STP000030
May 31, 2011

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	Docket Nos. 52-012-COL
	)	52-013-COL
NUCLEAR INNOVATION NORTH AMERICA LLC	)	
	)	
(South Texas Project Units 3 and 4)	)	May 31, 2011

REBUTTAL TESTIMONY OF APPLICANT WITNESSES JEFFREY L. ZIMMERLY AND ADRIAN PIENIAZEK REGARDING CONTENTION CL-2

I. BACKGROUND

Q1. Please state your full name.

A1. (JLZ) My name is Jeffrey L. Zimmerly ("JLZ").

(AP) My name is Adrian Pieniazek ("AP").

Q2. Have you previously presented testimony in this proceeding related to Contention CL-2?

A2. (JLZ, AP) Yes. We sponsored the "Direct Testimony of Applicant Witnesses Jeffrey L. Zimmerly and Adrian Pieniazek Regarding Contention CL-2" ("Direct Testimony") (Exh. STP000011).

Q3. Did your Direct Testimony describe your educational and professional qualifications?

A3. (JLZ, AP) Yes. Our responses to Questions Q2, Q3, Q6, and Q7 in the Direct Testimony summarized our current employment positions and our educational and professional qualifications. Our professional and educational qualifications are also described in Exh.

STP000002 and Exh. STP000012.

(JLZ) In summary, I am currently an Environmental Engineer and Corporate Quality Assurance Manager for Tetra Tech NUS, Inc., which is a contractor to Nuclear Innovation North America LLC ("NINA") for South Texas Project ("STP") Units 3 and 4. I participated in the preparation of the Environmental Report ("ER") for STP Units 3 and 4, including authoring and reviewing parts of the evaluation of severe accident mitigation design alternatives ("SAMDAs") in ER Chapter 7.

(AP) In summary, I am currently the Director of Market Policy for NRG Energy, Inc. ("NRG Energy"). My current responsibilities include representing NRG Energy's interests at the Electric Reliability Council of Texas ("ERCOT") and the Public Utility Commission of Texas ("PUCT").

Q4. Please describe the purpose of your Rebuttal Testimony.

A4. (JLZ, AP) The purpose of our Rebuttal Testimony is to respond to certain statements made in Exh. NRC000004 entitled "Prefiled Direct Testimony of Richard L. Emch, Jr., Jeremy P. Rishel, and David M. Anderson Regarding Contention CL-2" ("Emch/Rishel/Anderson Direct Testimony") and Exh. INT000021 entitled "Direct Testimony of Clarence L. Johnson" ("Johnson Direct Testimony"), both of which pertain to Contention CL-2.

Q5. Please describe Contention CL-2.

A5. (JLZ, AP) As admitted by the Board, Contention CL-2 states (LBP-10-14, page 30): "The Applicant's calculation in ER Section 7.5S of replacement power costs in the event of a forced shutdown of multiple STP Units is erroneous because it underestimates replacement power costs and fails to consider disruptive impacts, including ERCOT market price spikes."

Q6. Please summarize the conclusions in your Direct Testimony regarding Contention CL-2.

A6. (JLZ, AP) Our Direct Testimony demonstrated that there are no cost-effective SAMDAs for STP Units 3 and 4. We concluded that the ER's replacement power cost estimates are reasonable. We also demonstrated that consideration of all issues raised by the Intervenors and the NRC Staff regarding replacement power costs does not change the conclusion that there are no cost-effective SAMDAs. As part of that evaluation, we considered a higher capacity factor and net electrical output, ERCOT pricing data, the Intervenors' own cost estimates, ERCOT market effects, ERCOT price spikes, and loss of the ERCOT grid. Our evaluation of these issues was conservative, and provided further assurance that there are no cost-effective SAMDAs.

II. RESPONSE TO EMCH/RISHEL/ANDERSON DIRECT TESTIMONY

Q7. Have you reviewed the Emch/Rishel/Anderson Direct Testimony and the exhibits cited in that testimony?

