

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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|------------------------------------|---|-----------------------------|
| In the Matter of |) | |
| |) | |
| 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 Pieniazek 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 Pieniasek 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 Pieniasek 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>.

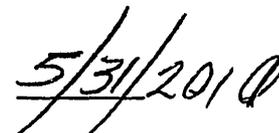
¹² See, for example, Wikipedia: http://en.wikipedia.org/wiki/Grid_parity. Among other references, Wikipedia cites General Electric’s Chief Engineer’s prediction that grid parity in sunny parts of the U.S. will occur around 2015. It notes “other companies predict an earlier date.”

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.

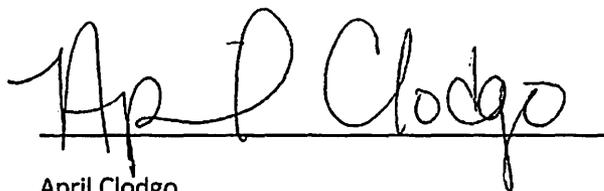


Philip H. Mosenthal

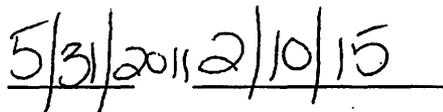


Date

Notarized by:



April Clodgo



Date

Notary Expires:

