# BEFORE THE
# FLORIDA PUBLIC SERVICE COMMISSION
# DOCKET NO. 130040-EI

IN RE: TAMPA ELECTRIC COMPANY'S
PETITION FOR AN INCREASE IN BASE RATES
AND MISCELLANEOUS SERVICE CHARGES

TECO
TAMPA ELECTRIC

**DIRECT TESTIMONY AND EXHIBIT**

**OF**

**J. BRENT CALDWELL**

COM 5
AFD 1
APA 1
ECO 10
ENG 1
GCL 1
IDM
TEL
CLK 1

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**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

**PREPARED DIRECT TESTIMONY**

**OF**

**J. BRENT CALDWELL**

**Q.** Please state your name, business address, occupation and employer.

**A.** My name is J. Brent Caldwell. My business address is 702 North Franklin Street, Tampa, Florida 33602. I am employed by Tampa Electric Company ("Tampa Electric" or "company") as Director of Origination & Market Services.

**Q.** Please provide a brief outline of your educational background and business experience.

**A.** I received a Bachelor Degree in Electrical Engineering from Georgia Institute of Technology in 1985 and a Master of Science in Electrical Engineering in 1988 from the University of South Florida. I have over 15 years of utility experience with an emphasis in state and federal regulatory matters, natural gas procurement and transportation, fuel logistics and cost reporting, and business systems analysis. In October 2010, I assumed responsibility for long-term fuel origination.

**Q.** Have you previously testified before the Florida Public Service Commission ("FPSC" or "Commission")?

**A.** Yes. I have previously testified before this Commission in Docket No. 120234-EI regarding the company's fuel procurement and delivery strategy for the Polk 2-5 Combined Cycle Conversion.

**Q.** What is the purpose of your direct testimony?

**A.** My direct testimony describes Tampa Electric's fuel inventory planning process and the factors that influence the reliable supply and delivery of coal, oil and natural gas. Tampa Electric uses fuel inventory planning to determine the proposed fuel inventory working capital levels included in the rate base in this proceeding.

**Q.** Have you prepared an exhibit to support your direct testimony?

**A.** Yes. I am sponsoring Exhibit No. ___ (JBC-1), entitled "Exhibit of J. Brent Caldwell", prepared under my direction and supervision. It consists of the following documents:

Document No. 1 List of Minimum Filing Requirement Schedules Sponsored or Co-Sponsored by J. Brent Caldwell

Document No. 2 2014 Proposed Coal Inventory

Document No. 3 Coal Inventory Levels 2008-2012

Document No. 4 2014 Proposed Fuel Inventory

**Q.** What types of fuel does Tampa Electric use?

**A.** Tampa Electric uses coal and petroleum coke ("coal" or "solid fuel"), natural gas, and light oil to generate electricity. In 2012, Tampa Electric's generation mix was comprised of 58 percent coal, 41 percent natural gas and less than one percent light oil. The company's annual coal requirement is approximately five million tons and the annual natural gas requirement is about 60 million MMBTUs. A relatively small amount of light (No. 2) oil is used for the start-up of solid fuel units and as a secondary fuel for three natural gas-fired combustion turbines.

**Q.** What is the objective of Tampa Electric's fuel management plan?

**A.** The company seeks to maintain an appropriate level of

fuel inventory to minimize the risk of service interruptions due to less generating capability than the instantaneous system demand requirements. The company's overall planning process recognizes the operating factors that affect inventory levels, such as fuel supply availability, fuel delivery logistics, fuel consumption, storage capacity, fuel quality and extraordinary events. The primary goal of maintaining adequate fuel inventories is to maintain generating capacity adequacy for system reliability while managing the economic impact to our customers. Maintaining appropriate levels of fuel is less expensive than making emergency purchases of fuel at a premium price, buying replacement power or interrupting electrical service to customers. Tampa Electric uses diverse supply sources, several delivery methods and various storage sites to mitigate the multitude of issues that may interrupt fuel supply to the company's generating system.

