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 WITNESS ADRIAN PIENIAZEK REGARDING CONTENTION DEIS-1-G

I. BACKGROUND

Q1. Please state your full name.

A1. My name is Adrian Pieniazek.

Q2. Have you previously presented testimony in this proceeding related to Contention DEIS-1-G?

A2. Yes. I sponsored the "Direct Testimony of Applicant Witness Adrian Pieniazek Regarding Contention DEIS-1-G" ("Direct Testimony") (Exh. STP000001).

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

A3. Yes. My responses to Questions Q2 and Q3 in the Direct Testimony summarized my current employment position and my educational and professional qualifications. My professional and educational qualifications are also described in Exh. STP000002. 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.

Q4. Please describe the purpose of your Rebuttal Testimony.

A4. The purpose of my Rebuttal Testimony is to respond to certain statements made in Exhibit NRC000031 entitled "Prefiled Direct Testimony of Daniel C. Mussatti and Dr. Michael J. Scott Regarding Contention DEIS-1" ("Mussatti/Scott Direct Testimony") and in Exhibit INT000001 entitled "Direct Testimony of Philip H. Mosenthal" ("Mosenthal Direct Testimony"), both of which pertain to Contention DEIS-1-G.

Q5. Would you please describe Contention DEIS-1-G?

A5. As admitted by the Licensing Board (LBP-11-07, page 48), Contention DEIS-1-G states as follows "NRC Staff's DEIS analysis of the need for power is incomplete because it fails to account for reduced demand caused by the adoption of an energy efficient building code in Texas, the implementation of which could significantly reduce peak demand in the ERCOT region." In that regard, the Licensing Board noted on pages 42 and 47-48 of LBP-11-07 that Texas had adopted an energy efficient building code in June 2010 that had not been accounted for in the Draft Environmental Impact Statement ("DEIS") (which predated the code).

As a basis for Contention DEIS-1-G, the Intervenors stated in their May 19, 2010 "Motion for Leave to File New Contentions Based on the Draft Environmental Impact Statement" (page 4) that a proposed Texas energy efficient building code based on the International Energy Conservation Code ("IECC") "has the potential to reduce peak demand by 2,362 MW annually by 2023 in the ERCOT region." As support for this contention, the Intervenors cited to a March 2007 report by the American Council for an Energy-Efficient Economy ("ACEEE") entitled "Potential for Energy Efficiency, Demand Response, and Onsite Renewable Energy to Meet Texas' Growing Electricity Needs" ("ACEEE Report") (Exh. STP000008).

Q6. Please summarize the conclusions in your Direct Testimony regarding Contention DEIS-1-G.

A6. My Direct Testimony demonstrated that consideration of the 2010 energy efficient building code in Texas does not change the conclusion that there is a need for power from South Texas Project ("STP") Units 3 and 4. I explained why the ACEEE Report does not indicate that 2,362 MW of peak load or baseload power can be saved in the ERCOT region by 2023. In particular, the 2,362 MW peak load savings for Texas from the 2007 ACEEE Report needs to be reduced to account for:

- more recent ERCOT demand projections, which show that the growth in peak load in 2023 will only be 52.1% of that expected in the 2007 ACEEE Report (Direct Testimony, pages 22-23);
- the ERCOT region, which only encompasses approximately 85% of the electric load in the entire state of Texas (the entire state was the basis for the estimated savings in the ACEEE Report) (Direct Testimony, pages 23-24); and
- baseload power demands, which are approximately 39% of peak demands (Direct Testimony, pages 24-25).

When the value of 2,362 MW in the ACEEE Report is adjusted to account for these factors, the value in the ACEEE Report is equivalent to a savings of 1,046 MW of peak load demand and 408 MW of baseload demand in 2023. The value of 408 MW is much less than the baseload generation from STP Units 3 and 4, and much less than the forecasted generation needs. Finally, I demonstrated that even assuming an additional reduction in peak demand of 2,362 MW in 2023, there still would be a need for power from STP Units 3 and 4.

II. RESPONSE TO MUSSATTI/SCOTT DIRECT TESTIMONY

Q7. Have you reviewed the Mussatti/Scott Direct Testimony and the exhibits cited in that testimony?

A7. Yes, I have reviewed the Mussatti/Scott Direct Testimony and the referenced exhibits.

Q8. What is your general reaction to the Mussatti/Scott Direct Testimony?

A8. I agree with their testimony in general. For the most part, the methodology, assumptions, and results of the Mussatti/Scott Direct Testimony are similar to those in my Direct Testimony.

Q9. Are there any differences in the methodology and assumptions in the Mussatti/Scott Direct Testimony and your Direct Testimony?

A9. Yes. In some areas, my Direct Testimony takes a more conservative approach than the Mussatti/Scott Direct Testimony. In other areas, the Mussatti/Scott Direct Testimony takes a more conservative approach than my Direct Testimony.

Q10. Please identify the areas in which your Direct Testimony is more conservative than the Mussatti/Scott Direct Testimony.

A10. The Mussatti/Scott Direct Testimony (pages 36 and 38) subtracts 334 MW from the savings of 2,362 MW estimated by the ACEEE Report, because the 2007 ACEEE Report assumed that 334 MW of savings would be realized prior to 2011. However, the new building code in Texas is not effective until 2011 and 2012. Therefore, the Mussatti/Scott Direct Testimony concluded that it is not appropriate to attribute 334 MW of savings prior to 2011 to the new building code in Texas.

Q11. What are your views on this approach taken by the Mussatti/Scott Direct Testimony?

A11. The subtraction of 334 MW in the Mussatti/Scott Direct Testimony is valid. My Direct Testimony is conservative in not accounting for this subtraction. If my Direct Testimony had accounted for this subtraction, my calculation of the demand savings in 2023 due to the new energy efficient building code would have been lower by 148 MW (334 MW x 0.85 x 0.521) of peak load and 58 MW (334 MW x 0.85 x 0.521 x 0.39) of baseload. In other words, when the subtraction of 334 MW is taken into account together with the other factors that I discussed in my answer to Q6 above, the 2,362 MW of savings estimated in the ACEEE Report is equivalent to 898 MW (1,046 MW – 148 MW) of peak load demand and 350 MW (408 MW – 58 MW) of baseload demand savings in 2023.

Q12. Please identify the areas in which your Direct Testimony is less conservative than the Mussatti/Scott Direct Testimony.

A12. My Direct Testimony is less conservative than the Mussatti/Scott Direct Testimony in the following areas: 1) the Mussatti/Scott Direct Testimony assumes that baseload power demand is 44% of peak load demand; 2) it provides credit for the effects of transmission line losses of energy; 3) it attributes all of the savings identified in the ACEEE Report to residential buildings and then adds separately calculated savings for commercial and industrial buildings; and 4) in determining the impact of a rate of growth in peak load that is smaller than estimated in the ACEEE Report, the Mussatti/Scott Direct Testimony multiplies the savings in the ACEEE Report by a factor of 65.5%, whereas I used a factor of 52.1%.

Q13. What are your views on the assumption that baseload represents 44% of peak load rather than 39%?

A13. As explained on page 8-26 of the Final Environmental Impact Statement ("FEIS") for STP Units 3 and 4 (Exh. NRC00003C), the FEIS stated that baseload is 44% of actual peak load and 39% of peak load requirements (which account for ERCOT's target reserve margin of 13.75%). Because the savings in the ACEEE Report are based upon peak load rather than peak load requirements, it was appropriate for the Mussatti/Scott Direct Testimony to use the 44% figure.

Q14. If your Direct Testimony had used the value of 44%, how would it have affected your results?

A14. My estimated savings from the new building code would have been increased by a factor of 44%/39%. As a result, my calculated savings in baseload demand would have increased to 460 MW (408 MW x (44%/39%)) in 2023, an increase of 52 MW (460 MW – 408 MW). This change in the percentage of peak demand represented by baseload demand does not impact the peak load demand savings.

Q15. What are your views on accounting for transmission line losses?

A15. As stated on page 37 of the Mussatti/Scott Direct Testimony, it is unclear whether the ACEEE Report accounted for transmission line losses. In fact, the ACEEE Report contains no discussion of transmission line losses (Exh. STP000008, page 25). Because the peak demand savings predicted by the ACEEE Report appear to be tied to the ERCOT load forecasts (Exh. STP000008, page 7) (which would include transmission line losses), I believe that it is reasonable to assume that the savings in the ACEEE Report do account for transmission line losses.

