SPRITZER: Okay.

19 MR. KUGLER: But I mean they can only sell
20 credits for what they actually generate.

21 CHAIRMAN SPRITZER: No, I understand.

22 MR. KUGLER: They can't sell them twice.

23 (Laughter.)

24 CHAIRMAN SPRITZER: Okay.

25 MR. KUGLER: It's just the way the systems

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1 are set up. Maryland's RPS is not unusual in that
2 regard.

3 CHAIRMAN SPRITZER: I was going to come to
4 the RPS eventually, but I guess we're already there.
5 So if I'm understanding your testimony correctly, if
6 I'm a Maryland utility, I could satisfy an RPS
7 requirement by buying credits from another state even
8 though that has no effect on the amount of wind or
9 other renewable designated renewable sources of power
10 actually generated within the State.

11 MR. KUGLER: That's correct. And the only
12 exception is solar. They carved that one out
13 especially -- for solar power the facility must be in
14 Maryland. It doesn't have to be owned by this power
15 company. They can buy credits from somebody else who
16 builds a solar facility. But it has to be within
17 Maryland.

18 CHAIRMAN SPRITZER: In terms of the region
19 you were looking at, as I understand it, offshore
20 wind, for example, as it's described in the
21 Applicant's Exhibit 10 that we were looking at before,
22 it's beyond the three-mile border. Well, let me go
23 back a minute. Do you have an understanding of
24 whether the border of Maryland where it ends when
25 we're going out to sea? How far do we have to go

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1 before we're no longer in Maryland?

2 MR. KUGLER: I'm not certain. I think for
3 most states it is three miles.

4 CHAIRMAN SPRITZER: Would you have
5 disqualified a wind source because it's not within the
6 border of Maryland, an offshore wind source because
7 it's not within the border of Maryland?

8 MR. KUGLER: If it was offshore of
9 Maryland, we would have included it.

10 CHAIRMAN SPRITZER: Okay.

11 MR. KUGLER: Regardless of how far out.

12 CHAIRMAN SPRITZER: All right. What about
13 if it's offshore in Delaware? Would that have been
14 excluded?

15 MR. KUGLER: We would not have included
16 that because it was not within Maryland because again,
17 we were looking at that as our region of interest.
18 And actually, that's our region of interest and the
19 State, as I said, is of the same opinion that they
20 need sources inside the State. And based on that, we
21 felt that that was the appropriate region to use.

22 CHAIRMAN SPRITZER: Leaving aside for a
23 moment of what the State prefers though, if we're
24 looking at what's a technologically feasible and
25 commercially viable alternative to Calvert Cliffs Unit

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1 3, would that include in your opinion wind power
2 generated off the coast of Delaware? Let me back up
3 a minute. There's no assumption built into that, I
4 guess. Could wind power generated offshore of
5 Delaware supply power to Maryland utilities? And if
6 so, how would they go about doing it?

7 MR. KUGLER: It's possible it could. I
8 don't -- I'm not sure of the grid structure between
9 Delaware and Maryland. The most congested areas are
10 typically to the north and the west. That's where the
11 transmission lines are fairly congested. That's where
12 a lot of the power comes into the State. I don't
13 think Delaware typically has been a significant power
14 provider to Maryland. So if there's grid there and
15 there's room available, it would be possible to do
16 that.

17 CHAIRMAN SPRITZER: Okay, as I understand
18 your testimony, you would have excluded that even if
19 it's possible?

20 MR. KUGLER: That's correct.

21 CHAIRMAN SPRITZER: From the combined
22 alternatives used in the FEIS?

23 MR. KUGLER: That's correct, because we're
24 using a region of interest of Maryland.

25 CHAIRMAN SPRITZER: Now coming back to the

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1 timeframe issue, you told us that -- the FEIS itself,
2 I guess, tells us that the timeframe used in the FEIS
3 itself is December of 2015.

4 MR. KUGLER: That's correct.

5 CHAIRMAN SPRITZER: Now sitting here
6 today, do you believe that's a realistic estimate of
7 the start-up commercial operations for Calvert Cliffs
8 Unit 3?

9 MR. KUGLER: Well, considering that the
10 Applicant now believes it's December 2017, I would say
11 no.

12 CHAIRMAN SPRITZER: Did the review staff
13 believe at the time that that was -- the issue in the
14 FEIS, that it was a realistic estimate?

15 MR. KUGLER: I was not involved in writing
16 the section where we developed the purpose and need,
17 so it's difficult for me to answer that question.

18 CHAIRMAN SPRITZER: All right. And you
19 stated, this is in a footnote of your testimony, I
20 believe, that the current projected date for the
21 completion of construction is December 31, 2017. How,
22 if at all, does that -- what, if anything, does that
23 tell us about start-up commercial operations.

24 MR. KUGLER: Well, I think the two terms
25 are almost interchangeable, completion of

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1 construction, commission of commercial operation, I
2 believe are synonymous. Once you finish your building
3 process, you're testing the systems as you build it
4 and so you do have a testing phase you go through, but
5 Applicant may actually be better suited to respond to
6 that question than I am.

7 CHAIRMAN SPRITZER: Does the NRC have a
8 definition of what constitutes the start-up commercial
9 operations in terms of power output, for example?

10 MR. KUGLER: I believe we do, but I'm not
11 sure what it would be. I can tell you from personal
12 experience I worked at a plant under construction.
13 Commercial operations date meant the point at which we
14 had completed all of our testing and we received an
15 operating license from the NRC and were capable of
16 operating 100 percent power.

17 CHAIRMAN SPRITZER: Did the review team
18 make an independent determination of when it believes
19 that is, when the review team believes commercial
20 operations are likely to begin for Unit 3?

21 MR. KUGLER: In the portions that I worked
22 on, we did not discuss that. I don't know if others
23 -- there may have been other portions like purpose and
24 need where they did.

25 CHAIRMAN SPRITZER: Now you're aware --

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1 well, are you aware that the NRC staff has made a
2 determination that a license cannot be issued to Unit
3 3 due to the current foreign ownership situation,
4 cannot be issued at present for Unit 3 due to the
5 foreign ownership issue?

6 MR. KUGLER: Yes, sir. I am aware of
7 that.

8 CHAIRMAN SPRITZER: Was that taken into
9 account in any way in establishing the timeframe for
10 looking at the combined alternative?

11 MR. KUGLER: Again, the timeframe was
12 really worked out in other sections and then we used
13 that information, but at the time that we were
14 preparing the EIS, originally that information did not
15 exist and honestly, I'm not certain at what point that
16 information became available to us. I'm not sure when
17 that determination was made. I know there was a
18 letter that went to UniStar, but I don't recall the
19 time frame of that letter. So how that fit in with
20 our work on the Final Environmental Impact Statement
21 I'm really not sure. But from the perspective of
22 performing this analysis, I would not have seen that
23 as an issue to be considered. It's a hurdle that has
24 to be overcome and dealt with one way or the other.

25 As I said, we're not stating in the EIS

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1 this plant is going to get built. We're stating this
2 is what's been proposed to us and we're comparing it
3 then to other options.

4 CHAIRMAN SPRITZER: Okay, I understand
5 your position on that. Do you have an understanding
6 of the estimated construction time for Unit 3, that
7 is, once a license is issued and they start
8 construction, how long would it take to complete
9 construction?

10 MR. KUGLER: I don't think I've seen a
11 specific number on that or if I have it, I don't
12 recall it.

13 CHAIRMAN SPRITZER: Do you know when a
14 license is issued, how long the licensee has to
15 complete construction?

16 MR. KUGLER: Well, the license is for 40
17 years. And I know from experiences in the past, the
18 plant doesn't necessarily get built immediately and
19 there can be delays. I don't think there's anything
20 that says they have a deadline to complete
21 construction. The Watts Bar units would be an example
22 of plants that had significant delays in construction.

23 CHAIRMAN SPRITZER: I believe Watts Bar,
24 what is it, Unit 2 is still under construction.

25 MR. KUGLER: Yes, sir.

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1 CHAIRMAN SPRITZER: As we speak. Do you
2 know approximately when that was licensed?

3 MR. KUGLER: I'm not certain, but I think
4 it might have been late --

5 MS. CORT: 1972.

6 MR. KUGLER: I thought it was maybe late
7 '70s because what I recall, when -- we prepared a
8 Supplemental Environmental Impact Statement for the
9 licensee at Watts Bar Unit 1 when they wanted to
10 complete construction and I believe there had been at
11 least a 15-year lag, so I'm thinking late '70s, but
12 I'm not certain.

13 CHAIRMAN SPRITZER: On page -- turn to
14 page 18 of the direct testimony. It's the same
15 exhibit, NRC-4. I believe you state there and I'm not
16 sure if it's on the screen, yes, there it is at the
17 top. You refer to the ReliabilityFirst Corporation
18 assigning the Bluewater Wind Project in Maryland a
19 confidence factor of 21.6 percent. And you tell us
20 what that means, the confidence factor is used by RFC
21 to estimate the portion of conceptual capacity to
22 include in its planning.

23 Is this essentially telling us the
24 probability that this unit would actually or this
25 combination of units, I guess, would actually be

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1 built?

2 MR. KUGLER: It's a tool that they use,
3 they being ReliabilityFirst Corporation, to try to
4 plan ahead as to what will come on line. They
5 recognize, and the point of this part of the testimony
6 is simply that this project, like many projects,
7 there's a fair bit of uncertainty as to whether it
8 will actually be built.

9 And so they use these confidence factors
10 to try not to over count proposals that they have
11 before them because if they do, their planning based
12 on every proposal they have in front of them, and then
13 some of them don't come to fruition, they may have
14 problems managing their grid. So it's just a tool
15 that they use to try and measure them.

16 CHAIRMAN SPRITZER: Did you look at this
17 or any other source to determine the confidence factor
18 for Calvert Cliffs Unit 3?

19 MR. KUGLER: I believe it did have a
20 number for Calvert Cliffs Unit 3. I don't recall what
21 that number is.

22 CHAIRMAN SPRITZER: If we look through the
23 exhibit, maybe we'll be able to find it. We don't
24 need to do that now.

25 MR. KUGLER: Okay.

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1 CHAIRMAN SPRITZER: It's something we can
2 do later. Now it's my understanding, and correct me
3 if I'm wrong, that the Constellation Energy Group
4 decided to withdraw as a partner in UniStar?

5 MR. KUGLER: That's what I understand.
6 Yes, sir.

7 CHAIRMAN SPRITZER: Are you aware of the
8 reasons for that decision, at least to the extent they
9 were publicized?

10 MR. KUGLER: I don't really recall to be
11 honest. It's not something that I was directly
12 involved in.

13 CHAIRMAN SPRITZER: I think you told us
14 before that you were aware that UniStar had applied
15 for a loan guarantee from the Department of Energy?

16 MR. KUGLER: I'm aware that they have,
17 yes.

18 CHAIRMAN SPRITZER: Okay. As far as you
19 know that has not been approved today, is that
20 correct? Or do you have any knowledge of that?

21 MR. KUGLER: I don't know.

22 CHAIRMAN SPRITZER: Okay. Is it fair to
23 say, well, let me back up a minute. Do you have any
24 knowledge of current prices for natural gas and how
25 they may have affected the probability of future

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1 nuclear plant construction?

2 MR. KUGLER: I don't know what the numbers
3 are. I do know that at this time natural gas prices
4 are pretty low, and that makes it obviously fairly
5 attractive as a source of power. I think though that
6 from my understanding, the power companies are a bit
7 circumspect about that because there have been low gas
8 prices before. They've also gone quite high. Those
9 of us living in Maryland have experienced the outcome
10 of that in our electric bills.

11 So what I've seen is that power companies
12 try to have a range of energy sources in their
13 portfolio so that no one energy source will so heavily
14 drive their prices that if something happens to drive
15 those prices up that the customers are completely at
16 the mercy of those.

17 So at the moment, yes, natural gas is
18 fairly inexpensive and that will probably play a role
19 in the near-term decisions that power companies make.
20 But I think a lot of power companies will also be
21 looking for other sources so that they have some
22 balance in their power generation portfolio.

23 CHAIRMAN SPRITZER: This is a convenient
24 breaking point. We will have some further questions
25 for you after lunch, but I think this will be a

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1 convenient breaking point.

2 Mr. Mariotte, any new -- any word on Mr.
3 Sklar?

4 MR. MARIOTTE: No, Your Honor. We've left
5 messages on his cell phone and his message service and
6 my office. We have to assume he's somewhere where he
7 can't receive those messages which I assume is about
8 30,000 feet in the sky.

9 CHAIRMAN SPRITZER: Do you have his flight
10 number that he was coming in on?

11 MR. MARIOTTE: No, no. We tried to check
12 for flights from Costa Rica which apparently is where
13 he was. But we don't know which flight he was on.

14 CHAIRMAN SPRITZER: All right. Well, we
15 have a few more questions for these witnesses after
16 the break and I do and I believe at least one or both
17 of my fellow Judges probably do, but we're probably
18 not looking at much more than an hour with them. So
19 I guess we, together with counsel for the other
20 parties can ponder what we're going to do if Mr. Sklar
21 does not appear.

22 MR. MARIOTTE: I apologize, Your Honor.
23 I just don't know what to say.

24 CHAIRMAN SPRITZER: I understand it's not
25 directly under your control. So you may want to think

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1 about -- we'll talk about this at some point, I guess
2 when it becomes clear that he's not going to be here
3 or whether he is going to be here or not.

4 All right, we'll stand adjourned for
5 lunch. Thank you.

6 ADMIN. JUDGE SAGER: What time should we
7 return?

8 CHAIRMAN SPRITZER: Oh, that's a relevant
9 question. One thirty will be a good time to come
10 back.

11 (Whereupon, at 12:15 p.m., the evidentiary
12 hearing was recessed, to reconvene at 1:30 p.m.)
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A F T E R N O O N S E S S I O N

2:10 p.m.

CHAIRMAN SPRITZER: All right. Any other administrative matters before we continue?

(No verbal response.)

No? Hearing nothing, we'll continue with the staff's witness. Just to remind you you're still under oath.

MR. KUGLER: Yes, Your Honor.

CHAIRMAN SPRITZER: Let's turn to NRC Exhibit 4. That's the direct testimony of the staff witnesses at page 12, paragraph A-11. I think that's right.

As I understand this, you used -- First of all, you used the Environmental Standard Review Plan Guidance on Alternatives.

MR. KUGLER: Yes, Your Honor.

CHAIRMAN SPRITZER: In your alternatives analysis for the FEIS. But, as I understand it, you also used guidance which is NRC 10 and that's guidance on doing accumulative impasse (phonetic) analysis. Is that correct?

MR. KUGLER: Yes, Your Honor.

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1 CHAIRMAN SPRITZER: Okay. And using NRC
2 10 I take it what you did was you looked for actions
3 which had been approved by the proper authority who
4 have submitted license permit applications for which
5 may not require approval of a regulatory agency but
6 for which procurement contracts have been signed. If
7 that were the case, you would treat something as being
8 reasonably foreseeable.

9 MR. KUGLER: Yes, Your Honor.

10 CHAIRMAN SPRITZER: On the other hand --
11 Well, let me ask. Were those -- Did at least one of
12 those conditions have to be satisfied for you to
13 consider a particular alternative to be reasonably
14 foreseeable?

15 MR. KUGLER: It didn't have to be
16 satisfied. We used this as guidance. If you look at
17 the very end of that paragraph, it mentions "future
18 actions that do not fall under the definition of
19 reasonably foreseeable but could potentially take
20 place as indicated by trending in the vicinity or less
21 formal communications may be addressed in a general
22 manner."

23 In looking, in going through our process
24 and looking to the future through Department of Energy
25 and State reports, we recognize that especially

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1 because of the length of time we're looking out, there
2 could be projects that have not yet reached the point
3 of meeting that definition of reasonably foreseeable
4 but that are likely to occur just because there are
5 trends in building those types of facilities.

6 For instance, we know that solar is being
7 built. And we expect that to continue. And, although
8 there may be no announcements of projects that add up
9 to the amount of power we're talking about, we expect
10 that trend to continue. So the guidance allows us to
11 consider those sort of factors as we evaluate what's
12 likely to occur in the region.

13 CHAIRMAN SPRITZER: Let me just ask this.
14 Why did you feel the need to use -- You have guidance
15 on doing alternatives analysis.

16 MR. KUGLER: Yes, Your Honor.

17 CHAIRMAN SPRITZER: And you looked at
18 that. Why did you have to then also look at guidance
19 on doing accumulative impact analysis?

20 MR. KUGLER: Well, the guidance that we
21 have on the alternatives analysis does talk about
22 looking forward at what is likely to occur in the
23 region by looking at things like what is commercially
24 viable, technically feasible. It doesn't really ever
25 define though what is meant by reasonably likely,

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1 reasonably foreseeable.

2 And so we've been working a lot in
3 cumulative packs as well. And the basic premise of
4 the way we approach cumulative packs really makes
5 sense in the same context. We're trying to find what
6 there is out there that has been announced in one form
7 and another. And it appears to be moving forward.

8 We're trying to get a sense of the likely
9 actions to occur in the area. And we take all these
10 factors into account. It's not one thing or another
11 really. It's a combination of these factors as we
12 work through what we're going to include in the
13 combination of alternatives.

14 CHAIRMAN SPRITZER: All right. Am I
15 correct that if an alternative only been discussed on
16 a conceptual basis it would necessarily be excluded by
17 the NRC staff from further consideration as an
18 alternative?

19 MR. KUGLER: If it has only been discussed
20 as a concept technologically or do you mean
21 conceptually in the sense that if somebody said "I
22 think I want to build a windfarm"?

23 CHAIRMAN SPRITZER: Yes, the second.

24 MR. KUGLER: The second one, okay. What
25 we looked at there -- We went for instance on wind,

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1 offshore wind in particular. We looked at a report
2 that was prepared by the National Renewable Energy
3 Laboratory where they were looking at how progress has
4 been moving on offshore wind. And they looked at a
5 number of projects that are being considered
6 throughout the country. And they had grouped a
7 certain portion of those as being projects that they
8 provided more detail on because they had progressed to
9 a point where they felt that these were projects that
10 looked like they may go forward. That was one
11 approach we had, looking at sources such as that.

12 As we've talked about Department of
13 Energy, the Engineering Information Administration,
14 they do their projections. The State also makes
15 projections. And we take all that information and
16 from that we try and develop what looks to be a
17 reasonable input for each of the different types of
18 energy.