**Q.** What fuel inventories are components of your overall system-wide fuel inventory?

**A.** Coal, natural gas and oil are components of Tampa Electric's overall system-wide inventory. For coal, inventory includes all coal that the company has

purchased and has in its control. This includes coal that is stored on-site at the power plants, stored off-site, and en route. The natural gas amount included in inventory is the amount owned by Tampa Electric and stored in underground storage caverns or stored in interstate pipelines. For oil, only quantities stored in tanks on-site is included in inventory because oil is not under Tampa Electric's ownership until it reaches the plant site.

**COAL INVENTORY**

**Q.** What are the system-wide coal inventory levels included in the company's inventory planning process?

**A.** Tampa Electric's coal inventory levels are included at "target" levels. Tampa Electric's overall system-wide target level for coal inventory is 98 days projected burn. While Tampa Electric targets 98 days, the actual days vary seasonally and based on various circumstances.

Document No. 2 of my exhibit shows the overall anticipated quantities of coal in inventory by station projected for 2014. This chart includes coal stored on-site at the power plants, stored off-site and en route.

**Q.** What is the projected average coal inventory level for 2014?

**A.** The projected 13-month average coal inventory level is approximately 1.4 million tons with a value for 2014 of $92.2 million.

**Q.** How does the proposed coal inventory level compare to Tampa Electric's historical coal inventory levels?

**A.** It is consistent with the company's actual coal inventory levels over the past five years. Tampa Electric's actual coal inventories have averaged 1.2 million tons, or approximately 101 days of burn, during that timeframe. In the past two years, inventory of coal for Tampa Electric represented an average of 95 days. Document No. 3 of my exhibit details the historic coal inventory levels for 2008 through 2012.

**Q.** Are there extenuating circumstances that have affected the coal inventory levels in the past few years?

**A.** Yes. Solid fuel inventories have been maintained at levels lower than the 98 days target beginning in late 2011 and continuing through 2013. The reduction is due

to a significant ongoing upgrade to the company's coal field equipment at Big Bend Power Station which temporarily reduced the space available for storing coal on-site. This multi-year, multi-million dollar project will increase reliability and functionality of the coal field and its equipment.

**Q.** What major factors influence the level of coal inventory Tampa Electric proposes to maintain in 2014?

**A.** Coal supply availability and deliverability to Tampa Electric have been affected historically by adverse weather conditions including floods, hurricanes, extreme conditions on waterways, water route blockages, work disruptions in the coal and railroad industries, consumption variations and transportation provider equipment breakdowns. The company must maintain sufficient coal inventory to mitigate the impact of these and other factors. Tampa Electric closely monitors these factors because of the dramatic impacts they can have on cost and reliability.

There are a number of considerations that influence Tampa Electric's proposed 2014 coal inventory level. These considerations are classified into four major

categories of inventory planning: 1) fuel commodity availability, 2) fuel delivery disruption, 3) fuel consumption variability, and 4) extraordinary events.

**Q.** Discuss some circumstances that lead to fuel supply availability.

**A.** Force majeure events and mine issues can influence coal production. Diminished supplier performance can also cause a supply disruption that reduces deliveries. Most importantly, though, is the changing market dynamics for coal. Tampa Electric's customers have benefitted from the low cost, abundant supply of coal from the Illinois Basin. This abundant supply has allowed Tampa Electric to acquire coal relatively quickly when needed. However, this dynamic has changed dramatically and is likely to change further. Many domestic utilities have begun switching their coal supply to the lower cost Illinois Basin. Additionally, the international market has begun buying significant quantities from the Illinois Basin. Thus, going forward, Tampa Electric will be competing with more, and much larger, entities for the same Illinois Basin supply so it will likely take more time and more cost to re-supply during a coal supply disruption event.

**Q.** What are some examples of fuel delivery disruptions?

**A.** The river and rail transportation systems used to deliver coal are subject to supply delivery disruptions. Tampa Electric faces the possibility of river closings associated with the repair of lock and dam mechanisms. These river locks raise and lower the barges for proper navigation through the Mississippi and Ohio River systems. Almost every year the river systems have high and/or low water conditions due to rain and snow or excessive drought. Fog, ice and transportation equipment breakdowns can delay or interrupt transportation on the river system as well.