A7. (JLZ, AP) Yes, we have reviewed this testimony and the exhibits.

Q8. What is your general reaction to the Emch/Rishel/Anderson Direct Testimony?

A8. (JLZ, AP) We agree with their testimony in general. For the most part, the methodology, assumptions, and results of the Emch/Rishel/Anderson Direct Testimony are similar to those in our Direct Testimony.

Q9. Are there any differences in the methodology and assumptions in the Emch/Rishel/Anderson Direct Testimony and your Direct Testimony?

A9. (JLZ, AP) Yes. In some areas, our Direct Testimony takes a more conservative approach than the Emch/Rishel/Anderson Direct Testimony. In other areas, the Emch/Rishel/Anderson Direct Testimony takes a more conservative approach than our Direct Testimony.

Q10. Please identify the areas in which your Direct Testimony is more conservative than the Emch/Rishel/Anderson Direct Testimony.

A10. (JLZ, AP) Our Direct Testimony is more conservative in the following areas:

- The Emch/Rishel/Anderson Direct Testimony (page 17) assumes that SAMDAs 3c, 7a, and 11a achieve no reduction in core damage frequency ("CDF"). In contrast, our Direct Testimony (page 26) assumes that each of those SAMDAs achieves a very small reduction in CDF (less than a 1% reduction). This difference in assumption has no effect on the results, since neither our Direct Testimony nor the Emch/Rishel/Anderson Direct Testimony designates those SAMDAs as being the most cost-effective SAMDAs.

- To adjust the cost of SAMDAs for inflation, the Emch/Rishel/Anderson Direct Testimony (page 37) used the Gross Domestic Product Implicit Price Deflator for Nonresidential Structures, which has a higher rate of inflation for escalating the costs of SAMDAs from 1991 dollars to current dollars than used in our Direct Testimony. As we discuss in response to Question Q50 in our Direct Testimony, we believe that the use of the Gross Domestic Product Implicit Price Deflator for Nonresidential

Structures is appropriate for escalating SAMDA costs because that index addresses construction costs. In contrast, the Consumer Price Index ("CPI") and the Core Personal Consumption Expenditure ("PCE") index both track inflation of consumer products, which is not directly applicable to SAMDA costs. Nevertheless, our Direct Testimony (pages 20-22) conservatively used the PCE index because it provides for a lower rate of inflation and bounds the issues raised by the Intervenors.

- The Emch/Rishel/Anderson Direct Testimony (pages 38-39) used a lower rate of inflation than our Direct Testimony (page 28) for escalating the replacement power costs from 1993 dollars to current dollars. This is because the Emch/Rishel/Anderson Direct Testimony uses the escalation factors for Electric Power (WPU054), which reflects inflation in prices for Residential Electric Power (WPU0541), Commercial Electric Power (WPU0542), and Industrial Electric Power (WPU0543), as well as, more recently (since 2010), Transportation Electric Power (WPU0546). Our Direct Testimony uses the escalation factors of Industrial Electric Power, because they are more conservative than the escalation factors for the other categories. The inflation rates for these categories from 1993 to 2009 are 1.40 for Electric Power; 1.37 for Residential Electric Power; 1.40 for Commercial Electric Power; and 1.46 for Industrial Electric Power (Exh. STP000031). Our use of a higher inflation rate for replacement power costs in our Direct Testimony is more conservative because it results in higher replacement power costs in current dollars. In any event, since our Direct Testimony and the Emch/Rishel/Anderson Direct Testimony both use actual ERCOT prices for replacement power (which are higher than the escalated

replacement power costs), this difference between the Emch/Rishel/Anderson Direct Testimony and our Direct Testimony has no effect on either of our conclusions.