19 The Energy Information Administration does
20 work on a regional basis. The State, of course, is
21 looking very specifically at what they see occurring
22 here. So between those two we feel like we developed
23 what makes sense for this region in this time frame.

24 CHAIRMAN SPRITZER: Let me tell you
25 though. I've been sort of thinking about this over

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1 the break and whether this is a question for your
2 lawyers or for you. Let me try it for you.

3 As far as I know, neither of you is an
4 attorney. So I'm just asking for your understanding.
5 I'm not asking you to tell me what the law is.

6 I guess the problem I'm having is my
7 understanding of what's required from an alternative
8 analysis is something has to serve the purpose and the
9 need of the project and tells us what that is. It has
10 to be technologically feasible, total wind and solar
11 technologically feasible. It has to be commercially
12 viable at least by the time that it would need to be
13 installed. But as I understand it and as I read your
14 guidance on alternatives if those criteria are
15 satisfied, that's a reasonable alternative.

16 Now your analysis as I'm reading it in
17 your direct testimony and in the EIS seems to be
18 introducing or at least could be read -- you can tell
19 me if I'm misinterpreting this or not -- to be
20 introducing an additional requirement that in essence
21 you need to be able to find some indication, a
22 permanent application, contract for construction,
23 something that convinces you not only is this
24 technologically feasible but commercially viable but
25 actually will or likely to be constructed within a

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1 given time frame.

2 MR. KUGLER: Okay.

3 CHAIRMAN SPRITZER: That's my problem.
4 Maybe you can tell me either that I'm misinterpreting
5 what you did or that I am correctly interpreting what
6 you did.

7 MR. KUGLER: No, it isn't exactly what we
8 did. As I said, if you take a look at what we have
9 listed as our combination of energy alternatives, if
10 you take solar for example, we talk about 75 megawatts
11 base load equivalent power. So that's really a power
12 output on average. And to get there you would need at
13 least 300 megawatts of solar installed.

14 That amount is far in excess of whatever
15 has been announced right now. So we didn't limit
16 ourselves to just what has been announced. When
17 things have been announced and they are moving
18 forward, that gives us some confidence those things
19 will, in fact, happen.

20 So there is a certain amount of balancing
21 to make sure that what we are developing makes sense.
22 For example, let's say we ran into a situation perhaps
23 where the projections we were looking said, "Well, we
24 only expect 100 megawatts of whatever."

25 But we've got applicants over who is

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1 developing 150 megawatts of that resource and they're
2 well along in the licensing process. And they've got
3 their financing and it looks pretty real.

4 I think in a situation such as that I
5 would say "Well, even if the projection is 100" -- I
6 don't think we use 100. We use at least 150 because
7 that looks like something pretty real.

8 We actually ran into a situation like that
9 in another application where the projection that we
10 were looking at -- I don't recall the exact numbers --
11 where the applicant in their renewable energy work was
12 actually proposing more wind energy than the current
13 projection showed for that area. Well, in that case,
14 we used what the applicant said they were planning to
15 do. We weren't going to use the projections because
16 it looked like things must have changed enough in the
17 region that they were now planning more than the
18 Energy Information Administration had projected at the
19 time they prepared their annual report.

20 We look at all of that information. We
21 don't limit ourselves to just one thing. In fact,
22 what we have given in our combination of energy
23 alternatives is over what Energy Information
24 Administration actually projects for this state once
25 we have taken it down to the state level which is an

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1 estimate.

2 But we went a bit over that because
3 Maryland is trying to implement an RPS. They are
4 trying to get renewables built. There is strong
5 interest in it. So we gave them a little margin on
6 that, although there wasn't anything real specific
7 that we could point to and say, "Here clearly they're
8 going to build more than what EIA said." But we felt
9 if we were going to err we were going to err on the
10 higher side.

11 MS. CORT: If I could just add regarding
12 the process. In the Section 9.2.3 of the EIS, we go
13 through and evaluate and assess various alternative
14 energy sources in terms of the commercial viability
15 and the technical feasibility.

16 And in some cases some of them were
17 determined not to be commercially viable, for example,
18 fuel cells, at this time based on some of the reports
19 that we were reading from the Department of Energy.
20 Some might not be technically feasible in the region
21 of interest such as geothermal for example.

22 And the list of the others, solar and wind
23 for example, we did determine that they were
24 commercially viable and technically feasible up to a
25 point but in and of themselves weren't able to meet

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1 the purpose and need of the proposal in front of us.
2 In that case what we did is then turn to the
3 combination of alternatives and brought some of these
4 together such that in combination they would be able
5 to meet the purpose and need of the application. It's
6 not as if we determined they were commercially viable
7 and technically feasible. Or we did not dismiss them
8 entirely.

9 But we saw that they weren't able to meet
10 the purpose and need in and of themselves. So then we
11 turned toward the combination of energy alternatives.

12 CHAIRMAN SPRITZER: As I understand your
13 testimony, the reason they couldn't meet the purpose
14 and need themselves as wind and solar is some means of
15 generating base load power and they can't do that by
16 themselves. Is that -- Am I understanding correctly?

17 MS. CORT: Yes, that is correct. Also the
18 levels that seem to be available. The availability of
19 that resource in the region seem to be limited. And
20 that came into play when we were developing and
21 deriving the combination of energy alternatives.

22 CHAIRMAN SPRITZER: I don't want to
23 belabor this point unnecessarily. But I guess maybe
24 I can ask the question this way. Is availability an
25 additional requirement on top of technological

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1 feasibility and commercial viability, availability by
2 the start date of the project or, excuse me, by the
3 start of commercial operations for the project?

4 MS. COURT: Well, you know as we have
5 mentioned before again relying -- It's a forward-
6 looking analysis. Looking into the future, we relied
7 on the information from the State of Maryland and the
8 Department of Energy on their projections.

9 And as part of these projections we've
10 mentioned earlier that the cost of the technology and
11 the performance of a given technology is considered in
12 addition in those projections. There are other
13 considerations such as availability of the resource in
14 the region, utilization, load profiles, environmental
15 constraints, policy and regulatory factors. So all of
16 those are part of the projections. In relying on some
17 of these projections that we do we are in effect
18 looking at all those different aspects.

19 CHAIRMAN SPRITZER: Let's look at the
20 FEIS. I believe it's page 9-8. But FEIS is Exhibit
21 NRC 3A, 9-8 I believe. I'll check that for you in a
22 minute. Yes, 9-8, Chapter 9. Yes, there you go. You
23 got it. You had it. Yes, coal fire. We want to
24 start with the title "Coal Fire Generation." Do you
25 have that available to you?

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1 MR. KUGLER: Yes, Your Honor.

2 CHAIRMAN SPRITZER: Now this talks about
3 an alternative, the coal fire generation alternative.
4 And it says, "Review team assumed construction of
5 super critical pulverized coal fire units at the
6 Calvert Cliff site." And if I'm reading this
7 correctly I assume you took that to be a reasonable
8 alternative to Calvert Cliffs 3.

9 MR. KUGLER: Yes, Your Honor.

10 CHAIRMAN SPRITZER: I would assume --
11 Well, tell me. This plant has not been submitted for
12 licensing or there are no construction contracts that
13 you know of for such a plant, are there?

14 MR. KUGLER: No, there are not, Your
15 Honor. But there are coal plants of this nature
16 within the region.

17 CHAIRMAN SPRITZER: Did you consider
18 construction of a coal plant at the Calvert Cliffs
19 site by the end of 2015 to be reasonably foreseeable
20 under the test that you've described?

21 MR. KUGLER: The basic approach that we
22 take in our guidance is to determine what forms of
23 energy generation are available that could meet the
24 purpose and need of the proposed action. So when we
25 look at that we can determine pretty quickly "Okay.

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1 We've got a need for base load power. Fairly large
2 magnitude. What can do that?"

3 Well, we know coal plants can do that.
4 And we know there are coal plants in the region. It's
5 reasonable to think somebody could build another coal
6 plant. Likewise with natural gas. It's pretty clear
7 that that's a possibility. That's an option that
8 could work.

9 When we started looking at the other
10 energy sources, we take a look at whether or not they
11 could actually carry this out individually. In
12 Section 9.2.3, we look at each source individually
13 such as wind, solar, hydropower and determine whether
14 it appears that that resource by itself could carry
15 out the purpose and the need of the proposed action.

16 And in Section 9.2.3. we found, for
17 instance, with wind and solar that it did not appear
18 realistic that they could carry that out in main
19 because they are intermittent sources. So the
20 approach we're taking focuses in on whether or not the
21 option could be done.

22 And when we looked at wind and solar we
23 took that same approach. We weren't even at that
24 point in Section 9.2.3 looking to see really how much
25 is likely to occur here.

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1 The first test is can it even do the job.
2 And we concluded that wind by itself could not do the
3 job. Solar by itself could not do the job.

4 Now when we get into Section 9.2.4 we're
5 now looking at a combination of energy alternatives.
6 We're trying to develop a mix of these various
7 alternatives. And so we need to set a value for them,
8 how much we should include as a contribution from wind
9 and solar, biomass and so on.

10 And our goal is to try and establish a
11 combination of energy alternatives that has the least
12 environmental impact. Because what we're trying to
13 determine is, is there some alternative that would be
14 environmentally preferable to the proposed action?

15 So as we go through that process we need
16 to establish some sort of parameters on how much to
17 expect from each of those resources. And that's where
18 we start getting into looking at how much can we
19 reasonably expect to see in this region in order to
20 establish some sort of numbers to include in that
21 combination.

22 CHAIRMAN SPRITZER: Okay. I understand
23 and I think that covers some areas that we've already
24 talked about. But I'm focusing on the coal fire
25 alternative right now. And to me -- tell me if you

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1 disagree -- I understand that it could fulfill the
2 purpose and need of the project. It's technologically
3 feasible, probably commercially viable.

4 And you seem to have treated that here as
5 sufficient to treat that as a reasonable alternative.
6 You didn't have to get into this business of looking
7 for projections and looking at DOE studies or any of
8 that. Feasible, commercially viable and fulfilled the
9 purpose and need. And you have appeared to have
10 included it solely on that basis as a reasonable
11 alternative. Is that a fair summary of what you did
12 with respect to coal fire generation?

13 MR. KUGLER: Can you give me just a
14 moment?

15 CHAIRMAN SPRITZER: Sure.

16 (Off the record discussion.)

17 MR. KUGLER: In carrying out the review
18 under our guidance, we focus in on those energy
19 sources that as we've discussed technically feasible,
20 commercially viable. If you look at the lead-in to
21 the discussion of coal, the preceding subsection,
22 where we talk about options that include the
23 generating capacity, we talk about where does power
24 come from in the United States and in Maryland.

25 And the bulk of the base load power in

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1 particular, base load power comes from coal and nature
2 gas. So we do tend to focus in on those two options
3 as known options capable of directly meeting the
4 purpose and need of the project.

5 So I'd say, yes, we focus in on whether
6 technically feasible and commercially viable. And we
7 do look I believe -- Let's see. If you look at page
8 9-7 towards the bottom.

9 CHAIRMAN SPRITZER: Okay.

10 MR. KUGLER: In the last paragraph, we do
11 consider what the Energy Information Administration is
12 projecting as a whole where they do talk about what
13 they expect to see in terms of new generation. So
14 natural gas plants are the biggest player in the
15 future as they see it at about a little over a half of
16 what's going to be installed. Renewables as a group
17 is also fairly big at 27 percent. Coal fire at 14 and
18 then nuclear at five.

19 We know that there are going to be coal
20 fire plants. There will be gas plants built. And
21 there will be renewables built.

22 Now those numbers are for the nation as a
23 whole. And so we do focus in a bit more on what's
24 likely in Maryland. But based on their ability to
25 meet the purpose and need directly we include those as

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1 options in our evaluation. And then we consider
2 whether they would be environmentally preferable.

3 CHAIRMAN SPRITZER: Just a few more
4 questions on this. I think you've already told me you
5 know of no current plan to build a coal-fired plant at
6 Calvert Cliffs site. Is that correct?

7 MR. KUGLER: I think I can state pretty
8 clear there's no plan to build a coal-fired plant at
9 Calvert Cliffs. That's correct.

10 CHAIRMAN SPRITZER: And the State of
11 Maryland I think you've talked earlier about their
12 policy in terms of energy development. Is it fair to
13 say that it does not favor construction of new coal
14 generation capacity?

15 MR. KUGLER: I'm not sure that would be
16 true. I must admit I'm not certain about that in
17 their policies.

18 CHAIRMAN SPRITZER: It would, however,
19 require if such a plant were to be built at the
20 Calvert Cliffs site or anywhere else for that matter
21 what's it called? A certificate of public convenience
22 and necessity from the State of Maryland?

23 MR. KUGLER: Yes, Your Honor.

24 CHAIRMAN SPRITZER: With respect to -- You
25 also discuss and I believe this is on page 9-14,

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1 National Gas-fired Generation, you assume construction
2 of a natural gas-fired plant located at the Calvert
3 Cliffs site. Am I also correct that you know of no
4 plan as of today to construct such a plant at the
5 Calvert Cliffs site?

6 MR. KUGLER: Yes, that's correct, Your
7 Honor. If I could explain a little bit about why we
8 in our evaluations use the Calvert Cliffs site. We're
9 trying to the extent possible to compare apples to
10 apples. So as we're working on the environmental
11 impact comparison between coal, natural gas and
12 nuclear, we put it at the same site. So you're
13 dealing with the issues in each location.

14 If we were to do it any other way to use
15 some other site, we wouldn't know where that site was.
16 We wouldn't know what the environmental conditions
17 are.

18 When we start getting into some of the
19 other energy sources, it becomes a little problematic.
20 So, for example, you can't build offshore wind on the
21 Calvert Cliffs site. When we get into some of those
22 other energy sources, we have to accept that it's
23 going to have to be at some unknown location other
24 than Calvert Cliffs.

25 But in order to make the comparison as

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1 fair as possible we use the proposed site for the
2 types of power generation that could be built at that
3 site.

4 CHAIRMAN SPRITZER: In light of that
5 comment, let me ask. Do you know of any current
6 proposal to build a coal-fire generation plant of the
7 type you're talking about here, a super critical
8 pulverized coal-fired unit, in Maryland that will
9 produce 16,000 megawatts of electric power anywhere in
10 the state? Any such proposal?

11 MR. KUGLER: No, I'm not aware of such a
12 proposal.

13 CHAIRMAN SPRITZER: Is there such a
14 proposal with respect to gas-fired generation?

15 MR. KUGLER: I'm not aware of one. No,
16 sir.

17 CHAIRMAN SPRITZER: But I take it you
18 concluded and I think this is quite reasonable that
19 those would still be reasonable alternatives to
20 construction at Calvert Cliffs.

21 MR. KUGLER: Yes, Your Honor. I would
22 point out again that even in the combination of energy
23 alternatives the amount of solar and wind that we
24 included we don't know of projects that would fulfill
25 all of that either. So it's not just the coal and

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1 natural gas that it would be true of.

2 CHAIRMAN SPRITZER: Does the NRC-10 which
3 is the Cumulative Impact Guidance that you referred to
4 earlier state anywhere that it should be used or for
5 that matter that it should not be used in conducting
6 an alternatives analysis?

7 MR. KUGLER: It doesn't say one way or the
8 other, Your Honor.

9 CHAIRMAN SPRITZER: I looked. I didn't
10 find that either. What about the guidance you used
11 which I believe is NRC Exhibit 8 on conducting the
12 alternatives analysis? Does it suggest anywhere that
13 you should look to guidance on cumulative impacts to
14 do the alternatives analysis?

15 MR. KUGLER: No, Your Honor. It does not.

16 CHAIRMAN SPRITZER: Are you aware of any
17 other FEIS other than the one for Calvert Cliffs Unit
18 3 where the review team for that FEIS has made use of
19 the Cumulative Impacts Guidance to do an alternatives
20 analysis?

21 MR. KUGLER: Well, I've worked on several
22 of the combined license applications and we use the
23 same basic approach in each case where we're looking
24 to determine what is likely to be built or could be
25 built in the region during the period we're

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1 considering. I believe we've been fairly consistent
2 in that.

3 CHAIRMAN SPRITZER: Okay. Getting toward
4 the end here. Turning to Section -- We're still in
5 the FEIS. Let's turn to Table 9-3 which is on page 9-
6 29 I guess at the top to the extent we can focus in on
7 that. Okay.

8 Now this summary of impacts is based on
9 the combined alternative as you constructed it, not
10 the modified version that assumed additional 300
11 megawatts for a total of 700 megawatts of the
12 alternative energy sources.

13 MR. KUGLER: That's correct, Your Honor.
14 This is the table associated with the actual
15 combination that we used. The other scenario we did
16 not create a separate table for because we weren't
17 analyzing in detail. We were just using it as an
18 example.

19 CHAIRMAN SPRITZER: And I take it you then
20 go on to discuss the possibility of adding an
21 additional -- What is it now? It would add an
22 additional 300 megawatts of base load power to the 400
23 that you start with which would require -- what does
24 it say -- for the wind contribution and installed
25 capacity of at least 1,000 to 1,200 megawatts with a

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1 400 megawatt electric CAES plant. That's the last
2 paragraph on page 9-28.

3 CHAIRMAN SPRITZER: And you say this is on
4 -- Now we're shifting over to page 9-30 at the top.
5 You say, "The impact categorizations in Table 9-3
6 would not change except that impacts to land use and
7 ecology might become large if onshore wind energy is
8 used." Do you see that?

9 MR. KUGLER: Yes. Yes, Your Honor.

10 CHAIRMAN SPRITZER: Now let's go back to
11 Table 9-3. Getting a workout here on page 9-29. I
12 guess I'm a little -- You're saying even with that
13 change the ranking or -- what do I call it -- the
14 characterization small to moderate for air quality
15 would not change.

16 MR. KUGLER: That's correct, Your Honor.
17 If you -- And we talked a little bit about this
18 earlier. If you take a look at the emissions that
19 we're talking about in this table, if we go to this
20 other scenario where we increase the wind by 300
21 megawatts, we would decrease the natural gas by 300.
22 So now it goes from 1200 megawatts down to 900.

23 CHAIRMAN SPRITZER: Right.

24 MR. KUGLER: Roughly speaking for the
25 purpose of this evaluation, you would take these

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1 emissions and they would be about three quarters that
2 value that's in the table.

