Indianapolis, Indiana
June 20, 2007
9:00 A.M. (EDT)

(Reporter marked document for identification as Petitioner's Exhibit No. 12)

JUDGE STORMS: Let's go ahead and go back on the record.

Petitioner, you may call your next witness.

MR. POPE: Thank you, Your Honor. Call Mr. Roebel.

JOHN J. ROEBEL, a witness appearing on behalf of the Petitioner, having been first duly sworn, testified as follows:

DIRECT EXAMINATION,

QUESTIONS BY MR. POPE:

Q State your name, please.

A John J. Roebel.

Q And by whom are you employed and in what capacity?

A Duke Energy Shared Services, and I am Senior Vice President, Engineering and Technical Services.
Q For purposes of this proceeding, has your direct testimony been reduced to written question and answer form?
A Yes, it has.
Q You have a document before you that's been marked for purposes of identification as Petitioner's Exhibit No. 12.
A Yes.
Q Is that your prepared testimony?
A Yes.
Q Do you have any changes or corrections that need to be made to that testimony?
A No, I do not.
Q If I were to ask you those same questions today on the Stand, would your answers be the same?
A Yes, they would.
Q Do you adopt Petitioner's Exhibit No. 12 as your testimony in this proceeding?
A Yes, I do.
MR. POPE: Your Honor, at this time, we will offer Petitioner's Exhibit No.

12.

JUDGE STORMS: If there is no objection, we'll show Petitioner's Exhibit No. 12 admitted into this cause.

(PETITIONER'S EXHIBIT NO. 12, BEING THE PREFILED DIRECT TESTIMONY OF MR. JOHN J. ROEBEL, ADMITTED INTO EVIDENCE.)

MR. POPE: Mr. Roebel is available for cross.

JUDGE STORMS: Thank you.

Mr. Hartley?

MR. HARTLEY: No questions.

JUDGE STORMS: Mr. Polk?

MR. POLK: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. JOHN J. ROEBEL,

QUESTIONS BY MR. POLK:

Q Good morning, Mr. Roebel.

A Good morning.

Q Does Duke have a contract signed and a firm price for the combined cycle power block?

A At the Edwardsport station?

Q Yes, sir.

A No, sir.

Q Does Duke have a contract signed and a firm price for the air separation unit at the Edwardsport facility?

A No, sir.

Q Does Duke have a contract signed and a firm price for the gasifier at the Edwardsport facility?

A No, sir.

Q Does Duke have a contract signed and a firm price for the labor to construct the Edwardsport IGCC?
A No, sir.
Q Does Duke have a contract signed and a firm price for engineering services associated with the construction of the Edwardsport IGCC?
A The entire construction or parts of the engineering that need to be performed so you can construct the plant?
Q Can you explain the difference?
A Well, you don't always sign up for the total engineering for a project at the beginning. You may do it in phases, and so you have to do certain pieces of engineering work to build up to finally your construction contracts and implementation in the field. We have done part of that, and part of that has been completed and paid for.
Q Can you tell me which part has been completed?
A The FEED study.
Q Can you tell me what remains to be done?
A Some detailed engineering on components and physical layout.
Q Does that mean you've got blueprints for the

facility, you know, detailed engineering specs for every piece, or does that engineering still need to be done?

A Some parts of that are completed but not all of it has been completed.

Q Do you have a contract signed and a firm price for the remaining engineering work?

A No, sir.

Q Mr. Roebel, are you familiar with the activities of Duke with respect to cost estimation for the Cliffside project in North Carolina?

A Not in great detail. You see, at the time of the merger, a lot of that was already completed, and we couldn't share information from one company to the other until the merger was consummated, and so their initial planning and estimation, it happened before we could talk to them about their estimates or their technologies or anything else.

Q Were they at a farther -- Were they further along in that process on Cliffside than Duke currently is with respect to Edwardsport?

A Well, they're apples and oranges kind of because we're developing this reference plant

with GE and Bechtel, and they were not developing a reference plant with anybody in an alliance at that point. We've been working on ours for a few years now from the first idea that we had to do Edwardsport, but certainly, they had done preliminary work on site layout and technology choices and preliminary estimates and things like that.

Q Is the type of plant that was -- is being proposed at Cliffside a new, unproven technology?

A There are parts of it that are not what people may have seen before. For example, the air quality control system that's now going to be used on the back end of Cliffside is going to employ a dry scrubber and then -- well, pardon me, first, it has an SCR, and then it has a dry scrubber; then it has a baghouse; then it has a wet scrubber. Originally, their original idea was to have an SCR, a precipitator, a wet scrubber and a wet electrostatic precipitator. So, that has been changed. It is a new application which is much better for the environment using proven components but never in that configuration

before. It's very low risk, but I think a pretty ingenious approach.

Q Is it fair to say, then, that what they're doing is simply a creative repackaging of existing components, tried and true technology?

A At some time, all components have been tried. It is just the configuration in which they are put together and the process that's different.

Q Are you aware that in October 2006, Duke Energy Carolinas updated its project cost estimate for the Cliffside plant from $2 billion for the project up to $3 billion?

A Yes, I am.

Q Okay.

MR. POLK: I have no further questions for this witness, Your Honor.

Thank you, Mr. Roebel.

JUDGE STORMS: Mr. Stewart?

MR. STEWART: Thank you.

CROSS-EXAMINATION OF MR. JOHN J. ROEBEL,

QUESTIONS BY MR. STEWART:

Q Good morning.

A Good morning.

Q When was the merger completed?

A April the 4th, 2006.

Q April of 2006?

A Yes.

Q Okay. And there were still hearings going on in 2007 regarding the Cliffside plant in North Carolina, weren't there?

A Yes. It is a long process.

Q Now, you seemed familiar with the update of the cost on that project; is that right?

A I wasn't responsible for it, but I'm familiar with it because at that point we could talk back and forth between the folks at the old Cinergy and the folks at Duke about experiences and where they saw the markets and how to make estimates; so, yes, I was involved in some of those discussions.

Again, I wasn't responsible for it, but it is interesting how our experiences lined up from say the beginning of the environmental programs that I think you're

familiar with to the market now and how those markets changed, and so, we talked about how that changed for Cliffside and how the market changed in the middle of their estimate.

Q And as originally proposed there, there were two 800 megawatt plants, and they ended up getting approval for one; is that correct?

A To the best of my knowledge, yes.

Q And the original estimate on that one was a billion dollars, but the current estimate on that one plant is $2.4 billion?

A It depends on what year dollars you use and whether AFUDC is used. I mean, dollars -- I have such a hard time comparing estimates that are out in the public on these multi-year construction programs because sometimes they use current year dollars, and sometimes they use escalated dollars, and sometimes they use AFUDC, and sometimes they don't. So, it is always important to try to get them on an apples to apples basis.

Q I don't know whether Duke is consistent in their presentation or not; you might, but they told the Commission in North Carolina initially that it was going to cost a billion

dollars, and they more recently told the Commission in North Carolina that it was going to cost $2.4 billion; is that right?

A I believe they told the Commission also that it was going to be $1.8 billion, but there was $600 million worth of AFUDC. So, not knowing the basis of the billion dollars, I can't tell you if it had AFUDC or not. That's my point, sir.

Q That's fine; thank you.

JUDGE STORMS: Mr. Mohler?

MR. MOHLER: Thank you.

CROSS-EXAMINATION OF MR. JOHN J. ROEBEL,

QUESTIONS BY MR. MOHLER:

Q Mr. Roebel, could you turn to Page 5 of your testimony, please?

A I'm there.

Q Under the "Clean Coal Technology" heading?

A Yes.

Q The last sentence, you state, I believe, "As Mr. Moreland explains, the Edwardsport Project will be equipped with Selective Catalytic Reduction (SCR) technology for the reduction of NOx emissions."; is that correct?

A Correct.
Q Were you here for Mr. Moreland's testimony?
A Yes, I was.
Q Could you clarify for me, I believe he stated that SCRs may be added to the IGCC plant at a cost of $4.4 million. Could you clarify the status of that?
A They are included in the cost estimate and the current plans for the plant.
Q Thank you.

MR. MOHLER: No further questions.

JUDGE STORMS: Mr. McGimpsey?

MR. McGIMPSEY: No questions, Your Honor.

JUDGE STORMS: Mr. Endris?

MR. ENDRIS: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. JOHN J. ROEBEL,
QUESTIONS BY MR. ENDRIS:

Q Good morning, Mr. Roebel.
A Good morning.
Q I've been looking at that picture behind us. Is that a picture of the proposed facility?
A It is a rendition of what the facility could

look like.
Q Okay. Because when I described this hearing to my son, he asked me if I could get a picture of this, and I said I would try. I think he wants to build it out of LEGOs.
A I think it is suitable for framing.
MR. POPE: Wait until the hearing is over before you take it, Bob.
MR. ENDRIS: Okay.
Q On Pages 1 and 2, you described your current duties and some of your background.
What will be your role going forward if this project is approved?
A I am responsible for the development of the project and the engineering on the project. Until such time as we receive the CPCN, I will continue to be responsible for the technical part of the project. The execution part in the field will be turned over to a gentleman by the name of Ron Barnes who is a co-worker of mine that also reports to my boss, but we will work in a matrix fashion at that point; again, for him to execute in the field and me to continue to supply the engineering and environmental support, things like that.

Q And have you had experience working on a construction project of this size previously?
A Yes. Years ago, I guess I was 27, I did the studies to convert Zimmer from an 840 megawatt nuclear plant to a 1300 megawatt coal plant, and the final cost of that was about $3.2 billion when it went on line in 1991. So, yes, I've done projects this big.
Q And how did that $3.2 billion compare to the cost projections before starting that project?
A The estimate for that project for the conversion was $3.5 billion, and we came in at $3.2 billion.
Q Under budget?
A Significantly.
Q On time?
A On time.
Q Wonderful.

Can you turn to Page 4 of your testimony, please?
A I'm there.
Q And there I notice you give the cost -- the estimated cost for demolishing the existing station, and you state that that was prepared for the Company's last rate case.

Do you know why that estimate was prepared for the rate case?

A No, I don't.

Q Do you know whether the cost of demolishing the Edwardsport station was included in the calculation of negative net salvage used in determining the depreciation rate?

A I don't know that. I know we were asked to work with somebody, an architect or engineer or somebody, by the rates people or the folks involved with the rate case to give them some figures. How they worked it into the rates and how it affected the rates, I wasn't familiar with that detail.

JUDGE STORMS: Mr. Endris, could I have you pull your microphone a bit closer?

MR. ENDRIS: Yes.

JUDGE STORMS: Thanks.

Q And Ms. Jenner in her testimony described that the STRATEGIST analytical tool is just that, a tool, and that judgment needs to be exercised. Do you have that opinion as well?

A Yes, I do.

Q And do you play a role in exercising that judgment or determining that judgment?

A I'd like to think so. I get asked for my opinion on the engineering, construction, operations, of different plants, whatever the options are that are in STRATEGIST. My group does provide the screening for the technologies that go into STRATEGIST. Mr. Moreland is in my group. So, yes, I give my opinion, and I hope people listen to it.

Q Well, what kind of opinion did you give with respect to the leading-edge nature of this technology and the kind of risk that might be faced?

A I guess I've been fortunate through my career that I've been able to look at new technologies and deploy them. I'm used to guarding the value of the dollars that we spend.