- In calculating replacement power costs, the Emch/Rishel/Anderson Direct Testimony (pages 39-40) assumed a 90% capacity factor for STP. In contrast, our Direct Testimony (page 30) assumed a 95% capacity factor for STP. As a result, the replacement power costs calculated in our Direct Testimony are slightly higher (95%/90%, or a factor of 1.06) than if we had used the assumptions in the Emch/Rishel/Anderson Direct Testimony. In that regard, our assumption of a 95% capacity factor is also higher, and thus more conservative, than the historical capacity factors for STP Units 1 and 2.

- The Emch/Rishel/Anderson Direct Testimony (page 46) is critical of the use of 2008 ERCOT pricing data in our Direct Testimony, stating that use of the anomalously high cost data from 2008 is not reasonable (but is conservative). We agree with that criticism. However, our Direct Testimony intentionally used the 2008 ERCOT pricing data in order to be conservative and bounding.

- The Emch/Rishel/Anderson Direct Testimony (page 49) assumes that wind has a 9% capacity factor in the dispatch model for calculating the market effects of an outage of the four STP units, while our Direct Testimony (pages 49-50) assumes a 0% capacity factor for wind. The assumption in the Emch/Rishel/Anderson Direct Testimony is realistic and accords with the assumptions in the Johnson Direct Testimony (pages 22-23). However, our Direct Testimony is conservative and bounding, because the

dispatch model assumes that wind has zero marginal cost, and replacement of wind with other generators results in the use of generators with a higher marginal cost.

- The Emch/Rishel/Anderson Direct Testimony (page 58) assumed a grid outage with an impact ($10 billion) assumed to be equivalent to the 2003 Northeast blackout occurs. Our Direct Testimony (pages 61-62), however, also considers a grid outage with an impact ($45 billion) assumed to be equivalent to the 2000/2001 California energy crisis (of which $0 to $5 billion came from blackouts, and the remaining $40 billion came from poor market design, uneconomic long-term contracts, and opportunistic behavior).

- The Emch/Rishel/Anderson Direct Testimony (page 67) states that SAMDA 9b with a cost of $2,686,500 (2009 dollars) is the SAMDA that is the closest to being cost beneficial. In contrast, our Direct Testimony (page 27) conservatively states that SAMDA 3d with a cost of $982,500 (2009 dollars) might be the closest to being cost-beneficial, and we did not evaluate SAMDAs with a higher initial cost such as SAMDA 9b. As explained at note (d) on page 18 of the Emch/Rishel/Anderson Direct Testimony, the Staff assumed that a SAMDA had a 0 reduction in CDF where the Advanced Boiling Water Reactor ("ABWR") Technical Support Document ("TSD") (Exhs. NRC00009A and NRC00009B) stated that a SAMDA had $0 averted onsite cost and did not explicitly provide a reduction in CDF. This was because the TSD explained that it only estimated averted onsite costs for SAMDAs that reduce CDF. We did not make this assumption in our Direct Testimony, and instead very conservatively assumed complete risk reduction for the SAMDA. However, we agree

with the rationale in the Emch/Rishel/Anderson Direct Testimony for selecting SAMDA 9b as the SAMDA that is closest to being cost beneficial. As we state on page 26 of our Direct Testimony, use of SAMDA 3d is conservative. However, selection of SAMDA 3d or 9b has no effect on the conclusions, since the cost of either of those SAMDAs far exceeds the benefit (averted cost) of the SAMDA.

Q11. Please identify the areas in which your Direct Testimony is less conservative than the Emch/Rishel/Anderson Direct Testimony.

A11. (AP) Our Direct Testimony is not as conservative as the Emch/Rishel/Anderson Direct Testimony regarding the dispatch model used to calculate the market effects of an outage of all four STP units:

- As discussed in our Direct Testimony (pages 45-46), the dispatch model used availability and/or capacity factor data from ERCOT and the North American Electric Reliability Corporation's Generation Availability Reports for 2005 to 2009. This resulted in the assumption that STP and the other nuclear units in ERCOT have a capacity factor of 88.5%. The Emch/Rishel/Anderson Direct Testimony (page 51) assumed that STP has a capacity factor of 90%. I reran the dispatch model assuming that STP and the other nuclear units have a capacity factor of 90%. As in the Direct Testimony, I ran the model twice: (1) with all four STP units available, versus (2) no STP units available. The effect was to increase the difference in the results between the two model runs by only $0.02 per MWh from my Direct Testimony calculations.