Q16. How would giving credit for transmission line losses have affected your results?

A16. My estimated savings from the new building code would have increased by 5.5 to 7.0% (Mussatti/Scott Direct Testimony, page 38). If I had used the 7.0% value, my calculated savings in peak load would have increased by 73 MW (1,046 MW x 0.07) and my estimated savings in baseload would have increased by 29 MW (408 MW x 0.07) in 2023.

Q17. What are your views on adding separately calculated savings for commercial buildings?

A17. It is not appropriate to add separately calculated savings for commercial buildings. Page 39 of the Mussatti/Scott Direct Testimony states that the ACEEE Report did not deal with commercial building codes. That statement is incorrect. As indicated on page 25 of the ACEEE Report (Exh. STP000008), the Report explicitly accounted for savings due to "residential and commercial building codes." The Mussatti/Scott Direct Testimony essentially attributes all of the savings identified in the ACEEE Report to residential building codes, and then calculates additional savings due to commercial buildings. Thus, the Mussatti/Scott Direct Testimony is double-counting savings due to commercial building codes.

Q18. What is the impact of this double-counting in the Mussatti/Scott Direct Testimony?

A18. Page 45 of the Mussatti/Scott Direct Testimony separately attributes a savings of 323 MW in peak load savings and 142 MW in baseload savings in 2020 to commercial buildings. These values would obviously be higher for 2023.

Q19. What are your views on adding separately calculated savings for industrial buildings?

A19. It is unclear from page 25 of the ACEEE Report whether the Report accounted for savings due to industrial building codes. It is not unreasonable to assume that the ACEEE

Report did not include industrial buildings in its estimate of savings due to new building codes. However, as indicated on page 49 of the Mussatti/Scott Direct Testimony, the savings from new industrial building codes (including line losses) is minor: 7.5 MW savings in peak load and 3.3 MW savings in baseload in 2020. These values would be higher in 2023 (I am conservatively assuming 10 MW for peak load and 5 MW for baseload in 2023).

Q20. What are your views on the use of a factor of 65.5% rather than 52.1% to account for a smaller rate of growth in peak load than estimated by the ACEEE Report?

A20. My factor of 52.1% is based upon the ratio of the differences from 2008 to 2023 in *total peak loads* estimated by ERCOT versus that estimated by the ACEEE Report. The factor of 65.5% used on page 38 of the Mussatti/Scott Direct Testimony is based upon the ratio of *annual growth rates* estimated by ERCOT in 2010 and the ACEEE Report. Use of the ratio of annual growth rates rather than the ratio of differences in total peak loads tends to overestimate the savings from the new building code, because it does not account for the compounding effect of the reduced annual growth rates over the years. Therefore, I conclude that the Mussatti/Scott Direct Testimony is unduly conservative in using a factor of 65.5% rather than 52.1%.

Q21. What is the effect of using a factor of 65.5% rather than 52.1%?

A21. By using a factor of 65.5% in the equation on page 38 of the Mussatti/Scott Direct Testimony, that testimony overestimates the peak load savings in 2023 due to the 2010 energy efficient building code by approximately 244 MW ((2,362 MW – 334 MW) x 85% x (65.5% – 52.1%) x 1.055).

Q22. If your Direct Testimony were adjusted to include the additional savings due to use of a 44% ratio of baseload to peak load, transmission line losses, and industrial

building codes, and the subtraction of 334 MW predicted in the ACEEE Report prior to the actual effective date of the new building codes, what would have been the impact?

