

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

**DOCKET NO. 120009-EI
FLORIDA POWER & LIGHT COMPANY**

**IN RE: NUCLEAR POWER PLANT COST RECOVERY AMOUNT
TO BE RECOVERED DURING THE PERIOD
JANUARY - DECEMBER 2013**

REBUTTAL TESTIMONY & EXHIBITS OF:

STEVEN R. SIM

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5 **July 9, 2012**

6
7 **Q. Please state your name and business address.**

8 A. My name is Steven R. Sim and my business address is Florida Power & Light
9 Company, 9250 West Flagler Street, Miami, Florida 33174.

10 **Q. Have you previously submitted direct testimony in this proceeding?**

11 A. Yes.

12 **Q. Are you sponsoring any rebuttal exhibits in this case?**

13 A. Yes. I am sponsoring the following two exhibits that are attached to my
14 rebuttal testimony:

15 Exhibit SRS – 12: Summary of Potential Additional Benefits for New Nuclear
16 Capacity If a Renewable Portfolio Standard (RPS) is
17 Imposed: Calculation for EPU Project; and,

18 Exhibit SRS – 13: 2011 Feasibility Analysis Results for the EPU Project –
19 Revisited, Total Costs and Total Cost Differentials for All
20 Fuel and Environmental Compliance Cost Scenarios in
21 2011\$: Sensitivity Analysis Assuming Higher EPU Cost
22 Estimate.

23 **Q. What is the purpose of your rebuttal testimony?**

1 A. The purpose of my rebuttal testimony is to explain why a number of
2 statements and recommendations made by Office of Public Counsel (OPC)
3 Witnesses Jacobs and Smith who have filed testimony in this docket are
4 fundamentally flawed and, therefore, should not be relied upon by the Florida
5 Public Service Commission (FPSC).

6 **Q. How is your rebuttal testimony organized?**

7 A. My rebuttal testimony is organized into 4 sections. The first section “sets the
8 stage” to provide what I believe is the proper context from which to view the
9 testimony of the OPC witnesses. In the second section, the OPC witnesses’
10 primary recommendation is examined. In the third section, a number of
11 “hedge” benefits that accompany the EPU project, but which are not included
12 in FPL’s 2012 feasibility analyses, and which are completely ignored in the
13 OPC witness testimony, are presented and discussed. In the fourth section,
14 specific points regarding the OPC witnesses’ testimony are discussed.

15
16 Because both of these witnesses are from the same company (GDS), and
17 appear to have virtually identical views, I will use the convention of referring
18 to their testimonies as “GDS” testimony or analyses. However, when
19 discussing a specific statement, I will identify the witness who provided that
20 statement.

21 **Q. Please summarize your rebuttal testimony.**

22 A. The results of FPL’s 2012 feasibility analyses in regard to the EPU project is
23 that completing the EPU project is projected to be cost-effective in 6 of 7

1 current scenarios of fuel cost forecasts and environmental cost forecasts. (In
2 the 7th scenario, low fuel costs and low environmental compliance costs are
3 assumed for each year for at least 30 years.) Based on these results, FPL
4 concludes that completing the EPU project is cost-effective and a valuable
5 addition for FPL's customers. GDS's testimony does not state that they
6 disagree with the 2012 feasibility analysis results or with FPL's conclusion.

7
8 However, GDS attempts, again this year, to "change the rules of the game" in
9 the final stages of the EPU project by recommending that a recent preliminary
10 cost forecast for the portion of the EPU project at the Turkey Point site be
11 turned into a binding cost value and that costs spent above this new "standard"
12 should not be allowed to be recovered. GDS bases this recommendation on a
13 overly simple "let's divide by two" calculation which they claim shows, with
14 certainty, that the portion of the EPU project at the Turkey Point site is not
15 cost-effective.

16
17 Yet an examination of the results of GDS's own analysis shows that their
18 claim of certainty in their conclusion cannot be supported. The result for one
19 of seven scenarios they analyzed already shows a cost-effective result. In
20 addition, the results in their other six scenarios could clearly be reversed if, for
21 example, values in assumptions and forecasts for natural gas and
22 environmental compliance costs used in the 2012 feasibility analyses
23 increased to levels used in feasibility analyses in the last few years. The

1 conclusion that GDS attempts to make from its analysis, and the
2 recommendation it makes based on its analysis and conclusion, have come
3 undone because GDS makes the common mistake of forgetting that
4 assumptions and forecasts used in a particular feasibility analysis are frozen at
5 a point in time in order to complete the analysis. Thus projected benefits for a
6 project, such as the EPU project, will certainly change in the future. And,
7 because the values in the current assumptions and forecasts are lower than
8 values assumed/forecasted for all prior feasibility analyses, it is likely that any
9 significant, long-term change in these values will be toward higher values
10 which would result in greater benefits for both the EPU and Turkey Point 6 &
11 7 projects.

12
13 In addition, GDS's analysis and testimony have ignored a number of potential
14 "hedge" benefits, mentioned in my direct testimony, that new nuclear capacity
15 makes possible. These hedges made possible by new nuclear capacity provide
16 potential benefits similar to those provided by insurance policies and by
17 financial selections chosen to diversify a financial portfolio. Having such
18 hedges in place provide significant benefits if future circumstances are
19 different from those currently forecasted. FPL's 2012 feasibility analyses do
20 not include these potential hedge benefits because they would be triggered by
21 events not assumed in FPL's current forecasts. However, a quantification of
22 these potential benefits shows that they are significant as will be discussed.

23

1 In conclusion, none of GDS's arguments change the fact that completion of
2 the EPU project is still projected to be a cost-effective and valuable addition
3 for FPL's customers. Furthermore, the feasibility analyses do not include a
4 number of significant potential hedge benefits that the EPU project makes
5 possible. When one adds the potential for these benefits to those already
6 accounted for in the feasibility analysis, the EPU project becomes even more
7 attractive.