One of my first jobs out of college was working as the mechanical project engineer on the East Bend station, a 600 megawatt unit that went on line in 1981 in Kentucky. It was a conventional technology boiler-wise and turbine-wise, but it had a scrubber on it, and it was the first scrubber on our system, and I was involved in the

investigation of what kind of scrubber to use and how to deploy it.

I think through that process I gained a real understanding of exactly what you have to look at, the long-term needs of the plant and the reliability that is so crucial to these plants, and how do we evaluate the use of a new technology or a new approach by us certainly in a plant that could last 40, 50, 60 years.

I'm proud to say that that scrubber has been wonderful and is still operating today removing SO2 in excess of 96 percent when it was originally designed for 81 percent on high sulfur coal and doesn't cost -- it doesn't go down to take any megawatts off the system.

The next approach or the next opportunity I had was the Zimmer situation. There had never been a nuclear plant converted to coal, much less being the largest boiler in the world, a 1300 megawatt boiler. We looked at that very closely. We used all the intelligence that we could gather to try to assess the success or the potential success of

that had we deployed it. I am very proud to say that has had a remarkable run since 1991 and has been the lowest cost unit on our system and certainly one of the most dependable. It was a large project. We analyzed it very carefully, and it has been very successful.

In addition, we not too long ago had the Noblesville Repowering that we converted in Noblesville, Indiana, and it has been very successful up there and has been a critical part of our system. Again, it was a conversion of an older plant to a very reliable and efficient part of our generating system.

We have been around this technology since 1994. The project manager, Dennis Zupan, was one of the project managers on the construction of that project. The plant manager, Jack Stultz, ran the power part of that project from its first day. So, we had people around that really knew that technology, conversed a lot with and interfaced a lot with the owners of the gasification island about what the problems

were, what kind of syn gas they were sending them, when it was going to be available, what the bottlenecks were, what the corrections were going to be.

So, after talking to them and seeing how that technology has been refined over the years and talking to people in the industry like the folks at Polk station for Tampa Electric and seeing where the technology has come, I told my boss at that time, which was Jim Rogers, that I thought it would be a good option to consider. I don't take that lightly. My reputation is staked upon whether these things run not the first day, not year one, but whether they're running 20 and 30 years longer.

So, we looked at it hard, and we feel very confident that this is going to be a very successful project.

Q I certainly look forward to that success and have enjoyed it in the past. Just one more area, Mr. Roebel.

You mentioned concern for the reliability of your generating units and the equipment. This facility is a base-load

facility?
A Correct.
Q And it will increase the proportion of base-load generation in your portfolio; is that correct?
A To a certain extent. We are going to retire the 160 megawatts at -- the existing megawatts at Edwardsport, but certainly some part of it, yes.
Q Those are more intermediate or peaking, aren't they?
A That's correct, still coal fired, but they're not part of the daily base-load fleet, you're correct.
Q And have you had any concerns or expressed any concerns about whether the addition of this amount of base-load capacity will affect the cycling of your other base-load facilities in terms of minimum run levels during shoulder periods or off-peak periods?
A We've looked at that. It is always a concern. As you well know, we put a lot of pollution control equipment on the back of our biggest units. Gibson has SCRs and scrubbers on it. Cayuga is going to have scrubbers on it, and

other parts of our system in Ohio, Kentucky and the Carolinas have those things. All of those things make the flexibility of the units a little tougher because they have certain requirements around them of temperature and cycles and other things like that, chemistry-wise and things; so, we've been looking at those issues a lot for our system anyhow, kind of getting ready for the future.

Right now we do a lot of that regulation and turn down at night with our units such as Gallagher or Wabash River or some of the other small coal-fired units on our system. In addition, we do some of it with Noblesville where we'll put it on during the day and take it off during the night.

So, we're aware of that, and we're looking at our whole system, and we think we can absorb this.

Q Thank you, Mr. Roebel.

MR. ENDRIS: Nothing further, Your Honor.

JUDGE STORMS: Thank you. Redirect?

MR. POPE: Briefly, Your Honor.

REDIRECT EXAMINATION OF MR. JOHN J. ROEBEL,

QUESTION BY MR. POPE:

Q Mr. Roebel, Mr. Endris asked you some questions about the demolition study for the existing Edwardsport plant.

Is the cost of that demolition included in the estimated cost of the Edwardsport IGCC Project, if you know?

A I don't know.

MR. POPE: That's all. Thank you.

JUDGE STORMS: Who would know the answer to that question that Mr. Pope just asked you?

WITNESS ROEBEL: Mr. Zupan.

MR. POPE: And Mr. Moreland too. I was just getting it into the record at the same time.

JUDGE STORMS: Okay.

Mr. Roebel, thank you very much for your testimony.

WITNESS ROEBEL: Thank you.

(WITNESS JOHN J. ROEBEL EXCUSED)

(Reporter marked documents for identification as Petitioner's Exhibit No. 5, with attached exhibits, and Petitioner's Exhibit No. 15)

JUDGE STORMS: Petitioner, you may call your next witness.

MR. POPE: Thank you, Your Honor. We'll call Diane Jenner.

DIANE L. JENNER, a witness appearing on behalf of the Petitioner, having been first duly sworn, testified as follows:

DIRECT EXAMINATION,

QUESTIONS BY MR. POPE:

Q State your name, please.

A Diane L. Jenner.

Q And by whom are you employed and in what capacity?

A I'm employed by Duke Energy Shared Services as Director, Integrated Resource Planning.

Q Ms. Jenner, for purposes of this proceeding,

has your direct testimony been reduced to written question and answer form?

A Yes.

Q Do you have before you a document that's been marked for purposes of identification as Petitioner's Exhibit No. 5?

A Yes.

Q Is that your prepared direct testimony?

A Yes.

Q Are there any changes or corrections that need to be made to your testimony?

A No, with the caveat that the numbers in this case have kind of evolved over time. So, my rebuttal testimony has the more current numbers in it.

Q And I believe it also has Exhibits 5-A through and including 5-D; is that correct?

A That's correct.

Q And you're sponsoring those exhibits also?

A Yes.

MR. POPE: Your Honor, just to tie the record, on -- tie into the record, on November the 1st, the Commission issued a Docket Entry. We all saved a bunch of trees by incorporating by reference the IRP in this

proceeding which was Exhibit 5-A, I believe.

Q Ms. Jenner, if I were to ask you the questions contained in Petitioner's Exhibit No. 5, would your answers be the same today?

A Yes.

Q And do you adopt Petitioner's Exhibit No. 5 along with attached Sub-Exhibits A through D as your testimony in this proceeding?

A Yes.

MR. POPE: Your Honor, we'll move the admission of Petitioner's Exhibit No. 5 with attached Sub-Exhibits A through D.

JUDGE STORMS: If there is no objection, we'll show Petitioner's Exhibit No. 5 with Sub-Exhibits A through D admitted into this cause.

(PETITIONER'S EXHIBIT NO. 5, BEING THE PREFILED DIRECT TESTIMONY OF MS. DIANE L. JENNER, WITH SUB-EXHIBITS 5-A THROUGH AND INCLUDING 5-D ATTACHED THERETO, ADMITTED INTO EVIDENCE.)

Q (Mr. Pope continuing) Ms. Jenner, do you also have a document in front of you that's been marked for purposes of identification as Petitioner's Exhibit No. 15?
A Yes.
Q Is that your prepared amended supplemental testimony filed in this cause?
A Yes.
Q Are there any corrections or changes that need to be made to Petitioner's Exhibit No. 15?
A No.
Q If I were to ask you the same questions contained therein on the Stand today, would your answers be the same?
A Yes.
Q And do you adopt Petitioner's Exhibit No. 15 as your supplemental testimony in this cause?
A Yes.

MR. POPE: Your Honor, at this time, we'll move the admission of Petitioner's Exhibit No. 15.

JUDGE STORMS: If there is no objection, we'll show Petitioner's Exhibit No. 15 admitted into this cause.

(PETITIONER'S EXHIBIT NO. 15, BEING THE PREFILED AMENDED SUPPLEMENTAL TESTIMONY OF MS. DIANE L. JENNER, ADMITTED INTO EVIDENCE.)

MR. POPE: The witness is available.

JUDGE STORMS: Thank you. Mr. Hartley?

MR. HARTLEY: No questions, Your Honor.

JUDGE STORMS: Thank you. Mr. Polk?

MR. POLK: Thank you, Your Honor.

CROSS-EXAMINATION OF MS. DIANE L. JENNER,

QUESTIONS BY MR. POLK:

Q Good morning, Ms. Jenner.

A Good morning.

Q Now, as I understand, you just indicated that a lot of numbers have been updated since you filed your direct, and you've even done some modeling runs since you filed your amended supplemental testimony; is that correct?

A That's correct.

Q Well, then, I think in order to kind of save time, rather than dwelling into the numbers that you used for your direct and your amended supplemental, we'll save some of the questions for your rebuttal testimony, but I would like

to cover some of the basics of the IRP process.

You and I have been through this many times before, and it is going to be very familiar. I have no intention of any trick questions, but I just want to enter into the record the same type of information that we've discussed in the past regarding the STRATEGIST model.

The STRATEGIST -- Well, can you explain what the STRATEGIST model is used for?

A The STRATEGIST model is an optimization model that is used to develop the Integrated Resource Plan. It looks at a variety of different alternatives, the load forecast, cost of alternatives, fuel cost, et cetera, to try to determine what the best plan is.

Q And is it correct that the STRATEGIST model is capable of generating outputs that would indicate increased investments in energy efficiency or renewables?

A Can you rephrase that, please?

Q Sure. When you do the modeling, there are choices that it can pick as the preferred resource mix going forward; is that correct?

A That's true.
Q Okay. And the way the model can operate is that it could generate any number of different options for that preferred resource mix, but that rather than setting up the model to result in a choice of renewables or a choice of energy efficiency, the Company instead runs the model using renewables and efficiency as part of the input process by way of the load forecast?
A I wouldn't entirely agree with that statement.
Q Can you explain how renewables and energy efficiency are taken account of within the STRATEGIST model as the Company runs it?
A The energy efficiency numbers that Dr. Stevie provides me are input into the model, and they are, for lack of a better term, hardwired so that the model does not choose them. They are a given in the model.

The supply-side options are looked at to serve what the load is after those energy efficiency alternatives have already been taken into account. On the renewable side, we allow the model to choose wind farm alternatives. In addition, we also ran a

sensitivity with a lower load forecast that could also be used as a proxy for a lower load forecast or a higher level of renewables or some combination thereof.

Q Let me try to break that apart a little bit. The model chooses supply options and presumes demand-side options the way the Company runs it?

A Yes.

Q The model is capable of choosing demand-side options, but the Company does not choose to run it that way?

A Yes, and part of the reason why we do it that way is to save on model run time and ensure that the model will solve. In addition, by hardwiring in the levels of DSM that Dr. Stevie gives us, we are giving DSM the best shot to be chosen because the model can also choose not to take the DSM.

I would also point out that in the C02 scenario, Dr. Stevie gave us is ultra-high DSM bundle, and that was what was used in the C02 scenario.

Q But, again, it is an assumption or a presumption; you said it is hardwired in to

the system; it doesn't allow flexibility; it is based on all of the assumptions and presumptions made by the people preparing the load forecast; correct?

A Well, it is different people that look at the DSM than look at the load forecast, but Dr. Stevie is in charge of both of those areas, and the folks that look at the DSM provide us with the cost-effective DSM.