- The Emch/Rishel/Anderson Direct Testimony (pages 50-51) correctly states that my dispatch model did not account for 177 hours during the year. This oversight

apparently was due to a database error in NRG Energy's computer systems. When transferring ERCOT load data into NRG Energy's systems, it appears the last hour of each day (*i.e.*, the ERCOT load between 11:00 p.m. and midnight) from the beginning of 2009 until June 2009 was lost in the transfer. The data transfer for the period June 21, 2009 to the end of the year did not have the same problem, as the data contained all 24 hours per day. Therefore, the missing hours were at night and during the first half of the year; *i.e.*, during non-peak load hours. This data error applied to my calculations of ERCOT prices for the scenario in which all four STP units are operating and the scenario in which all four units are not operating; thus, the effect of the missing hours has very little effect on the conclusions. I reran my dispatch model with data for those missing hours (and a 90% capacity factor for nuclear units), and the impact was to decrease the annual average price difference between the two model runs (*i.e.*, with and without the STP units) by $0.02 per MWh from my Direct Testimony calculations. The impact of this error is small, because the error affected both scenarios and applied to non-peak load hours when the marginal price of electricity is relatively low. The impact is also in the conservative direction because the price difference decreased.

- The Emch/Rishel/Anderson Direct Testimony (pages 51-53) ran a dispatch model using 2008 ERCOT prices, whereas our Direct Testimony ran the dispatch model using 2009 ERCOT prices. With respect to the price of electricity in ERCOT, 2008 was an anomalous year, with significantly higher costs than 2009 and 2010. Use of the 2008 data rather than 2009 data in the dispatch model impacts the results, because 2008 ERCOT prices are substantially higher than the 2009 ERCOT prices. In that

regard, the market price of electricity in ERCOT is generally based upon the price of natural gas used to generate electricity, and the 2008 average natural gas price ($8.50 per MMBtu) was much higher than the 2009 average natural gas price ($3.74 per MMBtu) (Exh. STP000020, pages iv-v). When I reran the dispatch model using 2008 ERCOT data (and a 90% capacity factor for nuclear units), I calculated the price increase due to market effects from the outage of the four STP units to be $5.23 per MWh. This is equivalent to an incremental averted cost for consumer impacts of market effects of $60,210, compared to $27,515 calculated as part of our Direct Testimony. The use of 2008 ERCOT prices is the primary reason why the Emch/Rishel/Anderson Direct Testimony (page 60) calculates a benefit from SAMDAs of $210,268 (for a 3% discount rate) while our Direct Testimony (page 63) calculates a maximum averted cost of $170,707 (for a 3% discount rate).

Q12. What are your views regarding the appropriateness of use of 2008 data versus 2009 data in the dispatch model?

A12. (AP) I agree with the discussion on page 46 of the Emch/Rishel/Anderson Direct Testimony, which states that use of the anomalously high cost data from 2008 is not reasonable but is conservative. Therefore, I continue to be of the opinion that use of 2009 ERCOT cost data in my dispatch model is reasonable.

Q13. If you had used the 2008 data in your dispatch model, how would it have affected your conclusions?