3 For instance, you see two emissions would
4 go from 4.2 million tons a year to something just over
5 3.0 million tons which is still pretty significant.
6 This is still a large natural gas plant. And so in
7 our judgment the air quality impacts would still be
8 small to moderate. It would still be in the same
9 category.

10 CHAIRMAN SPRITZER: And I think you told
11 me earlier that you assumed because you're going from
12 a 1200 to a 900 megawatts gas plant you would roughly
13 reduce the emissions quantities that appear here under
14 air quality by roughly 25 percent.

15 MR. KUGLER: That's correct. Yes, Your
16 Honor.

17 CHAIRMAN SPRITZER: So you didn't actually
18 need to run a new -- Well, tell me this. How is Table
19 9 -- The data that appears on Table 9-3 for air
20 quality, how did you generate that data?

21 MR. KUGLER: Well, the data, we go to --
22 There are a series of tables that the EPA puts out
23 that have factors for emissions for different fuels,
24 coal, natural gas. And based on the size of the plant
25 we can calculate then what the emissions would be for

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1 a given power level. And that's where these numbers
2 were derived from.

3 CHAIRMAN SPRITZER: So it's not -- You
4 don't have to use a complicated model of any sort.

5 MR. KUGLER: No, Your Honor. It's
6 relatively straightforward.

7 CHAIRMAN SPRITZER: Now for what we talked
8 about before you're familiar with the Maryland Renewal
9 Portfolio Standard or RPS Standard.

10 MR. KUGLER: Yes, Your Honor.

11 CHAIRMAN SPRITZER: Is it reasonably
12 foreseeable that Maryland utilities will comply with
13 that standard?

14 MR. KUGLER: Yes, Your Honor.

15 CHAIRMAN SPRITZER: Let's look at
16 Applicant's Exhibit 10, page 23, Table 6.

17 MR. KUGLER: I'm sorry, Your Honor. What
18 page was that?

19 CHAIRMAN SPRITZER: We're on -- This is
20 Applicant's Exhibit 10, page 23, Table 6 which appears
21 at the top.

22 MR. KUGLER: Okay. I'm there, Your Honor.

23 CHAIRMAN SPRITZER: Okay. Yes, I remember
24 this one. If you want to look over the preceding
25 pages, I don't know if this may help to put this table

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1 in context. You might take a minute to look it over
2 and let me know if you're ready to proceed.

3 MR. KUGLER: Okay. Your Honor, I think
4 I'm ready. Let's proceed.

5 CHAIRMAN SPRITZER: Okay. Actually, could
6 you look at Table 5 also?

7 MR. KUGLER: Okay. I understand what
8 they're doing there.

9 CHAIRMAN SPRITZER: I mean as I understand
10 it and of course please correct me if I'm wrong this
11 is attempting to calculate. Table 5 is attempting to
12 calculate or is calculating the renewal energy credits
13 that will be needed for Tier 1 resources.

14 MR. KUGLER: Right.

15 CHAIRMAN SPRITZER: Beginning in 2007 and
16 continuing up to 2022.

17 MR. KUGLER: Yes, Your Honor.

18 CHAIRMAN SPRITZER: That's the righthand
19 column, RECs needed for compliance. And I take it
20 that's determined by multiplying the percentage for
21 Tier 1 resources in the column labeled Tier 1. You
22 multiply that by retail electricity sales apparently
23 measured in megawatt hours. And that's going to tell
24 you the RECs needed for compliance.

25 MR. KUGLER: That's correct, Your Honor.

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1 An REC, a REC, is equivalent to 1 megawatt hour of
2 generation by whatever the resource is that's being
3 used to meet the RPS Standard.

4 CHAIRMAN SPRITZER: And wind power is one
5 of the Tier 1 resources.

6 MR. KUGLER: It is one option. Yes, Your
7 Honor.

8 CHAIRMAN SPRITZER: And there are a number
9 of others. I think they're listed in Footnote 11
10 beginning on the bottom of page 21. It says, "Wind,
11 qualifying biomass which apparently excludes sawdust,
12 methane from anaerobic decomposition of organic
13 materials in a landfill or wastewater treatment plant,
14 geothermal, ocean energy including energy from waves,
15 tides, currents and thermal differences, fuel cells
16 powered by methane or biomass, hydroelectric plants
17 less than 30 megawatts and poultry-litter incineration
18 facilities connected to the Maryland distribution
19 system."

20 All those I take it make up Tier 1.

21 MR. KUGLER: Yes, Your Honor.

22 CHAIRMAN SPRITZER: Is that list accurate
23 as to the best of your knowledge?

24 MR. KUGLER: I believe -- It looks fairly
25 accurate. I know that the State has their own reports

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1 on this. But that looks fairly complete.

2 CHAIRMAN SPRITZER: So utilities all --
3 Let me ask this. When it says, "RECs needed for
4 compliance" in the righthand column, is that -- I
5 would assume that's for all utilities in Maryland. Is
6 that right?

7 MR. KUGLER: Yes, that's for the state as
8 a whole.

9 CHAIRMAN SPRITZER: And for each utility
10 they determine how many sales they've had in the given
11 year in terms of megawatt hours multiplied by the
12 program percentage that appears in the Tier 1 column.
13 And that tells them how many RECs they need.

14 MR. KUGLER: That's correct, Your Honor.

15 CHAIRMAN SPRITZER: RECs is in capital R-
16 E-C which stands for Renewable Energy Credit.

17 MR. KUGLER: That's correct.

18 CHAIRMAN SPRITZER: Now if I understand
19 Table 6 correctly which is moving on back to page 23
20 where we started, it looks like what they're doing
21 here is making certain assumptions about the
22 percentage -- this is in the lefthand column -- of the
23 2022 REC obligation that will be met with wind power.
24 Now on that basis they are then determining, perhaps
25 I should say estimating, land-based and offshore

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1 installed wind capacity that would be needed to meet
2 that obligation assuming the percentage of wind power
3 is correctly stated in the first column.

4 MR. KUGLER: I believe what they're doing
5 here is indicating what it would look like, for
6 example, if you met 25 percent of the RECs with wind.
7 You would need -- if it was land-based -- 1,114
8 megawatts of capacity or if it was offshore 975.
9 They're not saying that that's what has to be done.

10 CHAIRMAN SPRITZER: I understand.

11 MR. KUGLER: Or will be done. Okay.

12 CHAIRMAN SPRITZER: Now can you tell -- I
13 couldn't -- whether the land-based installed capacity
14 needed and the offshore installed capacity are
15 alternative ways of meeting the REC? Or are you going
16 to need both?

17 MR. KUGLER: I'd have to check the
18 numbers, but it looks to me like they're saying either
19 or. It's not both.

20 CHAIRMAN SPRITZER: And since we're
21 talking if this is based on Table 6 which is looking
22 at the year 2022 and Table 5 tells us that in that
23 year 18 percent of retail electricity sales have to
24 come from Tier 1 resources.

25 MR. KUGLER: That's not quite correct, but

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1 almost. Well, it's because of the way the program is
2 set up. There are other options. Although my
3 understanding from the reports I've looked at from the
4 State is that for most Tier 1 resources, basically the
5 ones we're looking at here, there is an expectation
6 that the Renewal Portfolio Standard will be met
7 through RECs, renewal energy credits. Not necessarily
8 from within the State, but through RECs.

9 There is an alternative to pay -- It's
10 called an alternative compliance payment which
11 basically is if you don't get all of the credits that
12 you need you can pay money instead. So that is an
13 option. But the State expects for the most part that
14 for these resources that they will be able to satisfy
15 the Renewable Portfolio Standard with RECs. They
16 won't expect to see alternative compliance payments
17 for these resources.

18 CHAIRMAN SPRITZER: For the Tier 1
19 resources?

20 MR. KUGLER: For these Tier 1 resources.
21 There's one other Tier 1 resource that's not included
22 in that table and that's solar.

23 CHAIRMAN SPRITZER: Okay.

24 MR. KUGLER: It's treated separately
25 because it's a special carveout.

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1 CHAIRMAN SPRITZER: Okay. And that added
2 an additional two percent.

3 MR. KUGLER: Two percent. That's correct.

4 CHAIRMAN SPRITZER: That gets us up to the
5 20 percent total --

6 MR. KUGLER: Correct.

7 CHAIRMAN SPRITZER: -- intended by 2022.

8 MR. KUGLER: Yes, Your Honor.

9 CHAIRMAN SPRITZER: Okay. Now do you
10 think -- Well, let me ask this. Do you have an
11 opinion -- you don't have to have one -- as to whether
12 wind will make up 25 percent more or less? Is that a
13 reasonable estimate of what percentage of the standard
14 would be met with wind power in 2022?

15 MR. KUGLER: I'm trying to recall the
16 numbers that I've looked at. There's a recent report
17 by the State. It's called A Long Term Electricity
18 Report in which they estimated what they think will
19 happen in the State in terms of renewable energy. I
20 don't know if we want to try and call that one up.
21 It's Applicant's Exhibit 5.

22 CHAIRMAN SPRITZER: That would be helpful.
23 (Off the record discussion.)

24 MR. KUGLER: If we go to -- We have a
25 couple of different places we could look at. But if

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1 we go to page 9-5 and let's go to the top of the page.
2 Now this graph is showing what they call their
3 reference case. So basically when I see reference
4 case I generally read that to mean what they think is
5 most likely.

6 So this is a reference case that Maryland
7 has put together for renewal energy generation. And
8 if you take a look at that the wind power is in blue.
9 And it comes up relatively quickly through 2012 and
10 then pretty much flattens out at that point.

11 The solar starts out really small, but it
12 does continue to grow until about 2018 it looks like.
13 And then it starts to flatten out. And I think some of
14 that may relate to incentives when incentives are
15 going to run out.

16 The biomass and landfill gas, landfill gas
17 grows pretty quickly and then flattens out pretty
18 quickly. And then biomass grows gradually throughout
19 the period it looks like and then flattens out toward
20 the end.

21 If you look at what they're talking about
22 here, if you look at the wind power, it looks like
23 they're expecting -- I think when I looked at this I
24 blew it up really big so I could try and estimate. I
25 think I estimated it was about 560 gigawatt hours of

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1 generation.

2 Let's see. So that's 560,000 megawatt
3 hours as opposed to here over three million. So it's
4 about roughly one-sixth of that 25 percent. What
5 they're projecting is probably more in the range of
6 five percent, four percent, of the renewable energy in
7 the State coming from wind.

8 CHAIRMAN SPRITZER: So that's
9 significantly less than this document would say.

10 MR. KUGLER: Again, this document is
11 saying this is what it would look like. It wasn't
12 saying necessarily that's what's going to happen.

13 CHAIRMAN SPRITZER: Right. Can we tell
14 looking at this Figure 9.3 on -- What is the document
15 number?

16 MR. KUGLER: It's five, Applicant Exhibit
17 5. What is your question?

18 CHAIRMAN SPRITZER: Well, does this allow
19 us to compute the percentage that wind would make up
20 of the total Tier 1 resource? It doesn't look like
21 they're all shown on this.

22 MR. KUGLER: They're not all shown, but I
23 think the expectation is this is the bulk of them.

24 CHAIRMAN SPRITZER: Okay. I mean this may
25 be --

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1 MR. KUGLER: It looks like about one-fifth
2 roughly.

3 CHAIRMAN SPRITZER: Okay. So one-fifth
4 being 20 percent?

5 MR. KUGLER: Well, one-fifth of the 20
6 percent. So it would be about four percent. In other
7 words, if the RPS is 20 and 20 percent and this is
8 about one-fifth of that, it would mean about four
9 percent.

10 CHAIRMAN SPRITZER: Of the total.

11 MR. KUGLER: Of the total, yes. About 20
12 percent of the renewables, yes.

13 CHAIRMAN SPRITZER: Looking back to Table
14 6 on Applicant's 10, the one with the 25 percent, I
15 understood that 25 percent to be 25 percent of what
16 would meet the RPS standard. Twenty-five percent of
17 the total Tier 1 resources. Not 25 percent of the
18 total.

19 MR. KUGLER: I believe you're right.

20 MS. CORT: Yes.

21 MR. KUGLER: So it's about one-quarter.

22 (Off the record discussion.)

23 CHAIRMAN SPRITZER: Whereas the figure you
24 were giving from the table we were looking at in the
25 other exhibit was about 20 percent.

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1 MR. KUGLER: Roughly. I mean it's an
2 estimate.

3 CHAIRMAN SPRITZER: Okay.

4 MR. KUGLER: But that's not a large
5 difference.

6 CHAIRMAN SPRITZER: Okay.

7 MR. KUGLER: It would be somewhat less it
8 seems like than this 25 percent case.

9 CHAIRMAN SPRITZER: So if we took again
10 hypothetically 20 to 25 percent we assume that 20 to
11 25 percent -- Let me start again. If we assume that
12 Tier 1 requirement in 2022 will be somewhere that wind
13 power will make up somewhere between 20 and 25 percent
14 of the Tier 1 resources that would satisfy the REC
15 requirement in 2022.

16 And then we look at the offshore installed
17 capacity needed to meet that, it's going to be --
18 Well, if it's 25 percent, it's going to be 975.
19 Obviously less, somewhat less, if we're using 20
20 percent. Is that a fair estimate?

21 MR. KUGLER: That sounds -- Yes, I believe
22 that's correct, sir. Probably -- Well, if we're using
23 20 percent, it would be probably around 800. Yes.

24 CHAIRMAN SPRITZER: Now I know you weren't
25 looking at 2022 when you did the FEIS. But the amount

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1 that would be -- Either of those two amounts that
2 you've just given me would be larger than the amounts
3 you were assuming for offshore wind in the FEIS. Is
4 that correct?

5 MR. KUGLER: Yes, Your Honor.

6 CHAIRMAN SPRITZER: I guess one thing that
7 this would lead me to conclude -- and you can
8 certainly disagree if you do -- is that the time we do
9 the analysis, the date that we use for the analysis,
10 may very well affect the outcome if we take the
11 Maryland Renewable Portfolio Standard into account.

12 MR. KUGLER: Well, actually if we can go
13 back to -- If we can go to page 9-3 of the Applicant's
14 Exhibit 5, there's a figure toward the bottom of that
15 page right there. I'm trying to figure out. We're
16 doing math here kind of on the fly. But I'm trying to
17 figure out why the numbers don't seem to be coming out
18 right.

19 If you look at this figure, this is
20 talking about the total amount of additions in
21 megawatts. So that's the capacity that will have
22 occurred. So it's a cumulative graph between 2010 and
23 2030. And if you look at that, it's talking about
24 under 200 megawatts of wind.

25 So I'm having a difficult time reconciling

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1 that number with the numbers in this other report.

2 CHAIRMAN SPRITZER: Well, we've been going
3 for about an hour. Perhaps now would be a good time
4 to take a ten minute break. We will not be going out
5 for lunch. So hopefully in ten minutes.

6 And if you want you're more than welcome
7 to take a look and maybe you could help us understand
8 this a little better when we get back.

9 MR. KUGLER: Okay. Thank you, sir.

10 CHAIRMAN SPRITZER: Off the record.

11 (Whereupon, a short recess was taken.)

12 CHAIRMAN SPRITZER: On the record. What
13 exhibit were we looking at?

14 MR. KUGLER: Well, we were looking between
15 Applicant's Exhibit 5 and Applicant's Exhibit 10. I
16 think we have been able to sort out what the
17 difference is that we were struggling with.

18 In Exhibit 10 it talked about for the year
19 2022 over 13 million RECs being required to meet the
20 RPS standard. So that's over 13 million megawatt
21 hours of generation.

22 And yet in Exhibit 5 in Table 9.3 on page
23 9-5, it's only indicating RPS related generation of
24 under 3 million megawatt hours. And the difference is
25 that a very large percentage of the RPS is going to be

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1 met by generation outside the State. As we talked
2 about earlier, they can purchase RECs from anywhere
3 essentially within the PJM region, PJM being one of
4 the management regions for electric power in this
5 country.

6 What this is telling us is that a very
7 large percentage of the RECs that are purchased to
8 meet the Renewable Portfolio Standard in Maryland will
9 come from out-of-state. And then less than a quarter
10 of them will come from in-state resources for these
11 Tier 1 resources, the ones other than solar.

12 CHAIRMAN SPRITZER: Okay. Regardless
13 though of where the generating capacity happens to be
14 located, Maryland or somewhere else, are the numbers
15 in Table 6 of Applicant Exhibit 10 within the ball
16 park so to speak?

17 MR. KUGLER: If the RPS standard is met --
18 If 25 percent of the RPS standard is met with wind
19 power, those would be approximate capacities that
20 would be necessary. But the point would be that they
21 might be somewhere else and not necessarily supplying
22 any power to Maryland at all. Because again they can
23 purchase the RECs. They are not purchasing the power.

24 CHAIRMAN SPRITZER: Okay. So we need
25 somehow to integrate the information that was in the -

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1 - Which table is it again?

2 MR. KUGLER: I think honestly the long
3 term electricity report which is written by Maryland.
4 It's a very recent report. It's Figure 9.3 shows the
5 amount of generation.

6 But if we go back to Figure 9.1, I think
7 there's a point to be made here. And that is that the
8 State believes that it will have less than 200
9 megawatts of wind generation added between now and
10 2030. In our combination of energy alternatives, we
11 actually gave credit for 250 to 300 megawatts of
12 installed capacity.

13 The point I'm trying to make is that we're
14 not short-selling these resources. We have tried to
15 give as much credit as we felt we could to wind and
16 solar. So we included a substantial amount of new
17 installed capacity for these resources. And when you
18 look at what the state expects to see happen we're in
19 pretty reasonable alignment with them if not a little
20 bit higher.

21 CHAIRMAN SPRITZER: I take it that there
22 are a lot more additions of capacity for wind that
23 will occur, but they'll be outside at least according
24 to this document of Maryland.

25 MR. KUGLER: Well, not necessarily.

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1 Maryland is not saying what resource will meet the RPS
2 requirement for the RECs that are purchased from other
3 states. It just has to be those Tier 1 resources. So
4 it may or may not be wind. It's difficult to say how
5 much of player wind will be in those numbers.

6 CHAIRMAN SPRITZER: So just looking at
7 Figure 9.1 and again for some reason I can't remember
8 -- This is NRC 5 I believe?

