

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD PANEL

**In the Matter of
South Texas Project Nuclear Operating Co.
Application for the South Texas Project
Units 3 and 4
Combined Operating License**

**Docket Nos. 52-012, 52-013
May 31, 2011**

**REVISED INTERVENORS' CONSOLIDATED RESPONSE TO APPLICANT'S AND
STAFF'S STATEMENTS OF INITIAL POSITIONS**

Pursuant to the Initial Scheduling Order and the Board's March 11, 2011, Order regarding the schedule for the evidentiary hearing the Intervenors offer the following consolidated response to Applicant's and Staff's initial positions regarding contentions CL-2 and DEIS-1G.

Contention CL-2

The Staff proposes to apply the non-residential structures component of the GDP implicit price deflator.¹ Under the circumstances in this case, use of this index is not reasonable. First, the nature of SAMDAs is more specific than the non-residential structures component of the GDP implicit price deflator would reflect. For example, the Applicant posits that the lowest cost ABWR SAMDA is an improved bottom head penetration design.² Because of the specificity of this SAMDA the use of a more general index is not justified. Applying this generalized index to the SAMDA does not capture specific aspects of adjusted costs related to an improved bottom

¹Staff testimony, p. 37.

² Applicant Statement of Initial Position on CL-2, p. 25.

head penetration design.³The Staff has not justified use of the non-residential structures component of the GDP implicit price deflator because there is no evidence that specific sub-components of the SAMDAs are sufficiently similar to parameters in the non-residential structures component of the GDP implicit price deflatormake its application useful.⁴ Moreover, the Staff’s proposed index does not account for the equipment and software aspects of the index. These costs have actually decreased from 1991-2009.⁵ The equipment and software parameter reduced costs would have the effect of lowering the costs of SAMDAs. Therefore, the non-residential structures component of the GDP implicit price deflator should not be utilized because the Staff has not established that such is an “apples-to-apples” comparison with SAMDA costs.

Mr. Johnson argues that because the SAMDA costs are not detailed by Staff, a more generalized index should be applied.⁶ Hence, application of the gross domestic private investment index, which acknowledges Staff’s preferred exclusion of personal consumer expenditures, actually yields a lower escalation index.⁷ Additionally, use of the gross domestic private investment index includes productivity improvements that further dampens effects of inflation.⁸ Application of the gross domestic private investment index to the SAMDA costs produces an escalator rate (1.19) that is lower than the escalator Mr. Johnson utilizes in his direct testimony (1.31) and would therefore yield a lower cost for SAMDAs.⁹

³Johnson rebuttal testimony, p. 6.

⁴ Id.

⁵ Id. at pp. 6-7.

⁶ Id. at pp. 7-8.

⁷ Id.

⁸ Id. at p. 8.

⁹ Id. at pp. 7-9.

The Applicant argues that projections of natural gas prices should be based on commodity prices for 2009-2010.¹⁰ Mr. Johnson contends that 2009-2010 are not representative of long-term gas prices.¹¹ Additionally, long-term replacement power is more likely to be accomplished through purchase power contracts rather than relying on short-term access to the ERCOT energy balancing market.¹² NRG's power it generated and sold in 2010 yielded an average price of \$68.39 MWh that is appreciably greater than the approximately \$35-\$37 range of Applicant.¹³ Therefore, Applicant's replacement power costs are based on assumptions that it would get the benefit of purchasing power at the same cost as it generates it. This is not a realistic assumption given basic market behavior. NRG's 2010 price of \$68.39 is based on a more realistic model that assumes replacement power would be priced closer to retail (\$68.39) than NRG's wholesale costs for generation (\$35-\$37) over comparable time periods.¹⁴

Applicant assumes that natural gas prices will remain relatively stable and increase at the general rate of inflation.¹⁵ Mr. Johnson projects gas prices to increase greater than the rate of inflation.¹⁶ Applicant's projections for stability in gas prices is belied by Table 6 in the Zimmerman Pieniazek testimony.¹⁷ This table reflects broad fluctuations in gas prices over time. Additionally, irrespective of supply at any given time, gas is a nonrenewable resource and as supplies diminish prices will increase to reflect relative scarcity.

Applicant argues that loss of all STP units is a low-probability event that does not warrant consideration under NEPA.¹⁸ However, this argument does not address the premise

¹⁰ Applicant Statement of Initial Position on CL-2, p. 28.

¹¹ Johnson rebuttal testimony, p.9.

¹² Id. pp. 9-10.

¹³ Zimmerman Pieniazek testimony, p. 37.

¹⁴ Johnson rebuttal testimony, pp. 9-10.

¹⁵ Id. at p. 34.

¹⁶ Johnson rebuttal testimony, pp. 10-11.

¹⁷ Zimmerman Pieniazek testimony, p. 35.

¹⁸ Applicant Initial Position on CL-2, pp. 38-39.

contention CL-2 that presumes multiple unit failures. Additionally, this argument disregards the multiple unit, common cause failures at Fukushima Daiichi that began March 11, 2011.¹⁹ This ASLB has rejected the argument that multiple unit failures are so remote and speculative to justify exclusion from a NEPA analysis.²⁰ And this rejection occurred prior to the Fukushima Daiichi failures. Rejection of this argument now is even more justified given the events since March 11, 2011, at Fukushima Daiichi.

Applicant points to the February 2011, severe weather event in Texas to illustrate the ability of the ERCOT grid to absorb generation capacity losses.²¹ Mr. Johnson notes that this event was a close call regarding grid loss. For example, during the event reserve capacity dropped to as low as 445 MW and much of the reserve capacity was not immediately available. Additionally, the recovery from the February 2011, event was relatively fast. But this recovery is unlike that assumed in CL-2 that foresees an extended forced outage of multiple STP units.²²

Mr. Johnson differs with Applicant regarding whether ERCOT's 13.75% reserve margin would prevent adverse effects in the event of multiple unit loss at STP.²³ The ERCOT reserve margin is aspirational because ERCOT does not construct or own generating capacity. And ERCOT does not assume it will always have such a comfortable margin. Indeed, in the 2030 time frame, ERCOT projects a reserve margin of 4%-6% and loss of multiple STP units would arguably have an even greater disproportionate effect.

¹⁹Intervenors request that the ASLB take notice of the Emergency Petition to Suspend All Pending Reactor Licensing Decisions and Related Rulemaking Decisions filed with the Commission on April 14, 2011. The petition describes the failure of four Fukushima Daiichi units based on common causes.

²⁰ This argument was raised by Applicant in its objection to CL-2 (Applicant's Answer to CL Contentions at 25) and was considered and rejected by the ASLB in admitting CL-2. LBP-10-14, pp. 28-29.

²¹ Applicant Initial Position on CL-2, p. 38.

²² Johnson rebuttal testimony, p. 13.

²³ Id. at pp. 13-14.

Applicant asserts that because ERCOT has never sanctioned an entity for market power abuse it is not an issue that warrants consideration.²⁴ As discussed by Mr. Johnson, the absence of formal findings of market abuse does not mean such has not occurred historically.²⁵ And irrespective of whether improper market power is applied, the loss of all STP units would allow disproportionate market power to pivotal generators.²⁶ Applicant's argument is premised on the notion that loss of all four STP units would hardly be noticed by ERCOT. The reality is more nuanced and is dependent on, *inter alia*, reserve capacity at the time of loss and the relative power of pivotal generators. But to suggest that loss of all four STP units would be absorbed in a seamless manner overlooks realities in both the ERCOT fluctuations in reserve capacity and relative power of pivotal generators.

Applicant now adopts a drastically higher SAMDA cost of \$982,500.²⁷ This approach comports with neither the Applicant's analysis in its ER §7.5 or §7.5S. This increased SAMDA cost is based on Applicant's response to earlier Intervenor and Staff arguments and a decision to make its analysis less conservative.²⁸ Applicant did not address this less conservative analysis in its ER at §7.5S. Accordingly, the basis for this new SAMDA cost is not provided at the same level of detail discussed in the ER and it should be rejected.²⁹

Contention DEIS-1G

Staff and Applicant witnesses assert that the savings from the energy efficient building code are already accounted for in the ERCOT econometric forecasts.³⁰ Intervenor's expert, Philip Mosenthal, opines that the savings have only been minimally accounted for in the ERCOT

²⁴ Applicant Initial Position on CL-2, p. 32.

²⁵ Johnson rebuttal testimony, pp. 14-15.

²⁶ Id.

²⁷ Zimmerman Pieniazek testimony, p. 39;

²⁸ Id. at pp. 64-65.

²⁹ Johnson rebuttal testimony, p. 17.

³⁰ Pieniazek testimony p. 15; Scott testimony, p. 30.

forecast. First, the timing of improvements realized from the new building code tend to lag adoption.³¹ Moreover, because of slack in new construction during the recent recession energy conservation improvements have not been installed at a pace expected during more robust economic times.³²

Staff and Applicant witnesses advance the idea that savings from code/standards are double counted as part of energy savings programs.³³ Mr. Mosenthal concludes that there is not any significant double counting. First, the new building code savings are distinct from efficiency programs that were extant when the new building code was adopted. Therefore, the streams of savings are also distinct. Additionally, adoption of energy efficiency programs in Texas has produced savings in excess of mandate requirements. Moreover, trends for energy efficiency have considerable “head room” based on national trends. These circumstances weigh against any double counting of savings associated with codes/standards.³⁴

Staff and Applicant witnesses also take issue with the 2007 ACEEE study that projected savings from the energy efficient building code.³⁵ However, as explained by Mr. Mosenthal, his analysis did not depend on the 2007 ACEEE study and instead relied on a separate and more recent analysis.³⁶ Further, Mr. Mosenthal’s estimates of savings are conservative and do not include savings from major renovations.³⁷ These savings could result in “1,404 and 2,419 MW savings in 2020 and 2025, respectively, could in fact rise to more like 2,800-4,200 MW in 2020 and 4,800-7,200 MW in

³¹Mosenthalrebuttal testimony, pp. 5-6.

³² Id.

³³Pieniasek testimony, pp.16-17; Mussatti testimony, p. 33.

³⁴Mosenthalrebuttal testimony, pp. 7-9.

³⁵Pieneizak testimony, p. 3; Mussatti testimony, p. 39; Applicant Statement of position on DEIS-1G, pp.

³⁶Mosenthall rebuttal testimony, p. 9.

³⁷ Id. at p. 10.

2025.”³⁸ Additionally, neither Staff nor Applicant witnesses discuss likely upgrades to the building code expected periodically in the future.³⁹

Mr. Mosenthal disagrees with Applicant on whether the building code savings are enough to offset the need for power.⁴⁰ Mr. Mosenthal notes that the magnitude of coal capacity retirements is speculative given the uncertainties regarding environmental upgrades that might affect retirement decisions. The FEIS assumes all coal capacity over fifty years old will be retired. However, there has been no plant-by-plant analysis to determine which coal-fired units would be candidates for upgrades and longer service.⁴¹ Without such plant-by-plant analysis it is speculative whether such retirements will actually take place.

The Applicant argues that DEIS-1 is now moot because the effects of the adoption of the energy efficient building code have been accounted for in the FEIS.⁴² However, as argued by Mr. Mosenthal, the full magnitude of savings from the energy efficient building code and standards has not been fully recognized by the Applicant.⁴³ To find the contention moot requires a complete rejection of Mr. Mosenthal’s testimony that the Staff’s and Applicant’s conclusions regarding savings anticipated from the building code are incorrect and/or have already been accounted for by ERCOT’s econometric forecasts. Based on Mr. Mosenthal’s testimony, neither conclusion is justified.

³⁸ Id.

³⁹ Id. at pp.10-11.

⁴⁰ Mosenthal rebuttal testimony, pp. 11-12.

⁴¹ Id.

⁴² Applicant Statement of Position on Contention DEIS 1G, pp. 9-13.

⁴³ Mosenthal rebuttal testimony, pp. 3-7.

Applicant has posited that rather than actually account for demand reductions anticipated from the energy efficient building code a sensitivity test was utilized.⁴⁴ First, this does not meet the requirement of DEIS-1G to actually account for reduced demand. Mr. Mosenthal was able to do this analysis in his direct testimony.⁴⁵ The Applicant's sensitivity analysis assumes no such direct accounting is possible.⁴⁶ However, Mr. Mosenthal's analysis is straightforward and where it finds uncertainties such are bounded by reasonable estimates based on historical data.⁴⁷ Applicant's rejection of a demand reduction analysis is not justified based on the demand reduction analysis done by Mr. Mosenthal.

Applicant argues that its sensitivity analysis is adequate because it is reasonable based on available information.⁴⁸ However, Applicant's conclusion that inadequate data are available to reach reasoned conclusions is contradicted by Mr. Mosenthal's analysis. Moreover, reliance on a sensitivity analysis when a straightforward demand reduction analysis is anticipated by DEIS-1G raises questions about the Applicant's methodology. The N.R.C. has stated that need for power projections are reviewed based on methodology. "To be sure, the acceptability of any particular forecast made respecting the future need for the power...will hinge to an appreciable extent upon the propriety of the methodology employed in developing that forecast—including underlying data bases and assumptions."⁴⁹ Here, while Mr. Mosenthal does what DEIS-1G anticipates,

⁴⁴ Applicant Statement of Position on Contention DEIS 1G, p. 14.

⁴⁵ Mosenthal direct testimony, pp.5-9.

⁴⁶ Applicant Statement of Position on Contention DEIS 1G, p. 14.

⁴⁷ For example, Mr. Mosenthal discusses uncertainties related to code compliance and relies on federal studies that demonstrate upward trends on compliance.

⁴⁸ Applicant Statement of Position on Contention DEIS 1G, p. 14, citing *Kan. Gas & Elec. Co. (Wolf Creek Generating Station, Unit 1)*, ALAB-462, 7 NRC 320, 328 (1978).

⁴⁹ 7 N.R.C. at 328.

Applicant interposes a sensitivity study that does not fully account for savings from the energy efficient building code/standards.⁵⁰ The Applicant states that “[D]espite the inherent uncertainties in predicting the reduction in power demand attributable to the new building codes, the FEIS includes potential effects of the energy efficient building code in its sensitivity test.”⁵¹ In support of this conclusion Applicant cites Mr. Pieniasek’s testimony that states

“[O]nly a few months have passed since the adoption of the new building code. There is not enough reliable performance information available to assess its potential quantitative effect on the most recent ERCOT forecast. Thus, absent reliable, current information, forecasting any future reduction in power demand is speculative. Despite these uncertainties, the FEIS includes potential effects of the energy efficient building code in its sensitivity tests.”⁵²

Actually, the FEIS treatment of the effect of building code improvements is appreciably more attenuated. In explanatory text for FEIS Table 8-2 the only mention of the energy efficient building code is that it was adopted effective April 1, 2011. And neither Table 8-1 nor Table 8-2 make any quantifications for the effect of the energy efficient building code.⁵³

Applicant also argues that the ACEEE study is of no value because it considers peak load.⁵⁴ However, the contention specifically calls out reductions in peak demand anticipated by the adoption of the energy efficient building code. The contention is focused on the relative reduction of load, particularly peak load. The function of the EIS in this regard is to discuss the effect of the energy efficient building code on demand reduction; and as noted above in discussion of FEIS Tables 8-1 and 8-2, it has not done so.

⁵⁰ See for example, Mosenthal rebuttal testimony, pp. 3-6.

⁵¹ Applicant Statement of Position on Contention DEIS 1G, p. 16.

⁵² Pieniasek testimony, p. 16.

⁵³ FEIS, pp. 8-17-8-18.

⁵⁴ Applicant Statement of Position on Contention DEIS 1G, p. 20.