Q Let me rephrase that question then.

It hardwires the presumptions and assumptions of Dr. Stevie and the folks who work for Dr. Stevie or report to Dr. Stevie?

A Yes, and I trust Dr. Stevie's judgment.

Q With respect to renewables and the choice of wind farms, did the model allow the ability to choose incremental additions of wind power each year or did it limit the addition of that power to specific years?

A We limited it to specific years. Again, because of the way the model solves, if you give it too many alternatives, essentially the model will not be able to come to a solution in a reasonable amount of time because it is looking at all different combinations of

alternatives, and with wind farms, since what we modeled was 100 megawatt wind farms, which is a reasonable size to model, however, the summer on-peak contribution of a wind farm is only about 15 percent. So, each wind farm added -- only adds 15 megawatts of capacity to the system. So, you have to be very careful not to give it too many of those or the model is going to blow up.

Q Is the Edwardsport facility a summer peaking unit?

A No, it is a base-load unit.

Q Thank you, Ms. Jenner. I look forward to discussing these issues again on rebuttal.

MR. POLK: No further questions, Your Honor.

JUDGE STORMS: Thank you, Mr. Polk.

Ms. Dodd, your witness.

CROSS-EXAMINATION OF MS. DIANE L. JENNER,

QUESTIONS BY MS. DODD:

Q Good morning.

A Good morning.

Q Can you turn to Page 7 of your testimony?

A I'm there.

Q And on Line 17, you discuss what the plan should include and what issues should be taken into account including risk.

What risk are you referring to?

A There were different kinds of risk that we considered such as fuel cost risk. We've considered the risk of CO2 legislation. I believe some scenarios we initially looked at in the IRP also looked at differences in reserve margin requirements, things like that.

Q And you also discussed the role that judgment comes into play in the IRP process, and in exercising that judgment, do you also look at the regulatory treatment of the cost of various supply options?

A That's one factor among many.

Q Page 10, on Line 3, you say, "All of the generating units on our system, and their operating characteristics, were incorporated

into the model."

Did that include the current Edwardsport plant?

A The three existing units?

Q Yes.

A Yes, it did.

Q Page 23 --

A I'm there.

Q -- starting on Line 4, you're discussing the Planned Reserve Sharing Group and the possibility that it may result in lower reserve margins that companies need to carry.

On Lines 9 through 13, you discuss what steps are still necessary before you'll know what the results are belonging to that group.

Do you have a time line? Do you know how long it will take for the rules to be developed?

A The agreement to form the Midwest PRSG was just signed by the parties at the end of May. We have our first what I would call official meeting of the PRSG members next week, and the plan is to get going on the study that needs to be performed, and the target date for the

end of the study is the end of 2007 because we all have to know what level of reserves we're required to carry starting next June. During that process of performing the study, the exact rules and how some of the calculations will be done will also be established over that time frame.

Q And will the study also determine the sub-region or zone to which Duke Energy will belong?

A Yes, it will.

Q That also would be by the end of 2007?

A Yes; although, right now our expectation is that Duke Energy Indiana will be grouped with the other Indiana utilities, Duke Energy Kentucky, Duke Energy Ohio and the Illinois companies.

Q And then how long for the modeling -- detailed modeling study to be performed then?

A That's what I said --

Q That's the second part that you were talking about; okay.

A -- by the end of the year.

Q On Page 26, you're discussing the results of the -- under the base case conditions, using

80 percent of the IGCC plant and also using 100 percent ownership of the IGCC plant.

The costs that were modeled, did those include the cost of carbon capture and storage?

A No.

Q Did Duke include the cost of IGCC carbon capture and storage in any of the IRP modeling?

A No.

Q Is the analysis of 100 percent Duke ownership of the IGCC modeled in the IRP?

A In the IRP that was filed?

Q Yes.

A No.

MS. DODD: Nothing further.

JUDGE STORMS: Thank you, Ms. Dodd.

Nucor?

MS. BECKER: No questions, Your Honor.

JUDGE STORMS: Mr. Endris?

MR. ENDRIS: Thank you, Your Honor.

CROSS-EXAMINATION OF MS. DIANE L. JENNER,

QUESTIONS BY MR. ENDRIS:

Q Good morning, Ms. Jenner.

A Good morning.

Q Turn to Page 7 of your testimony, please.

A Okay.

Q Lines 9 through 18, here you're talking about how potential expansion plans are analyzed and the present value revenue requirements are obtained for each one and the forecasted costs compared by the Company. Do you see that testimony?

A Yes.

Q Then on Line 13, you state, "Normally, the model analysis will produce a number of expansion plans with PVRRs that are so close that, for practical purposes, they are identical."

By practical purposes, are you saying that the margin of error is greater than the difference in the PVRRs?

A No. What I'm saying is that the difference in PVRR compared to the total PVRR over the study period or planning period is an extremely small percentage.

Q Do you have a quantifiable margin of error associated with your STRATEGIST analysis?
A No.
Q And with respect to the small percentage points relative to the total PVRR, that's for the entire generation fleet in the Duke Energy system; is that correct?
A Yes and no. It includes the cost of fuel and O&M going forward on the existing fleet; however, the existing capital costs that have already been invested in those units is not modeled.
Q And what are the total PVRRs in dollars for the base case?
A In general, they're -- they varied throughout here, but they're on the order of, let me throw out, 30 billion.
Q 30 billion?
A Roughly. It depends on what scenarios you're looking at.
Q So even a small percentage difference is several millions of dollars?
A That's true.
Q Can you turn to Page 10 of your testimony, please, Lines 8 through 10, and here you

discuss the fuel prices, market prices and emission allowance prices utilizing the IRP process which were provided by ICF.

I think Mr. Rose testified yesterday that they provide hourly prices to you; is that correct?

A Yes.

Q And on Page 9, Lines 9 and 10, you discuss the 2005 load forecast, and subsequent to that, Duke Energy Indiana signed a contract to sell Hoosier Energy 100 megawatts for that period.

Is that an around the clock 100 megawatts, if you know?

A I know, but I don't know if that's confidential or not.

MR. POPE: Can we have a moment?

JUDGE STORMS: Yes. Let's go off the record for a moment.

(Off-the-Record Discussion)

JUDGE STORMS: Let's go back on the record.

We've had a brief discussion to confirm that the potential answer is not

confidential; so, Ms. Jenner has been informed by counsel that she may proceed safely.

A It is around the clock.

Q Thank you, Ms. Jenner.

And is that how it gets modeled into STRATEGIST, does it reflect 24 hours at 100 megawatts?

A Yes.

Q And would that be true with other wholesale contracts as well, that you would put them into your analysis on the basis of whether they are around the clock or a full requirements for whatever the demand level might be?

A Yes, we would model whatever the contractual requirements are.

Q And just to be clear, Dr. Stevie told me to ask you, did you use his 2004, I'm sorry, 2005 load forecast or did you use his 2006 load forecast for the exhibit here in your direct testimony?

A We used the 2005 load forecast. As my testimony discusses on Page 24, I also -- When we developed the IRP, the 2005 load forecast was all that existed. By the time we filed

testimony in this cause, Dr. Stevie had developed the 2006 forecast. So, we did take a look at it to see how it compared, and as my testimony states, in 2011, there was only 11 megawatts difference between the two.

Q Just one more question, Ms. Jenner.

On Page 26 of your testimony, at the bottom of the page where you talk about -- well, beginning on Line 15, and there on Line 16, you say, "In the CO2 Scenario, the 50% IGCC was economical with Federal Incentives and essentially break-even without Federal Incentives."

By break-even, what do you mean by that?

A I mean that the percentage difference in PVRR between that plan and the plan without the IGCC was very small.

Q Thank you, Ms. Jenner.

MR. ENDRIS: Nothing further, Your Honor.

JUDGE STORMS: Thank you. Redirect?

MR. POPE: No redirect, Your Honor.

JUDGE STORMS: Ms. Jenner, thank you very much for your testimony. You may step down.

(WITNESS DIANE L. JENNER EXCUSED)

JUDGE STORMS: Let's take about a ten-minute break.

MR. POPE: Your Honor, before we go off the record, if I could, in response to my redirect of Mr. Roebel, Page 15 of Mr. Moreland's direct testimony, which is already in the record is the reason I'm bringing it up, Exhibit No. 4, answers whether or not the cost of demolition is included in the estimate, and it is not, but he's already been on, and it's already in the record, but I wanted to point that out.

JUDGE STORMS: Thank you very much.

Let's take our ten-minute break.

(HEARING IN RECESS UNTIL 10:10 A.M., SAME DAY)

Indianapolis, Indiana
June 20, 2007
10:10 A.M. (EDT)

(Reporter marked documents for identification as Petitioner's Exhibit Nos. 13, 13-A, 13-B, 13-C and Confidential 13)

JUDGE STORMS: Let's go ahead and go back on the record.

Petitioner, you may call your next witness.

MS. KARN: Thank you, Your Honor. We call Mr. Stephen M. Farmer.

STEPHEN M. FARMER, a witness appearing on behalf of the Petitioner, having been first duly sworn, testified as follows:

DIRECT EXAMINATION,

QUESTIONS BY MS. KARN:

Q Could you, please, state your name for the record?

A Stephen M. Farmer.

Q And by whom are you employed and in what capacity?
A I'm currently a self-employed contractor.
Q Do you have a document before you that has been marked as Petitioner's Exhibit No. 13?
A I do.
Q Do you also have a document that's been marked as Petitioner's Confidential Exhibit No. 13?
A I do.
Q Do you have any changes or corrections to make to Petitioner's Exhibit No. 13?
A Yes. First of all, I guess we should establish for the record that I'm no longer an employee of Duke Energy Shared Services. I retired as of 12-31-2006.

Then, also, I have a correction on Page 12 of my testimony having to do with the basis reduction of the federal investment tax credit. On Line 4, "50%" should be changed to "100%", and on Line 12, delete "one-half" and replace that with "100%"; so, the sentence reads, "In effect, this means that a portion of the investment tax credit (i.e., reduction in basis, or, 100% of the investment tax credit, times the federal income tax rate)

represents an interest free loan . . ."

Q Thank you.

A Those are the only corrections that I have; although, I would say that as other witnesses have explained, there have been significant changes -- there have been a number of changes from my direct testimony to my rebuttal testimony, including updates of cost estimates and changes in the various proposed regulatory treatment of certain cost items.

Q Thank you. And you did make those changes and initial them in the margin; correct?

A I did.

Q Thank you. Given the fact that there have been those updates, if I asked you the same questions today taking into account that there have been updates included in the rebuttal, would your answers be the same?

A Yes, they would.

Q Do you adopt Petitioner's Exhibit No. 13 as well as Petitioner's Confidential Exhibit No. 13 as your sworn direct testimony in this case?

A I do.

Q Thank you.

MS. KARN: We will offer into evidence Petitioner's Exhibit No. 13, which includes Sub-Exhibits 13-A through 13-C, and Confidential -- Petitioner's Confidential Exhibit No. 13, which also includes Sub-Exhibits Confidential 13-A and 13-B.

JUDGE STORMS: If there is no objection, we'll show Petitioner's Exhibit No. 13 and Confidential Exhibit No. 13 and all of the sub-exhibits attached thereto admitted into this cause.

MS. KARN: Thank you, Your Honor.