9 MR. KUGLER: It's actually Applicant's 5.

10 CHAIRMAN SPRITZER: Applicant's 5, okay.
11 Figure 9.1, Applicant's 5, the blue which shows --

12 MR. KUGLER: Is wind.

13 CHAIRMAN SPRITZER: The blue part of the
14 bar graph which shows wind, if I'm understanding that,
15 it's talking about capacity additions only in
16 Maryland.

17 MR. KUGLER: That's correct.

18 CHAIRMAN SPRITZER: There could be
19 additional capacity additions that contribute to
20 meeting the RECs outside of Maryland.

21 MR. KUGLER: Yes, that's correct.

22 CHAIRMAN SPRITZER: And they could be used
23 to generate, to provide, electricity to Maryland even
24 though they might be located somewhere else.

25 MR. KUGLER: It's possible, but it's hard

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1 to say. It depends on where the resources are.

2 CHAIRMAN SPRITZER: If we were to assume
3 hypothetically that all the resources outside of
4 Maryland are used to provide power in Maryland, what
5 would be the number? What would be the total RPS
6 capacity addition whether in Maryland or not?

7 MR. KUGLER: I'm not sure I have a number
8 for that. Again in terms of the total Tier 1
9 resources it's roughly 20 percent or it's 20 percent
10 of the generation in Maryland which the estimate in
11 Applicant Exhibit 10 shows about 75 million megawatt
12 hours in the year 2022, the last year that they were
13 looking at. So roughly 15 million megawatt hours.

14 But what that converts to in terms of
15 megawatts capacity really depends on what type of
16 facility it is because they have different capacity
17 factors. It's very difficult to try and convert that
18 directly into a megawatt capacity number.

19 CHAIRMAN SPRITZER: Let me try and sum up
20 and see if this helps us. Again, going back to Table
21 6 on Applicant's 10 and again assuming 25 percent,
22 somewhere between 20 to 25 percent, of the 2022 REC
23 obligation will be met with wind power. If I
24 understand what you're telling me if we were to assume
25 that was to be met with offshore installed capacity of

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1 975 megawatts, a small percentage of that might be in
2 Maryland, the rest outside of Maryland.

3 MR. KUGLER: Yes. Yes, Your Honor.

4 CHAIRMAN SPRITZER: And you in your FEIS
5 limited as I understand it the additions to capacity
6 that you were interested in for those in Maryland,
7 physically located in Maryland or directly offshore
8 or offshore of Maryland.

9 MR. KUGLER: Yes, Your Honor.

10 CHAIRMAN SPRITZER: So if it was offshore
11 Delaware -- If a new capacity was offshore Delaware
12 and used to satisfy the REC obligation for 2022, it
13 wouldn't be part of your -- You wouldn't have included
14 that in the combination alternative.

15 MR. KUGLER: That's correct.

16 CHAIRMAN SPRITZER: Okay. I think I
17 understand where we are. Okay. Going back to
18 Applicant's 10 on page 22, I'm wondering if we can use
19 these numbers to tell us where we would be in terms of
20 solar power. I take it from what you told me earlier
21 with solar power that's got to be physically located
22 in Maryland in order to satisfy the REC obligation.

23 MR. KUGLER: That's correct.

24 CHAIRMAN SPRITZER: Let me ask one
25 preliminary question that I should have covered

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1 earlier. In the table, they're assuming a one percent
2 growth per year in retail electricity sales.

3 MR. KUGLER: Yes, Your Honor.

4 CHAIRMAN SPRITZER: Is that a reasonable
5 estimate in your view?

6 MR. KUGLER: I'm trying to think of other
7 reports I've looked at. It's probably not an
8 unreasonable number. I think other studies have shown
9 a slightly larger number. But it's probably a
10 reasonable number to use.

11 CHAIRMAN SPRITZER: If we were trying to
12 calculate the requirement for solar capacity that
13 would be necessary in 2022, I take it we'd start with
14 the 75,916,526 megawatt hour number, multiply it by
15 0.02.

16 MR. KUGLER: Yes, Your Honor.

17 CHAIRMAN SPRITZER: And that would be the
18 number of megawatt hours that whatever the capacity is
19 would have to provide.

20 MR. KUGLER: That's correct, Your Honor.

21 CHAIRMAN SPRITZER: Have you done -- Is
22 there a way to translate from that number two percent
23 of 75,916,526, derive that number and translate that
24 back into a particular installed capacity?

25 MR. KUGLER: It can be done. I'm not sure

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1 I can do it sitting here.

2 CHAIRMAN SPRITZER: All right.

3 MR. KUGLER: In round numbers, if for the
4 sake of argument we use a capacity factor for solar of
5 about 20 percent, most solar PV is less than that.
6 Solar concentrating can be higher.

7 And just as an example one of the projects
8 that's been discussed here is the installation at
9 FedEx Field. And if you look at the numbers for that
10 installation they're expecting a capacity factor of
11 around 15 percent.

12 But if we use 20 percent we would have to
13 take that roughly 1.5 million megawatt hours. I
14 didn't bring a calculator with me.

15 CHAIRMAN SPRITZER: I do have one I think.
16 Hold on.

17 (Off the record discussion.)

18 We do have one here if it will help. We
19 have all these engineers here.

20 MR. KUGLER: I wasn't expecting to be
21 doing calculations. All right. That's per year.
22 That's about 1.5 million.

23 MR. WILSON: Your Honor, in the interest
24 of efficiency, perhaps this is something we can supply
25 to you at a later date.

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1 CHAIRMAN SPRITZER: Well, I don't mean to
2 make the witness spend more time on it than
3 appropriate. But is this something you can do in a
4 few minutes or is it going to take a long period of
5 time?

6 MR. KUGLER: I think I can do it fairly
7 quickly.

8 CHAIRMAN SPRITZER: Okay.

9 MR. KUGLER: I just want to check the
10 number here. I mean just doing a quick calculation I'm
11 getting something over 800 megawatts --

12 (Off the record comment.)
13 -- of installed capacity to fully meet the two
14 percent. With that said, the State doesn't really
15 expect that to happen. And this gets into that
16 question that came up I think early on I think in the
17 opening statements. There was some discussion of the
18 staff doesn't expect the companies to meet the RPS
19 standard. And that's not true.

20 But as I've indicated, these companies
21 have options on how they meet that standard. And I
22 believe it's -- Is it in the long term electricity
23 report? I believe it is.

24 (Off the record discussion.)

25 If you could go to page 3-21 in

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1 Applicant's Exhibit 5, the paragraph under the table.
2 Okay. In this paragraph, the State discusses the
3 solar portion of the RPS standard. And what they
4 essentially say is that only by the year 2022 when
5 they reach the full two percent they only expect about
6 half of the solar requirement to actually be met by
7 facilities built and that the balance will be met with
8 these alternative compliance payments.

9 What they found and it's fairly consistent
10 with what I've seen elsewhere is that the way the
11 system is set up at some point these alternative
12 compliance payments come down over time. And at some
13 point they become less than the cost of actually
14 building the facilities.

15 And at that point it's cheaper for the
16 power company to pay the compliance payment rather
17 than build the facility. And their expectation is --
18 and this is the State, this is not us -- that's
19 exactly what's going to happen. They'll get to about
20 half of the amount required by the RPS and that the
21 balance will come from payments.

22 CHAIRMAN SPRITZER: So you gave me a
23 figure just now of installed capacity of?

24 MR. KUGLER: Something over 800.

25 CHAIRMAN SPRITZER: And we multiply that

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1 by 0.5.

2 MR. KUGLER: So about something over 400
3 by 2022.

4 CHAIRMAN SPRITZER: Okay. Let's look at
5 NRC 4 and your direct testimony pages 33 through 36.
6 But we'll start on page 33. Did you assume -- When I
7 read this, I got the impression but tell me if I'm
8 wrong -- that you assumed that enduser photovoltaics
9 will contribute to some extent to the so-called
10 combined alternative.

11 MR. KUGLER: Yes, Your Honor. At this
12 point in this state it's unlikely and in fact it's
13 discussed at the end of that page. We don't really
14 foresee any concentrating solar at all in this state.
15 So it's all going to be photovoltaic. A lot of it
16 will be or most of it, if not all of it, will be
17 enduse.

18 CHAIRMAN SPRITZER: Photovoltaic solar, is
19 that basically panels that people install on their
20 roof or carport or something like that?

21 MR. KUGLER: Or on land. There are -- The
22 bigger facilities that are being built in this state,
23 for instance, there's a 20 megawatt facility up in
24 Hagerstown. There they're clearing ground and
25 building a large 20 megawatt facility on the ground.

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1 So it's going to be a mixture of those types of
2 facilities and then the much smaller home-based
3 rooftop installations.

4 CHAIRMAN SPRITZER: When you refer to
5 enduser photovoltaics, is that assuming somebody
6 whether it's a business or an individual who's using
7 photovoltaics at least in part to generate electricity
8 for their own use?

9 MR. KUGLER: That's correct, sir.

10 CHAIRMAN SPRITZER: As opposed to
11 supplying it for the grid?

12 MR. KUGLER: Well, the way it typically
13 works is to the extent that the system is supplying
14 less power than they need they take all the power from
15 the solar panels and then some power from the grid.
16 There may be times when they're using less than the
17 solar panels are generating at which point they will
18 actually provide power to the grid.

19 CHAIRMAN SPRITZER: And is that why
20 photovoltaics could be included in the combined
21 alternative because they do at times generate or
22 supply power to the grid?

23 MR. KUGLER: It's not so much because they
24 supply power to the grid. But even when they're not
25 supplying power to the grid they are offsetting a need

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1 for power that the grid would have had to provide
2 otherwise. So whichever way the power is going they
3 are offsetting some of the generation that the grid
4 would have had to provide.

5 CHAIRMAN SPRITZER: And is that a
6 functional equivalent of base load power when the
7 photovoltaics are supplying -- In other words, are
8 they taking the place of base load power that would
9 otherwise be required?

10 MR. KUGLER: No, Your Honor. Because they
11 will operate in a very intermittent manner.
12 Obviously, photovoltaics only provide power in daytime
13 and when the sun is shining reasonably bright.. The
14 amount of energy you get drops fairly significantly
15 when cloud covers the sun. And obviously at night you
16 get nothing. So it's an intermittent source. It's
17 not base load.

18 Now as long as the applications are
19 relatively small compared to the grids capacity, the
20 grid can absorb that. And it won't really even show
21 up. It becomes more of an issue if you have very
22 large penetrations into the grid by an intermittent
23 source like solar. Then the grid operators have to
24 figure out how to manage that.

25 CHAIRMAN SPRITZER: Would the photovoltaic

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1 power that you assumed in the or used in the combined
2 alternative, is that combined with a CAES plan in some
3 way to produce base load power?

4 MR. KUGLER: We showed it as being coupled
5 with CAES in order to make it look like base load
6 power. It wouldn't necessarily have to be done that
7 way. It could be backed up by something other than
8 CAES. The reason we chose CAES was the environmental
9 impacts are slightly smaller if you back it up with
10 CAES than if, for instance, you back it up with
11 natural gas plant.

12 CHAIRMAN SPRITZER: Are photovoltaics --
13 Do they ever come with their own device that you can
14 use to provide constant power? For example, can they
15 be used to recharge a battery?

16 MR. KUGLER: That's possible. It can be
17 done. I'm sure it's been done somewhere. I don't
18 think it's typically done with home installations. I
19 don't -- I'm not aware of any of the larger ones that
20 we've looked at having any sort of storage like that.
21 But it can be done.

22 CHAIRMAN SPRITZER: To what level did you
23 make an assumption in the FEIS about the installed
24 capacity of these photovoltaic units?

25 MR. KUGLER: What we did in the FEIS was

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1 assume a base load equivalent power level of 75
2 megawatts. And depending on the capacity factor you
3 use would indicate how much actual installed capacity
4 you would need.

5 In our testimony we talked about giving it
6 a generous capacity factor of 25 percent which is
7 probably too high. But if you use 25 percent capacity
8 factor that 75 megawatts capacity of average
9 generation will convert to about 300 megawatts of
10 installed capacity. If you use a smaller capacity
11 factor, it means larger installed capacities.

12 CHAIRMAN SPRITZER: Okay. Let me just
13 take a quick look through my notes and see if there's
14 anything I left out. And at that point I'll turn you
15 over to my colleagues. Why don't you go ahead? I
16 don't have anything else. Thank you.

17 JUDGE ARNOLD: Thankfully my list of
18 questions have been considerably whittled down by
19 Judge Spritzer. On Intervenors in their testimony
20 they state "Applicants and NRC staff have consistently
21 understated the potential contributions of solar and
22 wind power to Maryland and the larger PJM grid." To
23 your knowledge, in the FEIS does it ever state what
24 the offshore wind potential is in Maryland? I ask
25 because I couldn't find it.

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1 MR. KUGLER: I'm trying to recall if we
2 specifically stated the offshore capacity. I know we
3 referenced the report by the National Renewal Energy
4 Lab and I know we looked at that. But again our focus
5 really was more on what is likely to be installed than
6 what is theoretically available offshore.

7 I know in our testimony we did
8 specifically state it. I believe that was in Answer
9 33 which is on page 27 of our testimony. So that
10 would be NRC 4. So page 27, Answer 33, we indicate
11 for the Mid-Atlantic Region, the Mid-Atlantic Region
12 from New Jersey to North Carolina has up to 570
13 gigawatts of potential offshore wind capacity and
14 about 54 gigawatts is attributable to Maryland.

15 Let's see.

16 (Off the record comments.)

17 But looking at the environmental impact
18 statement, no, it doesn't appear that we ever stated
19 an offshore potential.

20 JUDGE ARNOLD: Does the environmental
21 impact statement mention how much solar power
22 potential exists in Maryland?

23 MR. KUGLER: No, Your Honor.

24 JUDGE ARNOLD: The FEIS on page 9-23
25 states that "Utility scaled solar projects typically

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1 require five to ten acres for every megawatt of
2 generating capacity." Is that for an installed
3 megawatt capacity?

4 MR. KUGLER: Yes, Your Honor.

5 JUDGE ARNOLD: Okay. So at a 15 percent
6 capacity factor that would be something like 33 to 67
7 acres per actual average megawatt?

8 MR. KUGLER: That sounds about right.
9 Yes, sir.

10 JUDGE ARNOLD: Andy, could you put up the
11 Table 9-4? Okay. And that is Table 9-4 from the EIS.
12 I pulled it out so you didn't have to go searching for
13 it.

14 MR. WELKIE: Is that the one you pulled
15 out? Yes.

16 JUDGE ARNOLD: Now this is a comparison
17 between the four reasonable alternatives that you
18 evaluated against the various types of environmental
19 impacts. Correct?

20 MR. KUGLER: Yes, Your Honor.

21 JUDGE ARNOLD: And the combination of
22 alternatives in the righthand column, that's the
23 combination we're talking about, 100 megawatts wind,
24 75 of solar, etc.?

25 MR. KUGLER: Yes, Your Honor.

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1 JUDGE ARNOLD: Could you point out in this
2 table what specifically are the impacts that made you
3 say that the combination is not preferable to nuclear?

4 MR. KUGLER: Well, there are three basic
5 differences between them. The land use impacts are
6 greater for the combination of energy alternatives as
7 are the air quality impacts and the waste management
8 impacts.

9 Now not all of that is related to wind or
10 solar. Some of it relates -- If you go back to Table
11 9-3, we talk a bit about what's behind those impact
12 categories. So we talk about, for instance, in land
13 use you have impacts from the natural gas plant, wind,
14 solar, hydro, biomass and transmission lines which
15 would all affect land use. So it's a number of things
16 in that area.

17 In terms of air quality, it's primarily
18 the natural gas plant, although biomass generation
19 also has emissions. And then in waste management it's
20 basically some of the waste that comes from the
21 natural gas plants, biomass and municipal solid waste.
22 So those are the main differences between those.

23 JUDGE ARNOLD: Okay. Looking at those
24 three items for the combination of alternatives,
25 without considering whether it's reasonable or not, if

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1 you just increase the contribution of solar and wind
2 to that, in which direction do those three impacts go?
3 Do they improve or get more severe?

4 MR. KUGLER: Okay.

5 JUDGE ARNOLD: Start with land use.

6 MR. KUGLER: Starting with land use, if
7 you increase your wind and solar, in general you're
8 going to increase the land use impacts. While the gas
9 plant will start to get smaller, you eventually
10 eliminate one unit, another unit perhaps. They have
11 a relatively small footprint to begin with.

12 But as you start increasing the wind and
13 solar, a couple of things are going to happen. First
14 of all, the facilities themselves take up a fair bit
15 of space depending on exactly where they're set up.
16 In addition, you'll probably have to run more
17 transmission because you're going to start having
18 distributed sources of power and you have to be able
19 to move the power from those sources to the load
20 centers that are using them.

21 In terms of air quality, as you shrink the
22 natural gas plant, obviously wind and solar don't have
23 any significant impacts on air quality. So as you
24 make the gas plant smaller and smaller eventually you
25 would get to the point where those impacts would

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1 become small.

2 In terms of waste management, those
3 impacts should also gradually decrease, although you
4 still have the biomass and municipal solid waste
5 contributing to that.

6 But the land use probably becomes the
7 biggest issue. Because as you have already I think
8 figured out because of low capacity factors,
9 particularly for solar but also for wind, you end up
10 having to install very large nameplate capacities in
11 order to match these kinds of power outputs. And so
12 you're going to start affecting very large areas of
13 land.

14 Now some of the solar you may be able to
15 do on rooftops which reduces that impact somewhat.
16 But what we're seeing at least here in Maryland and I
17 think elsewhere in the country is that the larger
18 installations are not being done on rooftops but on
19 the ground. And they will have impacts.

20 JUDGE ARNOLD: Once again, putting aside
21 whether or not it's reasonable, say we can increase
22 the solar contribution and the wind contribution. Is
23 there ever a point at which that becomes
24 environmentally preferable as compared to nuclear?

25 MR. KUGLER: Looking at the table, I think

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1 the answer has to be no. I think you get a lot -- You
2 could get closer in that your air qualify impacts
3 could become similar, your waste impacts may become
4 similar. But your land use impacts continue to
5 increase. And so it would always be greater than
6 nuclear. And it doesn't end up being better than
7 nuclear and any of the other categories.

8 I'm sorry. Let me make -- No, that's
9 still correct because water use and quality were small
10 already. So you can't make it smaller than small.