Conclusion

Based on the above arguments and authorities Contentions CL-2 and DEIS 1G should proceed to the evidentiary hearing.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on May 31, 2011 a copy of “**INTERVENORS’ CONSOLIDATED RESPONSE TO APPLICANT’S AND STAFF’S STATEMENTS OF INITIAL POSITIONS**” was served by the Electronic Information Exchange on the following recipients:

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
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STP NUCLEAR OPERATING COMPANY) Docket Nos. 52-012 & 52-013
)
)
(South Texas Project, Units 3 & 4))

Rebuttal Testimony of
Philip H. Mosenthal
On Behalf of
Intervenors

May 31, 2011

1 **(I.) Identification and Qualifications**

2 **Q. Please state your name and business address.**

3 A. Philip H. Mosenthal, Optimal Energy, Inc., 14 School Street, Bristol, VT 05443.

4

5 **Q. On whose behalf are you testifying?**

6 A. I am testifying on behalf of the Sustainable Energy and Economic Development (SEED)
7 Coalition, Public Citizen, and South Texas Association for Responsible Energy (Intervenors).

8

9 **Q. Are you the same Philip H. Mosenthal that submitted direct testimony on behalf of**
10 **the Intervenors on May 9, 2011?**

11 A. Yes. A summary of my professional qualifications are included in my direct testimony,
12 and my resume has been filed previously as Exhibit INT00002.

13 **(II.) Introduction and Summary of Testimony**

14

15 **Q. What is the purpose of your rebuttal testimony in this proceeding?**

16 A. My rebuttal testimony addresses the direct testimonies of NRG Energy Witness Adrian
17 Pieniasek (Witness Pieniasek) and NRC Staff Witnesses Daniel C. Mussatti (Witness Mussatti)
18 and Michael J. Scott (Witness Scott), filed on May 9, 2011. Specifically, it focuses on the DEIS
19 Contention 1-G. All three witnesses mentioned above raise the following points.

20 1. Much or all of the building codes & standards electric savings likely to occur in the
21 ERCOT territory are already implicitly included in ERCOT's 2010 forecast.

22 2. Building codes & standards electric savings represent some portion of double counting of
23 efficiency savings because much of this is already embedded in projected savings from
24 demand-side management (DSM) programs included in the ERCOT forecast.

1 3. The analysis by the American Council for an Energy Efficient Economy (ACEEE) in
2 2007 suffers from a number of problems and that actual impacts from codes & standards
3 in Texas will be far lower.

4 4. Regardless of the impacts from codes & standards, a need still exists for power by 2018
5 (the latest estimate of the earliest STP3&4 will produce saleable power)¹, and therefore
6 would not change the results of the final environmental impact statement (FEIS).

7
8 My rebuttal testimony shows that issues 1, 2 and 4 are not true. In addition, I briefly
9 address issues around the ACEEE study. My direct testimony identified most or all of the same
10 issues raised by Applicant and Staff witnesses about the ACEEE study. Further, in my direct
11 testimony I offered a new, more detailed analysis specific to the current Texas situation.
12 However, I do note that while we agree on the flaws in the ACEEE study, I disagree with the
13 results of adjustments made by Witnesses Pieniasek, Mussatti and Scott and stand by my more
14 detailed analysis of the actual likely impacts from codes and standards in the ERCOT zone, as
15 discussed in my direct testimony.

16 **(III.) Issue 1: Does the ERCOT 2010 Forecast Include Savings from Building Codes and**
17 **Standards?**

18
19 **Q. Please explain Issue 1.**

20 A. While statewide adoption of building energy codes in Texas is just now going into effect,
21 Witness Pieniasek quotes from the FEIS: “However new energy codes have been adopted
22 continuously by Texas municipalities during the 2000-2010 period ahead of statewide actions in

¹ Witness Pieniasek direct testimony, p. 5.

1 2010 and much of their impact would have been included in the ERCOT forecast.”² Witness
2 Scott also discusses this issue and concludes that the ERCOT forecast reflects savings from
3 building codes.³ He goes on to state:

4 This rapid rate of adoption [municipal adoption of codes] and the
5 resulting savings are implicitly built into the ERCOT econometric
6 forecasting equations. Thus, the ERCOT econometric forecasts
7 already incorporate a proportion of the projected reductions in
8 electric consumption expected when the 2009 building energy
9 codes were adopted in June, 2010. There is no way to easily
10 calculate what this proportion is or predict what the local adoption
11 rate would have been, but it is likely to be significant.⁴

12
13 **Q. Do you agree with Witnesses Pieniazek and Scott?**

14 **A.** Partially. I agree with most of the factual statements, including that some proportion of
15 codes savings are likely implicitly embedded in the ERCOT forecast. I disagree, however, with
16 both the FEIS conclusion that “**much of their impact** would have been included” and Witness
17 Scott that the amount included “is likely to be **significant**” [emphases added]. As I explain
18 below, the actual level of incorporation of code savings implicit in the ERCOT forecast is
19 extremely small, and likely only a tiny fraction of the ultimate impact over time, and therefore
20 insignificant. The FEIS and Witness Scott are both correct that many municipalities adopted
21 codes prior to the full State adoption of the energy efficient code, and in theory, these impacts
22 would affect the historical data that drive the econometric model somewhat. However, they seem
23 to assume these adoptions have been in place for a long time, and therefore fully reflected in the
24 historical data. On the contrary, most adoptions are relatively recent. Witnesses Scott and
25 Mussatti provide an exhibit to their direct testimony — Attachment 2 — which lists each

² Pieniazek direct testimony p. 15, quoting the FEIS, p. 8-26.

³ Scott direct testimony, p. 30

⁴ Scott direct testimony, p. 32.

1 municipality in Texas that had adopted a code higher than the Texas statewide code prior to the
 2 recent enhanced statewide codes. However, they do not indicate the dates these codes went into
 3 effect. I have selected the five largest cities in Texas from Attachment 2 and determined the
 4 effective dates of code adoption. These are presented below in Table 1 (note population data
 5 differs slightly from Attachment 2 and is based on Census data). These 5 cities alone represent
 6 all the large population centers on the list, and combined account for roughly 41% of the total
 7 population that adopted any codes.

8 As can be seen in Table 1, the only major city in Texas that adopted any that were in effect prior
 9 to 2010 was Houston. Because the FEIS relies on the 2010 ERCOT forecast, any adoptions that
 10 were not effective at least at the beginning of 2009 (the last year of historic load data) would not
 11 have *any impact at all on the 2010 ERCOT forecast*. Even Houston’s code (which was
 12 significantly lower than the statewide 2009 IECC and IRC does), was not effective until August
 13 2008 for non-residential and January 2009 for residential codes. As a result, virtually none of the
 14 impact from Houston’s codes would have influenced the forecast. At most, a single year of
 15 effectiveness would show up in the historic data. As I explain below, this would be a trivial and
 16 likely insignificant impact on the overall ERCOT forecast.

Table 1: Code Adoption dates for the Six Largest Cities in Texas

City	Population	Commercial	Effective Date	Residential	Effective Date
Houston	1,953,631	ASHRAE 90.1-2004 w/ Houston Amendments	8/1/2008	IECC 2006 w/ Houston Amendments	1/1/2009
Dallas	1,188,580	IECC 2009 w/ Dallas Amendments	4/1/2011	IECC 2009 w/ Dallas Amendments	4/1/2011
San Antonio	1,144,646	IECC 2009 w/ San Antonio Amendments	1/1/2010	IECC 2009 w/ San Antonio Amendments	1/1/2010
Austin	656,562	IECC 2009 w/ Austin Amendments	4/19/2010	IECC 2009 w/ Austin Amendments	4/19/2010
El Paso	563,662	IECC 2009 w/ El Paso Amendments	4/1/2011	IECC 2009 w/ El Paso Amendments	4/1/2011
Fort Worth	534,694	IECC 2009 w/ Fort Worth Amendments	4/1/2011	IECC 2009 w/ Fort Worth Amendments	4/1/2011

17

18
19
20

Population Data Source: Bureau of the Census, GCT-PH1. Population, Housing Units, Area, and Density: 2000 Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data Geographic Area: Texas – Place.