8
9 **I. "Setting the Stage" to Discuss the GDS Testimony**

10
11 **Q. Do the GDS witnesses overlook the fundamental reasons why FPL is**
12 **implementing the EPU project?**

13 A. Yes. Let's remember what conditions existed leading up to 2007 when FPL
14 requested approval from the FPSC for a need determination for the EPU
15 project. At that time, FPL was projecting that it would become increasingly
16 dependent upon natural gas to serve its customers (and this projection is still
17 accurate today.) The projection resulted in concerns regarding both gas
18 deliverability and system reliability issues. For example, FPL's electric
19 system operations were seriously imperiled in 2005 during the period
20 following Hurricanes Katrina and Rita, when FPL struggled to maintain
21 service for its customers when natural gas supplies from the Gulf of Mexico
22 were reduced due to the storms. This heightened FPL's and the state of
23 Florida's appreciation and desire for fuel diversity.

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In addition, natural gas prices had been high and significant price volatility had been experienced. In 2005, for example, FPL paid natural gas prices in excess of \$11.50 per MMBtu (compared with the forecasted natural gas prices for 2012 used in the 2012 feasibility analyses of less than \$4 per MMBtu). This raised concerns about potential future electric rate impacts to FPL's customers from these high and volatile gas prices. Furthermore, the likelihood of having significant environmental compliance costs set on carbon dioxide (CO₂) emissions in the near future loomed.

In regard to this fuel diversity concern; i.e., increasing dependence upon natural gas, FPL had just attempted in 2006 to obtain approval for adding new, advanced technology coal-fired units to enhance fuel diversity. This effort proved unsuccessful, in part due to concerns over projected CO₂ compliance costs and CO₂ emission rates of coal-fired units. With this result, the option of addressing fuel diversity with coal was essentially closed for the foreseeable future.

Therefore, in regard to achieving any truly significant enhancement in fuel diversity, and in addressing expected CO₂ costs, additional nuclear capacity was a logical alternative. Additional nuclear capacity could be obtained in two ways: enhancing capacity at FPL's existing nuclear units, and by building

1 new nuclear units. In 2007, FPL sought FPSC approval to do both via the
2 EPU project and the Turkey Point 6 & 7 project.

3
4 In its need filing for the EPU project, FPL pointed out that the project is a
5 unique opportunity to obtain additional nuclear capacity at existing nuclear
6 sites. New nuclear capacity, through capacity “uprates” at these existing sites,
7 can be added much more quickly than is the case with new nuclear units, and
8 requires no new land. The potential for nuclear uprates in FPL’s service
9 territory is limited to the Turkey Point and St. Lucie sites. Therefore, FPL
10 requested approval for pursuing the EPU project at both sites as part of a total
11 package that encompassed all 4 existing nuclear units at the two sites and was
12 expected to provide a total of 414 MW of needed capacity by about 2012.

13
14 Also, in its need filing for the EPU project, FPL requested approval for
15 pursuing the project on an expedited basis. The expedited approach has
16 advantages and disadvantages. The primary advantage is that the additional
17 nuclear capacity could be brought on-line approximately 6 years more quickly
18 than if the approach had been to wait until all of the engineering studies had
19 been completed. Bringing the EPU project on-line more quickly results in 6
20 additional years of fuel savings for FPL’s customers. This not only benefits
21 FPL’s customers through earlier and greater fuel savings, but increases the
22 benefits of the EPU project as well. Securing these additional, earlier years of
23 fuel savings is especially important for a project such as the EPU due to the

1 fact that there are currently “hard stops” for each of the four existing nuclear
2 units: the end of the existing operating licenses for each of these units. On the
3 other hand, the disadvantage of the expedited approach is that there is greater
4 uncertainty throughout the process in regard to the costs associated with
5 uprating the existing nuclear units to obtain the additional capacity.

6
7 FPL’s 2007 petition to the FPSC for need determination approval, and the
8 economic analysis of the EPU project that was part of its need determination
9 filing, was based on pursuing the EPU project as a total package (all four units
10 at both sites), for a total of at least 414 MW of needed capacity, and on an
11 expedited basis. The FPSC approved the EPU project both as a total package
12 and on an expedited basis.

13
14 The total package, expedited approach has been the basis of the planning for,
15 and work on, the project from that point on. In addition, in each year
16 subsequent to 2007, FPL’s annual nuclear cost recovery filings have included
17 feasibility analyses using updated assumptions that project the cost-
18 effectiveness of completing the EPU project. All of these analyses have
19 utilized the total package, expedited approach for the EPU project that was
20 approved by the FPSC. All of these annual feasibility analyses through 2011
21 have shown that completing the EPU was projected to be cost-effective in
22 either all, or all but one, projected scenarios of fuel cost forecasts and
23 environmental compliance cost forecasts. In years in which the EPU was

1 projected not to be cost-effective in one scenario, that scenario was always a
2 scenario that assumed low fuel costs and low environmental compliance costs
3 every year for at least 30 years.

4 **Q. At what stage is the EPU project?**

5 A. Work on the project is nearing completion. The work at two of the four
6 existing nuclear units is scheduled to be completed by the time this docket
7 goes to hearing. Work at a third unit is scheduled to be completed before the
8 end of 2012 and work at the fourth unit is scheduled to be completed in March
9 2013. In short, the EPU project is in its final stages.

10
11 **II. What GDS Recommends**

12
13 **Q. Please summarize the GDS testimony regarding the EPU project?**

14 A. The GDS testimony can be summarized as follows: with the EPU project in its
15 final stages: (1) let's change the "rules of the game" in regard to how the EPU
16 project should be judged, and (2) let's impose a new arbitrary "standard" by
17 which a portion of the project, the uprate work at the Turkey Point site, will
18 eventually be judged for purposes of cost recovery.