A22. My estimated savings in 2023 for peak load would have been 981 MW, calculated as follows:

1,046 MW	(value from Direct Testimony)
+ 73 MW	(credit for transmission losses)
+ 10 MW	(credit for industrial building savings)
– 148 MW	(accounting for effective date of new building code)
981 MW	

My estimated savings for baseload would have been 436 MW, calculated as follows:

408 MW	(value from Direct Testimony)
+ 52 MW	(correction for use of 44% rather than 39%)
+ 29 MW	(credit for transmission losses)
+ 5 MW	(credit for industrial building savings)
– 58 MW	(accounting for effective date of new building code)
436 MW	

Furthermore, for the reasons I have already discussed, I do not believe that it is appropriate to consider transmission line losses. When the effect of those losses is subtracted, the savings in 2023 would be 908 MW (981 MW – 73 MW) in peak load and 407 MW (436 MW – 29 MW) in baseload. The differences between these sets of values (both with and without transmission line losses) and the values provided in my Direct Testimony are minimal. These changes would not affect any of my conclusions regarding the need for power from STP Units 3 and 4.

Q23. How do those values compare to the values provided in the Mussatti/Scott Direct Testimony?

A23. Page 50 of the Mussatti/Scott Direct Testimony estimated a savings in 2020 of 1,167 MW in peak load and 513 MW baseload. When the effect of the double-counting in the savings due to the commercial building codes is taken into account, those savings drop to 844 MW (1,167 MW – 323 MW) in peak load and 371 MW (513 MW – 142 MW) in baseload in

2020. Those values are comparable to the values I have calculated for 2023. Additionally, I agree with the statements in the Mussatti/Scott Direct Testimony that those savings have been conservatively calculated, and the actual savings would likely be less. For example, those savings would drop even further if a factor of 52.1% rather than 65.5% had been used to account for the differences in forecasted peak load as estimated by ERCOT in 2010 and estimated in the 2007 ACEEE Report. Therefore, I conclude that using either the values provided by the Mussatti/Scott Direct Testimony or the values in my Direct Testimony or Rebuttal Testimony, there is a need for power from STP Units 3 and 4.

III. RESPONSE TO MOSENTHAL DIRECT TESTIMONY

Q24. Have you reviewed the Mosenthal Direct Testimony and the exhibits cited in that testimony?

A24. Yes, I have reviewed the Mosenthal Direct Testimony and the referenced exhibits.

Q25. What is your general reaction to the Mosenthal Direct Testimony?

A25. To the extent that the Mosenthal Direct Testimony addresses the 2010 energy efficient building code in Texas, it correctly indicates that the 2007 ACEEE Report overestimates the savings to be obtained from energy efficient building codes given the changed circumstances between the time that Report was prepared and the present. However, most of the Mosenthal Direct Testimony does not address the energy efficient building code enacted in Texas in 2010. Furthermore, there are several inappropriate assumptions and errors in methodology in the Mosenthal Direct Testimony.

Q26. Please identify the areas in which the Mosenthal Direct Testimony indicated that the ACEEE Report overestimated savings relative to the 2010 energy efficient building code in Texas.

A26. The Mosenthal Direct Testimony (pages 6-8) indicates that the ACEEE Report overestimated savings because 1) the new building code was enacted in Texas later than assumed in the ACEEE Report; 2) more recent ERCOT forecasts show a smaller increase in peak load than the ERCOT forecasts used as the basis for the 2007 ACEEE Report; and 3) the ACEEE Report assumed 100% compliance with the new building code and Texas assumes a compliance rate of 90%. I agree with the Mosenthal Direct Testimony that the ACEEE Report overestimates savings in each of these areas.

Q27. By what amount did the ACEEE Report overestimate the savings relative to the 2010 energy efficient building code in Texas?

A27. The Mosenthal Direct Testimony does not identify an amount for each of the factors. However, there is other information which provides amounts of the overestimates:

- As correctly discussed in the Mussatti/Scott Direct Testimony (pages 36 and 38), 334 MW should be subtracted from the peak load savings estimated by the ACEEE Report to account for a later effective date for the new building code than assumed by the ACEEE Report. My Direct Testimony conservatively did not account for that reduction.
- As indicated in my Direct Testimony (pages 22-23), the savings estimated by the ACEEE Report in 2023 should be multiplied by 52.1% to account for a smaller increase in peak load demand forecast by ERCOT in 2010 relative to the 2006 ERCOT values used as the basis for the ACEEE Report. When this factor is

considered in isolation, it corresponds to a reduction in savings of 1,131 MW (2,362 MW x (100% – 52.1%)) of peak load in 2023.