21 Even when adoptions were done relatively earlier, the level of impact on the forecast
 22 would be very small. Witness Scott acknowledges that it is impossible to determine easily what
 23 the specific impact is, and I agree. However, there are a number of reasons to believe any

1 influence on the forecast would be very small. First, codes only impact new construction and
2 major renovation and typically have grace periods of 6 months to a year before one must fully
3 comply. Second, there are significant lags from design to actual completion of larger new
4 buildings and significant impacts are often not seen for at least a year or two after adoption.
5 Finally, the recent historical data that would be most relevant and possibly show impacts from
6 codes are the recession years (2008 and 2009) where new construction activity and load growth
7 virtually disappeared, and the resulting reductions in load from lost economic activity are likely
8 to swamp any statistical impact of these patchwork codes on the overall trends in historic data
9 carrying through to the forecast. Because codes primarily impact new construction, even if a year
10 or two of codes effects were embedded in the historic data, the impacts on the total ERCOT
11 loads would be very small. With new construction representing typically less than 2% of total
12 loads in any given year, the reductions from codes for a year or two are very small. Rather,
13 where code savings are significant is in the long term because each year's small incremental
14 impact accumulates over time due to the long lifetime of new buildings and equipment.
15 Therefore, the total impact by 2020 or 2025 is significant, as shown in my direct testimony
16 Exhibit INT00004. However, the impact in say, 2009 historic data influencing the forecast would
17 be inconsequential at best.

18

19 **Q. What about savings from Federal Standards? Are they also partially included in the**
20 **ERCOT Forecast?**

21

1 A. No. My analysis presented in my direct testimony showing an additional 1,598 and 1,989
2 MW reductions in 2020 and 2025,⁵ respectively, from Federal standards are new savings that
3 have not occurred yet, and by definition would not be included in the ERCOT forecast. NRG and
4 NRC Witnesses do not discuss standards or make any distinction between them and codes.

5

6 **(IV.) Issue 2: Do Savings from Building Codes and Standards Represent Double**
7 **Counting with Efficiency Programs that Were Included in the ERCOT Forecast?**

8

9 **Q. Do you agree with Witnesses Pieniasek and Scott that Savings from Building Codes**
10 **and Standards Represent Double Counting with Efficiency Program Savings?**

11 A. No. Witness Scott correctly points out that some efficiency program participants may in
12 fact choose to far exceed the building code because of the program, and therefore, for that
13 customer perhaps, the code is irrelevant.⁶ However, this fundamentally misunderstands how
14 efficiency programs and regulatory policy work in practice. It is virtually universal that
15 ratepayer-funded efficiency programs adopt “baselines” for estimating savings that reflect
16 current codes for new market-driven installations. In other words, except for early retirement of
17 functioning equipment and systems in existing buildings, any new investments in new buildings,
18 equipment and systems are assumed to at least meet code, and then only the incremental savings
19 from exceeding code are counted. As a result, with the adoption of new codes, the baseline for
20 counting savings in Texas efficiency programs is raised, and the programs will only count *the*
21 *additional* savings captured beyond code. Because efficiency program goals will still exist based
22 on regulatory and legislative mandates, increasing building code requirements simply has the

⁵ Philip Mosenthal direct testimony, Table 2, p. 13.

1 result of ramping up efficiency programs to still meet their goals through *new savings over and*
2 *above those mandated by code*. Therefore, the future efficiency program savings assumed in the
3 ERCOT forecast will still need to come from these additional savings.

4

5 **Q. What do you Conclude is Represented by the ERCOT Forecast in Light of Issues 1**
6 **and 2?**

7 A. My conclusion is that the ERCOT Forecast does not include any significant impacts from
8 building codes, and no impacts from future Federal Standards. The Forecast does include
9 efficiency program savings, based on current regulatory and legislative rules at the time it was
10 developed. These are separate and distinct from future savings coming from building codes.

11 I further conclude these are conservative estimates that represent the lower bound of efficiency
12 program savings likely to occur in Texas. First, the passage of recent legislation will likely result
13 in ERCOT's forecast estimate of efficiency programs to be underestimated in the future.⁷

14 Second, Texas programs have often exceeded mandated goals, and some jurisdictions such as
15 Austin, far exceed them. Finally, the Texas mandates are relatively small compared to many
16 states, and the trend among leading jurisdictions is now to remove *more than 100% of all electric*
17 *load growth* through efficiency programs, to drive total electric loads downward, not upward.⁸ It

18 is highly likely that these mandates will increase significantly in the future, consistent with
19 trends throughout virtually all parts of the U.S., to significantly ramp up publicly funded
20 efficiency programs. For example, based on a recent ACEEE presentation electric DSM

⁶ Scott direct testimony, p. 33.

⁷ For example, SB 1125, SB 898 and HB 51.

⁸ See, for example, planned savings in Massachusetts, Rhode Island and Vermont.

1 spending in the U.S. and Canada have doubled from 2007 to 2010, from roughly \$3.2 billion to
2 \$6.4 billion.⁹

3 **(V.) Issue 3: What is the Relevance of the 2007 ACEEE Study on the Impacts of**
4 **Building Codes on Texas Electric Usage?**

5

6 **Q. Please explain the situation regarding ACEEE 2007 Study?**

7 A. In 2007 ACEEE published a report showing the potential savings for Texas from
8 hypothetical adoption of statewide building codes (Mussatti and Scott direct testimony, Exhibit
9 STP000008). This 2007 study was used as evidence by Intervenors by their witness David
10 Powers in his comments on the DEIS that impacts from building codes could be substantial and
11 were ignored in the DEIS, in violation of the requirement to assess the need for power. The
12 ASLB agreed that the contention (DEIS 1-G) was a legitimate issue to address. However, Mr.
13 Powers' comments were general in nature and the 2007 ACEEE study was used simply to
14 illustrate the potential importance of codes savings on the forecast.

15 Subsequently, my direct testimony was based on a separate analysis of the likely future
16 impacts from the known building codes as well as Federal Standards in Texas, based on the
17 current best information and forecast. I believe therefore, that the 2007 ACEEE estimate is no
18 longer relevant to these proceedings.

19 I also note that the Applicant and NRC Staff Witnesses identified numerous problems
20 with the presumed reliance on the ACEEE Study in these proceedings. For the most part I agree
21 with them. For example, they noted that:

⁹ ACEEE, Nadel Keynote Address, Slide 2, <http://aceee.org/files/pdf/conferences/mt/2011/Introduction%20-%20Steve%20Nadel.pdf>

- 1 • The study is now 4 years old, and relied on a forecast that is no longer relevant.
- 2 • The study addressed the full state of Texas, and not just the ERCOT load zone.
- 3 • The study assumed 100% compliance with all codes.
- 4 • The study simply assumed a placeholder 15% improvement over current practices
- 5 initially, and then a jump to 30% at 2020, rather than using factors that reflect the actual
- 6 codes adopted and the mandated cycles for code upgrades.

7

8 The analysis presented in my direct testimony properly deals with all these issues, and
9 represents the current best estimate of impacts from codes. I also note that these reflect *savings*
10 *in addition to future efficiency programs*, and not a double counting of the same savings. Finally,
11 I note that my estimate is likely significantly low because I only estimated savings from new
12 construction, which typically represents only a percent or two of the total electric load in any
13 given year. The new statewide standards apply to major renovations as well as new construction.
14 Assuming a typical renovation cycle of around once every 25 years for many buildings, this
15 would imply fully 4% of existing building energy consumption would turnover and become
16 applicable to the codes *each year*. This represents potentially 2-3 times more savings than I have
17 modeled in my analysis. As a result, my estimates of 1,404 and 2,419 MW savings in 2020 and
18 2025, respectively, could in fact rise to more like 2,800-4,200 MW in 2020 and 4,800-7,200 MW
19 in 2025.