11 JUDGE ARNOLD: Really all of the exercise
12 in determining what's reasonable wasn't really
13 essential to this environmental determination.

14 MR. KUGLER: Well, I think it's important
15 that we develop a combination of energy alternatives
16 that we think could be done to compare it to what's
17 been proposed. Because until we do the comparison, we
18 don't know for sure how it's going to come out.

19 JUDGE ARNOLD: That finishes my
20 questioning.

21 JUDGE SAGER: I guess it's my turn.
22 Witnesses will be happy to hear that my list of
23 questions has gotten even smaller. I have to try to
24 pick through the detritus of all my lists here and see
25 what I can find.

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1 Let me ask sort of a dumb question. Who
2 defines the purpose of the project?

3 MR. KUGLER: We do. The NRC defines the
4 purpose and need.

5 JUDGE SAGER: And that's standard. And
6 does the NRC ever say that purpose is not reasonable?

7 MR. KUGLER: Are you saying do we say is
8 that the applicant's purpose is not reasonable?

9 JUDGE SAGER: Perhaps I'm being too
10 obtuse. The Intervenors have said that the purpose is
11 no longer valid. Does NRC ever look at the purpose
12 and say that's not valid?

13 MR. KUGLER: Well, I guess we could if we
14 find that. I can only really speak to this specific
15 case. But the approach we took -- Obviously, the
16 Applicant said, "We're looking to build a big base
17 load plant."

18 JUDGE SAGER: Yes.

19 MR. KUGLER: Okay. So we do consider
20 that. That's the proposal before us. But we also look
21 to see what the State had to say about it and the
22 State in reviewing the Certificate of Public
23 Convenience and Necessity took a hard look at this
24 proposal.

25 And in their view the building of a large

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1 base load facility within Maryland was very important.
2 And that was a large part of the basis for their
3 approval of that certificate. So based on the fact
4 that the State said, "Yes, we need base load
5 generation here and we need a lot of it" we felt that
6 that was a reasonable purpose and need to include in
7 our environmental impact statement.

8 JUDGE SAGER: Okay. Thank you. So I have
9 a couple of questions that all get at the question of
10 how independent is your analysis relative to the
11 Applicant's because the numbers comes out being the
12 same. So I assume -- Well, maybe I shouldn't make any
13 assumption.

14 Do you take the Applicant's analysis and
15 then say, "Yes, that's okay"? Or do you perform an
16 independent analysis? How independent are these two
17 analyses?

18 MR. KUGLER: We take a look at what they
19 submit to us, but we do our own independent work. We
20 go and look at what the DOE is saying. We look at
21 what the State is saying. I mean their information is
22 a starting point, but it's clearly not our endpoint.
23 We do our own work.

24 I'm trying to recall this case. I'll be
25 honest. I don't remember what the ER said for the

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1 combination of energy alternatives or if they even had
2 one. Because again we just start from what they have
3 to say, but we then go on and do our own work. So I'm
4 not sure I could remember. I don't think I even have
5 the ER here with me.

6 JUDGE SAGER: Okay. A minute please. I'm
7 having to scroll through the document. Well, I had
8 one question and I'm not sure it's a good one. But it
9 goes into another one that I thought of while we were
10 listening. It's sort of to the idea about the role of
11 the CAES combined. What is that, compressed air
12 energy storage basically.

13 That seems to be in the analysis a big
14 limitation to how much wind energy or solar energy can
15 be used for base load. How dependent is your analysis
16 on that? And we kind of got at that question a little
17 bit by asking about can you vary the amount of gas
18 power supplied.

19 Let me stop and let you answer. And then
20 I'll pile on.

21 MR. KUGLER: Okay. Honestly, the use of
22 CAES was not critical to how much wind or solar we
23 included. We determined how much wind or solar we
24 were going to include based on the projections of DOE
25 and the State and then said, "Okay. Once we have that

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1 might, how do we make up for the intermittent nature
2 of these resources"? And then we included some CAES
3 to do that.

4 In our I believe rebuttal testimony, we
5 spoke to -- And I don't know if we could pull that up,
6 the staff's rebuttal testimony. I don't know what
7 number that is.

8 MS. CORT: It's 43, NRC 43.

9 MR. KUGLER: So NRC 43.

10 (Off the record discussion.)

11 Okay. On page 15. Actually, I think we
12 want to go to -- Actually, go to page 16. I'm sorry.
13 And in this middle paragraph on this page we talked a
14 bit about what if. If we didn't use CAES at all, what
15 would that mean?

16 Well, as we talked about a little bit
17 earlier, there are other ways to deal with the
18 intermittent nature of wind and solar. And one way
19 would be to have natural gas powered plants as backing
20 it up. That's maybe actually a simpler solution, but
21 it has somewhat greater environmental impacts than
22 CAES would have because all of the power is then
23 coming from burning natural gas. Whereas in the CAES
24 plant some of the power is coming from the energy of
25 the stored air.

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1 We used CAES in order to try and again
2 minimize the impacts as far as we could on the
3 environment. But if we had not used CAES and if we
4 had used just natural gas to back it up instead which
5 would be the most likely source it wouldn't have made
6 any significant difference.

7 JUDGE SAGER: Right, but as I read it, it
8 seemed as if -- see if this is a correct statement --
9 that by doing that it allows you to use a fixed number
10 for the natural gas power plant and 900 megawatts or
11 1200 megawatts as I remember. Whereas, we asked
12 previously do you have an intermittent or have a
13 variable wind energy production from your wind and
14 solar that could be filled in by a variable natural
15 gas.

16 MR. KUGLER: Right. If we did away with
17 CAES and we took that out of the picture what we would
18 probably -- what I assume we would have done then
19 instead would have been to say, "Okay. We will build
20 a 1375 megawatt natural gas plant of which 1200
21 megawatts would run as base load and 175 megawatts
22 will cycle up and down with the wind and solar."

23 JUDGE SAGER: But the 175 megawatts wasn't
24 based -- Was that based on the CAES limitation? Or
25 that was based on other estimates?

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1 MR. KUGLER: No, the 100 megawatts of wind
2 and the 75 megawatts of solar were based on
3 projections from the State and from DOE. And then the
4 CAES was added on really at the back end.

5 JUDGE SAGER: Okay. So another kind of
6 question in a similar vein was I believe the
7 Intervenors have said that the whole idea of base load
8 has changed because you can bring together distributed
9 renewables over a large area and in effect have enough
10 power that you don't have to worry about running out.
11 Is that a reasonable scenario?

12 MR. KUGLER: I don't believe that it is.
13 It's a theoretically possible scenario. It would be
14 very expensive. And I don't think we have seen it
15 done in this country.

16 To do what -- To take that approach, what
17 you would do is say, "Okay. I need" -- pick a number
18 -- "let's say 400 megawatts from wind." But wind
19 doesn't always flow steadily in one place. So I'm
20 going to put wind turbines in many different locations
21 in the hope that there's always wind blowing in some
22 of those locations and I can get 400 megawatts
23 steadily out of it.

24 You're going to have to build a lot of
25 wind turbines to do that, spread it over a large area

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1 with their transmission lines. The costs, both
2 environmental and monetary, of taking that approach
3 will be very high. And you will still need to make
4 sure you've got some other backup power source because
5 there will be days when the wind is just not blowing
6 in any of those places. That's just the way the
7 weather works.

8 And solar is sort of similar. We know the
9 sun comes up every day. So we've at least got that.
10 But there are cloudy days like earlier today. You're
11 not going to get a lot out of your solar at that time
12 even though the sun is up.

13 So you're still going to have to back it
14 up with something else. And it gets very expensive to
15 do all that. And I think that's one of the reasons
16 we've really struggled to get large quantities of
17 renewables particularly in the eastern part of the
18 United States. Solar in particular and in some places
19 wind has come in in a fairly big way in some places
20 where those resources are really good.

21 JUDGE SAGER: In your earlier testimony,
22 you mentioned about the current grid runs into
23 problems of getting energy from one place to another.
24 So the idea that the wind is always blowing somewhere
25 maybe it's blowing in Texas and you needed the energy

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1 up here. Can the present day grid handle that kind of
2 transfer of energy?

3 MR. KUGLER: Not those kind of distances.
4 The line losses would be much too high. Generally,
5 you're wielding power within a region. And one of the
6 challenges facing Maryland right now is that we import
7 so much of our electricity that the transmission lines
8 coming into the state at peak periods are really
9 congested.

10 And it's a big concern. That's one of the
11 things the Public Service Commission is very concerned
12 about.

13 JUDGE SAGER: Okay. Give me a minute
14 please. Let's see how to say this. It appears that
15 your analysis of what is feasible is based largely on
16 some documents like what DOE -- I forget what.

17 MR. KUGLER: Annual Energy Outlook.

18 JUDGE SAGER: Right. What they have put
19 out. Those seem like they might be conservative. I
20 don't know whether that's true or not. You've
21 probably seen other estimates from other entities
22 projecting future wind and solar power.

23 Do you have a feeling for how conservative
24 DOE is as compared to the others? Is this on the low
25 end?

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1 MR. KUGLER: I think what I see DOE doing
2 is they're trying to project what they think is likely
3 to occur. I don't know that they're necessarily being
4 conservative as in low values. They're really trying
5 to take all the data they've gotten, look at what's
6 actually happening and project out what is likely to
7 occur down the road.

8 There were so many factors that affect
9 what will actually occur five or ten years from now.
10 It's a very difficult thing to try and project. But
11 I think what they do is fairly reasonable.

12 There are a number of reports you can find
13 that say -- One of the Intervenor's documents said I
14 think that Maryland could get 40 percent of its energy
15 easily from renewables. Again, what that report is
16 saying is in theory if we maximize everything this is
17 what we could do. And then if we use offshore wind it
18 said we could get over 100 percent. We could get all
19 of our energy from renewables and we don't need
20 anything else.

21 I think what I've seen is a lot of those
22 reports take a somewhat simplistic approach and ignore
23 factors like with all the variability in some of these
24 resources how does your grid manage this power and how
25 much grid are you going to have to build to do it.

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1 Because a lot of the renewables in order to make them
2 work need a lot of grid work to support them.

3 One of the big problems facing Texas right
4 now is they have enormous wind resources in the west,
5 not much in the east and they can't always get the
6 power even when it's available in the west, they can't
7 always get all of it to the east. They just don't
8 have the transmission capacity.

9 So there are challenges associated with
10 these scenarios that you really have to take into
11 account. And I think DOE tries to be realistic in
12 their projections.

13 MS. CORT: And if I could just add. I
14 wouldn't characterize necessarily particularly with
15 regard to the renewable projections from DOE. I would
16 not characterize them as being conservative. If you
17 look at the projections that they have out there from
18 the AEO 2010-2011 they're looking at over 70 percent
19 growth in electricity generation from these renewable
20 sources.

21 And if anything over the years what
22 they've probably been doing is over estimating.
23 You'll see back to the AEO 2009-2010-2011 they're kind
24 of scaled back as some of these planned generation
25 facilities have not come into fruition. They have

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1 scaled back. So I wouldn't characterize it as being
2 conservative.

3 JUDGE SAGER: Thank you. Let me see.
4 Okay. One final question. This comes from page 10 of
5 the staff rebuttal document. You don't need to go
6 look it up because I'll tell you the -- The phrase is
7 "There is no NEPA requirement to use the best
8 scientific methodology." It seems like a statement of
9 mediocrity. How defensible do you think your
10 scientific methodology is?

11 MR. KUGLER: Well, I believe the method
12 you use is very defensive. I think our intention is
13 to use the best information available. I think what
14 the statement is saying is that NEPA doesn't require
15 you to do that. It doesn't require extreme precision
16 especially when you're starting to talk out into the
17 future. So I think that was really the intention in
18 that statement.

19 But obviously our approach is to use the
20 very best information we can find to develop the
21 environment impact statement and the alternatives.

22 JUDGE SAGER: Thank you. I'm done, Judge
23 Spritzer.

24 CHAIRMAN SPRITZER: I just found one thing
25 in my notes that I forgot to ask you. Could you go to

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1 page 26 of NRC 4, your direct testimony? I believe
2 it's paragraph A-32 and toward the middle again. "The
3 MPSC" -- I think that's Maryland Public Service
4 Commission -- "considered the potential for wind power
5 in Maryland in the 2008 report and concluded the
6 economic benefits for renewables remain uncertain and
7 challenging." Do you know what they meant by
8 "economic benefits"?

9 MR. KUGLER: They're basically saying that
10 the net economic benefit or the recovery of cost for
11 renewables was borderline. As we go on, it says,
12 "Onshore wind yield net economic benefits albeit on
13 the small scale" so that you come out slightly ahead
14 on cost for onshore wind, but that offshore wind does
15 not yield economic benefits. They're saying that it
16 basically costs too much to build and operate offshore
17 wind compared to what you're going to get in return.

18 CHAIRMAN SPRITZER: They're talking I take
19 it about economic benefits to the owner of the
20 generated unit.

21 MR. KUGLER: I believe that's correct. I
22 believe that was their intention.

23 E CHAIRMAN SPRITZER: Essentially profit is
24 either going to make a profit or --

25 MR. KUGLER: Yes, that's correct. And of

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1 course that drives the decision what to build.

2 CHAIRMAN SPRITZER: Was that a factor in
3 your analysis of how much wind and solar to go into
4 the combined alternative?

5 MR. KUGLER: I think as Ms. Cort spoke
6 about earlier indirectly yes. We don't directly
7 consider cost unless an alternative is environmentally
8 preferable. But it is a factor that shows up in the
9 background of the projections that we use. So cost is
10 considered by those people working on the projections.
11 And so it is implicitly then within the projections
12 that we're using.

13 CHAIRMAN SPRITZER: All right. I don't
14 think I have anything further. And I take it my
15 colleagues are finished. So much to your dismay I'm
16 sure we are about finished with you.

17 Our next step would have been to ask the
18 counsel here to take a 15 minute break and let counsel
19 prepare any rebuttal questions if they have any. Can
20 you tell me? Do you expect to have any rebuttal
21 questions?

22 MR. SMITH: I don't believe we have any
23 rebuttal questions at this point.

24 CHAIRMAN SPRITZER: NRC staff?

25 MR. WILSON: No, Your Honor.

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1 CHAIRMAN SPRITZER: Again, Mr. Mariotte,
2 I have to come back to you. Do we have any word about
3 our witness of interest?

4 MR. MARIOTTE: We tried to call him during
5 the last break and did not reach him.

6 CHAIRMAN SPRITZER: All right. I suppose
7 then we'll proceed --

8 MR. MARIOTTE: We'll try again at the next
9 break.

10 CHAIRMAN SPRITZER: Well, why don't we
11 take a five minute break and you call him again now.

12 MR. MARIOTTE: We will certainly give it
13 a try, Your Honor.

14 CHAIRMAN SPRITZER: Okay. Off the record.
15 (Whereupon, a short recess was taken.)

16 CHAIRMAN SPRITZER: On the record.

17 MR. MARIOTTE: I have him on the phone
18 now. He's just landed. He is available tomorrow.

19 CHAIRMAN SPRITZER: But can he definitely
20 be here tomorrow? I'm not going to keep us and other
21 parties waiting tomorrow.

22 MR. MARIOTTE: He will definitely be here.

23 CHAIRMAN SPRITZER: At 9:30 a.m.

24 MR. SMITH: Would it be possible to start
25 earlier tomorrow?

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1 PARTICIPANT: It will be okay with me.

2 CHAIRMAN SPRITZER: What time would you
3 like? What?

4 MR. WELKIE: The building doesn't open
5 until 8:30 a.m.

6 CHAIRMAN SPRITZER: Okay.

7 (Off the record discussion.)

8 MR. MARIOTTE: Your Honor, yes. He says
9 he will be here at 9:30 a.m. tomorrow morning. And I
10 really apologize. I'm more dismayed than you are I
11 think.

12 CHAIRMAN SPRITZER: I take it that we will
13 proceed with the Applicant's witnesses, although I'll
14 give you the option since the original plan was that
15 you would go last and have a chance to respond to his
16 testimony. Do you want to proceed with your witnesses
17 now?

18 MR. SMITH: I think our witnesses are here
19 and they're available and we've been listening all
20 day. And we think we're certainly prepared to
21 continue today.

22 CHAIRMAN SPRITZER: Okay. Unless people
23 need to take a break, I guess we can get started with
24 a few witnesses and get them out of here in a
25 reasonable hour.

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1 MR. WILSON: Your Honor, a bit of
2 housekeeping. NRC staff. Our witnesses are scheduled
3 to fly out tomorrow at some point. And we're trying
4 to figure out if we need to hold them over or if we're
5 going to go beyond 2:00 p.m. tomorrow.

6 CHAIRMAN SPRITZER: I would hope we'd be
7 out of here by 2:00 p.m. I can't give anybody an
8 absolute guarantee. I guess we have closing arguments
9 as well as Mr. Sklar. We'll certainly try put it that
10 way. We won't be going out to lunch.

11 (Laughter.)

12 MR. WILSON: Thank you, Your Honor.

13 (Off the record discussion.)

14 CHAIRMAN SPRITZER: I don't know if that
15 gives you a good enough answer or not. All I can tell
16 you we'll try. We'll do our best. I'm reasonably
17 optimistic we'll be able to make it.

18 MR. WILSON: That's helpful. Thank you.

19 MR. SMITH: And certainly from our
20 perspective we're willing to stay as late as necessary
21 tonight to, for instance, get through our witnesses.

22 CHAIRMAN SPRITZER: I think we'll finish
23 without any problem. We have the room until 6:30 p.m.
24 But I hope we're not going to stay that long.

25 (Off the record discussion.)

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1 Before we start with the Applicant's
2 witnesses, Mr. Mariotte, I would like to ask you if
3 you're going to prepare any rebuttal questions for the
4 staff witnesses.

5 MR. MARIOTTE: No, we have no rebuttal
6 questions. Thank you.

7 CHAIRMAN SPRITZER: I think I've asked
8 everybody now. I think the State has no questions for
9 the witnesses either.

10 Good afternoon, gentlemen. I remind you
11 you're still under oath. My colleague, Mr. Arnold
12 will start the questioning.