(PETITIONER'S EXHIBIT NO. 13, BEING THE PREFILED DIRECT TESTIMONY OF MR. STEPHEN M. FARMER, WITH EXHIBIT NOS. 13-A, 13-B AND 13-C ATTACHED THERETO, ADMITTED INTO EVIDENCE.)

(PETITIONER'S EXHIBIT NO. CONFIDENTIAL 13, CONTAINING CONFIDENTIAL INFORMATION PERTAINING TO THE DIRECT TESTIMONY OF MR. STEPHEN M. FARMER, ADMITTED INTO EVIDENCE ON A CONFIDENTIAL BASIS.)

MS. KARN: The witness is available for cross-examination.

JUDGE STORMS: Thank you. Mr. Hartley?

MR. HARTLEY: No questions.

JUDGE STORMS: Mr. Polk?

MR. POLK: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. STEPHEN M. FARMER,
QUESTIONS BY MR. POLK:

Q Good morning, Mr. Farmer.

A Good morning.

Q How does it feel to be self-employed again?

A It is very nice. I'm enjoying it.

Q You said you were retired. Is that a retirement from Duke to work full time elsewhere, or are you enjoying -- having an opportunity, at least, to enjoy some free time now?

A I have a choice of free time. It is very nice. I have been retained by Duke Energy Indiana on a part-time basis, but I'm enjoying it.

Q Okay. And you worked for Duke and before that Cinergy and PSI for quite sometime; right?

A Yes. Duke formerly Cinergy formerly PSI for 31 years, I believe.
Q Well, I think you've earned some free time.
A Thank you.
Q Now, you said a lot of your numbers have changed since the filing of your direct testimony and have been updated in your rebuttal testimony?
A Yes.
Q All right. In that case, I'll reserve the questions that I have dealing with your rebuttal testimony. Thank you.

JUDGE STORMS: Ms. Dodd, your witness.

CROSS-EXAMINATION OF MR. STEPHEN M. FARMER, QUESTIONS BY MS. DODD:

Q Good morning, Mr. Farmer.
A Good morning.
Q Just a couple of questions. Page 17, and at the bottom of the page, Lines 22 and 23, you're talking about the procedures to recognize the difference in ratemaking between retail and wholesale jurisdictions with respect to environmental costs.

What are those procedures?

A The primary procedure is that our wholesale customers do not have a tracking mechanism, per se, like our retail customers do. For our retail customers, we recognize that under CWIP ratemaking, the Company would earn a cash return on its investment; therefore, there would be no need for the accrual of AFUDC. So, we discontinue the accrual of AFUDC on that portion of the investment that's applicable to the retail customers.

The wholesale customers, on the other hand, their rate treatment is not similar or not the same as for retail customers. Since we are not earning a cash return on the investment as the plant is being constructed, we do continue the accrual of AFUDC on that portion of the plant that is applicable to the wholesale customers. That's the primary difference.

Q And the allocation -- jurisdictional allocation between retail and wholesale customers, that remains the same for the environmental costs, doesn't it?

A Yes, it does.

Q Now, on Page 22, you're discussing the rate impacts, and on Line 15, you say -- well, on Line 14, retail revenues billed jurisdictional customers during the twelve months ending May 2006.

Is that total revenues billed to customers, or is that just base rates that are billed?

A I'm sorry, would you repeat that question?

Q Yes. You're talking about the -- how you're calculating the percent increases from retail revenues billed jurisdictional customers during the twelve months ending May 2006.

My question is: The retail revenues billed, is that total revenues, the base rates plus all trackers, or is it just the base rates?

A It is the total plus all trackers.

Q Thank you.

MS. DODD: No further questions.

JUDGE STORMS: Thank you.

MR. MOHLER: No questions.

MR. McGIMPSEY: No questions, Your Honor.

JUDGE STORMS: Mr. Helmen?

CROSS-EXAMINATION OF MR. STEPHEN M. FARMER,
QUESTIONS BY MR. HELMEN:

Q Mr. Farmer, Indiana Michigan Power Company filed a base rate case yesterday. Would you be available to the OUCC for consulting?

MS. KARN: I think I can answer that for him.

Q Can we talk later?

A We can talk later. I have a contractual provision that I think would preclude me from probably doing that.

Q I had to ask.

A I could be retained by I&M, I suppose.

MR. HELMEN: I don't have any questions on your direct testimony. Thanks.

JUDGE STORMS: Redirect?

MS. KARN: Nothing, Your Honor.

JUDGE STORMS: Mr. Farmer, thank you very much for your testimony.

WITNESS FARMER: Thank you.

(WITNESS STEPHEN M. FARMER EXCUSED)

JUDGE STORMS: Let's go off the record for a moment.

(Reporter marked document for identification as Intervenor's - ICC Exhibit No. JNN)

(Reporter marked document for identification as Petitioner's Exhibit No. 1)

JUDGE STORMS: Let's go back on the record.

Ms. Karn, you have one additional -- some additional testimony that you'd like to stipulate into the record; is that correct?

MS. KARN: Yes.

JUDGE STORMS: Please proceed.

MS. KARN: Thank you, Your Honor. I believe pursuant to stipulation by the parties, I would like to offer into evidence Petitioner's Exhibit No. 1, which is the prefiled direct testimony of James E. Rogers.

JUDGE STORMS: We will show

Petitioner's Exhibit No. 1 admitted into this cause pursuant to stipulation of the parties.

MS. KARN: Thank you, Your Honor.

(PETITIONER'S EXHIBIT NO. 1, BEING THE PREFILED DIRECT TESTIMONY OF MR. JAMES E. ROGERS, ADMITTED INTO EVIDENCE.)

MS. KARN: That completes Petitioner's case-in-chief.

JUDGE STORMS: Thank you. Mr. McGimpsey, you may call your witness.

MR. McGIMPSEY: Thank you, Your Honor. The Indiana Coal Council calls its witness, J. Nathan Noland, and, Your Honor, Mr. Noland needs to be sworn in.

JUDGE STORMS: Please stand and raise your right hand to be sworn.

(OATH DULY ADMINISTERED TO WITNESS)

MR. McGIMPSEY: Thank you, Your Honor.

J. NATHAN NOLAND, a witness appearing on behalf of the Intervenor, Indiana Coal Council, Inc., having been first duly sworn, testified as follows:

DIRECT EXAMINATION,

QUESTIONS BY MR. McGIMPSEY:

Q Would the witness, please, state his name and

business address?
A Nathan Noland, and I work for the Indiana Coal Council, 150 West Market Street, Indianapolis, Indiana.
Q Thank you. Mr. Noland, did you cause to be prepared and prefiled in this cause on May 15, 2007 your direct testimony which includes as an attachment thereto a brochure from the Vincennes University on its new mining program?
A I did.
Q Has that prefiled direct testimony been placed before you and marked as Intervenor's - ICC Exhibit No. JNN?
A Yes, it has.
Q Mr. Noland, do you have any changes to that prefiled direct testimony or Attachment 1 identified therein?
A Yes, sir. I would like to direct your attention to Page 7, Line 13, where I indicated in the testimony I submitted that there were two new underground mines that are in planning in the State of Indiana. Since then, I've learned that one of those mines actually is going to have two mine complexes

at the same location; so, there actually would be three new underground mines that are in the planning stage. There is actually a fourth mine in Pike County, and while it is at the very preliminary stages, by the time this plant was built, it would probably be available for coal supply as well.

Q So, Mr. Noland, would you like to change the word "two" to "four" or "two" to "three" on Line 13 of Page 7?

A To be most accurate, I think it should be four.

Q Mr. Noland, could you, please, make that change and initial it in the margin?

A So done.

Q Mr. Noland, if I were to ask you the same questions as set out in that prefiled direct testimony, would your answers be the same as those set out therein reflecting the change to Page 7, Line 13?

A Yes, sir.

MR. McGIMPSEY: Your Honor, I would offer into evidence what's been marked as Intervenor's - ICC Exhibit No. JNN.

JUDGE STORMS: If there is no

objection, we'll show Intervenor's Exhibit No. JNN admitted into this cause.

MR. McGIMPSEY: Thank you, Your Honor.

(INTERVENOR'S - ICC EXHIBIT NO. JNN, BEING THE PREFILED TESTIMONY OF MR. J. NATHAN NOLAND, WITH ATTACHMENT 1 ATTACHED THERETO, ADMITTED INTO EVIDENCE.)

MR. McGIMPSEY: The witness is tendered for cross-examination.

JUDGE STORMS: Thank you. Mr. Helmen, we'll start down here.

MR. HELMEN: Thank you, Your Honor. We have no questions of this witness.

JUDGE STORMS: Okay. That's why you were waving me on. Sorry. You have to use the microphone to tell me.

Nucor?

MS. BECKER: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. J. NATHAN NOLAND,
QUESTIONS BY MS. BECKER:

Q Good morning, Mr. Noland.
A Good morning.
Q Now, are you a native Hoosier?
A I am.
Q IU grad?
A Law school was IU. My proud undergraduate was at Purdue University.
Q I was just getting ready to ask you who you root for.
A Purdue.

Q Now, you have, essentially, worked in Indiana since you graduated from college and law school; is that correct?
A Yes, ma'am, other than the military.
Q And so since college and law school, you have sort of seen Indiana's economy wax and wane, and at times we prosper, and at times we suffer from downturns in our economy?
A That's correct.
Q Now, the thrust of your testimony this morning, as I understand it, and correct me if I'm wrong, you testify as to job retention, excuse me, job creation; is that correct?
A That's true.
Q And an increase in the tax base here?
A That would be true as well, yes, ma'am.
Q Increased economic development opportunities?
A Yes, ma'am.

COMMISSIONER ZIEGNER: Mr. Noland, could you move a little closer to the mike for us?

WITNESS NOLAND: Yes.

COMMISSIONER ZIEGNER: Thank you.

Q Now, all of those items are of significant concern to the mining industry; correct?

A Yes, ma'am.
Q Would you say those same things are true as to other industrial sectors of our state's economy?
A I certainly would.
Q Manufacturing?
A Certainly.
Q Steel?
A Certainly.
Q And you'd like to see an increased number of jobs, an increased tax base and increased economic development opportunities throughout our state?
A I would.
Q Now, would you also be concerned about job retention?
A Certainly.
Q Has the mining industry over time and your experience with the Coal Council and being in the coal business, have you seen the mining industry sort of suffer a downturn in terms of the number of jobs?
A We had a significant downturn in about 1995 due to Phase II of the Clean Air Act implementations. We have recovered from that

with the installation of many scrubbers and other pollution control equipment in our Indiana utilities and our customers outside of Indiana. The number of jobs that have -- that have gone down somewhat in the mining industry is offset by the higher productivity that our mines enjoy today.

Q When you talk about that significant downturn and the loss of jobs, can you place a percentage or a number on that?

A Well, currently today, the number of employees in the mining industry is fairly consistent with the numbers that we had in the mid '90s to late '90s, even though our production has gone up. In the early '90s, we had significantly more employees, but the productivity trends and new technology and new equipment has allowed the mining of additional tonnage with fewer employees. I don't know if I'm answering your question directly or not.

Q In your testimony you refer to approximately 3,000 employees directly in the mining industry; is that correct?

A Those would be direct mining jobs. Those are employees that are directly involved on a

daily basis with the production of the coal. It is not supervisory employees, safety personnel, management. It is direct mining jobs.

Q Subject to check, would you agree that, you know, approximately 25 percent of 3,000 is --

A 750.