20

21 **Q. Do you agree with the Adjustments made by Witnesses Pieniazek, Mussatti and**
22 **Scott to the ACEEE Study?**

23 A. No. These witnesses have attempted to make downward adjustments to the ACEEE
24 study, rather than redo the study with all correct assumptions. Their approach results in

1 erroneously low figures. Perhaps the largest flaw in their method is that they ignore the very
2 significant likely future upgrades to codes every 3 years, however it is by no means the only
3 problem with their approach. Regardless, I decline to go into a detailed critique of these
4 adjustments because the 2007 ACEEE Study should not be the basis for estimating impacts given
5 my new analysis.

6 **(VI.) Issue 4: Would Incorporating the Savings from Building Codes and Standards in**
7 **the EIS Analysis Affect the Conclusions on the Need for Power?**

8

9 **Q. Witness Pieniazek claims that even if the ERCOT forecast were adjusted for the**
10 **building codes savings there would still be a need for power.¹⁰ Do you agree?**

11 **A. No. This is far from certain at this point. As my analysis in my direct testimony shows**
12 **(Table 2, p. 13), without coal plant retirements there is no need for power until 2020, and at that**
13 **point the need is only 230 MW (less than 10% of the planned output of STP 3&4), after**
14 **accounting for building codes and standards savings. Considering mothballed plants, and the**
15 **very high likelihood of new renewable and gas generation being built in the ERCOT territory by**
16 **2020, effectively, there is likely to be no need for new additional power even after 2020. I also**
17 **note that this is even without considering the likely significant impacts from building codes**
18 **coming from renovation of existing buildings, which could be far higher than the 1,404 MW I**
19 **estimate from codes by 2020. As a result, it is entirely possible that no need will exist even in**
20 **2025 or beyond. In addition, as noted above, some states have now driven “load growth**
21 **negative,” and as climate change becomes a greater political issue this is highly likely in Texas**

¹⁰ Pieniazek direct testimony, p. 4.

1 as well. Therefore, it is quite possible there will be no need for new power for the foreseeable
2 future.

3 I acknowledge that some coal plant retirements may occur, and that with retirements
4 there *could be a need* for power by 2018 when STP 3&4 might go online. However, even that is
5 speculative. First, the assumption about retirements is based on an assumption of stringent
6 environmental regulations being imposed on these older coal plants — a far from certain
7 outcome, and one that has not yet happened — and that retirements would be driven by
8 economic decisions that it is not worthwhile to invest in improvements to bring these plants into
9 compliance. Second, the FEIS assumptions about retirements include *100% of all plants over 50*
10 *years old*, clearly an upper bound of those plants that could be retired. Applicant and NRC Staff
11 have done no plant-by-plant economic analysis to show which plants older than 50 years could
12 be retrofitted to meet potential new environmental regulations economically. Given the age of
13 these plants, it is likely these plants are already fully or mostly depreciated. Given that brand new
14 coal plants typically cost less than new nuclear units (in terms of all-in amortized costs per
15 lifetime kWh produced) when being built from scratch, it seems highly unlikely that fully or
16 mostly depreciated coal plants could not be retrofitted to meet environmental compliance at least
17 more cost-effectively than building STP 3&4. While it is possible market rates for baseload
18 power could rise somewhat because of these speculative environmental regulations and new coal
19 plant investments, it is still likely they could outcompete STP 3&4 in providing ERCOT with
20 this baseload power, and that plant operators will choose to do so.

21

22 **Q. Given that no one can predict the future with certainty, and the long lead time**
23 **necessary to bring a nuclear plant online, what do you recommend the NRC do?**

24 **A. I recommend the NRC reject the FEIS as insufficient because it does not adequately show**
25 **a definite need for power, and has failed to consider existing and known laws and regulations**

1 relating to already passed building codes and standards, while at the same time relying on
2 speculative arguments about environmental regulations that have not passed and that have
3 significant political and industry opposition.

4 While I acknowledge that nuclear plants take a long time to build, the risks of delay
5 caused by a rejection of the DEIS/FEIS are not great and the lights won't go out. Delays caused
6 by a rejection of the DEIS/FEIS will allow tremendous benefits, most of which bear on the need
7 for power from STP 3&4, to Texas and its ratepayers, even if in the end the plant is built. The
8 benefits include:

- 9 • the economic value of deferral, which is large because of the time value money and the
10 large capital costs associated with STP 3&4;
- 11 • allowing for greater certainty about possible environmental regulations, and analysis of
12 the economics of existing coal plants, resulting in a far clearer picture of the real likely
13 need for power in the future;
- 14 • allowing for greater certainty about future gas prices, hydrofracking technology and
15 regulation, and other issues that likely will have a major impact on future investments in
16 combined cycle gas plants that can serve as baseload power, perhaps far more cheaply
17 than STP 3&4;
- 18 • allowing for greater certainty about the level of continued investment in Texas in
19 renewable power, including wind, solar and biomass, that can reduce the need for power;
- 20 • allowing for better understanding of the current trends toward dramatic increases in
21 investment in efficiency throughout the U.S., as well as general climate change policies,
22 and the likely future resources provided by efficiency in Texas; and
- 23 • allowing for continued advancement in all sorts of emerging technologies that can
24 dramatically change the need for power in Texas in the future. For example, Smart Grid

1 alone has been estimated by ACEEE to have captured load reductions of 4-12% of
2 residential electric load in a national study.¹¹ Similarly, many have projected
3 photovoltaics could reach “grid parity” within just a few years (the point where PV can
4 compete economically without subsidies with coal and nuclear), which could usher in a
5 revolution of distributed, grid-connected power that could fundamentally change the
6 needs for even baseload power in Texas.¹²

7
8 All these things taken together can dramatically clarify the likely future needs for new
9 power, if any, and inform policymakers so that the best decisions can be made. Even a 2 year
10 delay in approval could provide much better knowledge and theoretically still allow STP 3&4 to
11 go online in 2020, the first year of a need for power under my conservative analysis.

12
13 **Q. Does this conclude your testimony?**

14 **A. Yes.**

¹¹ Ehrhardt-Martinez, Donnelly & Laitner, *Advance Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities*, June 2010, <http://aceee.org/files/pdf/SKP-KEM-Energy-Feedback-Perspectives-Sep-14-2010.pdf>.

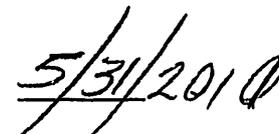
¹² See, for example, Wikipedia: http://en.wikipedia.org/wiki/Grid_parity. Among other references, Wikipedia cites General Electric’s Chief Engineer’s prediction that grid parity in sunny parts of the U.S. will occur around 2015. It notes “other companies predict an earlier date.”

Affidavit of Philip H. Mosenthal

I, Philip H. Mosenthal, affirm that the attached rebuttal testimony of Philip H. Mosenthal, dated May 31, 2011, on behalf of Intervenors submitted to the United States Nuclear Regulatory Commission before the Atomic Safety and Licensing Board re: In the Matter of STP Nuclear Operating Company (South Texas Project, Units 3 & 4), in Docket Nos. 52-012 & 52-013, is true and correct to the best of my knowledge. The subject testimony and supporting analyses were developed by me or under my direction.

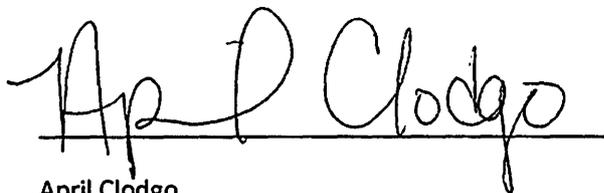


Philip H. Mosenthal

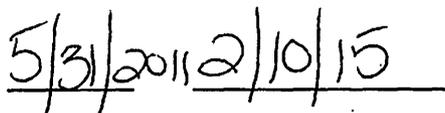


Date

Notarized by:

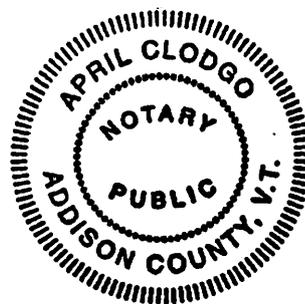


April Clodgo



Date

Notary Expires:



Affidavit

My name is Clarence L. Johnson and I am a resident of the City of Austin, County of Travis, Texas. I hereby declare, under penalty of perjury, that: (1) I am responsible for the pre-filed Rebuttal Testimony of Clarence Johnson, filed in Docket Nos. 52-012 and 52-013 (COL) before the Atomic Safety & Licensing Board, and attached hereto; and (2) The contents of the testimony are true and correct to the best of my knowledge and belief.