- As indicated in the Mosenthal Direct Testimony (page 8) and the Mussatti/Scott Direct Testimony (page 29), the rate of compliance is likely to change over time. The State has committed to reach a compliance rate of 90% by 2017. As a result, the savings estimated by the ACEEE Report should be reduced by at least 10%, or 236 MW of peak load in 2023 when this factor is considered in isolation. My Direct Testimony and the Mussatti/Scott Direct Testimony conservatively did not account for that reduction.

Q28. Does the Mosenthal Direct Testimony address all of the adjustments necessary to the ACEEE Report?

A28. No. As I discussed in my Direct Testimony (pages 23-25), to provide an accurate evaluation of the effect of the ACEEE Report projected demand savings on the need for power for STP Units 3 and 4, the demand savings need to be reduced to account for only the ERCOT region, which is the region of interest for STP Units 3 and 4 need for power, and only baseload demand savings.

Q29. Please identify those aspects of the Mosenthal Direct Testimony that do not pertain to the savings to be obtained from the energy efficient building code enacted in Texas in 2010.

A29. The Mosenthal Direct Testimony addresses the following issues that do not pertain to the savings to be obtained from the energy efficient building code enacted in Texas in 2010, and therefore are unrelated to Contention DEIS-1-G:

- The Mosenthal Direct Testimony (pages 4-5, 7-9) takes credit for future updates to the building code. These future updates are not part of the energy efficient building code enacted in Texas in 2010.
- The Mosenthal Direct Testimony (pages 5, 12-15) takes credit for savings from the Federal Energy Independence and Security Act ("EISA") of 2007. EISA is not part of the energy efficient building code enacted in Texas in 2010.
- The Mosenthal Direct Testimony (pages 15-17) discusses use of smaller generation (*e.g.*, natural gas, demand side management) as baseload generation, economic value of delaying new nuclear units, technological advancement, costs of alternative generation, mothballed plants, and costs of demand response programs. These topics are not tied to the energy efficient building code.

Furthermore, much of the EISA is not relevant to demand for electricity, such as the provisions in the EISA that pertain to motor vehicles. Additionally, to the extent that the EISA pertains to energy efficiency in buildings, the Mosenthal Direct Testimony appears to be engaging in double-counting of savings from both EISA and the Texas code. For example, both the EISA and the Texas code address lighting and air conditioning.

Q30. What is the effect of accounting for future code updates in the Mosenthal Direct Testimony?

A30. As indicated on page 7 of the Mosenthal Direct Testimony, the basis for his estimated savings due to new buildings codes in Texas is Exh. INT000004. That exhibit assumes savings of 20% (residential) and 11% (commercial) for use of the 2009 IECC relative to the 2001 IECC. However, due to assumed code improvements in future years, those values are assumed in Exh. INT000004 to substantially increase (for residential, to 39% in 2015, to 45% in

2020, and to 55% in 2025; for commercial, to 22% in 2015, to 29% in 2020, and to 32% commercial in 2025). Thus, as indicated by Exh. INT000004, over half of the Texas building code savings predicted by the Mosenthal Direct Testimony for 2015, 2020, and 2025 appears to be attributable to anticipated future code updates, not to the energy efficient building code adopted in 2010.

Q31. Do you agree with these assumptions regarding demand savings for future code updates?

A31. No. The Mosenthal Direct Testimony and Exhs. INT000003 and INT000004 do not support achieving 39% to 55% residential energy savings between 2015 and 2025 based on updated building codes. The testimony references a Texas A&M University, Energy Systems Laboratory ("ESL") study (Exh. INT000016) and a Department of Energy ("DOE") estimate of building savings from IECC 2012 (Exh. INT000017); however, neither supports these assumed residential energy savings. Instead, the ESL study supports a roughly 20% single-family, residential savings based on the adoption of the 2009 IECC and DOE estimates a 30% increase in energy savings—both residential and commercial—when the 2012 IECC is compared to its 2006 predecessor. Therefore, the demand savings projected in the Mosenthal Direct Testimony for future building code updates are speculative.

Q32. What does the Mosenthal Direct Testimony assume regarding the status of the building code for municipalities prior to adoption of the energy efficient building code in 2010?