Q Thank you. If you lost about 25 percent of those jobs, would that be a significant impact?

A I think it would be a significant impact in portions of the state, yes, ma'am.

Q If a local community lost 750 employees in one fell swoop, would that impact that local community?

A I would certainly think so.

Q Not just the local tax base but sort of the fabric of the community and the loss for those individuals involved in the community?

A Yes, ma'am, I think it would.

Q Okay. And the ancillary economic development associated with that particular employment loss?

A Yes, ma'am.

Q Thank you.

MS. BECKER: Nucor has no further questions.

JUDGE STORMS: Ms. Dodd?

CROSS-EXAMINATION OF MR. J. NATHAN NOLAND,
QUESTIONS BY MS. DODD:

Q Hello, Mr. Noland.
A Good morning.
Q On Page 3 of your testimony, you discuss the Governor's Energy Plan, and is it part of the Governor's Energy Plan to grow Indiana jobs and incomes by producing more of the energy we need from our own natural resources while encouraging conservation and energy efficiency at any cost?
A The first part of that statement is accurate. Certainly in any economic model, cost is going to be a factor.
Q So would you agree that it is important to balance environmental issues and economic impacts of environmental compliance measures?
A Can you restate that for me, please?
Q Would you agree that it is important to strike a balance between environmental compliance and the impact on the economy of the environmental

compliance?
A Well, certainly those have to be taken into consideration in any new development, be it a new power plant or any type of new project. The electric utility industry is under constraints not only in Indiana but nationally with growing environmental concerns or growing environmental compliance, but we still have to produce electricity somehow, and my testimony, I think, would indicate that I still believe that coal is the most affordable and reliable option, and costs associated with the use of coal have to be taken into consideration by the Commission and others as they look at these projects.
Q And would you agree that it is not only the utility industry but all industry that is concerned with environmental compliance and incurring costs to reduce emissions?
A Well, certainly the electric utility industry has taken the blunt of a lot of environmental compliance issues since the early '80s, and it is affecting other industries as well and particularly the industrial community.
Q And on Page 4 of your testimony, you state

that, "The IGCC Project will add 630 megawatts of Indiana-generated electricity . . ."

Now, are you aware that the proposed IGCC plant will be replacing the current Edwardsport generation plant?

A I am aware of that, yes, ma'am.

Q And that plant currently has the capacity of 160 megawatts; right? Do you know if that's true?

A It is probably roughly in that range, but I don't think the Edwardsport plant in today's world was going to be around much longer; so, we need the 600-plus megawatts of new production -- actually, we need more than that. If you believe the State Utility Forecasting Group's forecast, we need more than just this particular plant to ensure that we still will have sufficient electricity generation here in Indiana.

Q Are you aware that new, super critical pulverized coal plants are considered to be clean coal technology?

A Certainly the coal industry and the Indiana Coal Council would support some pulverized coal plants particularly the new generation,

and we believe those are still very -- can still meet the pollution control requirements that we have, but it seems like we've just skipped that generation of plants, that we've just jumped beyond that, and they're very difficult to permit in any jurisdiction at this point in time.

Q And all of the benefits that you discussed to the coal industry as a result of the IGCC Project, those same benefits would occur if it was a pulverized coal plant being built, wouldn't they?

A Assuming that the plant was going to be utilizing approximately the same amount of tonnage of coal on an annual basis, yes, ma'am.

Q Would you agree that the IGCC technology is not a proven technology today?

A No, ma'am.

Q I notice in your testimony you said it is a promising technology?

A But I think it is proven, and I guess by saying promising, I think that is for our industry, the next generation of electric generating plants that we're going to see

constructed not only in Indiana but probably throughout the country.

Q Are you aware of any other IGCC plant of this size operating in the United States?

A Personally, I'm not.

Q On Page 6, you discuss the number of construction jobs that will be created as a part of this project. Those are temporary jobs, aren't they?

A Yes, ma'am.

Q Would you agree that the creation of permanent jobs is more beneficial in the long run?

A Well, certainly, and that's one of the reasons why we support this plant because it could grow jobs for the coal industry in Indiana.

Q Other than the coal industry, do you think it is important to attract other types of industry and businesses to Indiana?

A Certainly.

Q Would you agree that businesses and industry when they're looking at what areas to locate in or to expand a plant will evaluate the cost of operating in that particular location?

A Certainly.

Q Would you agree that the cost of energy would

be a factor in those costs?
A Yes, ma'am, and I think that's one of the reasons why Indiana has been able to continually grow our economy when we're sitting here with the third lowest electric utility rates east of the Mississippi River on a state average, and I think we can continue to do that.
Q And what report is that from to give that statistic that you just gave?
A You can go on the Department of Energy's web site Energy Information Administration and look at the average cost of electricity in all 50 states.

East of the Mississippi, only West Virginia and Kentucky have lower average rates on a kilowatt basis.
Q Those are average rates?
A Those are average rates.
Q For all customer classes?
A I'm not sure about that. I'd have to look at how the report is put together, but that's how it is stated.
Q Do you know what the estimated rate impact is on Duke's electric rates as a result of the

IGCC Project?
A I do not.
Q The current estimate is around, at a peak, 18 to 19 percent for the industrial customers. Do you believe that could have an impact on the industrial industry's decision-making in continuing or locating in Indiana?
A Well, certainly the coal industry is an industrial consumer of electricity the same as many other industries in the state, and we are very concerned about rate impacts, but we're also very concerned about the reliability of the electricity that we need at the mines on a daily basis, and I think the cost of electricity is going to go up not only in Indiana from plants like this but throughout the country, and I think Indiana will still be one of the lowest cost generators of electricity, particularly on the East Coast.
Q And you mention the need for reliable service?
A Yes, ma'am.
Q So that is as important as cost, would you say?
A Certainly affordability and reliability are the two things that we think of on a daily

basis, and we would be very concerned as a coal industry not only with the loss of coal production because we didn't build new base-load plants, but we would be very concerned about importing power from outside the state from sources that we would have no control over, and with transmission grid issues, et cetera, we just firmly believe that close to home, which is very consistent with Governor Daniels' Energy Plan, is the way to go.

Q And would you agree that pulverized coal plants are one of the most reliable types of generation you can have?

A They have been over the years, and if you can get them permitted, I think they're still a viable option.

Q Thank you.

MS. DODD: No further questions.

JUDGE STORMS: Mr. Polk, your witness.

MR. POLK: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. J. NATHAN NOLAND,
QUESTIONS BY MR. POLK:

Q I think one of the benefits of going last is it significantly reduces the number of questions one has to ask because they've already been asked by other folks.

A Well, that's good then.

Q Now, on Page 2 of your testimony, Lines 14 and 15, you say that the Coal Council has an acute interest in projects that encourage the use of coal, and I think we all know what that means, but just to be clear, the Coal Council supports this project because it will burn more coal, and the folks that the Coal Council represents produce coal and make money off of that; correct?

A Well, we tend to try to make money. Sometimes our customers don't agree with our rate structures, but we try to, yes, sir.

Q Does the Coal Council have a preference for the technology that is used or simply a preference that, all things being equal, if the same amount of coal is being used, it doesn't matter which technology?

A Well, on the short-term basis, certainly, you

know, the more coal that we can sell, the happier we are; however, I think it is a given, as I've looked at other jurisdictions around the country, that our new fleet of power plants are going to have to be plants such as the IGCC plant. There are just too many environmental questions that keep being raised about pulverized coal plants. They had difficulty permitting one of those in Kentucky. They've had trouble in Illinois. I just think this is the breed and the new generation that we have to support.

Q Why is that?

A Congress and the U.S. EPA and others continually drive more and more environmental regulation of the electric utility industry, and you have to go to the technology that is going to give you the absolute best result.

Q Is there any particular environmental risk that you think the IGCC addresses that the super critical pulverized coal plant doesn't?

A I have not looked at any recent information that would compare this particular plant with a very modern pulverized coal plant. I just think that this is the way that the future is

going to have to go because it is just too difficult to permit these other type of plants.

Q Are you familiar with the testimony that Duke has put forward in this case?

A I was not here, sir.

Q Have you read the testimony that they prefiled?

A I scanned it, but just, I mean, briefly.

Q Okay. Did you scan the testimony of any other party to this proceeding?

A I did not.

Q Are you aware of Duke's request for -- regarding the Cliffside power plant down in North Carolina?

A I am not, sir.

Q Have you scanned the Governor's Energy Plan?

A I have.

Q In fact, I look at your testimony, and you have a quote here about growing Indiana jobs, et cetera, on Page 3, Lines 15 through 17, where it talks about encouraging conservation and energy efficiency.

Would you agree that encouraging conservation and energy efficiency are a

significant part of the Governor's Energy Plan?

A Yes, I would.

Q Does the Governor's Energy Plan also support renewable energy?

A There is a section in the plan where they discuss renewables, yes, sir.

Q Do you know whether Indiana is a net importer or exporter of electric power?

A I believe currently we are a net exporter, but if you look at the State Utility Forecasting Group's report, by 2010, we may be in a situation where we'll be a net importer if we do not build new base-load generation.

Q Do you know if Indiana is a net importer or a net exporter of skilled labor?

A I do not.

Q Do you know whether facilities in Indiana have closed up and moved their operations elsewhere in recent years creating a loss of jobs in the state?

A Well, certainly we have seen that as many states have. A lot of our economy has moved in some cases out of the country.

Q Do you know what the percentage of Indiana

coal or the percentage of Duke's coal that comes from Indiana is?

A I don't know the exact percentage, but Duke certainly relies heavily on Indiana coal. It would be well in excess of 50 percent.

Q I believe I know the answer to this question, but I just want to make sure.

The Coal Council supports a net increase in jobs for Indiana, not simply an increase within its industry?

A Certainly the overall state economy is very important to us.

Q Has the Coal Council done any studies with respect to job creation or job loss as a result of increasing energy prices?

A We have not; although, there is some discussions going on to do some economic modeling of a number of different things, but we have -- currently, we have not.

Q An increase in energy prices based on normal market economics would generally trigger a response to use less energy; correct?

A It should.

Q So if prices increase sufficiently, it could actually reduce the amount of electricity

generated in the state or being consumed in the state and reduce the amount of coal needed to fuel that generation; correct?

A I wouldn't support that statement. I think you're going to see a growing demand for electricity even with conservation and other measures. I mean, if you believe the State Utility Forecasting Group's report, they certainly still contend that we will see a growth in electricity of 2 or 2.5 percent, something like that, in the coming years.

Q Thank you.

MR. POLK: I have no further questions, Your Honor.

JUDGE STORMS: Thank you, Mr. Polk.

Mr. Hartley?

MR. HARTLEY: No questions.

JUDGE STORMS: Ms. Karn?

MS. KARN: Thank you.

CROSS-EXAMINATION OF MR. J. NATHAN NOLAND,
QUESTIONS BY MS. KARN:

Q I just wanted to follow up on a few areas that some of the other counsel have talked with you about.

Ms. Dodd mentioned the rate impact from the capital costs associated with the Edwardsport IGCC Project. Do you recall that?

A Yes, ma'am.

Q Would you agree with me that the fuel cost to be associated with this plant would be -- which is using Indiana coal would be lower than an alternative such as a natural gas combined cycle plant?

A Yes, ma'am.

Q When you were speaking with Ms. Dodd and I think also with Mr. Polk, you mentioned that, in your opinion, and what you've seen in your experience, is that super critical pulverized coal plants or, at least, pulverized coal plants were difficult to permit.