19 **Q. Has GDS made similar recommendations to change the rules of the game
20 in previous NCRC dockets?**

21 A. Yes. Previous GDS recommendations to change the rules of the game have
22 included: (i) *include sunk costs in "going forward" analyses* (thus ignoring
23 the Nuclear Cost Recovery Rule and statute, ignoring the FPSC's Order on

1 this subject, and ignoring common economic analysis practice that GDS has
2 actually agreed with in another state’s nuclear docket); (ii) *set up a new, single*
3 *standard or cost recovery “cap” that would be a moving target from year to*
4 *year* (thus introducing confusion into the evaluation of the project from year
5 to year and ignoring the use of multiple scenarios of fuel cost forecasts and
6 environmental compliance cost forecasts that help address uncertainty
7 regarding these costs); and (iii) *pretend the uprate work is two distinct EPU*
8 *projects – one at each site – for economic feasibility purposes.* These poorly
9 conceived recommendations from GDS have all properly been rejected by the
10 FPSC.

11
12 In 2012, GDS is attempting to revive its previous recommendation to separate
13 the EPU project into two parts for economic analysis, and is again arguing for
14 a cost recovery cap, contrary to previous FPSC rulings.

15 **Q. What does GDS recommend this year?**

16 A. This year’s recommendation is presented by Witness Jacobs on page 23, lines
17 12 through 15, of his testimony where he recommends that the FPSC not
18 allow FPL to recover any costs for the Turkey Point EPU work that exceed an
19 early 2012 forecast of \$1.6 billion.

20 **Q. Does this new recommendation warrant serious consideration?**

21 A. No. In addition to this latest “let’s change the rules of the game after the
22 game has started” recommendation violating basic concepts of reasonableness
23 and fairness, there are at least three other reasons why this latest GDS

1 recommendation is not worthy of serious consideration. First, the FPL cost
2 value GDS refers to is from a preliminary study used in the eventual
3 development of FPL's "non-binding cost estimate" as referred to in the
4 Nuclear Cost Recovery Rule (Rule). Section 8(f) of the Rule includes the
5 following language referencing the need determination filing and the annual
6 nuclear cost recovery docket filings: *"The estimates provided in the petition
7 for need determination are non-binding estimates. Some costs may be higher
8 than estimated and other costs may be lower. A utility shall provide such
9 revised estimated in-service costs as may be necessary in its annual report."*

10
11 GDS's recommendation is to force a preliminary study result used in the
12 development of a non-binding cost estimate to be turned into a binding cost
13 value by allowing no cost recovery beyond the estimated amount. Therefore,
14 GDS's recommendation violates the Rule.

15
16 Second, GDS's recommendation focuses only on a selected subset of project
17 costs, not on the eventual cost-effectiveness of the total EPU project. GDS's
18 testimony appears to take as established fact that the projected benefits of the
19 EPU project included in FPL's April 2012 feasibility analyses are final and
20 cannot change in the future.

21
22 As previously mentioned, using current 2012 forecasts for fuel and
23 environmental compliance costs, FPL's 2012 feasibility analyses show that

1 completing the EPU project is projected to be cost-effective for FPL's
2 customers in 6 of 7 scenarios; a result that is consistent with the results from
3 all of FPL's economic/feasibility analyses from 2007 – on. FPL recognizes
4 that the current 2012 forecasts have changed from those used last year and, in
5 fact, that these forecasts have changed each year in FPL's annual feasibility
6 analyses. Furthermore, the FPSC expects to see “updated assumptions”,
7 including updated fuel cost forecasts and environmental compliance cost
8 forecasts, utilized each year in FPL's annual feasibility analyses. Therefore,
9 it is reasonable to expect that costs for fuel and environmental compliance
10 could, and likely will, continue to change in the future.

11
12 However, GDS ignores the fact that the projected values in the 2012
13 feasibility analyses represent a single frozen “snapshot in time” of projections
14 that likely will continue to change. As evidenced by the economic analysis
15 that accompanied the need determination filing for the EPU project, and by
16 each of the annual feasibility analyses for the NCRC dockets from 2008 to the
17 present, the projected benefits from completing the project can be seen to have
18 changed from year to year. Therefore, it is reasonable to expect that the actual
19 benefits that will be realized by the EPU project could be different than this
20 one 2012 snapshot/ projection shows at this point in time.

21
22 Furthermore, the fuel cost and environmental compliance cost forecasts on
23 which the 2012 feasibility analyses are based are the lowest forecasted values

1 among the set of all forecasted values that FPL has utilized since the 2007
2 need filing. Therefore, it is reasonable to assume that the actual future values
3 for fuel costs and environmental compliance costs may well be higher,
4 perhaps significantly higher, than those assumed in the current analyses. In
5 such a case, that means that the actual benefits of the EPU project would be
6 higher, perhaps significantly higher, than are currently projected. This
7 underscores the weakness of the GDS analysis. Higher fuel and
8 environmental compliance cost-based benefits, when divided by two as GDS
9 has done, could very well reverse the conclusion GDS has reached with
10 respect to the cost-effectiveness of the Turkey Point uprate work.

11
12 Third, the GDS testimony appears to not recognize, and certainly does not
13 account for, other potential benefits that the EPU project brings which are not
14 included in FPL's 2012 feasibility analyses. For purposes of this rebuttal
15 testimony, these other potential benefits will be referred to as "hedge"
16 benefits.

17
18 **III. EPU "Hedge" Benefits Not Included in FPL's 2012 Feasibility**
19 **Analyses (and Not Considered by GDS)**

20
21 **Q. What do you mean by "hedge" benefits?**

22 By "hedge" benefits, I am referring to several types of risk reducing benefits
23 for FPL's customers that exist due to the additional nuclear capacity from the

1 EPU project. The beneficial hedge aspect of new nuclear capacity was
2 mentioned in my direct testimony. These potential benefits are not included
3 in FPL's 2012 feasibility analyses because the bases for these potential
4 benefits are outside of the current set of assumptions and forecasts utilized in
5 the 2012 feasibility analyses. However, if entirely plausible circumstances
6 arise in the future (such as the significantly higher natural gas prices
7 experienced in recent years), substantial additional benefits will be realized by
8 FPL's customers from the EPU project beyond those captured in the 2012
9 feasibility analyses.