A32. As indicated on footnote 6 of page 7 of the Mosenthal Direct Testimony, some municipalities have had in place in recent years building codes that are stricter than the 2001 IECC Code, but the Mosenthal Direct Testimony nonetheless assumes that the 2001 IECC Code

is currently being used throughout Texas. This represents a form of double-counting, since the ERCOT forecasts account for savings already achieved by municipalities that have enacted building codes that are stricter than the 2001 IECC Code. As discussed on pages 30-32 of the Mussatti/Scott Direct Testimony, municipalities representing more than half of the population of Texas had enacted either the 2006 or 2009 IECC Code before the 2010 Texas building code, with the average throughout the state being the 2006 IECC Code. As indicated in the Mussatti/Scott Direct Testimony, the 2006 IECC Code represents a savings of 9.9% to 22.1% relative to the 2001 IECC Code. Thus, a large portion of the building code savings estimated in the Mosenthal Direct Testimony was already being achieved prior to the enactment of the 2010 energy efficient building code in Texas.

Q33. What are the errors in methodology in the Mosenthal Direct Testimony?

A33. The first row of Tables 1 and 2 in the Mosenthal Direct Testimony identify the firm load based upon Table 8-5 of the FEIS (Exh. NRC00003C). However, FEIS Table 8-5 represents the sensitivity study of the NRC Staff. As discussed on FEIS pages 8-25 and 8-26, the firm load forecasts in FEIS Table 8-5 include a reduction to account for new energy efficiency programs. Thus, Tables 1 and 2 of the Mosenthal Direct Testimony are engaging in double-counting—those tables reference the firm load forecasts for the sensitivity analysis in FEIS Table 8-5 (which includes a reduction in firm load to account for the energy efficient building code in Texas), and then subtract an additional savings for the same building code.

Q34. What is the effect of that double-counting in the Mosenthal Direct Testimony?

A34. The Mosenthal Direct Testimony should have used the firm load forecast in FEIS Table 8-3 (Exh. NRC00003C), and then subtracted their estimate of savings due to the new

building code. The difference in firm load forecasts in FEIS Table 8-3 and Table 8-5 is substantial. In 2015, the difference is 531 MW (68,672 MW – 68,141 MW); in 2020, the difference is 1,056 MW (73,863 MW – 72,807 MW); and in 2025, the difference is 1,465 MW (77,959 MW – 76,494 MW). Furthermore, since line B of Tables 1 and 2 in the Mosenthal Direct Testimony multiplies the firm load by the target reserve margin of 13.75%, the impacts are even greater. When multiplying the differences between FEIS Tables 8-3 and 8-5 by 1.1375, the double-counting in Tables 1 and 2 of the Mosenthal Direct Testimony becomes 604 MW in 2015, 1,201 MW in 2020, and 1,666 MW in 2025. This error alone is equivalent to about one of the STP units.

Q35. How does the Mosenthal Direct Testimony account for baseload generation?

A35. The Mosenthal Direct Testimony (page 11) does not distinguish between baseload and peak load generation, stating that "any reduction in the total loads can translate directly to reductions in the need for baseload capacity, since the 'peaker' units that supplement baseload would still exist and can still capture the same differential between the baseload generation and the actual peak."

Q36. Do you agree with this methodology regarding baseload generation?

A36. No. This methodology is based on several inappropriate assumptions. First, this methodology does not account for the fact that the energy generated by peak load plants is substantially more expensive than the energy generated by baseload plants. Therefore, in a deregulated market such as ERCOT, if expensive peak load generators were being used to supply baseload power, less expensive baseload generators would enter the market to supplant the peak load generators. Thus, even in a deregulated market, it is valid to distinguish between peak load

and baseload. Also, many peaking units are simply not designed or do not have sufficient environmental permits to run as baseload units.

Furthermore, the Mosenthal Direct Testimony (pages 14 and 16) states that, while some plants older than 50 years may retire, that represents an upper band or "worst case" of what is possible and "seems excessive," and ERCOT's own estimates do not assume these retirements. In actuality, retirement of plants that are 50 years old does not represent an upper bound or worst case and is not excessive. As discussed on page 8-23 of the FEIS (Exh. NRC00003C), ERCOT and the FEIS also identify plants that are 30-years old and 40-years old, which could also be subject to retirement due to age, cost, or environmental reasons. Thus, as discussed in the FEIS, the "most conservative" assumption is that only the 50-year plants will retire (and no plants younger than that). I agree with that assessment in the FEIS.