When you said that, were you talking primarily about environmental permitting?

A Yes, ma'am.

Q And then, if you know, Mr. Polk was asking you about what percentage of Indiana coal that Duke Energy uses.

Do you know whether Duke Energy Indiana plans to use Indiana coal for the new Edwardsport IGCC Project?

A Well, they've stated publicly that they intend to. They made that statement, I believe, at one hearing before the General Assembly, and we believe that they will. We're the closest resource for them, and I would assume if we can provide the coal at the price that you're willing to pay, that it will be Indiana coal that you use.

Q Thank you.

MS. KARN: That's all that I have, Your Honor.

JUDGE STORMS: Thank you. Redirect?

MR. McGIMPSEY: Thank you, Your Honor.

REDIRECT EXAMINATION OF MR. J. NATHAN NOLAND,
QUESTIONS BY MR. McGIMPSEY:

Q Mr. Noland, you were asked some questions concerning job loss and job creation, and Mr. Polk, I believe, asked a specific question concerning a study done -- has there been a study done by the Coal Council regarding a change in energy prices and how that affects the -- how that affects job creation.

Has there been any studies done or are you aware of the -- a job creation just by an increase in coal mining activity? Is there a ripple effect that you know about just through another study in coal mining?

A Well, I was -- I think the most recent study that I have seen, Counsel, was, I believe, done in 2001. It was done on a site specific mine in Knox County, Indiana which was an underground mine that produced about 1.8 million tons of coal a year. That particular mine had 225, plus or minus, jobs with an annual payroll of about $16 million. As I recall, and I haven't looked at the study for awhile, there were almost 500 ancillary jobs in the county not related to the mining

of the coal but related to that mine with an annual payroll of -- in excess of, I believe, $30 million or some dollars. So, it was -- just in that county, it was a two to one ripple effect. It was just -- that was contained just in Knox County, Indiana.

Q So, it is your position that the coal mining industry has a ripple effect; that if there is an increase in coal mining jobs, there is an increase throughout the economy in general of increased economic activity?

A Yes, sir.

Q Mr. Polk also asked you whether or not you are aware of any closings of industrial facilities. I think your response was yes. I think that's just around Indiana in general.

Are you aware if there has been new announcements of new plants opening in Indiana within the last year, just industrial plants?

A Well, certainly the Honda plant in Greensburg, Indiana was one of the most significant new plants or new announcements. I think there was one in the paper the other day about a new transmission plant facility, and I think we'll

continue to see expansion of our economy from those sectors, from the manufacturing sectors.

Q Mr. Noland, you were also asked some questions concerning the Governor's Homegrown Energy Plan, and you responded to a question that that plan supports renewables, but if you were to look at that plan, is the bulk of it, in your estimation, dedicated to coal-type technologies, such as IGCC, or renewable technologies if you had to choose between those two?

A Well, certainly I think there is multiple pages that talk about clean coal technology, and the Governor's plan jumps right to IGCC as the answer for clean coal technology plants in Indiana, and I think, it's been a few days since I reviewed the report, there was half a page or maybe a page that did talk a little bit about renewables.

MR. McGIMPSEY: No further questions, Your Honor.

JUDGE STORMS: Mr. Noland, thank you very much for your testimony. You're excused.

(WITNESS J. NATHAN NOLAND EXCUSED)

JUDGE STORMS: Let's go off the record.

(Reporter marked documents for identification as Intervenors' - CATF and IWF Exhibit Nos. 1 and 2)

JUDGE STORMS: Let's go back on the record.

Mr. Hartley, you may call your first witness.

MR. HARTLEY: Thank you, Your Honor. Call Mr. Douglas Cortez.

JUDGE STORMS: Mr. Cortez, you have not been previously sworn; is that correct?

WITNESS CORTEZ: No.

JUDGE STORMS: Please stand and raise your right hand.

(OATH DULY ADMINISTERED TO WITNESS)

DOUGLAS H. CORTEZ, a witness appearing on behalf of the Intervenors, Clean Air Task Force and Indiana Wildlife Federation, having been first duly sworn, testified on Direct and Rebuttal as follows:

DIRECT EXAMINATION,

QUESTIONS BY MR. HARTLEY:

Q What is your name?

A Douglas H. Cortez.

Q Mr. Cortez, what is your business address, and how are you employed?

A My address is 412 North Coast Highway, Laguna Beach, California. I'm an independent consultant to the energy industry.

Q You have before you what has been marked as Intervenors' - Clean Air Task Force and Indiana Wildlife Federation Exhibit No. 1; is that correct?

A Yes.

Q Is that a copy of your prefiled direct testimony in this matter?

A Yes.

Q Do you have any changes or corrections that need to be made to that testimony before it is entered into the record?
A No.
Q And if I were to ask you all of the questions contained in that Exhibit 1, would your answers be the same?
A Yes.
Q Do you adopt that as your prefiled direct testimony in this matter?
A I do.
Q And attached thereto are two exhibits labeled Cortez 1 and Cortez 2. Are you sponsoring both of those exhibits as part of your direct testimony?
A Yes.
MR. HARTLEY: Your Honor -- Well, I'll just do the second one at the same time.
Q Do you have before you Exhibit No. 2 --
A Yes.
Q -- of the Clean Air Task Force and Indiana Wildlife Federation?
A Yes.
Q Is this a copy of your prefiled rebuttal testimony in this matter?

A Yes, it is.
Q Do you have any changes or corrections to make to that testimony before it is entered into the record?
A No.
Q And if I were to ask you all of the questions contained therein, would your answers be the same?
A Yes, they would.
Q Do you adopt that as your testimony -- your rebuttal testimony in this matter?
A I do.

MR. HARTLEY: Your Honor, Indiana -- I'm sorry -- the Clean Air Task Force and Indiana Wildlife Federation would offer into evidence their Exhibits 1 and 2 including the two attachments to Exhibit No. 1.

JUDGE STORMS: If there is no objection, we'll show Intervenors' - Clean Air Task Force and Indiana Wildlife Federation Exhibits 1 and 2 with attachments thereto admitted into this cause.

(INTERVENORS' - CATF AND IWF EXHIBIT NO. 1, BEING THE PREFILED DIRECT TESTIMONY OF MR. DOUGLAS H. CORTEZ, WITH EXHIBITS CORTEZ 1 AND CORTEZ 2 ATTACHED THERETO, AND INTERVENORS' - CATF AND IWF EXHIBIT NO. 2, BEING THE PREFILED REBUTTAL TESTIMONY OF MR. DOUGLAS H. CORTEZ, ADMITTED INTO EVIDENCE.)

MR. HARTLEY: Mr. Cortez is available for cross-examination.

JUDGE STORMS: Thank you. Mr. Reed?

MR. REED: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. DOUGLAS H. CORTEZ,
QUESTIONS BY MR. REED:

Q Good morning, Mr. Cortez.
A Good morning.
Q Sir, I wonder if I could have you turn to Page 15 of your testimony, please?
A The direct?
Q Your direct, yes, I'm sorry. Particularly, sir, I'm interested in the question that begins on Line 15.
A I'm there.
Q Excellent. Sir, the sentence that begins in the middle of Line 20 in response to that question says, "For Mesaba, Fluor estimated the cost impact would be $200 per kilowatt hour (sic) in 3rd Quarter 2005 dollars." Do you see that, sir?
A I think it says $200 per kilowatt.
Q I'm sorry, $200 per kilowatt hour.

A Per kilowatt.
Q I'm sorry, per kilowatt. Excellent.
Sir, can you explain to me how that $200 per kilowatt was calculated, where I might find in your testimony the figures that would help me make that calculation?
A The figures, I believe, are in the attached exhibit which is the non-confidential report that was filed in the Minnesota case. Without looking through it again, I'm not sure the exact figures are there to where you could make the calculation yourself because it may have been redacted for confidential reasons, but my testimony states that to calculate that, you look at the before and after capacity of the plant and the before and after investment. So, you take into account the changes in the capacity of the plant as well as the investment, and so that is reflected in the $200.
Q Which is, I believe, the testimony that you have that begins on Lines 1 through 3 on the next page, on Page 16; is that correct? That sort of talks about the methodology?
A Yes.

Q Very good, sir. Can you tell me, sir, if the $200 per kilowatt charge on Line 21 of Page 16 includes FEED study costs?
A I think so, yes. I mean, the FEED study costs would be a negligible factor in that number, whether it included it or not.
Q Thank you, sir. I'd like to move on to Page 16 where you were talking about the methodology in deriving this $200 per kilowatt.
A I'm there.
Q At the end of Line 1, you use the acronym EPC. Am I correct, sir, that EPC stands for engineer, procure and construct?
A That's correct.
Q And that is a particular type of contract; correct?
A I don't think there is any contractual implications in that term. It is just the cost to build -- to engineer, procure the equipment and build those facilities. So, it would include all of the, what I would call, hard costs. It doesn't include AFUDC or financing costs or the owners costs.
Q Very well. Do you know, sir, then, when we

talk about the Edwardsport plant, I guess the costs -- the EPC cost estimates for Edwardsport that you discuss down on Line 6, you note at Line 7 that those costs are slightly lower than the estimates for Fluor; correct?

A Yes.

Q Now, the estimates that you're comparing them to, and now I need to kind of jump back up to Line 2, you say that -- you talk about a partial carbon capture case.

Can you tell me in the Mesaba study what percentage partial carbon capture they were looking at?

A In both cases, we're looking at removing most of the CO2 in the unshifted gas that comes from the gasification unit. Because Mesaba is using a subbituminous coal, that gas contains about twice the CO2 that the Edwardsport project would contain. So, the amount of carbon being captured both in terms of the tons per year and the percentage is about half.

So, where Mesaba is looking at 30 percent carbon capture, this particular

approach would maybe capture 15 to 20 percent of the carbon that is in the coal, and, therefore, the equipment required to do that would cost less, in my judgment.

Q Understood. So I'm clear, it is 30 percent at Mesaba; 15 to 20 at Edwardsport?

A Correct.

Q Thank you, sir. Sir, have you had an opportunity to review Mr. Thompson's testimony in this case?

A I believe I've looked through it, but it's been awhile.

Q Do you recall Mr. Thompson estimating a cost of approximately $10 million for FEED studies associated with carbon capture and sequestration?

A I don't recall that.

Q You do not? Have you had, sir, an opportunity to review Mr. Zupan's testimony?

A Yes.

Q Are you familiar with Mr. Zupan's estimate of approximately $80 million for 15 to 18 percent carbon capture and one sequestration well?

A Yes.

Q Would you agree with me -- Let me rephrase

that.

Earlier when I asked you a question about the FEED study associated with the Mesaba plant, you said you believed those costs would be negligible?

A I think your question was the FEED study that needed to be done to add the carbon capture equipment, not the FEED study to engineer the entire facility. There is a big difference there.

Q Correct, I'm only focusing on the FEED studies regarding carbon capture and sequestration.

A Yes.

Q If you can, in your estimation, would $10 million for FEED studies for carbon capture, sequestration, test well, would that be reasonable or in the ballpark?

A The only thing I feel qualified to talk about is the surface facilities. I don't have direct knowledge of the cost of the injection wells or the sequestration activities. So, if you're talking about just the FEED work that would need to be done to implement a modification to the plant to capture 15 to 20 percent of the carbon, I cannot imagine

that costing $10 million. That seems like a very high number for that.