10
11 In this sense, one can think of these potential benefits from additional nuclear
12 capacity arising from the EPU project (but which would also arise from new
13 nuclear capacity that will be provided by Turkey Point 6 & 7) as similar to the
14 potential benefits offered by an insurance policy. An insurance policy
15 provides security today for the future, and has great value if certain
16 circumstances arise. Adding the incremental nuclear capacity from the EPU
17 project to FPL's portfolio of generating units is also akin to diversifying one's
18 financial portfolio to ensure that one's economic future remains viable when
19 financial markets change. Sound financial planning dictates a diversified
20 portfolio of investments. Additional nuclear capacity provides similar
21 diversification for FPL's generation portfolio which must be designed for an
22 uncertain future in regard to fuel costs and environmental compliance costs.

1 **Q. Please provide examples of the types of costs that the EPU project can**
2 **provide a hedge against.**

3 A. Two types of hedges will be discussed. First, additional nuclear capacity is a
4 hedge against significantly higher fuel and/or environmental compliance
5 costs. Second, additional nuclear capacity can serve as a hedge against costs
6 that would be incurred by FPL’s customers if a renewable portfolio standard
7 (RPS), or clean energy standard (CES), mandate was imposed.

8 **Q. In regard to the first type of hedge, a hedge against significantly higher**
9 **future fuel and environmental compliance costs, doesn’t FPL’s 2012**
10 **feasibility analysis already address different forecasts of these costs?**

11 A. Yes. FPL’s 2012 feasibility analyses are performed with 7 scenarios of
12 forecasted fuel and environmental compliance costs. However, these
13 forecasts are all based on recent or current prices and projections. As we have
14 seen in the past, “current” prices can change quickly and significantly. And,
15 with change in current prices, forecasts of future costs can also change
16 significantly. This is best seen by looking at the differences between the
17 “sets” of forecasted fuel costs, and forecasted environmental compliance
18 costs, that have been utilized in FPL’s last several annual feasibility analyses.
19 For these comparisons, the forecasted Medium Fuel Cost forecast and the Env
20 II forecast will be used. The comparison to be discussed is based on the
21 annual percentage differences in terms of forecasted \$/mmBTU costs for fuel,
22 and forecasted \$/ton costs for CO₂, between two forecasts for each year,

1 present valuing the annual differences in the cost values, then computing the
2 average annual present value difference between the forecasted values.

3
4 A comparison of the 2012 and 2011 forecasts for natural gas shows that the
5 2012 forecast is 9% lower than the 2011 forecast. Similarly, the 2012 forecast
6 is 25% lower than the 2010 forecast and 32% lower than the 2009 forecast.
7 These comparisons show how significantly projections of fuel costs can
8 change over a very short 3-year window.

9
10 A comparison of the 2012 and 2011 forecasts for CO₂ shows that the 2012
11 forecast is 74% lower than the 2011 forecast. The comparable differences
12 between the 2012 forecast and the 2010 and 2009 forecasts are 79% and 74%,
13 respectively. These comparisons show how significantly projections of
14 environmental compliance costs can also change over even a 1-year window.

15
16 These comparisons also help to point out just how low the 2012 forecasted
17 values are to values forecasted over the last three years. The 2012 forecasted
18 values have decreased so much that it is reasonable to assume that any
19 significant change in forecasted values that is likely to occur would be in the
20 opposite direction; i.e., to higher forecasted fuel costs and environmental
21 compliance costs. In fact, there is no reason to believe that actual cost values
22 in the future cannot match, or exceed, the higher levels previously forecasted
23 in just the last few years.

1 **Q. Can you provide estimates of what such a change in forecasted values**
2 **would have on the benefits of the EPU project projected in the 2012**
3 **feasibility analyses?**

4 A. Yes. The estimates are also based on the Medium Fuel Cost and Env II
5 forecasts. In FPL's 2012 feasibility analyses, the CPVRR system fuel cost
6 savings of the EPU project is projected to be approximately \$1.3 billion, or
7 \$1,300 million. In other words, the projected CPVRR difference in projected
8 system fuel costs between the Resource Plan with EPU and the Resource Plan
9 without EPU is approximately \$1,300 million. As discussed above, the 2012
10 forecasted prices for natural gas are lower than the forecasted prices in 2011,
11 2010, and 2009 by 9%, 25%, and 32%, respectively. Selecting the middle
12 value of 25% and applying it to the current projected EPU fuel savings value
13 results in a potential increase of approximately \$430 million ($[(1300 / (1-$
14 $0.25)) - 1300] = 433$) CPVRR in additional fuel savings benefits for the EPU
15 project if actual natural gas prices in the future match those forecasted as
16 recently as 2010.

17
18 In FPL's 2012 feasibility analyses, the CPVRR system environmental
19 compliance cost savings of the EPU project is projected to be approximately
20 \$90 million. As discussed above, the 2012 forecasted compliance costs for
21 CO₂ have decreased from the costs forecasted in recent years by 74%, 79%,
22 and 74%. Selecting the 74% value and applying it to the current projected
23 EPU environmental compliance cost savings value results in a potential

1 increase of approximately \$250 million ($[(90 / (1-0.74)) - 90] = 256$) CPVRR
2 in additional environmental compliance cost savings benefits for the EPU
3 project if actual costs match those forecasted only last year.

4
5 Therefore, if actual future fuel costs and environmental compliance costs
6 matched very recent forecasts of these costs, the net benefits realized by the
7 EPU project would be increased by approximately \$680 million ($680 = 430 +$
8 250) CPVRR above the savings projected in the 2012 feasibility analysis for
9 the Medium Fuel Cost forecast, Env II forecast scenario.

10
11 In section IV of this testimony, I will return to these estimates, and to
12 estimates of other potential hedge benefits offered by the EPU project that will
13 be discussed next, in regard to GDS's analysis of the portion of the EPU
14 project at the Turkey Point site.