A13. (JLZ, AP) Our conclusions would have been unaffected. As discussed above, the average annual price increase due to market effects from the outage of the four STP units is $5.23 per MWh using 2008 data and a 90% nuclear capacity factor. If this amount were taken

into account in our Direct Testimony, the values in Table 11 of our Direct Testimony would be as follows:

Total Monetized Impacts		
Characteristics	**7% Discount Rate**	**3% Discount Rate Sensitivity Analysis**
Total Costs Using NUREG/BR-0184 Replacement Power Costs in 1993 Dollars (Table 2)	$13,377	$23,015
Total Costs Using NUREG/BR-0184 Replacement Power Costs Escalated to 2009 Dollars (Table 4)	$16,945	$28,656
Total Costs Using NUREG/BR-0184 Replacement Power Costs Escalated to 2009 Dollars and Adjusting for a 95% Capacity Factor and Higher STP Units 1 and 2 Output (Table 5)	$23,754	$39,441
Total Costs Using Replacement Power Costs Based on 2009 ERCOT Pricing Data (Table 7)	$24,831	$41,145
Total Costs Using Replacement Power Costs Based on the Highest Historical Annual ERCOT Pricing Data from 2008 (In 2009 dollars) (Table 8)	$51,462	$83,280
Total Costs Using Replacement Power Costs Based on Johnson Report 1 (in 2008 dollars) (Table 9)	$35,094	$57,351
Total Costs Using Replacement Power Costs Based on 2008 ERCOT Pricing Data and Accounting for Market Effects (Table 10)	$54,352	$87,853
Total Costs Using Replacement Power Costs Based on 2008 ERCOT Pricing Data and Accounting for Market Effects and Consumer Impacts	$111,672	$143,490
Total Costs Using Replacement Power Costs Based on 2008 ERCOT Pricing Data and Accounting for Market Effects, Consumer Impacts, and Price Spikes	$143,504	$175,322
Total Costs Using Replacement Power Costs Based on 2008 ERCOT Pricing Data and Accounting for Market Effects, Consumer Impacts, Price Spikes, and Grid Outages	$149,744	$181,562
Total Costs Using Replacement Power Costs Based on 2008 ERCOT Pricing Data and Accounting for Market Effects, Consumer Impacts, Price Spikes, and Grid Outages (Equivalent to California Energy Crisis)	$171,584	$203,402

The maximum averted cost (for a 3% discount rate) of $203,402 in the above table is similar to the averted cost calculated in the Emch/Rishel/Anderson Direct Testimony (page 60) of $210,268 (for a 3% discount rate). These values are still well below the lowest risk-adjusted cost of the SAMDAs ($982,500). Therefore, these changes would not affect the conclusion that there are no cost-effective SAMDAs.

III. RESPONSE TO JOHNSON DIRECT TESTIMONY

Q14. Have you reviewed the Johnson Direct Testimony and the exhibits cited in that testimony?

A14. (JLZ, AP) Yes, we have reviewed this testimony and the exhibits.

Q15. What is your general reaction to the Johnson Direct Testimony?

A15. (JLZ, AP) Much of the Johnson Direct Testimony repeats the positions stated in the December 21, 2009 report prepared by Clarence L. Johnson, titled "Review of Replacement Power Costs for Unaffected Units at the STP Site" ("Johnson Report 1"), and the October 6, 2010 "Affidavit in Response to Motion for Summary Disposition" ("Johnson Report 2"). Our Direct Testimony addresses the positions in Johnson Report 1 and Johnson Report 2.

The only appreciable new information in the Johnson Direct Testimony pertains to 1) the implications of Fukushima on the assumed duration of the STP outages; 2) Mr. Johnson's statement that different discount rates should be used in cost-benefit analyses and cost-effectiveness analyses; 3) Mr. Johnson's statement that low discount rates should be used because a Department of Energy ("DOE") loan guarantee is being sought to help finance construction of STP Units 3 and 4; 4) Mr. Johnson's statement that operating reserves, not target reserve margin, is the relevant factor to consider in evaluating the effects of price spikes and grid outages; and 5) Mr. Johnson's statement that it takes two years rather than one year to bring a combustion turbine generator online.

Q16. At pages 6 and 14-15, the Johnson Direct Testimony states that, based upon the experience at Fukushima, it should be assumed that all STP units would be shut down permanently. What is your view?