Likewise, fog, hurricanes and equipment breakdowns affect the Gulf transportation system. Gulf Coast hurricanes such as Hurricanes Katrina and Isaac that strike the mouth of the Mississippi River, significantly disrupt coal and other energy commodity deliveries. Given the risks associated with hurricane activity and the problems one Gulf hurricane can cause, maintaining a 98 day coal inventory level is very reasonable. For example, due to Hurricanes Katrina and Rita in 2005, coal inventory levels were depleted to less than 20 days at Big Bend Power Station in the months following the

hurricanes because of the extended interruption of transportation. These same events caused a shutdown of gas supply due to the evacuation of and damage to gas production platforms in the Gulf of Mexico. As a result, limited gas supply due to infrastructure and transportation facility damage can create a higher demand for coal.

Even small storms can have a large impact on the logistics of transporting solid fuel. For example, Isaac, a Category 1 hurricane in 2012, caused widespread flooding and disabled several terminals at the mouth of the Mississippi River for many weeks. Similarly, in June 2012, Tropical Storm Debby constrained shipping in Tampa Bay for an extended period of time.

The rail transportation system is affected by congestion, track maintenance, rail blockings, flooding and equipment breakdowns. This results in slower turn times, which is defined as the time it takes a train to return to the coal mine for its next shipment, in turn causing reduced deliveries.

**Q.** How can these solid fuel supply and delivery disruptions affect Tampa Electric's inventory?

**A.** Tampa Electric's plants are located approximately 1,000 miles from the Illinois Basin where the vast majority of its coal is mined, and up to 50 percent of Tampa Electric's coal inventory at any given time is off-site or en-route. As mentioned above, after Hurricane Katrina, Tampa Electric's on-site inventory level fell to a low of only 20 days. Because Tampa Electric prepared for hurricane season by building sufficient storm season inventory, the company was able to maintain adequate inventory supply on-site and manage through the disruption of deliveries that lasted almost six months without disrupting service to its customers. It is important to recognize that any of these events can cause lingering issues that disrupt normal fuel supply and logistics for many months.

**Q.** What is meant by coal burn variability and how does it affect Tampa Electric's planning process?

**A.** Coal burn variability refers to the difference between the planned coal burn and the actual coal burn. Typically, in order to obtain the most cost-effective pricing, coal suppliers and transporters require consistent monthly delivery schedules, which can be inconsistent with the varying consumption needs of the

plants. Larger coal inventories allow the company to absorb swings in supply during varied times of higher or lower burn, which is caused by seasonality, weather and unit operating performance, including unit availability, heat rate and capacity factor.

The amount of burn variability affects Tampa Electric in the overall inventory planning process depending on how quickly and how completely the company can respond to unexpected fuel requirements at the electric generating plants. As previously stated, the company's power plants are located approximately 1,000 miles away from the coal supply sources; therefore, the company's coal inventory planning process must ensure that higher or lower than expected fuel consumption can be accommodated. During constrained fuel supply events, the process of procuring solid fuel can take well over 90 days from identifying the need for more coal to that coal being available for consumption at a power plant.

**Q.** What is meant by extraordinary events affecting coal inventory planning?

**A.** Other risk factors are those unidentified low probability but high consequence events that prudent

fuel inventory management must take into consideration because they could significantly affect fuel levels. These events can result in major disruptions to coal supplies by affecting suppliers, the transportation system and even fuel requirements. These other risk factors include potential legislative and regulatory changes affecting potential use of coal for electric generation. Mine Safety and Health Administration ("MSHA") regulations can influence coal production and interrupt transportation. Additional risks include mine closures, due to low demand and increased use of natural gas.

In addition, vessels can sink and have sunk in the Port of Tampa channels, blocking deliveries. Catastrophic events like damage to the Sunshine Skyway Bridge in 1980 blocked the channel and prevented coal deliveries for an extended period. While events like this are rare, the impact is immeasurable if the plant does not have adequate supply on hand.