15 **Q. How much would the EPU's projected benefits increase if the current**
16 **licenses at FPL's existing nuclear units were extended?**

17 A. In such a case, the projected benefits of the EPU project would increase
18 tremendously. Using the 2012 cost forecasts for Medium Fuel and Env II,
19 without any potential adjustment to these forecasts as discussed above, and
20 assuming a 20-year extension of the operating licenses at each of the four
21 nuclear units, the additional CPVRR benefits that would be realized by FPL's
22 customers from only the fuel and environmental compliance cost aspects of

1 the EPU project would be approximately \$1.2 billion, or \$1,200 million,
2 above those projected in FPL's 2012 feasibility analyses.

3 **Q. Please discuss the second type of hedge regarding a potential RPS or CES**
4 **mandate.**

5 A. Recently proposed RPS or CES mandates have what can be termed a "nuclear
6 neutral" provision. What a nuclear neutral provision means is that, although
7 the RPS/CES mandate requires that a certain percentage of the energy
8 delivered by the utility to its customers be "renewable / clean", the percentage
9 calculation only applies to energy delivered by fossil fuel-based generation.
10 Energy generated by nuclear units is not included in the RPS/CES calculation
11 regarding the amount of energy that must be served by renewable/clean
12 sources.

13
14 For example, suppose that a particular RPS/CES mandate requires that 20% of
15 a utility's energy be from renewable/clean sources and assume that a utility
16 without any nuclear generation delivers 100,000 GWh annually. The 20%
17 mandate would require that 20,000 GWh per year be generated from
18 renewable/clean sources. Now assume that the mandate has a nuclear neutral
19 provision and the utility is adding 490 MW of new nuclear capacity (as FPL is
20 adding with the EPU project). If we assume that the 490 MW of nuclear
21 capacity operates at a 90% capacity factor, approximately 3,860 GWh per
22 year will be supplied by nuclear energy (490 MW x 8,760 hours per year x
23 90% x 0.001 GW per MW = 3,860 GWh).

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The amount of renewable/clean energy that the mandate would now require is reduced from 20,000 GWh to 19,228 GWh $((100,000 - 3,860) \times 20\% = 19,228)$. This equates to a reduction in the renewable energy requirement of 772 GWh $(20,000 - 19,228 = 772)$ per year. Because of the nuclear capacity addition, the utility will not have to incur the cost of renewable facilities that would annually produce 772 GWh. These avoided costs would represent additional benefits for the incremental nuclear capacity.

Q. Can you provide an estimate of what the magnitude of the additional potential benefits might be for the EPU project if such a 20% RPS/CES mandate were imposed?

A. Yes. Exhibit SRS – 12 provides the summary results of a projection of what the potential benefits for the EPU project might be if a 20% RPS/CES mandate with a nuclear neutral provision were imposed, similar to recent proposals from U.S. Senator Bingaman. If such a mandate were to be imposed, FPL would seek to meet the mandate using the most economical means possible. It is very likely that a significant portion of these renewable energy additions would be photovoltaic (PV) facilities. Therefore, for purposes of this example, it is assumed that the renewable energy expenditures that would be avoided by the EPU’s 490 MW would be PV-related net costs. These avoided net costs consist of avoided capital and fixed O&M costs from not having to build and site as much PV, minus fuel and

1 environmental compliance cost savings that would otherwise have been
2 realized if the additional PV capacity had not been avoided.

3
4 Using the Medium Fuel Cost and Env II forecasts for fuel and environmental
5 costs that are used in FPL's 2012 feasibility analyses, and a reasonable set of
6 current assumptions for PV as shown in Exhibit SRS-12, the additional
7 potential benefits for the EPU project is projected to be approximately \$192
8 million CPVRR. Thus the imposition of an RPS/CES mandate with a nuclear
9 neutral provision would be expected to significantly enhance the economics of
10 the EPU project (and, to an even greater extent, of the Turkey Point 6 & 7
11 project).

12 **Q. Please summarize how you believe the potential hedge benefits from the**
13 **EPU project discussed in this section should be viewed when considering**
14 **the projected cost-effectiveness of the EPU project.**

15 A. It is important to remember that FPL's 2012 feasibility analysis, like all of the
16 economic analyses from the need determination filing in 2007 through the
17 annual nuclear cost recovery dockets from 2008 through 2011, is essentially a
18 snapshot taken in time in which numerous assumptions and forecasts are
19 frozen. In reality, these assumptions and forecasts are continually changing.
20 As evidenced by the discussion in this section, these assumptions and
21 forecasts have changed quickly and significantly over the last three years and
22 can be expected to continue to change over the 30-plus year remaining
23 operating lives of the uprated nuclear units. GDS's recommendation ignores

1 this reality and proposes to disallow recovery over an arbitrary cost threshold
2 on the basis that one single snapshot, FPL's 2012 snapshot, with respect to
3 anticipated EPU benefits, will never change.

4
5 It should also be recognized that the most recent snapshot, the 2012 feasibility
6 analysis, includes fuel cost forecasts and environmental compliance cost
7 forecasts that assume lower cost values than any other snapshots have
8 included. Therefore, I believe that any significant long-term changes in either
9 of these forecasts will likely be toward higher costs, thus increasing the
10 projected benefits of both nuclear projects.

11
12 In addition, none of the potential hedge benefits that have been discussed in
13 this section have been included in FPL's 2012 (or earlier) feasibility analyses.
14 Yet the EPU project definitely serves an important hedge role just as an
15 insurance policy, or a diversification choice in a financial portfolio, play
16 important roles in offering hedge benefits that would be realized if actual
17 circumstances experienced in the future are different than those currently
18 expected or forecasted.

19
20 The 2012 feasibility analyses already project that it is cost-effective for FPL's
21 customers to complete the EPU project in 6 of 7 fuel cost, environmental
22 compliance cost scenarios. When one also takes into account these other

1 hedge considerations, the projected economic outlook for the EPU project is
2 further enhanced.