A16. (JLZ) Our Direct Testimony and ER Section 7.5S.5 (Exh. STP000013) assumed 1) that there would be an accident at one of the ABWRs at STP Units 3 and 4, and that the

accident would not adversely affect the structures, systems, and components at the other STP units (except for some contamination, which would be cleaned up), and 2) that the accident would result in the permanent shutdown of the ABWR unit experiencing the accident, a shutdown of the other ABWR unit for six years (similar to the period of shutdown of Three Mile Island ("TMI") Unit 1 following the severe accident at TMI Unit 2 in 1979), and a shutdown of STP Units 1 and 2 for two years. It was assumed that STP Units 1 and 2 would be shut down for a shorter period than the unaffected ABWR unit, because STP Units 1 and 2 are pressurized water reactors ("PWRs") that use different design principles than an ABWR. Until the Johnson Direct Testimony was submitted, the Intervenors and Mr. Johnson did not contest these assumed years of shutdown—in fact, Mr. Johnson used those same shutdown assumptions in Johnson Report 1 (page 3).

At Fukushima, each of the units experienced accident conditions (unlike the scenario in Contention CL-2, where only one of the STP units is postulated to experience an accident). In particular, it appears from reports by the owner (Tokyo Electric Power Company ("TEPCO")) that:

- All six Fukushima units were subject to the most severe earthquake in Japanese history and a tidal wave that was 14 meters (about 45 feet) above sea level, resulting in a station blackout for Units 1 through 4.
- Fukushima Units 1, 2 and 3 each experienced a partial to full meltdown of the reactor core.
- The Reactor Building at Fukushima Unit 4 experienced substantial damage, apparently due to a hydrogen explosion.

- TEPCO has cut holes in the roofs of the Reactor Buildings at Units 5 and 6 to prevent any hydrogen accumulation.

Given these unique circumstances, it is not unreasonable to assume that the Fukushima units may never operate again. On March 31, 2011, TEPCO's Chairman Tsunehisa Katsumata stated that Units 1 through 4 will not be restarted, and that any decision to restart Units 5 and 6 would be made only after consultation with the government and local residents.

There is nothing related to Fukushima that affects the basis for the outage duration assumed in ER Section 7.5S.5 or our Direct Testimony. Because each of the units at Fukushima experienced accidents, the situation at Fukushima is dissimilar to the situation postulated in Contention CL-2, where an accident is assumed to occur at one unit and the other units do not experience an accident.

Furthermore, it is not reasonable to postulate that a situation similar to Fukushima would occur at STP resulting in accidents at multiple units. The accidents at Fukushima were caused by natural phenomena involving an earthquake and tsunami. As indicated in ER Section 7.5S.3, external events (such as natural phenomena) at the STP site have a small contribution to risk. Accordingly, accounting for the probability of those categories of events would not have a material impact on the results of the SAMDA evaluation. In fact, the Licensing Board has rejected a proposed contention that argued that the ER should evaluate external events and accidents at all four STP units as part of the SAMDA evaluation (LBP-10-14, page 22).

Q17. How would your conclusions change if it were assumed that all four STP units were permanently shut down following a severe accident?

A17. (JLZ, AP) Even if it were assumed that all four STP units were permanently shut down following a severe accident, this would not change the conclusion that there are no

cost-effective SAMDAs. This is due to the large margin between the maximum averted costs and the lowest risk-adjusted cost of the SAMDAs ($982,500) determined in our Direct Testimony. For example, as shown on Table 8 of our Direct Testimony for a 3% discount rate and conservatively assuming ERCOT prices from 2008, the replacement power costs for the ABWR unit experiencing the accident (which would be permanently shut down) are $43,245, and the replacement power costs for the other three STP units that would be temporarily shut down are $14,943, $7,170, and $7,170, for a total replacement power cost of approximately $72,528. If the replacement power costs shown on Table 8 of our Direct Testimony for each of the four units were to be increased to be equivalent to the STP unit that is permanently shut down, then the total replacement power costs would be $172,980 (or approximately $100,000 more than the total shown on Table 8). If this incremental cost were added to the maximum averted cost of $170,707 shown on Table 11 of our Direct Testimony or to the $210,268 shown on Table 12 of the Emch/Rishel/Anderson Direct Testimony, the sum would still be well under the lowest risk-adjusted cost of the SAMDAs ($982,500). Therefore, even if it were assumed that all four STP units would be permanently shut down, there still would be no cost-effective SAMDA.