The conservative nature of assuming generation units do not retire until they are 50 years old is illustrated by NRG Energy's experience with plant retirements. The following table shows all NRG Energy plants that have retired since the market opened to competition in 2002.

Unit Name	Unit Capacity (MW)	Date in Service	Retirement Date	Retirement Age (years)
Deepwater 7	174	1955	2005	50
HO Clark 21 GT	13	1968	2005	37
HO Clark 22 GT	13	1968	2005	37
HO Clark 23 GT	13	1968	2005	37
HO Clark 24 GT	13	1968	2005	37
HO Clark 25 GT	13	1968	2005	37
HO Clark 26 GT	13	1968	2005	37
Webster 3	374	1965	2005	40
Webster 21GT	13	1967	2005	38
TH Wharton 2	229	1960	2005	45
Cedar Bayou 3	760	1974	2007	33
SR Bertron 21 GT	20	1967	2009	42
PH Robinson 1	460	1966	2009	43
PH Robinson 2	460	1967	2009	42
PH Robinson 3	551	1968	2009	41
PH Robinson 4	736	1973	2009	36

As shown in this table, NRG Energy has retired 16 units with a total capacity of 3,855 MW. The average age at retirement for these units is 39.5 years, which is much less than the conservative assumption that generation units retire at 50 years. Additionally, only one of those plants was as old as 50 years at retirement.

Additionally, it is likely that plants younger than 50 years old will retire due to cost or environmental reasons. For example, the Environmental Protection Agency ("EPA") is considering new regulations to implement Section 316(b) of the Clean Water Act that could require power plants with once-through cooling systems to retrofit to cooling towers in order to minimize potential adverse impacts related to cooling water withdrawals. If that were to occur, many generators could decide to retire the plants that are 30 to 50 years old rather than incur the substantial expense of retrofitting the plants with costly cooling towers. In a May 11, 2011 report, "Review of the Potential Impacts of Proposed Environmental Regulations on the ERCOT System" (Exh. STP000029), ERCOT evaluated the impact of these new regulations, stating (page i):

> Older gas steam units that are subject to retrofit requirements are more likely to be retired. In many cases, this generation is less efficient and less flexible than new quick-start gas-fired generation, and many of these generating units are nearing the end of their useful life. Any requirement to upgrade these old inefficient units is likely to cause unit retirements; generation owners are much more likely to invest capital in new, more efficient generation. Based on the analysis included in this study, the imposition of closed-loop cooling tower requirements as part of the changes to Section 316(b) of the Clean Water Act is likely to result in the retirement of over 8,000 MW of gas-fired generation, with a majority of these units being located in or near the urban centers of Dallas/Fort Worth and Houston. Without additional replacement generation (the analysis of which was not included in the scope of this study) the retirement of this gas-fired generation would reduce generation reserve margins to below 2% in 2015.

Therefore, ERCOT has recognized factors that could result in the earlier retirement of generating units, such as new environmental regulations. As shown in the above quoted language, this one factor could result in the retirement of over 8,000 MW of generation, an amount that dwarfs the entirety of the savings from the energy efficient building code and could result in a great need for power in 2015.

Moreover, as explained in my Direct Testimony (pages 13-14), ERCOT forecasts only account for retirements after ERCOT receives an official notice regarding retirements (typically only a few months before retirement). This does not mean ERCOT believes these plants will not retire, only that it conservatively does not account for retirements until it receives official notice, because ERCOT does not have sufficient economic information to forecast retirements.

Q37. The Mosenthal Direct Testimony (page 16) concludes that the FEIS fails to show a need for STP by 2015 – 2020. Based upon the analysis provided in that testimony, what is your view on whether there is a need for power from STP Units 3 and 4 in 2015 – 2020?