3
4 **IV. A Discussion of Specific Points in the GDS Testimony**

5
6 **Q. Do the GDS testimonies state that they disagree with FPL's conclusion**
7 **that completing the EPU project is projected to be cost-effective for**
8 **FPL's customers based on the results from the 2012 feasibility analysis?**

9 A. No.

10 **Q. How would you characterize GDS's analysis approach designed to**
11 **examine a portion of the EPU project at the Turkey Point site?**

12 A. Witness Smith's approach is an overly simple "let's divide by two" exercise.
13 By its very design, this approach is not intended to provide detailed, accurate
14 results. Therefore, I do not believe that the results of the GDS analysis are
15 accurate or meaningful.

16 **Q. GDS claims it is certain that, based on the results of their analysis, the**
17 **portion of the EPU project at the Turkey Point site will not be cost-**
18 **effective. Would you please discuss this?**

19 A. Yes. On page 8, lines 17 and 18, Dr. Jacobs states that "*...it is apparent that*
20 *the Turkey Point uprate project already is sure to result in net costs, not*
21 *benefits, to customers*"(emphasis added). Then on pages 20 and 21, lines 23
22 through 2, Dr. Jacobs states "*Even more significant, however, is the analysis*
23 *by Brian Smith of GDS that demonstrates the Turkey Point EPU project will*

1 *result in net costs, not net benefits, to FPL's customers...*” (emphasis added).
2 From these statements, it is clear that GDS believes it is certain that the
3 portion of the EPU project at the Turkey Point site will not be cost-effective.
4 Furthermore, from Dr. Jacobs’ last statement, their belief in this certainty is
5 based on Witness Smith’s analysis.

6
7 To justify a claim of “certainty”, the results of any analysis that examines the
8 projected cost-effectiveness of a project should have at least two
9 characteristics. First, the results for each scenario examined in the analysis
10 should all reach the same conclusion; i.e., the project is cost-effective in all
11 scenarios or the project is not cost-effective in all scenarios. Second, the
12 results of the analysis in all scenarios should be so overwhelmingly in the one
13 direction (cost-effective or not cost-effective) that there is no way to reverse
14 the results with a reasonable change in the assumptions used in the analyses.

15
16 So, setting aside the issue of inaccuracy that is inherent in their analysis
17 approach, the results of the GDS analysis can be examined to see if they meet
18 both of the above-mentioned characteristics required for “certainty”.

- 19 **Q. Do the results of this GDS analysis meet both of these characteristics?**
20 A. No. Neither of these characteristics is met. The first characteristic, that the
21 results for all scenarios show (for GDS’s claim to be supported) that the
22 portion of the EPU project at Turkey Point is projected to not be cost-effective
23 is not met because GDS’s analysis for the High Fuel Cost, Env III scenario

1 shows a cost-effective result. Therefore, even at this first step of the
2 examination of GDS's claim of certainty, it is clear that the GDS analysis fails
3 the "certainty" test.

4
5 The second characteristic, that the results of the analysis in all scenarios
6 should be so overwhelmingly in the one direction (cost-effective or not cost-
7 effective) that there is no way to reverse the results with a reasonable change
8 in the assumptions used in the analyses, is also not met. For example, in the
9 GDS analysis of the two other High Fuel Cost scenarios, although their results
10 show a "net cost" result, the magnitude of the CPVRR net costs is far from
11 overwhelming: \$12 million and \$38 million. Any number of changes in
12 assumptions or forecasts could easily change those results to a cost-effective
13 outcome.

14
15 For example, after accounting for the CPVRR effect of annual revenue
16 requirements, a decrease in actual capital costs of approximately \$10 million
17 and \$30 million, respectively, from the cost estimate used in the analyses
18 would reverse the results for these two scenarios to cost-effective. Or, looking
19 at the benefits side of the equation and referring back to the two types of
20 hedge benefits discussed in section III, if potential benefits from either of
21 these types of hedges were to be experienced, the revised projections for the
22 \$12 million and \$38 million CPVRR net cost scenarios would change to cost-
23 effective.

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An examination of the GDS results for the three Medium Fuel Cost scenarios shows much the same thing: their results are far from overwhelming. For these scenarios, GDS projects CPVRR net costs of \$157 million, \$199 million, and \$226 million. Recalling the discussion in section III, fuel savings benefits alone in regard to the Medium Fuel Cost forecast could increase by \$430 million CPVRR if actual fuel costs matched values projected only two years ago. Utilizing GDS’s “let’s divide by two” approach to benefits, such a change in the actual fuel costs would result in both the \$157 million net cost value scenario, and the \$199 million net cost scenario, now turning cost-effective due to the additional \$215 million ($430 / 2 = 215$) CPVRR fuel savings benefits.

In addition, if actual environmental compliance costs were to match those projected only last year, the resulting \$250 million CPVRR in additional benefits would translate, in GDS’s analysis, to another \$125 million CPVRR in benefits for the portion of the EPU project at the Turkey Point site. In combination with the additional fuel savings value just discussed, this would change the \$226 million net cost scenario to cost-effective.

Finally, if the operating licenses for the four existing nuclear units were extended as discussed in section III, the resulting \$1,200 million CPVRR, cut in half by GDS’s approach to \$600 million CPVRR for the Turkey Point site,

1 would reverse the outcome for not only all three Medium Fuel Cost scenarios,
2 but for all 6 scenarios that GDS's analysis projects will result in net costs.

3
4 It is clear that GDS's own analysis, with which they are trying to justify their
5 claim of "certainty", does not come close to providing this justification. In
6 fact, the results of GDS's own analysis immediately refutes their claim
7 because their result for one scenario is a cost-effective result. Furthermore,
8 GDS presumes there will be no change in fuel or environmental compliance
9 costs in an upward direction over the long term – a presumption no one can
10 make with any certainty. And finally, GDS simply has not considered a
11 number of hedge benefits, not included in FPL's 2012 feasibility analyses,
12 which could be provided by the EPU project. The application of these
13 potential benefits could change the outcome of GDS's analysis in all scenarios
14 to cost-effective.