Q18. At pages 18-19, the Johnson Direct Testimony states that, although the Office of Management and Budget ("OMB") indicates a 7% discount rate should be used for cost-benefit analyses, it recommends that discount rates for cost-effectiveness analyses be based upon the rates of treasury bills. What is your view on the difference between cost-benefit analyses and cost-effectiveness analyses?

A18. (JLZ, AP) As discussed in our Direct Testimony (page 11), Section 8.b of the OMB Circular A-94 (Exh. STP000016) states that a 7% real discount rate should be used as part

of regulatory analyses. The Johnson Direct Testimony (page 19) agrees that OMB indicates that 7% is the default discount rate for cost-benefit analyses. The SAMDA evaluation is a cost-benefit analysis, not a cost-effectiveness analysis as urged by the Johnson Direct Testimony. OMB defines "cost-effectiveness" as "[a] systematic quantitative method for comparing the costs of alternative means of achieving the same stream of benefits or a given objective" (Exh. STP000016, page 18). The SAMDA evaluation does not meet this definition because it is not comparing alternatives against each other using the same stream of benefits; instead, it is evaluating the costs and benefits of each SAMDA. This conclusion is supported by NRC guidance discussed in our Direct Testimony (pages 11-12), including NUREG/BR-0184 (Exh. NRC00008B) and NUREG/BR-0058 (Exh. NRC000010), which also concludes that 7% is the appropriate discount rate.

Q19. Page 19 of the Johnson Direct Testimony states that, because a DOE loan guarantee is being sought for financing STP Units 3 and 4, a discount rate below normal interest rates for corporate borrowing is appropriate. What is your view of this issue?

A19. (JLZ, AP) The rate for the DOE loan guarantee for financing construction is not relevant to the discount rate for the SAMDA analysis. The discount rate is not used to calculate the cost of the SAMDAs (which instead is fixed by the ABWR Technical Support Document and escalated from 1991 dollars to current dollars). Instead, in the SAMDA analysis for STP Units 3 and 4, the discount rate is used to calculate the net present value of future replacement power costs. The replacement power costs (and the discount rate for replacement power costs) are independent of the rate of the DOE loan guarantee for financing construction.

Q20. If it were assumed that the Johnson Direct Testimony is correct regarding the discount rate, what impact would it have made on your conclusions?

A20. (JLZ, AP) The Johnson Direct Testimony (page 19) recommends that a 3% discount rate be used for the SAMDA analysis. Our Direct Testimony utilized both a 7% discount rate and a 3% discount rate as part of a sensitivity analysis. Even using a 3% discount rate, our Direct Testimony demonstrates that there are no cost-effective SAMDAs. Therefore, the statements in the Johnson Direct Testimony regarding the discount rate, even if accepted as accurate, would have no effect on our conclusion that there are no cost-effective SAMDAs.

Q21. Page 21 of the Johnson Direct Testimony states that the amount of operating reserves, and not the ERCOT target reserve margin, is the more relevant factor in evaluating the impact of price spikes and grid outages. What is your view?

A21. (JLZ, AP) Both operating reserves and the reserve margin are relevant. In fact, the two are related, because ERCOT's target reserve margin, which is calculated at the peak hour of the year, increases the ability of having adequate operating reserves every day and every minute of the year.

The amount of operating reserves is important in the period immediately after the loss of a large amount of generation. If the operating reserves are not sufficient to cover the amount of lost generation, there could be temporary prices spikes. However, in response to those price spikes, idle generating plants (as reflected by the reserve margin) would enter the market to take advantage of the increases in prices. Our Direct Testimony assumes that price spikes last for one year. That period is very conservative relative to the period until idle generating plants reflected by the reserve margin would start up. Thus, the reserve margin is important for limiting the period in which price spikes would occur.