Another example is the manner in which the events of September 11, 2001 complicated and delayed the transportation of coal due to heightened security in ports.

Tampa Electric has mitigated impacts of catastrophic events through the addition of rail facilities at Big Bend Power Station. However, there is an additional risk that multiple supply disruption events can occur in rapid succession and compound the effects of these individual risks. The prospect of running out of fuel is not an option; therefore, it is essential to have an adequate inventory to avoid such an event. It is important to recognize that any of these types of events can cause lingering issues that disrupt normal fuel supply and logistics for many months.

**NATURAL GAS INVENTORY**

**Q.** Please describe the company's need for and portfolio of natural gas supply.

**A.** Tampa Electric has a fleet of natural gas fired generation including simple and combined cycles units as well as aero derivative combustion turbines. Tampa Electric also has the responsibility to procure natural gas fuel for three wholesale purchase power agreements. Tampa Electric has continually enhanced its natural gas supply portfolio, including adding underground natural gas storage capacity, beginning in 2005. Due to the operational characteristic of natural gas peaking units,

natural gas storage is a key component of supply needs.

**Q.** Please describe Tampa Electric's natural gas supply plan.

**A.** The company's supply plan for natural gas is to maintain a portfolio of natural gas supply arrangements that have access to multiple supply basins, various delivery points, volume flexibility and varying term lengths. These natural gas supply arrangements are conducted through industry standard contracts with creditworthy parties. This process allows for reliability of supply, operational flexibility and lower overall cost.

In addition to secure supply arrangements, underground natural gas storage is a valuable component of maintaining reliable service for customers. Natural gas storage is used primarily to address unexpected swings in gas supply needs due to unexpected changes in utilization of natural gas-fired generating units, and to "smooth" gas supplies over weekends and holidays when consumption levels may change dramatically. Tampa Electric also maintains nearly full contracted storage levels during times of greatest uncertainty. For instance, Tampa Electric fills natural gas capacity

storage before the start of each hurricane season since supply availability may be at risk during the same period that gas consumption is at its maximum. Similarly, Tampa Electric keeps natural gas storage nearly full during major plant outages and extreme cold weather periods since gas consumption has the greatest uncertainty during those times.

**Q.** What natural gas storage capacity does Tampa Electric have?

**A.** Tampa Electric currently has a contract with Bay Gas Storage for up to 1,250,000 MMBTU of storage capacity. The 1,250,000 MMBTU of storage capacity provides Tampa Electric with approximately five summer days of gas supply. The projected 13-month average volume of natural gas in storage in 2014 is 900,000 MMBTU with a value of $3,604,000.

**OIL INVENTORY**

**Q.** What is the company's oil inventory planning process?

**A.** Although less than one percent of the company's generation comes from its oil-fired units, this generation is critical for peak demand periods and for

startup at its base load units. Therefore, the company is concerned with maintaining proper levels of oil inventory. The minimum desired level for light oil at each plant is an adequate supply determined to be necessary to maintain the reliability of the company's generation system during maximum demand conditions.

**Q.** Do the criteria for oil inventory levels differ from those applicable to coal inventory?

**A.** Yes. While the normal generation dispatch procedure provides for priority generation by coal and natural gas, the three oil-fired generating units must have adequate supplies of oil, not only for expected use, but also to allow for continued use in the event of unscheduled outages of major coal-fired units, limitations of natural gas supply, and/or higher than expected loads. This contingency consideration dictates that greater quantities of oil be maintained in inventory than normally would be maintained on a purely projected burn basis. Light oil is also necessary for unit startup and flame stabilization to the Big Bend coal-fired units. In 2009, Tampa Electric installed an additional aero derivative combustion turbine at Big Bend Power Station with the ability to run as a dual

fuel unit on oil. This unit is a critical asset because it has black start capabilities that would be used to "jump start" Big Bend coal units.

**Q.** What is Tampa Electric's inventory plan for light oil?

**A.** The company's light oil inventory plan is to maintain, at a minimum, the level of oil necessary to provide peaking reliability and coal unit start-up in its generating system. The company has included 81,242 barrels of light oil in inventory for 2014, which equates to a 13-month average of $10,701,000.