13 JUDGE ARNOLD: First, could each one of
14 your introduce yourself so I know who is who?
15 Starting on your right.

16 MR. RATTI: I'm Stefano Ratti.

17 MR. LUTCHENKOV: Dimitri Lutchenkov.

18 MR. VAN DER LINDEN: Septimus van der
19 Linden.

20 JUDGE ARNOLD: My first few questions I
21 believe are the appropriate person for me to ask is
22 Mr. Lutchenkov. Is that correct?

23 MR. LUTCHENKOV: Yes.

24 JUDGE ARNOLD: Would you agree that the
25 amount of wind power available in Maryland is greater

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1 than the 100 megawatts considered in the EIS?

2 MR. LUTCHENKOV: No, I would not agree.
3 That it's greater than?

4 JUDGE ARNOLD: That the amount of wind
5 power available is greater than 100 megawatts.

6 MR. LUTCHENKOV: Excuse me. Yes.

7 JUDGE ARNOLD: Would you agree that the
8 amount of solar power that could be available in
9 Maryland is greater than the 75 megawatts considered
10 in the environmental impact statement?

11 MR. LUTCHENKOV: Yes.

12 JUDGE ARNOLD: Is there any, to your
13 knowledge, UniStar Environmental documents stating
14 that the potential for wind energy in Maryland is only
15 100 megawatts or that the potential for solar energy
16 in Maryland is 75 megawatts?

17 MR. LUTCHENKOV: Not to my knowledge.

18 JUDGE ARNOLD: Does UniStar own or operate
19 any wind or solar power businesses?

20 MR. LUTCHENKOV: We do not.

21 JUDGE ARNOLD: If a license to build
22 Calvert Cliffs 3 were not granted, would UniStar
23 consider building solar or wind power plants instead?

24 MR. LUTCHENKOV: I really can't answer
25 that. But we are a nuclear generating company at this

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1 point developing nuclear power.

2 JUDGE ARNOLD: If there were to be either
3 solar or wind facilities built instead of Calvert
4 Cliffs 3 and they were to be ready in the time frame
5 that Calvert Cliffs 3 is planned, would they have to
6 at least be in the planning stages by now? I mean,
7 how quickly can you build from a dead stop, get up and
8 build 1600 megawatts of solar or wind power?

9 MR. LUTCHENKOV: If I can defer to Mr.
10 Ratti. I think he's better.

11 JUDGE ARNOLD: Okay.

12 MR. RATTI: Yes, it would be possible to
13 begin building a solar plant today that is not
14 announced yet and be done before the completion of
15 Calvert Cliffs.

16 JUDGE ARNOLD: Okay. And that would
17 include all the permitting?

18 MR. RATTI: That would include potentially
19 with the exception of offshore wind. But for onshore
20 wind and solar I would say that would be possible.

21 JUDGE ARNOLD: Thank you. Your Exhibit 5,
22 let's see, that's the long term energy report from
23 Maryland. And not all of us are intimately familiar
24 with that. So I've got a few questions about it. Who
25 prepares that report?

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1 MR. RATTI: I believe that was prepared by
2 a panel of experts and consulting firms on behalf of
3 the Maryland Department of Natural Resources.

4 JUDGE ARNOLD: Okay. And they are experts
5 in forecasting electricity supplies.

6 MR. LUTCHENKOV: That is our
7 understanding.

8 JUDGE ARNOLD: Okay. Is this a periodic
9 report or was it just a one time thing?

10 MR. RATTI: I think it was a one time
11 thing. I think it was at the request of the Governor
12 I believe.

13 JUDGE ARNOLD: What is your understanding
14 of the reference case in the report? What is the
15 intent of the reference case?

16 MR. RATTI: My understanding of the
17 reference case would be that is the scenario that
18 could be expected in terms of an electricity mix going
19 forward.

20 JUDGE ARNOLD: Okay. And that means if
21 nothing changes this is what we would realistically
22 project is going to happen.

23 MR. RATTI: Based on what we know today,
24 yes.

25 JUDGE ARNOLD: Okay. Now the report also

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1 contains a high renewable scenario. Do you know how
2 that differs from the reference case?

3 MR. RATTI: It is different in that it
4 assumes a higher percentage of renewables would be
5 included in the Renewable Portfolio Standard. I
6 believe it goes from 20 percent to 30 percent. And so
7 as a result of that there would be higher amount of
8 renewable generating capacity being installed.

9 JUDGE ARNOLD: Do you know? Does it try
10 to bound the maximum possible that might happen? Or
11 is it just a sensitivity? What would it look like if
12 there was more?

13 MR. RATTI: I don't know for sure. I
14 believe that's the case that it's a bounding analysis.
15 There is also somewhere in the report also a mid case
16 which is in between the base case and the high case
17 renewable scenario. So it could be construed as a
18 sensitivity analysis.

19 JUDGE ARNOLD: The report submitted into
20 evidence was actually labeled a Draft Final Long Term
21 Electricity Report for Maryland. To what extent does
22 the draft nature affect its reliability?

23 MR. RATTI: I believe this was pretty
24 extensively studied. So the draft has been around for
25 a bit for over a year. So I would think that's pretty

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1 close to final. But again I can't say for sure.
2 Okay.

3 JUDGE ARNOLD: Mr. Van Der Linden, I
4 understand you're the person to ask questions about
5 the CAES.

6 MR. VAN DER LINDEN: Correct.

7 JUDGE ARNOLD: If a combination of power
8 sources relies upon a CAES facility of significant
9 capacity in Maryland in order to produce base load
10 power, would you consider that alternative to be
11 reasonable?

12 MR. VAN DER LINDEN: It will be reasonable
13 if you could build a case plant under the situation in
14 Maryland which has certain geological conditions that
15 are not suitable.

16 JUDGE ARNOLD: Okay. So it's unlikely.

17 MR. VAN DER LINDEN: That's unlikely, yes.

18 JUDGE ARNOLD: Are there any other large
19 energy storage capabilities that could be developed in
20 Maryland in the time frame of interest?

21 MR. VAN DER LINDEN: Not that I'm aware
22 of.

23 JUDGE ARNOLD: In Answer 52 of your direct
24 testimony, you state "The basic objective of the
25 utility scale storage of electricity is to store

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1 access energy or energy with low production costs
2 produced during off-demand periods and to use the
3 energy at a later date to generate power during
4 periods of high demand." Do you recall that
5 statement?

6 MR. VAN DER LINDEN: Yes, I do.

7 JUDGE ARNOLD: Okay. I want to explore
8 that concept first with solar power. Now solar power
9 as I understand it is produced predominantly during
10 the daytime.

11 MR. VAN DER LINDEN: Right.

12 JUDGE ARNOLD: So if you combine it with
13 CAES what you would be able to do then is take solar
14 power produced during the day and sell it at night.

15 MR. VAN DER LINDEN: You could do that. If
16 you can do Hughes case, yes.

17 JUDGE ARNOLD: Okay. Now is there excess
18 solar power capability available or likely to be
19 available in Maryland in the near future?

20 MR. VAN DER LINDEN: I'd defer that to Mr.
21 Ratti.

22 MR. RATTI: The question is if, there's
23 excess solar capacity available in Maryland in the
24 future. I'm not sure I understand what you mean by
25 that.

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1 JUDGE ARNOLD: Well, in the definition
2 that Mr. Van Der Linden had for combining CAES or
3 energy storage with a power production was you use
4 excess energy or energy with low production cost
5 produced during off-demand periods and what I'm trying
6 to do is determine if solar power fits that
7 definition.

8 MR. RATTI: I think solar power because of
9 the nature of the resource tends to be producing power
10 during the times of higher demand. So I would believe
11 that it would be likely to be the case. I think more
12 what he's referring to here may be the case of wind
13 where in which case wind tends to blow at night or
14 during periods of lower demand.

15 MR. VAN DER LINDEN: Or other energy
16 sources, you know.

17 JUDGE ARNOLD: Yes. So in your opinion
18 does it make sense, economic sense, to combine solar
19 power with any type of storage in order to make it
20 into base load?

21 MR. VAN DER LINDEN: Not really.

22 JUDGE ARNOLD: Okay. If I understand it
23 correctly, what you're doing is taking power from when
24 it's needed.

25 MR. VAN DER LINDEN: Yes.

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1 JUDGE ARNOLD: Storing it and then
2 providing it later when you can get less money for it.

3 MR. VAN DER LINDEN: If you can manage
4 bulk energy storage this is what we're really talking
5 about. Then that does make sense if it's possible.

6 JUDGE ARNOLD: My impression is that
7 combining wind power with CAES makes a little bit more
8 sense in that -- Correct me if I'm wrong, but the
9 impression I've gotten from reading exhibits is that
10 wind power is typically more available at the
11 nighttime and off-peak times as opposed to during the
12 middle of the day.

13 MR. VAN DER LINDEN: That's correct.

14 JUDGE ARNOLD: So combining wind with CAES
15 allows you to take energy produced at night, store it,
16 convert it back into electricity during the day and
17 sell it at a higher price.

18 MR. VAN DER LINDEN: That's correct
19 because what you're doing is you're using spill damage
20 here because you can't use it at night. And you would
21 store it and then you'd dispatch it as capacity on the
22 demand cycle during the day. That's again on the
23 premise that you can store it.

24 JUDGE ARNOLD: Yes. Now that to me
25 doesn't sound like base load power. That sounds like

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1 peaking power or load following.

2 MR. VAN DER LINDEN: That's correct. It's
3 more like what we would call mid-range or mid-merit
4 power. And this is what the MISO system as examined
5 may find that to be very useful. They had a lovely
6 storage facility. As I testified the project was
7 cancelled because of porosity of the sandstone was not
8 adequate. So you run into those risks as well.

9 JUDGE ARNOLD: I'm just looking at it and
10 it doesn't make economic sense to combine solar and
11 CAES. And if you combine wind with CAES, then you're
12 following the load. You're not being base load. So
13 is there any situation that you can conceive of where
14 you would combine solar and wind and CAES to make base
15 load power that makes economic sense?

16 MR. VAN DER LINDEN: No.

17 JUDGE ARNOLD: Okay.

18 Now we're back to Mr. Ratti.

19 MR. RATTI: Yes.

20 JUDGE ARNOLD: In Answer A-42 of your
21 direct testimony, you state "In 2010 the typical cost
22 of utility scale photovoltaic plants was approximately
23 3,400 per kilowatt down from 8,000 per kilowatt in
24 2004." Do you recall this statement?

25 MR. RATTI: Yes, I do. I have it in front

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1 of me.

2 JUDGE ARNOLD: Okay. Do those figures --
3 Are they for installed kilowatt or an average kilowatt
4 production capability?

5 MR. RATTI: These are per installed
6 kilowatt.

7 JUDGE ARNOLD: Okay. So at a 15 percent
8 capacity factor that would be more in the neighborhood
9 of 22,000 to 23,000 per kilowatt of available power.

10 MR. RATTI: That's correct.

11 JUDGE ARNOLD: And to make this into a
12 base load supply would require some sort of storage
13 facility in addition. Right?

14 MR. RATTI: Yes.

15 JUDGE ARNOLD: So per kilowatt of
16 capability it's 22,000/23,000 plus some storage cost.

17 MR. RATTI: Correct.

18 JUDGE ARNOLD: Would that be an
19 economically advantageous system?

20 MR. RATTI: It would not be economically
21 advantageous.

22 JUDGE ARNOLD: I've heard the term "two
23 percent carveout of the RPS" mentioned several times
24 and I really -- This is the first time I've had
25 contact with that term. So could you explain what

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1 exactly carveout is?

2 MR. RATTI: Yes, a carveout is a part of
3 the renewal portfolio standard that is targeted
4 towards a specific technology. So by carveout it
5 means a specific technology.

6 In this case, it is solar. So the State
7 of Maryland requires that two percent of the
8 electricity used in Maryland comes from solar power
9 specifically. So that's why it's carved out from the
10 remaining 18 percent.

11 JUDGE ARNOLD: Are there other carveouts
12 or is this -- in the RPS?

13 MR. RATTI: This is the only one for
14 Maryland. The use of carveouts is pretty common in
15 the United States in other states. But for Maryland
16 this is the only one.

17 JUDGE ARNOLD: Okay. Are these carveouts
18 in terms of production capability or of the amount of
19 electricity produced?

20 MR. RATTI: It's in terms of the amount of
21 electricity produced.

22 JUDGE ARNOLD: Let's assume for a moment
23 that there are no financial incentives to build solar
24 power and there are no state or federal mandate to do
25 so. Under that condition, what do you see as the

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1 prospects for solar power in Maryland over the next
2 dozen years?

3 MR. RATTI: Under those conditions, I
4 would expect really no solar power to be deployed in
5 Maryland.

6 JUDGE ARNOLD: And these financial
7 incentives that do exist they don't actually reduce
8 the cost of it. It just distributes the costs among
9 the population.

10 MR. RATTI: Yes. It may be a little bit
11 more complicated than that. But it is true that they
12 do not reduce the cost, but what they do is they help
13 the power producer offset the cost of producing solar
14 power so that effectively they can sell it at a lower
15 price than what it cost them to produce.

16 And these incentives are a mix of federal
17 incentives such as the Investment Tax Credit and then
18 state incentives. And obviously a large part of the
19 benefit here comes from the Solar Renewable Energy
20 Certificates which is the certificates that you can
21 sell for complying with the solar carveout.

22 JUDGE ARNOLD: Okay. That's the end of my
23 questions.

24 JUDGE SAGER: Okay. Let me see what -- So
25 getting back to the purpose of the project the

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1 Applicant has to decide on what the purpose is. Why
2 provide 1600 megawatts of base load power? Where did
3 UniStar come up with that idea that that is why they
4 wanted to make this the purpose of the application?

5 MR. LUTCHENKOV: The EPR design is a 1600
6 megawatt.

7 JUDGE SAGER: Okay. I didn't specifically
8 mean -- I was trying to get at this whole question of
9 what is the purpose of building a power plant and
10 whether it is still reasonable to say is base load
11 power a reasonable concept. So maybe that's a better
12 question for me to ask you. Is base load power still
13 a valid concept?

14 MR. LUTCHENKOV: Yes, it is.

15 JUDGE SAGER: Okay. Can you elaborate?

16 MR. LUTCHENKOV: Yes. There is a baseline
17 of power needed for if you want to call it background
18 demand. And that is decided upon and constantly
19 adjusted really based on the demand profile of the
20 region of interest.

21 And in this case the idea is to have a
22 base load power threshold at which the generator or
23 generating units because the actual base load power
24 required across the region is different than for each
25 generator. A generator provides a constant amount

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1 continuously of generation for long periods of time.
2 And what is intended to do is that the minimum load
3 and then you add on top of that peakers and mid-range
4 units to provide the peak loads. There are sometimes
5 peaks, sometimes valleys. So the base load is
6 something that is there constantly and the generators
7 provide that constant capacity.

8 JUDGE SAGER: Okay. Forgetting for a
9 moment that it may be uneconomic right now to build
10 renewables instead of a nuclear power plant, but
11 suppose you had virtually unlimited renewable wind and
12 solar. Would it be feasible to use that instead of a
13 base load nuclear plant?

14 MR. LUTCHENKOV: When looking at the
15 region of interest my understanding is it is not
16 because of the distribution problems and challenges as
17 well as the intermittent nature of those renewals.

18 JUDGE SAGER: Okay. Thank you. I guess
19 your application contains I guess in the environmental
20 report an analysis of renewable energy and what was
21 the basis of your determination or what's reasonably
22 foreseeable?

23 MR. LUTCHENKOV: The information provided
24 from the reference sources that we used I don't have
25 them on top of my head, but they're all listed and

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1 input from subject matter experts who understand those
2 particular technologies and the environment.

3 JUDGE SAGER: Okay. I guess I was trying
4 to get at what your source was. But if you don't have
5 that, let me move on.

6 MR. LUTCHENKOV: Well, I can --

7 JUDGE SAGER: For example, the staff used
8 the DOE Energy EIA.

9 MR. RATTI: Yes, in the testimony here, we
10 relied pretty heavily on the Long Term Electricity
11 Report for Maryland which we discussed before and
12 effectively looking at what the RPS requirements are.
13 And so that's what we could expect the amount of
14 renewable energy to be deployed in Maryland over the
15 next 10 to 15 years. So we took a slightly different
16 approach than what the staff's witnesses have talked
17 about. But we ultimately come to a similar
18 conclusion.

19 JUDGE SAGER: Okay. This comes from page
20 17 of the initial statement. But I think it may be
21 attributed to Mr. Ratti. Bluewater is unlikely to put
22 it into service for some time. Can you comment on how
23 long that might be and why is it going to take so
24 long? I guess we're speaking about the Maryland
25 Whitewater 600 megawatts power.

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1 MR. RATTI: The Maryland Bluewater, not
2 the one in Delaware.

3 JUDGE SAGER: No, I'm talking about
4 specifically the one in Maryland.

5 MR. RATTI: Okay. There is no requirement
6 to date to build offshore wind in Maryland. So
7 there's no offshore wind carveout. So when you look
8 at the economics of the different renewable energy
9 resources, offshore wind tends to be among the
10 renewable energy resources the most expensive or at
11 least close to the most expensive.

12 So one would expect that if there is a
13 requirement to build renewable energy there will be
14 other ways to fulfill that requirement before you get
15 to build offshore wind unless again there was a
16 specific carveout. They would be obligate utilities
17 to purchase renewable energy from offshore wind in
18 which case that will be different. But that's not the
19 case today.

20 JUDGE SAGER: But presumably NRG Bluewater
21 had some reason for proposing to make a 600 megawatt
22 offshore plant.

23 MR. RATTI: Yes.

24 JUDGE SAGER: I mean obviously if it's
25 very expensive what is it that's driving them to do

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1 that?

2 MR. RATTI: I believe that at some point
3 there have been discussions. Indeed there's been a
4 bill introduced in 2010 in the Maryland legislature.
5 And that would have required utilities to purchase
6 offshore wind. So I think there was an interest at
7 that point in time. In case if there is a renewable
8 portfolio standard specifically directed towards
9 offshore wind, they wanted to -- they probably wanted
10 to get ready and start the process since these
11 projects take a long time.

12 JUDGE SAGER: So let me see if I got that
13 correct. So they are seeing -- They want to be first
14 in line basically if and when the government support
15 comes around because it's going to require government
16 support to do that.

17 MR. RATTI: Yes, I think you said it
18 better than I did.

19 JUDGE SAGER: Well, that wasn't my
20 intention. This goes to page 18 of the initial
21 statement. This is I think based on the Maryland RPS.
22 I think you gave a number of 500 to 70 megawatts (170
23 megawatts I guess actual power) for wind.