Clarence Johnson

Dated: May 31, 2011

**U.S. NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY & LICENSING BOARD**

**IN THE MATTER OF
STP NUCLEAR OPERATING COMPANY
(SOUTH TEXAS PROJECT UNITS 3 &4)**

**§
§
§**

**DOCKET NOS.
52-012 & 52-013
(COL)**

REBUTTAL TESTIMONY

OF

CLARENCE L. JOHNSON

ON BEHALF OF THE

INTERVENORS

May 31, 2011

**DIRECT TESTIMONY OF CLARENCE JOHNSON
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ATTACHMENTS

Exhibits

1 I. INTRODUCTION

2 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

3 A. My name is Clarence Johnson. My address is 3707 Robinson Ave., Austin, Texas 78722.

4 Q. ON WHOSE BEHALF ARE YOU PRESENTING REBUTTAL TESTIMONY IN
5 THIS PROCEEDING?

6 A. I am presenting testimony on behalf of the intervenors.

7 Q. ARE YOU THE SAME CLARENCE JOHNSON WHO PREVIOUSLY FILED
8 DIRECT TESTIMONY IN THIS PROCEEDING?

9 A. Yes.

10 Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS
11 PROCEEDING?

12 A. My testimony rebuts the direct testimony regarding contention CL-002 filed by the NRC
13 Staff and Applicant. To the extent my testimony does not address particular statements
14 or concepts presented in Staff and Applicant testimony, such omission should not be
15 construed as agreement with those statements or concepts.

16 Q. HAVE YOU REVIEWED ANY ANALYSES PRESENTED BY APPLICANTS
17 AND STAFF?

18 A. Yes. I reviewed the testimony of Applicant witnesses Zimmerly and Pieniazek and Staff
19 witnesses Emch, Rishel, and Anderson.

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Q. DO YOU AGREE WITH STAFF’S PROPOSED ESCALATION FACTOR FOR SAMDA IMPLEMENTATION COSTS?

A. No. The Staff proposes to use the non-residential structures component of the GDP implicit price deflator. My testimony proposed to use either the PCE, which is comparable to the Applicant’s use of the CPI, or the overall GDP implicit price deflator, with a preference for the core versions of each index. The Staff’s rationale is that the non-residential structures component of the GDP deflator is “more specific to private capital investment than other inflation indexes...”⁴ The results for this component are an extreme outlier from other general inflation measures, whether the PPI, PCE, CPI, or GDP implicit price deflator. Furthermore, the SAMDA projects appear to be more narrow in composition than overall nuclear plant construction costs. Perhaps the non-residential structure component index would be appropriate for inflating the overall total costs of a plant or building. But the Staff has not demonstrated that the individual SAMDA projects are composed of costs appropriately compared to the structures index. The non-residential structure component is composed of specific ratios of labor, construction commodities, equipment, electrical devices, furnishings, etc. If the SAMDA projects are not comprised of similar ratios for those sub-components, the structure index could result in extremely inaccurate inflation results---because the sub-components have a wide range of different price inflation results. The structure component index is not the only index comprising GDP private non-residential fixed investment. Equipment and Software is the other component of GDP private non-residential fixed investment. Unlike

⁴ Staff Testimony at 37.

1 the structure index, the equipment and software index is *negative* for the period 1991 –
2 2009. “Equipment” likely would be a significant component of the SAMDA projects, but
3 the Staff has not shown whether the equipment ratio for the SAMDAs is more aligned
4 with the composition of all non-residential structures or the equipment and software
5 component.⁵ Yet the difference in the two indices spans a range from a negative value to a
6 high positive value.

7 **Q. CAN YOU EXPLAIN WHY A MORE GENERAL GDP COMPONENT INDEX**
8 **WOULD BE APPROPRIATE?**

9 A. Yes. I can understand the Staff’s view that household consumer inflation should be
10 excluded from the escalation index. However, more general GDP indices are available
11 that do not include personal consumer expenditures. The 1991 – 2009 inflators based on
12 various categories of capital components that exclude household expenditures are shown
13 below.

14 **COMPONENT INDEX 2009/1991**

15
16 Gross Domestic Private Investment 1.19
17 Non-Residential Fixed Investment 1.033
18 Non-Residential Structures 2.25
19 Equipment & Software 0.78
20

21 The Staff has chosen the most extreme escalator from the investment indices. Without a more
22 detailed review of the composition of SAMDA costs, a higher level index, such as Gross
23 Domestic Private Investment, would be a more reasonable choice. That index would result in an
24 escalation of SAMDA implementation costs significantly less than my recommendation (1.31).

25

⁵ The Bureau of Economic Analysis NIPA Handbook referenced by Staff defines the Equipment and Software component as “purchases by private businesses and non-profit institutions of new equipment (such as furniture,

1 In addition, price indices reflect only changes in prices, and therefore do not account directly for
2 productivity growth. The U.S. Bureau of Labor and Standards calculates total factor productivity
3 (TFP) growth, which tends to offset pure price inflation. The TFP growth for the period in
4 question is approximately 1.4% per annum. By including “equipment and software,” which is
5 one of the principal sources of productivity increases in the business sector, the gross domestic
6 private investment index indirectly recognizes productivity growth.

7

8 **Q. THE USE OF PRICE INDICES TO ESTIMATE SAMDA COSTS HAS**
9 **PRODUCED A WIDE RANGE OF SAMDA IMPLEMENTATION COSTS. IS**
10 **THIS AN IDEAL METHOD OF ESTIMATING SAMDA IMPLEMENTATION**
11 **COSTS?**

12 **A.** Not at all. But it is the consequence of the environmental report’s use of SAMDA cost
13 estimates produced in 1991. If one assumes that the proposed STP units 3 & 4 cannot be
14 put into service until 2020 at the earliest (a reasonable assumption, given the current
15 status of the plant), the original cost estimates for the SAMDAs will be almost 30 years
16 old. Clearly, a preferable—and more accurate---course of action would have been to
17 prepare new current cost estimates with the Applicant’s filing. Instead, applying 18 year
18 escalation rates to 1991 budgeted estimates will produce a greater margin of error; and
19 even fractional differences in the choice of escalation indices will result in material
20 differences.

21 **Q. PLEASE SUMMARIZE YOUR CONCLUSION REGARDING THE**
22 **ESCALATION RATE APPLIED BY THE STAFF.**

machinery, and motor vehicles) and of computer software which meets the definition of fixed investment.” (p. 6-5)

1 A. Inflating the 1991 SAMDA costs by 2.25, as recommended by the Staff, should be
2 rejected. The inflation rate used by the Staff falls outside the range of generally applied
3 indicia of price inflation for that period, and should not be used in the absence of more
4 detailed review of the composition of SAMDA cost estimates. To the extent that
5 personal consumer expenditures should be excluded from the inflation index, a more
6 generalized private domestic fixed investment index would result in an inflation
7 multiplier less than I recommended in my direct testimony.