Q Thank you, sir. If Mr. Zupan's estimate of around $80 million to do 15 to 18 percent, if that's close, would you be able to tell me how that would compare in terms of dollars per kilowatt relative to the $200 per kilowatt at the Mesaba project?

A Well, just doing the math here in my head, and I don't have the exact numbers plus I think the Mesaba numbers are confidential, but if one takes the 600 megawatt plant times 200, you have $120 million, and if we're looking at $80 million for the Edwardsport project, and in fairness to Mr. Zupan, I'm sure that's just a rough order magnitude estimate because they haven't done the detailed work yet, those numbers hang together to me, and my testimony says that in light of the lower amount of CO2 that would be processed, it looks reasonable to me, the $80 million.

Q I think your testimony was you had estimated it would probably be somewhat lower?

A Than the Mesaba case.

Q Than the Mesaba case.

A And to me $80 million is somewhat lower than the 120.

Q Right.

Thank you very much, Mr. Cortez.

MR. REED: Nothing further, Your Honor.

JUDGE STORMS: Thank you, Mr. Reed.

Nucor?

MS. BECKER: We have no questions, Your Honor.

JUDGE STORMS: Mr. Stewart?

MR. STEWART: Thank you, Your Honor. We have no questions for Mr. Cortez.

JUDGE STORMS: Thank you, Mr. Stewart.

Mr. Polk?

MR. POLK: Thank you, Your Honor.

CROSS-EXAMINATION OF MR. DOUGLAS H. CORTEZ,
QUESTIONS BY MR. POLK:

Q Good morning, Mr. Cortez.
A Good morning.
Q I understand you have a flight out this afternoon?
A I have time. Ask whatever you want. I'd like to stay longer if I could.
Q Well, we'll have to have you back again some day.
A That would be great.
Q Have you ever testified in a proceeding against a power plant?
A The testimony I've given in previous cases since becoming an independent consultant is listed in my direct testimony. I wouldn't describe any of those as being against a power plant. I don't testify for or against power plants. I testify as an expert witness in the technical area.
Q Now, on Page 5 of your direct testimony, there is a brief discussion of the -- of how Vectren describes the proposed plant as being carbon capture ready.
Would you classify the plant as

carbon capture ready?
A I'm sorry, say that again?
Q Would you classify the Edwardsport IGCC plant as designed to be carbon capture ready?
A Well, Duke and Vectren have described the plant as carbon capture ready, and they have defined what that means. I don't believe the term carbon capture ready has any generally accepted definition in the industry; so, I would certainly accept their definition the way that they've described it.
Q So you would accept carbon capture ready to mean exactly what?
A I think Duke and Vectren has described it as leaving the adequate space to add the equipment in stages.
Q And how --
A And looking at the FEED package, it appears that is exactly what they've done.
Q So it is essentially -- carbon capture ready means there is enough real estate to put the equipment on?
A I think so, yes.
Q And how much real estate is necessary to put the equipment on?

A I don't remember, but in looking at the FEED material, the work that they've shown me, I do recall looking at it, and it seemed adequate to me, but I don't remember the exact area that they've set aside.
Q So, given that definition, my backyard Weber grill would be carbon capture ready if it was on a sufficiently large plot of land?
A Your backyard what?
Q Weber grill, charcoal grill.
A You must have a very large home. Where I live that wouldn't work.
Q Well, if it was on a sufficiently large plot of land though?
A Looking at this drawing, which I would like a copy of, it doesn't look to me like real estate is a problem there.
Q All right. But in terms of being ready to capture carbon, you know, we could put anything out there, a Weber grill, an Edsel, a school teacher, and they all would be carbon capture ready because there is sufficient real estate to put them there?
A No, I think there is more to it than that. They thought about where it would go; what

parts of the plant it interconnects with, and I believe they've given the proper forethought to saving the space to add whatever equipment would be required. I think it is far more thought through than your backyard example.

Q But it is a bit more complicated than simply knowing how much space you need and where you would put it; right?

A I believe there are complications, of course, in doing this, but none of them are -- we understand what those complications are and how to do it.

Q If the Edwardsport facility was required to control more than 20 percent or to capture and sequester more than 20 percent of its carbon emissions, would there need to be significant redesign and re-engineering of the plant?

A As it is now represented in the FEED study?

Q Yes.

A Yes.

Q What would be the additional costs of that redesign and re-engineering?

A I don't know. It would be somewhere -- something less than the cost of what they've spent to get to this point. I don't know if

that's been published or not.
Q On Pages 10 and 11, the bottom of Page 10 and moving over to Page 11, you talk about equipment used for capturing carbon in an IGCC facility, and you state down there at Line 21 that proven technology is already utilized on a large commercial scale.
Can you tell me the largest facility that you're aware of and how many tons per year they are able to capture and sequester?
A Give me a moment. Can you point to the line that you're referring to?
Q Sure. And I can go ahead and read your --
A Bottom of 10?
Q It is starting at the bottom of 10, and on Line 19, you say, "No. The technology and equipment I have described for implementing carbon capture, including the use of water shift reactors to convert CO to CO2, and the CO2 scrubbing, drying and compression equipment, is proven technology, already utilized on a large commercial scale in the petroleum and chemical process industries."
Can you tell me what the largest

scale facility that uses that technology is that you're aware of?

A You know, virtually every hydrogen plant in the refining industry and every ammonia plant captures carbon and uses this same technology. The largest ammonia plant, I would have to look it up, but it is definitely equal to or larger than scale than what we're talking about here.

Q About how many tons per year do they capture and sequester?

A Ammonia plants are -- again, this would be a guess, but it is in the thousands of tons per day, and the equivalent of CO2 is a similar range.

Q They capture --

A You have to capture CO2 to make ammonia. It is part of the process, and it is practiced on a very large scale.

Q And they capture that from pole gas?

A No. They're capturing it from synthesis gas that is created in a steam methane reforming unit, but it is the same process. Whether it is coal or gas, the gas that's coming out has the same technology for capturing the CO2.

Q And they capture thousands of tons of CO2 a day?
A Yes.
Q And they sequester thousands of tons of CO2 a day?
A They do not sequester it. It's going to the atmosphere; although, people are looking at capturing it for EOR use. It will happen soon, I think.

There are gasification plants in Europe that are running on oil and some on coal that are capturing and making beneficial use of the CO2.

Q Are those 600 megawatt plants?
A No.

The oil-fired IGCC plants in Italy are 500 megawatts, and they do capture CO2 for the manufacture of hydrogen. So, those are very large scale, and, again, the actual tons per day of CO2, I don't know, but if you want me to get back to you, I can give you a number on that.

Q That would be nice to know.
A All right.
Q And how much of that carbon is sequestered?

A In the Italian plants, none, but the plant in Holland does make beneficial use of the CO2.
Q Moving on to Page 12 of your testimony --
A I'm there.
Q -- and looking at Line 15 where you state, "What is not known is the level of engineering and design changes in the upstream equipment to handle the syngas pressure loss that would result from the addition of a CO2 absorber and related drying equipment. However, the level of pressure loss should be modest and I believe the necessary changes to upstream equipment would also be modest."

Do you know what the costs of the engineering and design changes would be?
A No, but I believe they would be modest. You know, it is possible, after they've taken a first look at this, that upstream of the absorber, if you do a partial capture of 15 to 20 percent, it may be that the design changes upstream are zero, but if there are some, I believe they would be modest.
Q That would be for the existing plant, but they'd still need to do the engineering and design to add additional capture?

A This is for the 15 to 20 percent case --
Q Okay.
A -- that I'm referring to.
Q To get above 15 to 20 percent?
A To go above 20 percent, then, they're going to need to make more substantial changes.
Q Can the plant as designed actually capture 20 percent of its carbon emissions?
A Say that again.
Q Can the plant as designed actually capture 20 percent of its carbon emissions?
A I believe Duke is now studying that, but it is my judgment that that plant is readily adaptable to add another CO2 absorber to the existing unit and capture 15 to 20 percent.
Q Would that have any results on the efficiency of the plant?
A It will have some impact on the efficiency of the plant. I believe that would be modest, but as part of the study, they could determine whether or not there are ways to mitigate that and restore it. I think it is more of an economic question than it is a technical question.
Q Now, you talked about the Mesaba project a

little bit. Do you know the status of that project?

A That project is now before the Minnesota Public Service Commission which is weighing the decision whether or not to give it a power purchase agreement.

Q So, to your knowledge, they haven't made a decision yet?

A They have not made a decision.

Q Now, when you indicated earlier that there are facilities out there capturing thousands of tons a day, is that one or two thousands of tons a day, four or five thousands of tons a day?

A I promised to get back to you on that.

Q Okay.

A I can't give you a more precise number, but it is a very large number.

There are gas processing plants in -- Natural gas contains CO2. There is natural gas being produced in America on a very large scale, and it is all capturing carbon. This is not a difficult technology for people in the process industry.

Q Is it easier to do it from natural gas than it

is from coal?
A I think at the point that the gas enters the absorber, that absorber doesn't know what the raw material was that it came from.
Q How many tons of coal, or I'm sorry, how many tons of carbon per year would be 20 percent of the emissions from the Edwardsport plant?
A I think we guesstimated 700,000 tons.
Q And do you know what cost per ton of carbon it would be to remove those emissions?
A I don't know that number for the Edwardsport project, but for other projects where this has been looked at, it is nominally in the $20 range is what other investigators have come up with.
Q So how much would it cost per -- Okay.
A The other studies have been for the full carbon capture. I would think in this case, it would be less than that, but I don't think it would exceed $20 a ton.
Q Now, is that for capture or is that for capture and sequestration?
A That is to capture, dry it and compress it. As it leaves the compressor, it goes to a sequestration operation, and those costs were

not included.
Q Okay.
A Edwardsport is in a unique location where that would be very nearby and would be one of the lowest cost sequestration operations.
Q I thought earlier you said you only specialize in above the ground. Are you now saying that you understand the stuff that happens below the surface?
A I think common sense tells you if you don't have to build a hundred mile pipeline, that would be cheaper than building a one mile pipeline. I'm enough of an expert to know that.
Q And building no pipeline would be even cheaper than building a one mile pipeline?
A But even in your backyard, you could probably build a one mile pipeline.
Q Not in my backyard.
A And by the way, in California, they're going to be banning the Weber barbecues; so, you better feel lucky that you're living here.
Q My wife feels the same way when I use it.
A But we will make syn gas available if you need that for your barbecue.

Q Well, I suppose that raises a question. That's an interesting point.

Is there something unique about the gasification process that requires that the gas be used in an electric generating facility?

A No. The syn gas coming out of a gasification plant can be used for a lot of different things. It can be used to manufacture methanol, SNG, ammonia, and it can be used as a fuel to a combined cycle power plant.

Q Could it then be used to be put out on a, say, traditional natural gas pipeline distribution network to be used --

A No.

Q -- in the manufacturing process?

A I'm sorry; no, it is not pipeline quality gas, but if you go to SNG, substitute natural gas, then, yes, and we're talking about doing that here in Indiana.

Q What additional costs would it take to go that route?

A There's been a lot of studies done of that, but I'm not sure that I have those numbers for you. I didn't come prepared to give that to

you, but, again, if you want me to dig out some information on that for you, I can do that.

Q We might follow up on that.

A You've got my number.

Q Now, looking at your rebuttal testimony --

A Okay.