24 So I'm just curious. Where does that
25 number come from? And I think you make the statement

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1 that wind will be limited by the RPS. So explain why
2 that's so.

3 MR. RATTI: If you just give me one
4 second, I will find it.

5 JUDGE SAGER: Sure. The initial position
6 statement is page 18. I guess it's page 18, second
7 paragraph.

8 MR. RATTI: Yes, I believe here I was
9 referring to in the Long Term Electricity Report there
10 is a portion of the RPS that will be fulfilled by in-
11 state resources. I believe I was referring -- and
12 this may not be completely clear here -- the fact that
13 if all of that portion were to be fulfilled with wind
14 power that will be the expected installed capacity
15 that you would have in that case.

16 If you were referring to the relationship
17 between 560 megawatts versus the 170, I believe that's
18 as we discussed as was discussed before. That's
19 between the two there is a capacity factor of wind.

20 JUDGE SAGER: So those numbers are based
21 on the LTER, Maryland LTER, projected carveout then.

22 MR. RATTI: Yes.

23 JUDGE SAGER: Okay. So why is it that the
24 RPS is going -- If wind power is a great energy
25 source, clean energy source and people want it, why is

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1 the RPS going to limit the upward growth of wind
2 power?

3 MR. RATTI: So I don't believe that the
4 RPS is going to limit the growth of wind power. I
5 think it's still going to spur the development of wind
6 power. In fact, there will be more wind developed as
7 a result of the RPS.

8 So I'm not sure. I didn't want to imply
9 that that will be the case. I think the RPS is
10 effective in spurring the development of wind power.
11 There will be wind power built as a result of that.

12 JUDGE SAGER: Okay. On the next page, the
13 top of page 19, the first sentence, it says, "Thus on
14 balance and in Mr. Ratti's professional opinion, the
15 best estimate for projected installed wind capacity is
16 21 megawatts which is considerably lower." So why do
17 you think it's going to be less, this value?

18 MR. RATTI: This is the calculation that
19 comes from again the Long Term Electricity Report. I
20 believe it's Exhibit 5. This comes from I believe the
21 total amount of installed capacity that is expected to
22 come on line as a result of RPS from in-state wind
23 generation. It's about 190 megawatts in that report.

24 Considering the fact that there is already
25 120 megawatts that has been effectively developed over

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1 the last year or so or has come on line over the last
2 year or so. There is about 70 left which if you apply
3 to that 70 the capacity factor that gives you the 21
4 megawatt of average capacity. That's the calculation.

5 JUDGE SAGER: So Judge Arnold already
6 asked part of this question. I was going to ask why
7 is solar bound by the two percent RPS carveout which
8 of course is because the argument is that solar is
9 uneconomic without some sort of government support.

10 Yet the Intervenor claim that solar power
11 is cheaper than nuclear power. Can you tell me why
12 the big difference? Why would someone -- Why can one
13 group say that solar power is cheaper? And one say
14 that it's so much more expensive? Do you have any
15 idea what the difference comes from?

16 MR. RATTI: Well, in one case, I can say
17 that a lot of times when people refer to solar power
18 being cheaper they're talking about the price, not
19 necessarily the cost of solar power. So the cost of
20 solar power I don't think anybody would question that
21 is today significantly higher than nuclear and a lot
22 of other energy sources, not all of them, but most of
23 them.

24 Having said that, there are incentives in
25 place today that help to close that gap. And in some

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1 cases in some states that gap is smaller. Therefore
2 it's easier to close that gap. Some other states as
3 may be the case for Maryland, that gap is pretty big.
4 So it's more difficult to close that gap.

5 And also the incentives that are given to
6 close that gap are different in different states. So
7 there may be situations where you do have a case where
8 the price of solar power after you account for all the
9 incentives is actually competitive. And that's why it
10 gets built.

11 There has been significant solar power
12 being added to the grid in the United States in the
13 last few years. It makes economic sense in that
14 respect.

15 But a blanket statement that says the cost
16 of solar power is lower than nuclear is -- I would say
17 it's misleading.

18 JUDGE SAGER: Okay. I'm skipping over to
19 page 21. Let's see if I can -- what I have in my note
20 here. Right, second sentence, "In terms of installed
21 capacity, the LTR reference case predicts that there
22 will be 498 megawatts of new solar capacity installed
23 in Maryland over the next ten years." So that's 498
24 with a capacity factor that goes down to 75.

25 But what is that attitude? In other

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1 words, what would the total be? Already there are
2 some. Right. And so that is 498 megawatts is added
3 to what?

4 MR. RATTI: I don't recall off the top of
5 my head the exact number of megawatts currently
6 existing in Maryland. It's a fraction of the 498.

7 JUDGE SAGER: So it's much smaller.

8 MR. RATTI: It's much, much smaller. I
9 don't know if -- I don't want to speculate. But it's
10 certainly a high number today.

11 JUDGE SAGER: If it's essentially zero
12 today and over the next ten years it's 498, doesn't
13 that apply a very steep angle of takeoff? Would you
14 expect very much larger figures, say, in the next ten
15 years?

16 MR. RATTI: You mean the ten years --

17 JUDGE SAGER: Sorry. Let me say that
18 again. If it's zero today and in ten years it will be
19 498, doesn't that imply that it will be more than
20 double that in another ten years beyond that at 20
21 years down the road?

22 MR. RATTI: Under current law, I don't
23 believe that will be the case because again this
24 growth is driven by the carveout in the Renewable
25 Portfolio Standard.

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1 JUDGE SAGER: It's going to go up and hit
2 a ceiling and stop.

3 MR. RATTI: Yes. That's the scenario as
4 it's described in the Long Term Electricity Report.

5 JUDGE SAGER: Okay. Sorry. I have to
6 browse through my questions. Okay. On page 27, I
7 read this and I kinda shook my head and realized I
8 didn't understand it. So because of the impacts --
9 Okay. So it's in Section 2, Comparison of Energy
10 Alternatives, sentence 2. It says, "Because the
11 impacts of any combination of energy alternatives will
12 be greater than the impacts of a natural gas
13 alternative" and then it says -- forget the
14 parenthetical for a moment -- "there will be no
15 combination of alternatives that is environmentally
16 preferable to natural gas." Could you elaborate on
17 that?

18 MR. LUTCHENKOV: Yes. I think the table
19 that we looked at before when we had the comparison of
20 coal, natural gas, renewables, renewables being on the
21 last column. And Judge Arnold actually keyed in on it
22 that if you look at the differences that if you
23 increase the amount of renewables and decrease the
24 amount of the natural gas that's combined with those
25 renewables, even though the natural gas emissions come

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1 down, there are other NEPA considerations that need to
2 be taken into account of which are archeological,
3 terrestrial, aquatic. I could go down the list.
4 There are about 14 to 16 other items. All those
5 besides the air emissions going down will actually
6 tend to increase especially land with the renewables.

7 JUDGE SAGER: Okay. I just wanted to make
8 sure I understood that. Let's see. Page 29,
9 paragraph 2, line 7. So let me see. All right. So
10 I guess the sentence is "Even if photovoltaics could
11 be deployed on rooftops and sufficient storage
12 mechanisms were available in conjunction with
13 photovoltaics to produce baseload power, the
14 environmental impacts of the combination of the
15 alternatives still would not change appreciably."
16 Obviously one of the big environmental impacts of very
17 broad renewables is that you have to be able to use
18 broad land use impact.

19 But presumably when you are using rooftop
20 solar, you don't have that same impact. So could you
21 please explain that statement?

22 MR. LUTCHENKOV: Just a second to think
23 about that one.

24 JUDGE SAGER: Okay. Sure.

25 MR. RATTI: The only thing I would add is

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1 I would say that the combination of solar power that's
2 going to come on line is likely to be a combination of
3 utility scale, ground mount solar power and rooftop.
4 So I think there will be still a significant portion
5 that will come from utility scale installation that
6 use land.

7 JUDGE SAGER: But basically that statement
8 relies on solar development including a significant
9 amount of utility scale where you have to bulldoze
10 some land and put up some solar panels.

11 MR. RATTI: Yes.

12 JUDGE SAGER: Okay. That's all my
13 questions, Judge Spritzer.

14 CHAIRMAN SPRITZER: Very well. Let's
15 bring up -- I don't have it ready -- Applicant Exhibit
16 1, the direct testimony, page 11, the paragraph that
17 begins "Offshore wind technology has evolved from
18 onshore wind technology. Today offshore wind
19 technology has been proven for shallow waters
20 typically less than 30 or 35 meter deep with virtually
21 all installations of offshore wind projects in this
22 category." What does the term "proven" mean as it was
23 used? And I think this question is for you, Mr.
24 Ratti. Is it Ratti or Ratti?

25 MR. RATTI: Ratti.

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1 CHAIRMAN SPRITZER: The problem last night
2 with --

3 MR. RATTI: No problem.

4 CHAIRMAN SPRITZER: So what does the term
5 "proven" mean in that paragraph?

6 MR. RATTI: In my opinion, proven means
7 that there has been a significant number of
8 installations in the order of -- In this case, I
9 believe hundreds of megawatts, mostly in Europe in the
10 North Sea that have been around for several years. So
11 there's a very good understanding of this technology.

12 CHAIRMAN SPRITZER: So the technology
13 works in the sense of doing what it's supposed to do.

14 MR. RATTI: Yes.

15 CHAIRMAN SPRITZER: And are these
16 installations generally owned by private or public
17 companies if you know?

18 MR. RATTI: For utilities for the most
19 part. So in some case in Europe I think you have
20 state owned utilities as well with some private
21 ownership. So it's a little bit of a mix. But it
22 tends to be owned by utilities.

23 CHAIRMAN SPRITZER: Private and public
24 utilities.

25 MR. RATTI: Yes.

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1 CHAIRMAN SPRITZER: As far as do you have
2 any knowledge whether the privately owned wind
3 operations are profitable for the operators? Do they
4 at least cover their costs?

5 MR. RATTI: Obviously, I don't have access
6 to their financials, but if I can venture I would say
7 they're likely to be profitable.

8 JUDGE ARNOLD: Before we get away from
9 that question, let's understand what it means. Are
10 electric rates in Europe about equal to what they are
11 in the United States?

12 MR. RATTI: No, but the point here is that
13 in Europe there is a system of incentives which is
14 slightly different from what you have in the United
15 States. We have so-called feed-in tariffs that are
16 set up. Those are rates at which the utilities are
17 obligated, the buyers are obligated, the distribution
18 utilities are obligated, to take power from certain
19 sources.

20 Say, if you had an offshore wind facility,
21 you could sell at a certain rate. Same thing for
22 solar power and onshore wind and other renewables.

23 JUDGE ARNOLD: It's just that when you're
24 talking about whether or not they make a profit, you
25 have to not only look at the costs but also at what

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1 you're giving back, you know, in this case rates. And
2 if they have significantly greater rates there than we
3 have here, then they're making a profit over there.
4 It would not necessarily mean they would make a profit
5 here. So I'm just trying to investigate that.

6 MR. RATTI: Yes. You're absolutely
7 correct. The price is effectively set artificially by
8 the government. And it's set in such a way obviously
9 that it covers the cost and the reasonable profit. So
10 that's how it works.

11 In the United States, there are no feed-in
12 tariffs.

13 CHAIRMAN SPRITZER: No what?

14 MR. RATTI: No feed-in tariffs.

15 CHAIRMAN SPRITZER: What's the difference
16 -- Well, in Maryland we have the renewable portfolio.

17 MR. RATTI: That's right.

18 CHAIRMAN SPRITZER: Does that in some way
19 provide the same sort of incentive?

20 MR. RATTI: It could. It's a slightly
21 different mechanism. But it could. The Renewable
22 Portfolio Standard is also coupled with what's called
23 the Alternative Compliance Payment. So effectively
24 the price of power plus the Alternative Compliance
25 Payment in some ways I would say you can say that it

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1 has some similarities to a feed-in tariff. But it's
2 not quite the same thing.

3 CHAIRMAN SPRITZER: Okay. You mentioned
4 Europe and feed-in tariffs that you were talking
5 about. I take it those are -- Are those in Europe?

6 MR. RATTI: Yes. They are different
7 depending on the country.

8 CHAIRMAN SPRITZER: Okay. Are there
9 countries where wind has been installed where there
10 are no feed-in tariffs that you're aware of?

11 MR. RATTI: There may be. I can't think
12 of one right now. I'm sure it's possible.

13 MR. VAN DER LINDEN: None that I'm aware
14 of.

15 CHAIRMAN SPRITZER: If there was a witness
16 that had a -- More than one of you can answer one
17 question.

18 MR. VAN DER LINDEN: There are none that
19 I'm aware of. They're thinking about doing that, but
20 it hasn't happened in any of the countries yet.

21 CHAIRMAN SPRITZER: Any of you know what
22 the estimated construction time for Calvert Cliffs
23 Unit 3 would be from time of license is issued, if
24 it's issued, until when commercial operations would
25 begin? Well, let me finish that. To when

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1 construction would be completed.

2 MR. LUTCHENKOV: Well, the safety related
3 construction is postulated around 60 to 68 months or
4 a five year period roughly. That's still being
5 developed. It's not fine-tuned yet.

6 CHAIRMAN SPRITZER: Safety related?

7 MR. LUTCHENKOV: Safety related, that
8 construction which is related to the NRC.

9 CHAIRMAN SPRITZER: Okay.

10 MR. LUTCHENKOV: Once you get to COLA.
11 The COL allows you to proceed with it.

12 CHAIRMAN SPRITZER: And you said 65 to 68
13 months.

14 MR. LUTCHENKOV: Yes, about five or so
15 years.

16 CHAIRMAN SPRITZER: Is there other
17 construction that would be necessary in order to begin
18 commercial operations?

19 MR. LUTCHENKOV: There's what's considered
20 preconstruction in NRC terms which is the development
21 of the site prior to its ground clearing, grubbing,
22 tree clearing, setting the site up for the initial
23 development.

24 CHAIRMAN SPRITZER: Is that time in
25 addition to the safety related construction time?

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1 MR. LUTCHENKOV: It is.

2 CHAIRMAN SPRITZER: And what is the time
3 that would be required for that?

4 MR. LUTCHENKOV: It would be anywhere from
5 18 months to 24 months depending on the site.

6 CHAIRMAN SPRITZER: If we wanted to -- Can
7 that occur before the license is issued or does that -
8 -

9 MR. LUTCHENKOV: It could.

10 CHAIRMAN SPRITZER: Do you have to request
11 permission from the NRC to start construction early?

12 MR. LUTCHENKOV: No. That's unrelated to
13 safety related construction. What you need is your
14 appropriate state and federal permits of which we have
15 our state CPCN. We have most of the other state
16 permits and federal permits. We just received our
17 title wetlands permit from the Board of Public Works
18 in Maryland. We are on the cusp of receiving our
19 other title and non-title or Army Corps wetlands
20 permits as well.

21 CHAIRMAN SPRITZER: Now at present does
22 UniStar intend to begin any of the preconstruction
23 work prior to getting the COL?

24 MR. LUTCHENKOV: At this time, no. As we
25 stated in the Board of Public Works meeting and

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1 numerous other times, we will not proceed until we
2 have certain factors, key factors, in place, one of
3 which as you know is the U.S. Partner. The other is
4 DOE Loan Guarantee. And the other is Favorable
5 Economic and Regulatory Structure in the state to
6 proceed.

7 CHAIRMAN SPRITZER: The last term that you
8 used, "Favorable Regulatory Structure" and Federal and
9 State Regulatory Structure, can you be a little more
10 specific about what that means?

11 MR. LUTCHENKOV: Yes. It's in fact that
12 the -- That actually comes back to the economics as
13 well that the economics within the structure of the
14 state will allow for a profitable entity and a
15 profitable generation of power.

16 CHAIRMAN SPRITZER: What would the State
17 have to do to accomplish that?

18 MR. LUTCHENKOV: It's not obvious to me at
19 this point and that's -- Where I am in the company
20 it's not within my purview to answer that at this
21 time.

22 CHAIRMAN SPRITZER: That's not -- Any of
23 that, whatever those conditions would be, they're not
24 in place as we sit here today.

25 MR. LUTCHENKOV: That is correct.

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1 CHAIRMAN SPRITZER: And the loan
2 guarantee, UniStar does not have a loan guarantee as
3 we sit here today.

4 MR. LUTCHENKOV: The loan guarantee we do
5 not have, but we are active in pursuing it.

6 CHAIRMAN SPRITZER: The CAES technology,
7 has this actually been used anywhere in combination
8 with wind and solar to generate baseload power?

9 MR. VAN DER LINDEN: Not as baseload
10 power. It's being used in Germany. There's only one
11 facility at Huntorf near Bremen in Germany. That was
12 built 35-40 years ago. And at that time they didn't
13 have wind. But it was built specifically to support
14 a nuclear plant where it could provide 290 megawatts
15 in less than three minutes to support the plant.

16 Later on, they found it very useful as
17 they started building more wind power. There is
18 actually wind at the site today. And they use some of
19 that.

20 CHAIRMAN SPRITZER: That facility is still
21 in existence?

22 MR. VAN DER LINDEN: That facility is
23 still existing. There's another one in the U.S. and
24 they've been operating very satisfactorily. And
25 nothing has been built since they were completed.

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1 CHAIRMAN SPRITZER: You said they've been
2 operating satisfactorily. To do what?

3 MR. VAN DER LINDEN: Well, the one in
4 Germany provides what we call firm capacity. In other
5 words, when it's called upon it delivers. It doesn't
6 have to run. So they get paid by not running.

7 Now the one in Alabama supplements their
8 system in terms of meeting mid-day about 45 hours of
9 load. And from that standpoint it's served them very,
10 very well. They also have a small storage facility.
11 They have coal. They have gas. And they have gas
12 turbines as standby. So they are well equipped to
13 deal. If they had wind there, they could deal very
14 well with wind. They don't have wind.

15 CHAIRMAN SPRITZER: The facility in
16 Alabama, what is it getting power from? Wind? You
17 said they're not getting wind.

18 MR. VAN DER LINDEN: No, no. It's getting
19 power from its coal plants at night.

20 CHAIRMAN SPRITZER: Oh, I see.

21 MR. VAN DER LINDEN: Yes. That way they
22 don't have to deload them. So they run at a more
23 efficient point and they don't increase emissions. So
24 that's a very useful application.