8 **III. REBUTTAL OF APPLICANT TESTIMONY**
9

10
11 **Q. APPLICANT'S TESTIMONY USES ELEVEN MONTHS OF ERCOT PRICING**
12 **DATA FROM 2010 TO SUPPORT THE USE OF 2009 ERCOT PRICES FOR**
13 **CALCULATING REPLACEMENT POWER. WHAT IS YOUR RESPONSE?**

14 A. Neither 2009 or 2010 should be considered representative of future power prices for STP
15 replacement power. As I noted in my testimony, 2009 prices were influenced by
16 historically low natural gas prices which were suppressed by the impact of a major
17 national economic recession. The national economy has begun to recover, but in a
18 relatively slow fashion. As a result, 2010 gas prices continue to be somewhat depressed,
19 and electric power prices for 2010 are likely to reflect lower pricing than the future years
20 which are relevant to STP 3 & 4 replacement power costs. Furthermore, balancing
21 energy prices reflect only a small percentage of the overall ERCOT energy market. The
22 average power costs reflect the costs of entering into bilateral contracts, hedging and
23 trading costs, and ancillary services. The owners of STP are unlikely to rely on the
24 relatively shallow balancing energy market to replace STP generation for an extended
25 period of time, but instead are likely to enter into bilateral contracts to purchase power to

1 replace the STP generation. 2010 Texas power sales by NRG Energy, owner of the
2 largest share of the current STP units, provide an alternative benchmark for power costs
3 in the Houston and South zones of ERCOT. The average cost per MWH can be
4 calculated from NRG's SEC Form 10-K, based on NRG's total Texas power sales
5 revenues and annual power output.⁶ NRG's generated and sold power at an average price
6 of \$68.39 per megawatt-hour in 2010.⁷ This is substantially more than the \$37 range of
7 2009 and 2010 balancing energy power prices reflected in Applicant's testimony.

8
9 **Q. THE APPLICANT'S TESTIMONY DISCUSSES THE \$60 - \$63 PER MWH**
10 **PRICE OF POWER USED IN YOUR INITIAL REPORT. CAN YOU DISCUSS**
11 **THE CONTEXT OF THAT ANALYSIS?**

12 A. Yes. In my initial report, I attempted to develop a methodology for projecting the price of
13 power during the period that STP 3 & 4 would be in operation. The method was based
14 on projecting implicit generation heat rates and gas prices over a long term period, and it
15 produces a \$60 - \$63 per MWH (real \$2008) price for the period 2020 - 2025, which I
16 assumed to be the initial three or four years of operation. My initial report assumed real
17 gas price escalation (e.g., a rate higher than general inflation) over the long term. A 2020
18 commercial operation date implies that the relevant period for forecasting power prices
19 could extend out to 2060. Extending the methodology in my initial report over the 40
20 year life of STP 3 & 4 would produce much higher real power prices than the 2008
21 balancing energy prices used as a "sensitivity" by the Application. Given that the
22 Applicant's 2008 ERCOT price sensitivity produced power prices that are more

⁶ NRG 2010 SEC Form 10-K at 15-16; \$3.057 billion in power revenues divided by 44.7 million MWHs.

1 representative of the long or intermediate term future than the depressed 2009 prices, I
2 chose to accept the Applicant's 2008 ERCOT price in order to avoid potential confusion
3 which could arise from interjecting a different priceforecast. However, I disagree with
4 Applicant's contention that the 2008 ERCOT prices are conservative, given the fact that
5 natural gas prices are likely to escalate faster than inflation over the long term.

6 **Q. APPLICANT'S TESTIMONY AGREES THAT FUTURE WHOLESALE POWER**
7 **PRICES WILL BE DRIVEN BY GAS PRICES, BUT DISPUTES THAT SUCH**
8 **PRICES WILL GROW AT A FASTER RATE THAN INFLATION.**
9 **APPLICANT'S TESTIMONY AT PAGE 38 POINTS TO DECLINES IN 2009**
10 **POWER PRICES AS EVIDENCE OF THE LACK OF REAL ESCALATION.**
11 **HOW DO YOU RESPOND?**

12 A. First, one should look at the long term price trend for real escalation rates, rather than 1
13 or 2 individual years. I have already addressed the economic conditions which led to a
14 decline in 2009 gas prices. Over any short term period, gas prices can be very volatile
15 and may rise and fall with short term conditions. However, natural gas is a finite
16 resource, and over the long term the price is likely to grow at a rate in excess of general
17 inflation. The Applicant's testimony foresees "stable" gas prices over the next decade.
18 However, it requires a great deal of optimism to assume that STP 3 & 4 will even be
19 operating within the next decade. The more relevant time period is the potential 40 year
20 operational period extending to approximately 2060. Second, the U.S. Energy
21 Information Administration's 2011 Annual Energy Outlook projects a long term 2.3%
22 real escalation rate (above inflation) in natural gas spot prices at the Henry Hub.⁸ Third,

⁸ EIA spreadsheet, aeotab_13-1

1 ERCOT's Long Term Planning Task Force forecasts real (\$2009) natural gas prices of
2 \$8.49 per mmbtu and an average locational marginal price of \$87.75 per MWH in 2030.⁹
3 The ERCOT planning study reflects real increases in both gas prices and power prices,
4 and supports my position that the Applicant's use of 2008 balancing energy prices as a
5 sensitivity should not be characterized as conservative. Fourth, STP 3 & 4 is unlikely to
6 be built unless natural gas prices are forecasted to rise substantially. The economic
7 feasibility of the project depends on high gas prices.

8 **Q. APPLICANT'S TESTIMONY STATES THAT THE POSSIBILITY OF A**
9 **SEVERE ACCIDENT AT ONE OF THE ABWR'S, FOLLOWED BY THE**
10 **SHUTDOWN OF THE REMAINING STP UNITS, AND THE LOSS OF THE**
11 **ERCOT GRID IS "SPECULATIVE AND REMOTE." PLEASE RESPOND TO**
12 **THAT ASSERTION.**

13 **A.** My testimony indicates that this is a low probability event with very large consequences.
14 However, the Applicant does not appear to consider the potential for a common mode
15 event which could affect the ABWR and other generating units in ERCOT at the same
16 time. For example, natural disasters like a hurricane or tornados could remove other
17 generating units from the grid at the same time that the natural event has increased the
18 risk of a severe accident at the STP site.

19 **Q. THE APPLICANT POINTS TO THE FEB. 2, 2011 ROLLING BLACKOUTS IN**
20 **ERCOT AS EVIDENCE THAT THE SIMUELTANEOUS LOSS OF THE STP**
21 **UNITS WOULD NOT CAUSE SERIOUS EFFECTS ON THE ERCOT GRID. DO**
22 **YOU AGREE?**

⁹ ERCOT Long Term Planning Task Force, May 2011, "Process Overview and Interim Results," at 7, May 2011.

1 A. Not necessarily. First, contrary to the impression given by Applicant’s testimony, the
2 loss of generation on Feb. 2, 2011 due to freezing weather was a very serious event. The
3 Independent Market Monitor stated that responsive reserve capacity fell as low as 445
4 MWs (compared to a minimum requirement of 2,300 MW) and characterized the
5 operating reserves as “perilously low for a sustained period of time.”¹⁰ Also, of 15 units
6 that had contracts with ERCOT to provide black start service¹¹, one unit failed to start
7 and 8 units tripped.¹² This implies that ERCOT could have faced major obstacles to
8 recovery if all or part of the grid had gone black. Second, the Feb. 2, 2011 event
9 illustrates the possibility of significant risk to the grid if a STP forced outage occurred at
10 the same time that other generating units have incurred outages due to severe weather
11 events. Third, unlike the large amount of capacity shut down by freezing weather and
12 gradually brought back into service on Feb. 2d and 3d, the STP capacity (after a ABWR
13 accident) cannot be returned to service over a short period of time.

14 **Q. APPLICANT’S TESTIMONY SUGGESTS THAT MOTHBALLED GAS**
15 **CAPACITY AND ERCOT’S 13.75% INSTALLED CAPACITY RESERVE**
16 **MARGIN WOULD PREVENT BLACK OUTS AND PRICE SPIKES IF THE STP**
17 **UNITS WERE SHUT DOWN. PLEASE RESPOND TO THAT ASSERTION.**

18 A. ERCOT does not control the construction of capacity to meet reserve requirements, and
19 instead relies on the market to meet installed reserve requirements. The possibility exists
20 that ERCOT installed capacity will fall below the required reserve margin at various
21 points in time during the future. A recent ERCOT study examined the impact of

¹⁰ “IMM Report on Investigation of ERCOT Energy Emergency Level 3 on Feb. 2, 2001” at 6, 19 (April 21, 2011).
¹¹ “Black Start units” refer to generating units that will be used by ERCOT to re-start the grid if a black out were to occur.
¹² Texas Reliability Entity Report, May 13, 2011 at 18.