15 **Q. The GDS analysis approach is based on the "to go" costs of completing**
16 **the EPU project. In regard to the "to go" cost values they used in their**
17 **analysis, what point in time do these "to go" costs represent and how**
18 **different might their analysis results have been if more current "to go"**
19 **costs were used?**

20 A. The "to go" costs they used were based on projections as of December 31,
21 2011. As of July 9, 2012, the EPU project is now 6 months closer to its early
22 2013 completion. In terms of expenditures for the EPU project that have been
23 made in these 6 months, the sum of the actual expenditures from January

1 through May of 2012, plus the estimated expenditures for June 2012, are at
2 least \$800 million. These costs are no longer “to go” costs. After accounting
3 for the CPVRR annual revenue requirement effect on these costs, it is safe to
4 say that approximately \$1 billion, or \$1,000 million, CPVRR in “to go”
5 CPVRR costs have been removed. Therefore, if the GDS analysis were to
6 utilize current “to go” costs, their analysis results would show that net benefits
7 would have increased \$1,000 million CPVRR for all scenarios which would
8 result in a cost-effective result for all scenarios.

9 **Q. Witness Jacobs states that, if FPL had used the 2010 High Bridge-based**
10 **estimate of higher capital costs in its 2011 feasibility analysis, the 2011**
11 **feasibility analyses results presented to the FPSC in that year would have**
12 **been “materially different.” Please discuss.**

13 A. On page 20, lines 11 through 14, Dr. Jacobs asserts *“Had FPL incorporated*
14 *an estimate for Turkey Point that was consistent with High Bridge’s 2010*
15 *estimate during the 2011 proceeding, the magnitude of the increase*
16 *necessarily would have led to a materially different feasibility calculation.”*

17
18 Part of what GDS is saying is that FPL’s 2011 feasibility analysis should have
19 included a different cost estimate for Turkey Point. GDS raised no such
20 claim last year when the 2011 feasibility analysis was considered and
21 accepted by the FPSC. While the time for challenging the 2011 feasibility
22 analysis has long passed, nonetheless, even if FPL had used the 2010 High
23 Bridge estimate for the Turkey Point work in its 2011 feasibility analysis, the

1 EPU project would have remained cost-effective in six of seven scenarios.
2 This is demonstrated in Exhibit SRS – 13. Therefore, Dr. Jacobs’ claim that
3 the incorporation of this higher cost estimate would have “*materially*”
4 changed the results of what FPL presented to the FPSC in its 2011 feasibility
5 analyses is simply not true.

6 **Q. GDS attempts to compare various “\$/kw” costs for the portion of the**
7 **EPU project at the Turkey Point site and for the Turkey Point 6 & 7**
8 **project. What is being discussed here?**

9 A. On page 10, lines 14 through 21, Witness Jacobs attempts to make a
10 comparison of different “\$/kw” cost values. One value is a \$5,190/kw value
11 that represents the high end of the range of FPL’s overnight construction cost
12 estimate for Turkey Point 6 & 7. The other value is a \$7,520/kw value that
13 Dr. Jacobs appears to have developed for the portion of the EPU project being
14 carried out at the Turkey Point site. (Dr. Jacobs also makes reference to these
15 values, directly or indirectly, on several other pages including page 11, lines
16 18 through 24; page 17, line 17; page 18, lines 1 through 3; and page 20, lines
17 19 through 22.)

18
19 On page 17, lines 16 through 19, Dr. Jacobs quotes a portion of FPL Witness
20 Jones’ direct testimony which states (paraphrasing) that the EPU project is
21 projected to provide nuclear capacity at a lower \$/kw value than could be
22 obtained from building a new nuclear unit. Dr. Jacobs has developed his
23 “\$7,520/kw” value for the portion of the EPU project at the Turkey Point site,

1 compared it to FPL's overnight construction cost estimate for Turkey Point 6
2 & 7 of \$5,190/kw, and attempts to make the point that not only is FPL
3 Witness Jones' statement incorrect, but that this indicates that the portion of
4 the EPU project at the Turkey Point site will not be cost-effective.

5 **Q. Are there problems with Dr. Jacobs comparison and conclusions?**

6 A. Yes. There are several problems. First, Dr. Jacobs is attempting to assign
7 meaning to the results of a "\$/kw" screening type calculation involving two
8 nuclear projects that have significantly different characteristics. FPL has
9 previously explained in detail (in my rebuttal testimonies in the 2009 and
10 2010 nuclear cost recovery dockets) the fundamental problems inherent in
11 using a "cents/kwh" screening type calculation to compare resource options
12 with significantly different characteristics. These same inherent fundamental
13 problems also exist for a "\$/kw" screening calculation that Dr. Jacobs is
14 attempting to use.

15
16 Second, Dr. Jacobs has misunderstood FPL Witness Jones's statement.
17 Witness Jones was comparing, on a \$/kw basis, the high end of the total
18 estimated installed costs for the total EPU project and Turkey Point 6 & 7.

19
20 For the EPU project, the \$/kw value is based on the total cost estimate of
21 approximately \$3.15 billion divided by 490 MW which results in an installed
22 cost of approximately \$6,429/kw. For the Turkey Point 6 & 7 project, the
23 upper end of the installed cost estimate is approximately \$18.7 billion. When

1 that installed cost value is divided by 2,200 MW, the result is an installed cost
2 value of approximately \$8,500/kw.

3
4 Third, Dr. Jacobs is mistakenly attempting to compare two distinctly different
5 “types” of cost values: an installed total cost value for the portion of the EPU
6 project at the Turkey Point site and an overnight cost for Turkey Point 6 & 7.
7 The \$5,190/kw overnight cost value for Turkey Point 6 & 7 does not account
8 for any of the annual escalation in labor and materials cost that would occur
9 over the approximately 10-year period prior to project completion in
10 2022/2023. On the other hand, the cost values Dr. Jacobs is using to develop
11 his \$/kw number for the portion of the EPU project at the Turkey Point site
12 includes the impacts of these annual cost escalations as well as sunk costs.
13 Clearly he is trying to compare two values that are distinctly different in
14 regard to what types of cost components are included in each value. In other
15 words, he is attempting to make a comparison of two types of values that are
16 inherently not comparable.