25 CHAIRMAN SPRITZER: And the plant in

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1 Germany, what is its source of power? The CAS.

2 MR. VAN DER LINDEN: The source of power
3 there is from the grid, nighttime.

4 CHAIRMAN SPRITZER: So neither of those
5 are running in combination with wind or solar.

6 MR. VAN DER LINDEN: No, no solar at all.
7 There is some wind in Germany, yes. I might add the
8 purpose of the unit in Germany was as a support
9 system. It wasn't intended to really integrate wind
10 because it's a non-recuperative system.

11 In other words, the efficiency isn't as
12 good as it could be if they had a recuperative system.
13 I think I explained it in some of the documents
14 between the two technologies. It's the same
15 technology except the one is designed to start up very
16 rapidly with a high power amount. And that was the
17 purpose. But if there is any excess power like wind
18 and wind spillage, yes, they can accommodate that.

19 CHAIRMAN SPRITZER: I take it from your
20 testimony you have some familiarity with the German
21 electrical system.

22 MR. VAN DER LINDEN: I know a little bit
23 about what goes on because I follow it.

24 CHAIRMAN SPRITZER: It's I think been a
25 matter of some public attention that they've decided

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1 to abandon apparently over time their existing nuclear
2 facility. Maybe abandon is the wrong term.

3 MR. VAN DER LINDEN: Yes. Correct.

4 CHAIRMAN SPRITZER: Cease operation of
5 their --

6 MR. VAN DER LINDEN: They are phasing them
7 out because they believe that the renewables such as
8 wind could replace it. But they're going to find that
9 extremely difficult. And they're going to have to
10 look for large storage facilities. And that's going
11 to increase the cost of wind which is already in terms
12 of German rates and what we pay here quite excessive.

13 CHAIRMAN SPRITZER: What kind of storage
14 facilities would be available to them to combine with
15 wind?

16 MR. VAN DER LINDEN: Europe has a lot of
17 salt domes like we have here in the lower part of the
18 country. So these are used for natural gas storage.
19 These domes are fairly large. So like the facility at
20 Huntndorf you can store natural gas in the dome as
21 well. You can solution minus cylinder and store air.
22 They will be looking at those.

23 But Germany has on another path. They
24 want total green energy. So they're looking at CAES
25 that uses no fuel at all. But they'll still need

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1 storage. And the heat from the compression cycle
2 would be stored in a thermal storage device. Of
3 course, that makes it very expensive.

4 And at the moment they're struggling with
5 the concept of storing that heat and the materials of
6 the compressors that have to withstand very high
7 temperatures. So that's another -- My estimation of
8 saying they're probably another 15 years away before
9 that comes about. But they're on that mission.
10 Whether they'll achieve it or not, I don't know.

11 CHAIRMAN SPRITZER: In the interim while
12 they're looking for these storage solutions, are they
13 intending to use backup natural gas or coal facilities
14 to work in conjunction with the wind to generate
15 baseload power?

16 MR. VAN DER LINDEN: Yes, they do have
17 natural gas backup. I can specifically mention Spain
18 that has a very high renewable portfolio in terms of
19 wind and solar. So they put in these combined cycles
20 and they would run them at 60 percent load. Now
21 that's not always a very efficient operating point for
22 combined cycles. Some manufacturers have adjusted to
23 that.

24 What the result is that if they lose 300
25 or 400 megawatts of wind which happens and happens

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1 fairly frequently then these plants can ramp up from
2 the 60 percent load to the full load. If you have an
3 800 megawatt combined cycle plant that's a lot of
4 capacity you can put on in a very short time.

5 However, if they have to shut them down at
6 night because there's no demand, some manufacturers
7 have designed the plant to idle at night while still
8 meeting emissions. Then they can ramp up in the
9 morning. But that is the way it will have to operate.

10 If you're going to depend on 1,000
11 megawatts of combined cycle, you're not really getting
12 that. You're getting 600 megawatts. The other 400 is
13 there to accommodate wind. So that becomes an
14 expensive support system.

15 CHAIRMAN SPRITZER: Let's turn to page 13
16 of Applicant's Exhibit 1. Actually let's go to page
17 14 at the top.

18 JUDGE SAGER: What section is that?

19 CHAIRMAN SPRITZER: This is Mr. Ratti
20 again I believe, although any of you can provide an
21 answer. "East Coast installation cost," the second
22 sentence on the page. "East Coast installation cost,"
23 this is for onshore wind turbines I believe, "are
24 likely to be well above \$1500 per kilowatt. For
25 reference, the 2011 Long Term Electricity Report for

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1 Maryland assumes installed costs for onshore wind
2 farms at \$2200 per kilowatt increasing to \$1800 per
3 kilowatt after 2011." And it goes on to give some
4 figures on O&M costs.

5 My question is can you give me some
6 information as to how those costs would compare to
7 Calvert Cliffs if they're possible to compare for the
8 same type of costs.

9 MR. RATTI: I don't know how they figure
10 for Calvert Cliff that I can compare to directly.

11 CHAIRMAN SPRITZER: Okay. None of the
12 other UniStar witnesses have that data either.

13 MR. LUTCHENKOV: I don't know if I have
14 that in front of me.

15 CHAIRMAN SPRITZER: Okay. If you don't
16 have it, you don't have it. Page 18 again of
17 Applicant's Exhibit 1, paragraph A-29, we're talking
18 about the cave wind project. You said it was
19 announced in 2001 and received its local and state
20 permits in 2009 and most federal permits in 2010 and
21 2011. Do you know when they applied for the federal
22 permits? I guess this is Mr. Ratti again.

23 MR. RATTI: I believe, but I'm not
24 completely sure, it was in the 2005-2006 time frame
25 that they actually applied. But I would have to

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1 check.

2 CHAIRMAN SPRITZER: Now at the end of the
3 next paragraph you refer to the DOI's -- that's
4 Department of Interior I take it -- Smart from the
5 Start initiative which you is taking steps to attempt
6 to reduce the length of the permitting process at
7 least at the federal level, what specifically are they
8 doing?

9 MR. RATTI: I'm not intimately familiar
10 with the initiative. But I believe they are trying to
11 streamline the process so that time lines are shorter
12 than they have been in the past with the expectation
13 that if there are more projects coming through the
14 pipeline they could be processed more quickly. I'm
15 not sure as to specifically inside the Department how
16 they plan to accomplish that.

17 CHAIRMAN SPRITZER: Okay. Now on page 20
18 in the second single-spaced paragraph you talk about
19 wind energy areas in the Atlantic. I take it the
20 Department of the Interior is attempting to focus on
21 expediting permitting for those specific wind energy
22 areas.

23 MR. RATTI: Yes. This is one of the
24 initiatives within the Smart from the Start. So that
25 will be one example.

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1 CHAIRMAN SPRITZER: Is there such a wind
2 energy area off of the coast of Maryland?

3 MR. RATTI: Yes. There is for sure. I
4 don't recall the map of the wind energy areas. But
5 certainly that's a wind energy area.

6 CHAIRMAN SPRITZER: Why did they select
7 Maryland if you know?

8 MR. RATTI: Well, in general, Maryland has
9 the waters off the coast of Maryland have a high wind
10 energy potential, offshore wind energy potential. So
11 certainly those would be a candidate for offshore
12 wind.

13 CHAIRMAN SPRITZER: Now at the bottom of
14 page 23, you talk about a scenario that is apparently
15 -- the LTER apparently considered as a possibility.
16 Namely, you're expanding the RPS that currently exists
17 to require 30 percent renewable by 2030. I take it
18 that would be in place of the current requirement for
19 20 percent by 2022. Is that correct?

20 MR. RATTI: Yes.

21 CHAIRMAN SPRITZER: Do you know what the
22 status of that initiative is today?

23 MR. RATTI: I don't believe there is a
24 specific initiative that refers to increasing the RPS
25 from 20 percent to 30 percent. I believe this was

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1 simply a scenario that was considered in the report
2 that would have a higher renewal penetration.

3 CHAIRMAN SPRITZER: All right, gentlemen.
4 That's all I have. Thank you.

5 JUDGE ARNOLD: I just have one other set
6 of questions. You were here earlier when I was
7 questioning the staff concerning the conclusions of
8 the final environmental impact statement.

9 MR. RATTI: Yes.

10 JUDGE ARNOLD: I just had them display
11 Figure 9-4 showing the environmental impacts of the
12 various alternatives. Do you recall that?

13 MR. RATTI: Yes.

14 JUDGE ARNOLD: And the staff witness
15 essentially came to the conclusion that no matter how
16 much you increase the solar and wind contributions the
17 combination alternative would not be environmentally
18 preferable to nuclear power. Would you agree with
19 that?

20 MR. LUTCHENKOV: Yes, I would and that's
21 reflected on their bounding analysis as well where
22 they took and quadrupled the wind. And the NEPA
23 evaluation essentially comes out the same which is
24 there is no alternative including these combination
25 alternatives that are environmentally superior or

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1 equal to the proposed project, Calvert 3.

2 JUDGE ARNOLD: Thank you.

3 CHAIRMAN SPRITZER: All right. I don't
4 think we have any further questions. Again, we had
5 said at the end of each group of witnesses we would
6 take a break if anyone wanted to propose any rebuttal
7 questions.

8 Mr. Mariotte, do you have any rebuttal
9 questions? Do you want to consider proposing any
10 rebuttal questions for these witnesses?

11 MR. MARIOTTE: Yes. I have two although
12 I'm having a hard time putting one into a question
13 form. But, yes, I have two.

14 CHAIRMAN SPRITZER: Why don't we take a
15 ten minute break then and do that and we'll come back
16 and wrap up the day at that point.

17 MR. MARIOTTE: All right. Your Honor,
18 could you explain to me the process? Should I write
19 out a question and hand it to you?

20 CHAIRMAN SPRITZER: Write out a question,
21 hopefully one I can read, and I will --

22 MR. MARIOTTE: Easier said than done.
23 Thank you.

24 CHAIRMAN SPRITZER: All right. We'll give
25 you ten minutes. Be back at 5:30 p.m. Off the

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1 record.

2 (Whereupon, a short recess was taken.)

3 CHAIRMAN SPRITZER: All right. Let's go
4 back on the record.

5 All right. We have two questions from the
6 NRC staff. Mr. Ratti, you testified that it was
7 possible to build a 1600 megawatt wind or solar
8 facility in Maryland by 2022. Is that correct?

9 MR. RATTI: I think the question was
10 whether the development and construction time of solar
11 and wind is within the next -- is possible to build
12 something that has not been announced yet today and
13 have that completed by 2022. So I think the answer to
14 that question is yes. I don't think if I implied that
15 I believe it's possible to build a 1600 megawatt solar
16 facility. That was not my intent.

17 CHAIRMAN SPRITZER: All right. In any
18 event, whatever you may have said previously, the next
19 question is is it probable that 1600 megawatts of wind
20 or solar will be built or installed in Maryland by
21 2022.

22 MR. RATTI: No, it's not possible as I
23 said in the testimony.

24 CHAIRMAN SPRITZER: Not possible or not
25 probable?

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1 MR. RATTI: It's theoretically possible.
2 It's highly unlikely.

3 CHAIRMAN SPRITZER: But what are the
4 obstacles that you would see to doing that?

5 MR. RATTI: The main would be probably
6 economics again. There is not enough incentives to
7 really justify the construction of so much wind in
8 Maryland. And also there would be problems of grid
9 integration and all that.

10 CHAIRMAN SPRITZER: Okay. Next question,
11 is one of the goals of Maryland's RPS to encourage the
12 use of renewable energy in order to drive down the
13 costs so that it could potentially be competitive with
14 other electricity sources and thus continue to grow in
15 the post RPS period?

16 MR. RATTI: That could be considered to be
17 one of the intents. Yes, it is I believe the hope of
18 the legislature to drive down cost further than it is
19 today so that eventually at some point in the future
20 these sources could be competitive with conventional
21 sources. Yes.

22 CHAIRMAN SPRITZER: From what I understand
23 when -- Well, let me back up a minute. For utilities
24 that purchase I believe they're called RPS credits.

25 MR. RATTI: Renewable energy certificates.

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1 CHAIRMAN SPRITZER: Yes, certificates.
2 Sorry. Can they purchase those from the state or only
3 from other utilities?

4 MR. RATTI: The utilities purchase those
5 credits or certificates from producers of power so if
6 the owner of a power plant would sell their
7 certificate to a load serving entity.

8 CHAIRMAN SPRITZER: Is there some way a
9 utility in Maryland can pay money to the state to
10 effectively reduce the number of certificates that it
11 has to purchase?

12 MR. RATTI: Yes.

13 CHAIRMAN SPRITZER: Or has to have?

14 MR. RATTI: Yes, they can elect to pay the
15 alternative compliance payment which is also expressed
16 in dollars megawatt hours. So in the case of solar
17 for the solar carveout they can pay today \$400 a
18 megawatt hour. If they decide not to purchase solar
19 renewable energy certificate, that is part of the law.
20 There is the same thing on the Tier 1 RPS.

21 CHAIRMAN SPRITZER: And the money the
22 state receives from those payments, do you know what
23 it's used for?

24 MR. RATTI: It's typically used -- I
25 believe that's the case for Maryland as well --

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1 invested in research to improve the cost and the
2 technology for renewables.

3 CHAIRMAN SPRITZER: Improve the cost, I
4 assume you mean reduce the cost.

5 MR. RATTI: Reduce the cost, yes.

6 CHAIRMAN SPRITZER: Okay. Which seems
7 consistent with what you were saying earlier that one
8 of the purposes at least behind the law is to help
9 drive down the cost of renewables over time.

10 MR. RATTI: Yes. It is a self -- it is a
11 mechanism that is, yes, if the RPS turns out to be too
12 stringent and so therefore it can't be met with
13 physical capacity, then the expectation is that there
14 will be some money to be invested to actually reduce
15 the cost so that in the future the RPS could be met
16 with physical capacity.

17 CHAIRMAN SPRITZER: Next question. The
18 report on -- Well, let me back up. And maybe I can
19 find that unless you happen to know the exhibit
20 number.

21 JUDGE ARNOLD: Fourteen or 15. Oh, 16.

22 (Off the record discussion.)

23 MR. MARIOTTE: It's JNT-12.

24 CHAIRMAN SPRITZER: Yeah. Okay. JNT-12.
25 The question is the report on solar versus nuclear

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1 costs submitted by Joint Intervenors and referred to
2 earlier was chosen among other reports showing similar
3 conclusions because it is specific to North Carolina.
4 And, witness, can you -- Excuse me -- connect -- Well,
5 excuse me. Can you comment on the relative solar
6 potential of North Carolina and Maryland?

7 MR. RATTI: The potential of North
8 Carolina is likely to be better than Maryland,
9 probably not significantly, not a lot better. There
10 is, I believe, as part of one of the exhibits,
11 although I certainly cannot recall which one, a map of
12 the solar resources within the United States with
13 different colors that go from light yellow to dark
14 red. And if you look at that map, I believe that
15 North Carolina will be a little bit darker than
16 Maryland, so a little bit better, but not as good as
17 say the Southwest.

18 CHAIRMAN SPRITZER: Now this report, JNT-
19 12, is entitled "Solar and Nuclear Costs: The Historic
20 Crossover: Solar Energy is now the Better Buy." And
21 you can see the little diagram on the cover. It seems
22 to show solar and nuclear costs intersecting in 2010
23 and continuing to decline below nuclear after 2010.
24 Have you read this report?

25 MR. RATTI: I have, but not in detail.

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1 I'm not intimately familiar with it. But I believe
2 again it goes back to one of the previous questions.
3 I think there is a difference here between price and
4 cost again. In some cases, solar power is likely to
5 be priced at a level that will be considered to be
6 lower than the cost of producing nuclear power. I
7 think that's probably a fair statement.

8 But again the price of solar power today
9 is reduced through heavy use of incentives, the
10 Federal Tax Credit and Solar Portfolio Standards. And
11 so that's -- it's probably not a fair apple-to-apple
12 comparison.

13 CHAIRMAN SPRITZER: But if we're looking
14 at the question of whether solar is economically
15 viable we would certainly want to take into account,
16 wouldn't we, whatever federal incentives there are
17 even though they may interfere with other market
18 choices there would otherwise be? We would want to
19 take the federal incentives into account in making
20 that analysis, wouldn't we?

21 MR. RATTI: Yes. So I would say that it's
22 fair to say that in some cases solar could be priced
23 lower than what the cost of producing nuclear power
24 would be. I would also say that in my testimony -- I
25 don't recall the specific place -- I do refer to the

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1 DOE Annual Energy Outlook that is an authoritative
2 source of cost of different types of power generation.
3 And the cost of solar power -- now we're talking about
4 the cost without any incentives. So just the raw
5 costs -- is significantly higher than nuclear and most
6 of the other resources, say, for offshore wind
7 probably.

8 CHAIRMAN SPRITZER: How is that usually
9 measured? In kilowatt hours or?

10 MR. RATTI: That is usually measured in
11 kilowatt hours. It's called the levelized cost of
12 electricity. It takes into account the capacity
13 factors, financing costs and a lot of other
14 assumptions.

15 MR. SMITH: For completeness, he's
16 referring to the Applicant's rebuttal testimony which
17 is Applicant Exhibit No. 55 and in paragraph A-15
18 which is on page 9.

19 CHAIRMAN SPRITZER: Okay. Thank you.

20 Have either of the other UniStar witnesses
21 read this report, JNT-12?

22 MR. LUTCHENKOV: No.

23 MR. VAN DER LINDEN: No.

24 CHAIRMAN SPRITZER: Okay. And we didn't
25 have any rebuttal questions from UniStar, did we?

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1 (No verbal response.)

2 All right. Unless anybody has anything
3 further, I believe we're done for today. We will
4 reconvene at 9:30 a.m. tomorrow morning which at time
5 we'll very much look forward to meeting Mr. Sklar.
6 Off the record.

7 (Whereupon, at 5:41 p.m., the above-
8 entitled matter was recessed to reconvene at 9:30
9 a.m., the next day.)
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CERTIFICATE

This is to certify that the attached proceedings
before the United States Nuclear Regulatory
Commission

Proceeding: Calvert Cliffs III Nuclear Project
Evidentiary Hearing

Docket Number: 52-016-COL

ASLBP Number: 09-874-02-COL-BD01

Location: Solomons, Maryland

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