The operating reserves are also important for preventing a grid outage. When a generating unit is lost from the grid, the generating units and/or load resources carrying reserves at the time need to respond. The operating reserves are designed to ensure that the grid can handle the instantaneous loss of the two largest generating units. With respect to the scenario postulated for STP, a severe accident in one of the ABWR units would not cause an accident in the other STP units. Following the accident at one of the ABWR units, the other units would be shut down in a controlled manner (unless one or more of the units were already shut down for other reasons). This controlled sequence would help prevent adverse impacts of the grid. ERCOT would have time to adjust, and could even shed load if necessary to prevent loss of the grid. As indicated by the events in February 2011, when a large number of generating plants in ERCOT were forced off line due to extreme cold weather (the lost capacity exceeded the capacity of the four STP units), other plants and load resources, reflected by the reserve margin, started up and helped ensure a stable grid. Therefore, it is appropriate to account for the reserve margin as well as the operating reserves in determining whether a grid outage would occur. In any event, our Direct Testimony (pages 60-63) conservatively assumes that an outage of the four STP units could cause a loss of the grid, and our Direct Testimony accounts for the costs of such a grid outage.

Q22. Page 22 of the Johnson Direct Testimony states that you are overly optimistic in stating that a new combustion turbine generator could be installed in one year, and that two years is more appropriate based upon a report by the U.S. Energy Information Administration ("EIA"). How do you respond?

A22. (AP) Table 8.2 of the cited EIA Report (Exh. INT000030) identifies times for bringing various types of new generating units online, assuming an order in 2009. For

combustion turbine generators, that table shows an online date of 2011 (or two years). However, Footnote 8 of that table explains: "Combustion turbine units can be built by the model prior to 2011 if necessary to meet a given region's reserve margin." Thus, the EIA Report supports the conclusion in our Direct Testimony that a combustion turbine generator could be brought online in about one year if warranted based upon the ERCOT market. Additionally, as I explained in my Direct Testimony (page 44), based on my personal experience, a simple cycle generation unit could be brought online in about a year. In any event, the answers to Questions Q111-Q112 and Q119-Q123 in our Direct Testimony demonstrate that there are no cost-effective SAMDAs, even assuming that there are price spikes and grid outages. The time needed to bring a combustion turbine generator online does not affect that conclusion.

IV. CONCLUSIONS

Q23. What are your conclusions regarding the Emch/Rishel/Anderson Direct Testimony and the Johnson Direct Testimony?

A23. (JLZ, AP) We conclude that the Emch/Rishel/Anderson Direct Testimony is generally consistent with our Direct Testimony. To the extent that there are differences, those differences are not significant and do not affect the conclusion that there are no cost-effective SAMDAs.

With respect to the Johnson Direct Testimony, we conclude that most of the positions in that testimony are similar to those in the Johnson Report 1 and Johnson Report 2, which we accounted for in our Direct Testimony. Our Direct Testimony demonstrates that there are no cost-effective SAMDAs even if the positions in the Johnson Report 1 and Johnson Report 2 were to be adopted. Although there are some new positions in the Johnson Direct Testimony, those positions are not appropriate (as in the case of the reference to the Fukushima accident), are

bounded by our Direct Testimony (as in the case of the discount rate), or do not affect our calculation of the replacement power costs and market effects of an STP outage (as in the case of operating reserves and time to bring a combustion turbine generator online).

Q24. Are true, accurate and correct copies of each of the exhibits referenced in your testimony attached?

A24. (JLZ, AP) Yes.

Q25. Does this conclude your testimony?

A25. (JLZ, AP) Yes.

(JLZ, AP) I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 31, 2011.

Executed in Accord with 10 C.F.R. § 2.304(d)

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Executed in Accord with 10 C.F.R. § 2.304(d)

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