A37. Even using the numbers provided by the Mosenthal Direct Testimony, I conclude that there is a need for power from STP Units 3 and 4 in 2015 – 2020. Table 2 of the Mosenthal Direct Testimony provides a summary of Mr. Mosenthal's analysis. The last line of that table shows a need for 3,686 MW in 2015 and 12,667 MW in 2020, assuming retirements of plants at 50 years. Thus, Table 2 clearly shows a need for power from STP Units 3 and 4 in the 2015 – 2020 time frame.

Q38. Line J of Table 2 of the Mosenthal Direct Testimony shows a need of -2,437 MW in 2015 and 230 MW in 2020 if it is assumed that there are no retirements. How do you respond to that part of the analysis?

A38. Line J accounts for savings from the EISA. As previously discussed, the EISA is not part of the 2010 energy efficient building code in Texas. If such savings are not considered, the need for power increases by 1,208 MW in 2015 and 1,598 MW in 2020, according to Table 2 of the Mosenthal Direct Testimony. Furthermore, as I have previously discussed, the Mosenthal Direct Testimony double-counted savings from the 2010 energy efficient building code in Texas, by using the firm load from FEIS Table 8-5 (which includes savings from that code) plus subtracting building code savings in Line F of Table 2. When that double-counting is eliminated, the need for power increases by another 604 MW in 2015 and 1,201 MW in 2020. Accounting for these two factors, there would be a need for -625 MW in 2015 and 3,029 MW in 2020 using the other numbers in Table 2 and assuming no retirements. This clearly shows a need for power from STP Units 3 and 4 in the 2015 – 2020 period.

Furthermore, when the other errors and inappropriate assumptions in the Mosenthal Direct Testimony are corrected, the need increases further. These corrections include:

- Elimination of credit assumed in the Mosenthal Direct Testimony for future updates to the building code; and
- Accounting for the fact that large portions of Texas are currently using 2006 and 2009 versions of the IECC Code rather than the 2001 Code as assumed by the Mosenthal Direct Testimony.

Finally, even taking Table 2 of the Mosenthal Direct Testimony (and the supporting Exh. INT000004 and INT000005) at face value, it only shows a delay of one to two years in the need for STP Units 3 and 4. The earliest that STP Units 3 and 4 would enter commercial operation is 2018. Exh. INT000004 shows a savings from new buildings codes (including future code updates) of 1,037 MW in 2018. This represents about one year of growth in peak demand in

ERCOT, which generally increases at about 1,000 MW per year as indicated by FEIS Table 8-3 (Exh. NRC00003C). Furthermore, Exh. INT000005 shows a savings from the EISA of 1,442 MW in 2018. When this value is added to 1,037 MW from the building codes, the total is 2,479 MW of savings in 2018. This represents about two years of growth in peak demand in ERCOT. Therefore, even if the savings predicted by the Mosenthal Direct Testimony were accepted as valid, those savings would only shift the ERCOT demand curve by about one to two years.

IV. SUMMARY AND CONCLUSIONS

Q39. Please summarize your views of the Mussatti/Scott Direct Testimony.

A39. In general, the methodology and results of the Mussatti/Scott Direct Testimony are similar to those in my Direct Testimony. Although there are some differences in methods and results, those differences are relatively minor and do not affect the conclusion that there is a need for power from STP Units 3 and 4 in 2015 – 2020, even accounting for the savings from the 2010 energy efficient building code in Texas.

Q40. Please summarize your views of the Mosenthal Direct Testimony.

A40. In general, the Mosenthal Direct Testimony addresses many issues that are not associated with the 2010 energy efficient building code in Texas, such as the EISA and future updates to the building codes. Nevertheless, even ignoring those problems, the Mosenthal Direct Testimony shows a need for STP Units 3 and 4 in the 2015 – 2020 period when retirements of 50-year old plants are considered. Furthermore, even if retirements are not considered, the Mosenthal Direct Testimony shows a need for STP Units 3 and 4 in 2015 – 2020, when the testimony is corrected to delete consideration of the EISA and the double-counting of the savings from the 2010 energy efficient building code in Texas.

Q41. Are true, accurate and correct copies of each of the exhibits referenced in your testimony attached?

A41. Yes.

Q42. Does this conclude your testimony?

A42. Yes.

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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