17 **Q. GDS refers several times to certain scenarios associated with the 2012**
18 **Medium Fuel Cost forecast as FPL’s “base case”. Are these statements**
19 **accurate?**

20 A. No. On page 3, lines 1 and 2, Witness Smith claims “...including the medium
21 fuel price scenario that FPL regards as its base case, ...”. Similarly, on page
22 9, lines 14 and 15, Witness Jacobs asserts “...in FPL’s ‘base case’

1 *scenario... ”.* (Dr. Jacobs appears to be referring to the Medium Fuel Cost,
2 Env II scenario at this point in his testimony.)

3
4 Both of these representations of a specific fuel cost forecast, or a scenario of a
5 combination of a specific fuel cost forecast and a specific environmental
6 compliance cost forecast, as representing a “base case” for FPL are inaccurate.
7 For purposes of the nuclear feasibility analyses, FPL does not consider any
8 specific forecast, or scenario of combined forecasts, as a ‘base case’.

9 **Q. GDS states that “less than half” of the costs for the EPU project have**
10 **been spent to-date. Is this statement accurate?**

11 A. No. On page 14, lines 20 and 21 of Dr. Jacobs’ testimony, he says:
12 *“According to Dr. Sim’s analysis, less than half of the revised estimate of*
13 *costs has actually been spent.”* What Dr. Jacobs appears to be referring to are
14 the values presented in lines 9 and 10 of Exhibit SRS – 6 of my direct
15 testimony which show that approximately \$1.46 billion have been “previously
16 spent” and approximately \$1.59 billion are the “going forward” costs.

17
18 However, on page 24, lines 13 and 14 of my direct testimony, it is explained
19 that the \$1.46 billion represents costs spent through December 31, 2011. As
20 of July 9, 2012, the EPU project is more than 6 months closer to project
21 completion in early 2013 than it was at the end of 2011. As previously
22 mentioned, the actual/estimated costs that have been spent through June 2012
23 are at least \$800 million. Consequently, the percentage of the total project

1 cost that has already been spent, as of July 9, 2012, is at least 74% ((1.46 +
2 0.8) / 3.05 = 74%).

3 **Q. Does this conclude your rebuttal testimony?**

4 A. Yes.

5

Summary of Potential Additional Benefits for New Nuclear Capacity
If a Renewable Portfolio Standard (RPS) is Imposed:
Calculation for EPU Project

(1) Key Assumptions:

20%	= % of utility annual fossil fuel generated electricity (GWh) that must be produced by renewable sources
2022	= Start year of RPS mandate
2032	= Stop year of the analysis
PV	= Type of renewable energy
\$1,500	= Capital cost of renewable energy in start year (\$/kw-ac)
\$14.26	= FOM cost of renewable energy in start year (\$/kw-ac)
30	= Book life of renewable energy facility (years)
18%	= Annual capacity factor of renewable energy in first year
0.5%	= Annual degradation factor in renewable energy output
Medium Fuel	= Fuel cost forecast from 2012 feasibility analyses
Env II	= Environmental compliance cost forecast from 2012 feasibility analyses

(2) Results (CPVRR, 2012\$, millions):

\$334	= capital cost savings from avoided PV facilities
\$31	= FOM cost savings from avoided PV facilities
\$10	= land cost savings from avoided PV facilities
\$72	= transmission capital cost savings from avoided PV facilities
(\$239)	= higher fuel costs due to avoiding PV facilities (fuel penalty)
(\$17)	= higher CO ₂ costs due to avoiding PV facilities (CO ₂ penalty)
<hr/>	
\$192	= net RPS-based benefits from EPU capacity

2011 Feasibility Analysis Results for the EPU Project - Revisited

Total Costs and Total Cost Differentials for All Fuel
and Environmental Compliance Cost Scenarios in 2011\$:
Sensitivity Analysis Assuming Higher Cost Estimate
(millions, CPVRR, 2011 - 2043)

(1)	(2)	(3)	(4)	(5) = (3) - (4)	(6)	(7) = (5) + (6)
Fuel Cost Forecast	Environmental Compliance Cost Forecast	Total Costs for Plans		Total Cost Difference Plan with the EPU Project minus Plan without the EPU Project	Assumed Higher Cost Estimate	Resulting Total Cost Difference Plan with the EPU Project minus Plan without the EPU Project
		Plan with the EPU Project	Plan without the EPU Project			
High Fuel Cost	Env I	148,874	149,839	(966)	318	(648)
High Fuel Cost	Env II	157,675	158,814	(1,139)	318	(821)
High Fuel Cost	Env III	174,854	176,362	(1,508)	318	(1,190)
Medium Fuel Cost	Env I	131,183	131,742	(559)	318	(241)
Medium Fuel Cost	Env II	139,869	140,605	(736)	318	(418)
Medium Fuel Cost	Env III	156,695	157,793	(1,098)	318	(780)
Low Fuel Cost	Env I	113,389	113,544	(155)	318	163

Notes: (1) A negative value in Column (5) indicates that the Plan with the EPU Project is less expensive than the Plan without the EPU Project. Conversely, a positive value in Column (5) indicates that the Plan with the EPU Project is more expensive than the Plan without the EPU Project.

(2) The "Assumed Higher Cost Estimate" value in Column (6) was developed based on the High Bridge estimate of \$1.429 billion discussed in the OPC/GDS testimony of Dr. Jacobs. This value was substituted for the \$1.237 billion estimate that was used in FPL's 2011 feasibility analyses. After accounting for the the accompanying increase in carrying costs, and the CPVRR annual revenue requirement effects, due to the higher cost estimate, the resulting increase to the cost of the project in this 2011-based sensitivity analysis is approximately \$318 CPVRR as shown in Column (6).