Q -- on Page 5, there is a question there referring to Mr. Schlissel's testimony, and it states, "Mr. Schlissel states on Page 6, Lines 6 through 9, that Duke is not including technology for carbon capture and storage and there is no reason to expect construction of Edwardsport will lead to carbon capture. Do you agree?", and you answer no with a long explanation.

What I'd like to do is explore that a little bit, and I'd like to kind of break that sentence in two parts.

Is Duke including technology for carbon capture and storage at the Edwardsport facility as currently planned and designed?

A My understanding is they're not.

Q Okay. So, with respect to that particular point, Mr. Schlissel is, in fact, correct,

they're not including carbon capture and storage at their facility currently?

A Not in this current filing, no.

Q Okay. Now, you disagree with Mr. Schlissel, believing that there is a reason to expect construction of Edwardsport will lead to carbon capture, and you seem to indicate that the reason that you believe that is that there is sufficient space, and that the technology is uniquely suited to capture carbon.

Are there any other reasons which make you think that they might actually go ahead and capture and sequester carbon at this facility?

A I didn't state it in that answer to that question, but I might have stated it elsewhere that if we do have carbon -- some form of carbon control coming, whether it is a carbon tax or a cap and trade system based on market conditions, it would be my testimony that a partial carbon capture facility at Edwardsport or any other similar IGCC plant would be one of the lowest cost sources of carbon to capture. So, if there is an economic driving force to capture carbon or a regulation that

requires it, I think this project would be a prime candidate to do it, yes.

Q And you estimate that cost at how many dollars per ton?

A Under $20 a ton.

Q That's at 20 percent?

A Yes, at 20 percent. Up to 90 percent would be -- We published a very nice study on this, and they're at $20 a ton for 90 percent carbon capture. At 20 percent or 15 percent, I think it would be substantially less than that.

Q So the cost increases the more carbon you need to capture and sequester?

A If you go above 20 percent, which is what you can get from the unshifted gas, the native CO2 that is in the syntheses gas, and you have to start shifting that, then you have to add equipment to shift that carbon monoxide to carbon dioxide. That costs more per ton. That incremental capture costs more per ton than the first step which is partial carbon capture.

Q And do you have any basis for belief that they would capture and sequester carbon at, for argument's sake, let's say $20 a ton if

current regulations have a fail-safe protection built in that carbon emissions won't cost more than $10 a ton?

A I'm not sure I understand the premise to that question.

Q Okay, and that's understandable. You weren't here yesterday or the day before for the testimony from Duke's other witnesses, were you?

A No, I was not.

Q Okay. There was some discussion on future carbon regulation, and that the cost of compliance wouldn't be too detrimental to the economy because there would be some cap that Congress would legislate on the cost of compliance. There would be emission allowances or whatever. I think there is still some disagreement over where that amount will be in the end, and there is different pieces of legislation where that amount will vary, but the premise here is that carbon capture and sequestration will only be done when it is cheaper than other options to comply.

A Right.

Q Do you generally agree with that?
A If it is based on market forces, and we should all want carbon to be captured at the cheapest possible location, I think given the size of the CO2 emission problem that we have in this country, it is inevitable, in my judgment, that we will be capturing carbon from coal-based power plants some day, and when that day comes, the IGCC plants will be much cheaper to capture carbon from than a pulverized coal plant.
Q Do you agree that an investor-owned utility that is responsible to shareholders is unlikely to engage in an environmental compliance strategy that costs more than other alternatives?
A I don't think anybody, investor-owned utility or otherwise, but especially a regulated investor-owned utility, should do anything that isn't prudent for the ratepayer, and the question, if I understood what you just asked, it would not be a prudent thing for them to do. If they know that there is a cheaper source of CO2 to capture, they ought to go after the cheapest source first.

Q So, if legislation is passed that caps the cost of complying with carbon regulations at $10 a ton, and capture and sequestration cost more than $10 a ton, it is unlikely to occur, and you would actually view that as being imprudent to require that?
A What I said is it would be imprudent to capture carbon at a higher cost when they have knowledge that there is a cheaper way to do it. Right now, given the volume of CO2 that we're looking at in the years to come, I can't imagine what that other source would be, but it's probably not in my area of expertise.
Q And that's based on the science of what's needed to keep carbon at relatively or what some folks would view as sustainable levels in the environment?
A Again, this is a little bit outside of my area, but I understand there is a lot of discussion about a 2020-type concept where we're reducing greenhouse gas emissions by 20 percent by the year 2020. This is being talked about in Congress and in the current administration. I can't imagine how we could ever get to that goal without capturing carbon

from coal-fired power plants, and should that happen some day, and I think it will, the IGCC plants will be the lowest cost initial way to do that.

Q And do you, then, believe that in order to get to that 20 percent reduction, you'd have to do more than a 20 percent reduction at one facility? You'd either have to do 20 percent at every facility or something greater than 20 percent at certain facilities?

A My understanding is that the issue is not so much the carbon capture equipment and cost, but it is the sequestration side of it where more work needs to be done, and whether we go 20 or 50 or 90 percent capture, we need to take the first step, and the DOE regional partnerships and the programs that they have for drilling test wells and gathering the data that is needed to get going with this is what's needed, and Edwardsport represents an excellent opportunity to be one of those test facilities, and I think the first step is to go 15 or 20 percent, which is low cost carbon capture, and let's get the data, and if that data says let's go to 50 percent or 90

percent, then, that's what we'll do in a few years, but I think you have to walk before you can run.

Q But, again, that's subject to any cost constraints or cost limits or cost protections that legislation might --

A Well, I'm from California. The good people of Indiana need to make that decision whether or not this is an important enough project to get started on. That's a policy decision that is probably above my pay rate.

Q Now, one thing has been puzzling me a little bit. You've been using an amount of $20 a ton or less. Yet when I look at your rebuttal testimony at Page 6, Line 22, the sentence that starts there, you say that, "The DOE estimated that the total avoided cost for CO2 capture is $32 a ton of CO2, versus $68 a ton for SCPC and $83 a ton for a natural gas combined cycle plant."

A Can you tell me what page you're on again?

Q Page 6 of your rebuttal testimony --

A Thank you.

Q -- Line 22, the sentence that starts about three words or four words into that line and

carries over to the next page.
A Right. I didn't bring the DOE report with me, but I believe the one that they issued last month where they updated all of this is closer to $20 a ton. So, you'll have to forgive me, but I may be reaching back to a study that they published a year ago in '06. They just published and updated that study last month, and I'll have to check my report, but I think it is less than $32 now.
Q But there is no question in your mind that we should be capturing and sequestering more than 20 percent if we want to get to sustainable levels of CO2 in the atmosphere?
A I think that is coming some day. I think the way to get there is to start with the low hanging fruit which is the partial carbon capture case, and let's test a few injection wells and gather the data so we can get better numbers on the higher carbon capture cases.
Q But, again, you would only recommend that if that was the lowest cost option, most cost-effective option; correct?
A As a technology person, I think it is important to get this first phase going to

gather the data that we need. I think to go with higher carbon capture levels now, unless you have a secure place to put the CO2, could be an investment that wouldn't get utilized for awhile.

Q Well, would it be prudent to make the investment if we never have the technology to store the CO2?

A I believe the technology for storing the CO2 is inevitable. I think we just need to go get the data and do it. I think all of the experts, and that's not my area, but all of the reports that I've read from all of the various regional partnerships, they all believe that this is doable. It is just a question of rolling up our sleeves and getting to work on it.

Q My clients have heard the same thing with respect to the storage of nuclear waste at one facility for many years now.

A I can't imagine how this would have anything to do with the storage of nuclear waste.

Q Well, I think it is an environmental problem, in this case, of a global nature with folks saying the technology exists, even though

we've never used it and done it, but just give us time, and it will be there; just give us the money now.

JUDGE STORMS: Is that a question, Mr. Polk, for Mr. Cortez?

MR. POLK: I think I'm done with my questions, Your Honor.

JUDGE STORMS: Thank you, Mr. Polk.

Mr. Pope?

MR. POPE: Brief questions.

CROSS-EXAMINATION OF MR. DOUGLAS H. CORTEZ,
QUESTIONS BY MR. POPE:

Q You had a few discussions with Mr. Polk, and I'll refer you to Page 5 of your rebuttal testimony, sir. On Line 18, you talk about Duke has shown sufficient space for future carbon capture equipment.

A This is on Page 5?

Q Page 5 of your rebuttal testimony, Line 18.

A Yes, sir. Go ahead.

Q And, in fact, in your discussion with Mr. Polk, it's not only sufficient space, but it helps to have it sort of in the right location

within the plant footprint too, doesn't it?
A Yes, and in my judgment, it is in the right spot.
Q One other question, sir, again in response to Mr. Polk, you said on the Mesaba plant that the Minnesota Commission, that it was still pending in front of them. A few months ago, there was a lot of trade press about something coming out of the Minnesota Commission with respect to that project. Do you know what that was about?
A I'm not an expert on the Minnesota utility regulatory process, but my understanding is it goes through an ALJ first who makes a recommendation or provides advice to the Commission, and then the Commission goes forth and makes their own decision. The ALJ issued an advice that he would not support the signing of a PPA.
Q So that was the recommended decision about the PPA, not a recommended decision about the plant, first of all; is that correct?
A That is correct.
Q And it is still not final in front of the Commission yet; is that correct?

A It has yet to go to the Commission.
Q Thank you.
MR. POPE: That's all I have.
JUDGE STORMS: Mr. Hartley, redirect?
MR. HARTLEY: Thank you, Your Honor. Just one question.

REDIRECT EXAMINATION OF MR. DOUGLAS H. CORTEZ, QUESTION BY MR. HARTLEY:

Q On Page 16 of your direct testimony, you were asked about -- by Mr. Reed, you were asked about your testimony here, and on Line 5 you indicate Duke has provided you with the results of a very preliminary analysis, and then I think you were asked about an $80 million number that had been contained in Duke's rebuttal testimony.
I just wanted to ask: Is that $80 million number the results of the preliminary analysis that Duke shared with you?
A I believe, yes, that number came from them.
MR. HARTLEY: No further questions.
JUDGE STORMS: Thank you.

Mr. Cortez, thank you very much for your testimony.

WITNESS CORTEZ: Thank you.

JUDGE STORMS: You are excused.

(WITNESS DOUGLAS H. CORTEZ EXCUSED ON DIRECT AND REBUTTAL)

JUDGE STORMS: Mr. Hartley, I just want to touch base with you. You have -- I know we discussed this a little bit off the record, but you have a couple of other witnesses that you need to present perhaps either through stipulation or the parties are still discussing whether or not they'll have cross-examination; correct?

MR. HARTLEY: Yes, Your Honor. It is my understanding that with respect to Dr. Friedmann and Mr. Melzer, that the parties have all agreed to waive cross, and I'm simply in the process of getting affidavits from them that we can attach to their testimony and put those in the record. I should have those this afternoon so we can do that tomorrow.

With respect to Mr. Thompson, who is our last witness, I believe some of the parties do have questions for him, and he will be here tomorrow.

JUDGE STORMS: Okay. So we're in a position now to be able to hop around, and we'll then go to the CAC, and I believe the parties have questions for Grant Smith; so, he'll be our next witness.

Let's go ahead and take about a ten-minute break, and then we'll resume with Mr. Smith's testimony.

(RECESS)

(HEARING IN RECESS UNTIL 12:00 P.M., SAME DAY)