1 proposed EPA environmental regulations, and predicted that the regulations would cause
2 8,000 MW of older gas fired generation to be retired, resulting in a reserve margin of 2%
3 in 2015.¹³ Furthermore, results of ERCOT's Long Range Planning Task Force Study
4 project reserve margins as low as 4% - 6% in 2030 under the Business as Usual
5 scenario.¹⁴ The ERCOT impact resulting from a severe accident at one of the ABWRs
6 will be affected by the amount of installed generation reserves at the time the accident
7 occurs.

8 **Q. THE APPLICANT'S TESTIMONY STATES THAT NO ERCOT GENERATOR**
9 **HAS EVER BEEN FOUND GUILTY OF MARKET POWER ABUSE, AND**
10 **IMPLIES THAT THIS JUSTIFIES AN ASSUMPTION OF PERFECT**
11 **COMPETITION IN THE SIMULATION MODEL USED TO CALCULATE**
12 **MARKET IMPACTS OF A STP SHUTDOWN. DO YOU AGREE?**

13 A. No. The staff of the Public Utility Commission has brought numerous enforcement
14 actions for market manipulation, but in most cases, a settlement was reached whereby the
15 generator pays a fine or restitution and agrees to take mitigation measures in the future.
16 Although the settlements may not require an admission of market power abuse, that is not
17 sufficient basis to ignore the *possibility* of market power. Among the notable cases,
18 Luminant agreed to pay a \$15 million fine for alleged market manipulation during a
19 series of winter price spikes in 2005. I also disagree with the Applicant Testimony's
20 claim that the price impact of market power would be the same for both the with- and
21 without- STP cases in its simulation of ERCOT prices. Shortage situations allow pivotal

¹³ "Review of Proposed Environmental Regulations on ERCOT" at i. ERCOT System Planning, May 11, 2011.

¹⁴ ERCOT Long Range Planning Task Force, May 2011.

1 generators¹⁵ to charge higher prices than they would in normal supply conditions.
2 Therefore, the price impact of market power can increase when the STP units are
3 removed from the market. Although I agree with the Applicant that market power
4 impacts cannot be quantified precisely, the Applicant could have attempted to
5 approximate a market power premium to the prices in the without-STP case.

6
7 **Q. APPLICANT'S TESTIMONY CLAIMS THAT PRICE INDICES APPLIED TO**
8 **SAMDA COSTS SHOULD NOT BE ADJUSTED FOR REGIONAL OR LOCAL**
9 **PRICE DIFFERENTIALS BECAUSE MOST OF THE EQUIPMENT IS**
10 **PURCHASED AT NATIONWIDE PRICES FROM OUTSIDE THE REGION OR**
11 **LOCALITY. DO YOU AGREE THAT IT IS INAPPROPRIATE TO**
12 **RECOGNIZE LOCAL OR REGIONAL COST DIFFERENCES?**

13 **A.** No. Even if one assumes that materials and equipment are purchased outside the region
14 or locality, local labor costs will be incurred; and salary and wage rates vary by region.

15
16 **IV. STAFF & APPLICANT'S RISK ADJUSTED SAMDA**

17 **Q. HAS THE APPLICANT'S TESTIMONY CHANGED THE 2009 DOLLAR**
18 **AMOUNT OF THE LOWEST COST SAMDA FROM THE AMOUNT USED IN**
19 **THE AFFIDAVIT ATTACHED TO THE APPLICANT'S MOTION FOR**
20 **SUMMARY JUDGEMENT?**

21 **A.** Yes. Page 30 of the affidavit attached to the Applicant's motion for summary judgement
22 identifies the lowest cost SAMDA as \$158,000 (\$2009). In the corresponding paragraph

¹⁵"Pivotal" generation refers to suppliers whose capacity is necessary in order to meet hourly demand at a particular time.

1 of Applicant's direct testimony (page 63), the lowestcost SAMDA is shown as \$982,500
2 (\$2009). From the standpoint of intervenors, this gives the perception of a moving target.

3 **Q. WHAT IS THE BASIS FOR THE CHANGE?**

4 A. The approach used in the Applicant's environmental report and affidavit was to perform a
5 screening analysis which did not identify each SAMDA's contribution to core damage
6 frequency (CDR) in the quantification of SAMDA implementation costs. Intervenors
7 responded to the screening analysis methodology in preparing their support for
8 Contention CL-002. Applicant's direct testimony has increased the SAMDA
9 implementation cost to reflect risk-adjusted costs, i.e., the SAMDA costs have been
10 increased to reflect the claimed effect of the SAMDA action in reducing the probability
11 of core damage. In other words, the Applicant's testimony increases SAMDA
12 implementation costs to reflect the claim that each individual alternative measure
13 produces a relatively small reduction in CDR. The conclusion of Applicant's direct
14 testimony (p. 64-65) describes this change obliquely: "we also have removed some of the
15 conservatism included in the Joint Affidavit."

16 **Q. HAS THE STAFF TAKEN A SIMILAR POSITION?**

17 A. Yes. The Staff's testimony takes a similar position, except that the CDF adjustments are
18 applied to averted costs instead of SAMDA costs.

19 **Q. SHOULD THE RISK ADJUSTMENTS BE RELIED UPON TO REJECT**
20 **INTERVENORS' TESTIMONY?**

21 A. No. Intervenors contended that the environmental reports' replacement power costs for
22 monetizing the collocation severe accident impact was understated, and my testimony
23

1 demonstrates that to be true. Intervenors contested the Applicant's claim that none of the
2 SAMDAs passed the screening test used by the Applicant. My testimony shows that the
3 lowest cost SAMDA, based on the screening methodology relied upon by the Applicant,
4 is less than averted costs if ERCOT power cost impacts are recognized and the 1991 cost
5 estimates are properly converted to 2009 dollars.

6 **Q. WHAT IS YOUR RECOMMENDATION?**

7 A. I contend that intervenors have shown that the Applicant dismissed further review of
8 SAMDAs based upon an incorrect conclusion that no SAMDAs passed the screening test.
9 My recommendation is that a positive screening test should trigger a more robust review
10 of the SAMDAs by the Applicant. The Applicant's effort to make the screening test
11 results "less conservative" by changing the costs to risk adjusted dollars does not permit
12 intervenors to effectively respond to a fundamentally different analysis. If the Applicant,
13 instead, is required to provide a more in depth analysis of SAMDA costs, the results will
14 be more transparent and comprehensive. Given the significant potential costs of a severe
15 accident to residents, consumers, and the economy in Texas, my recommended approach
16 should provide greater assurance and confidence to the public that all potential mitigation
17 measures have been adequately reviewed.

18 **Q. PLEASE DESCRIBE HOW A MORE ROBUST REVIEW WOULD BE**
19 **BENEFICIAL.**

20 A. First, more accurate and up-to-date cost estimates for relevant SAMDAs should be
21 developed. As discussed previously in my testimony, the SAMDA cost estimates are 20
22 years old. Simply escalating those costs for inflation, as presented in this proceeding,
23 does not permit consideration of productivity improvements and technological changes

1 which may change the costs and/or effectiveness of an alternative. Second, the Staff and
2 Applicant have not provided adequate support for their assumption that measures which
3 mitigate, rather than prevent, core damage have no effect on collocated units or off-site
4 replacement power. For example, is it possible that a mitigation measure which does not
5 contribute to CDR may still reduce the amount of damage incurred at collocated units or
6 reduce the duration of shut downs at collocated units? Third, the Applicant can evaluate
7 whether any lessons learned from the severe accident at Fukushima Daiichi would change
8 the conclusions regarding particular SAMDA alternatives. The CDR for a unit like
9 Fukushima (in the range of 10^{-6}) does not seem consistent with core damage at three
10 reactors. I don't think it is unreasonable for the Staff and Applicant to examine whether
11 any of the events at Fukushima would modify their reliance upon the CDRs used in this
12 application.

13 **Q. DOES THIS CONCLUDE YOUR TESTIMONY AT THIS TIME?**

14 **A. Yes.**