**TOTAL FUEL INVENTORY**

**Q.** What is the total amount of fuel inventory that Tampa Electric proposes to be included in working capital for 2014?

**A.** The 2014 13-month average total fuel inventory included in working capital is $106,507,000 as shown on Document No. 4 of my exhibit.

**Q.** Please summarize your direct testimony.

**A.** Tampa Electric generates energy for customer use from a

diversified fuel portfolio of coal, oil and natural gas fired units. The company utilizes a dynamic fuel inventory plan that takes into account fuel commodity supply availability uncertainty and transportation uncertainty, fuel consumption variability, and other risk factors, to provide a consistent level of system protection and reliability. Inventory levels take into account the types of fuel maintained and consumed to meet plant requirements in a cost-effective manner and to reliably serve customers.

Tampa Electric's 2014 total proposed fuel inventory of $106,507,000 is an appropriate value for the fuel inventory component of working capital. This level of inventory provides for continued reliable service at a cost that is less than the consequences of not having enough fuel to meet the customer needs. Finally, this inventory level is consistent with the company's inventory planning process and actual historic inventory levels.

**Q.** Does this conclude your direct testimony?

**A.** Yes, it does.

TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
FILED: 04/05/2013

# EXHIBIT

# OF

# J. BRENT CALDWELL

**20**

# Table of Contents

TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
EXHIBIT NO. ___ (JBC-1)
WITNESS: CALDWELL
DOCUMENT NO. 1
PAGE 1 OF 1
FILED: 04/05/2013

**LIST OF MINIMUM FILING REQUIREMENT SCHEDULES**

**SPONSORED OR CO-SPONSORED BY J. BRENT CALDWELL**

| MFR Schedule | Title |
|---|---|
| B-18 | Fuel Inventory By Plant |
| C-2 | Net Operating Income Adjustments |
| C-8 | Detail Of Changes In Expenses |
| C-9 | Five Year Analysis - Change In Cost |
| C-37 | O&M Benchmark Comparison By Function |
| C-38 | O&M Adjustments By Function |
| C-39 | Benchmark Year Recoverable O&M Expenses By Function |
| C-41 | O&M Benchmark Variance By Function |
| C-42 | Hedging Costs |
| F-8 | Assumptions |

TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
EXHIBIT NO. ___ (JBC-1)
WITNESS: CALDWELL
DOCUMENT NO. 2
PAGE 1 OF 1
FILED: 04/15/2013

## 2014 PROPOSED COAL INVENTORY

| | Tons | Amount ($000) |
|---|---|---|
| Big Bend Units 1 – 4 | 445,522 | $31,922 |
| Polk Unit 1 | 125,668 | 12,720 |
| Storage Facility | 781,330 | 47,560 |
| **Total 2014 Proposed Coal Inventory** | **1,352,520** | **$92,202** |

* Total system wide 13 month average, based on end of the month inventory using projected burn.

TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
EXHIBIT NO. ___ (JBC-1)
WITNESS: CALDWELL
DOCUMENT NO. 3
PAGE 1 OF 1
FILED: 04/15/2013

## COAL INVENTORY LEVELS 2008-2012

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| January | 109 | 80 | 121 | 122 | 86 |
| February | 108 | 81 | 122 | 121 | 83 |
| March | 105 | 83 | 124 | 119 | 82 |
| April | 101 | 87 | 123 | 116 | 82 |
| May | 96 | 91 | 122 | 112 | 82 |
| June | 92 | 95 | 122 | 108 | 83 |
| July | 88 | 100 | 123 | 105 | 84 |
| August | 85 | 104 | 124 | 101 | 84 |
| September | 83 | 109 | 124 | 97 | 84 |
| October | 81 | 113 | 124 | 94 | 84 |
| November | 80 | 116 | 122 | 91 | 84 |
| December | 80 | 119 | 122 | 89 | 85 |
| | | | | 2011-2012 Average | 95 |
| | | | | 2008-2012 Average | 101 |

* Total system wide 13 month average, based on end of the month inventory.

TAMPA ELECTRIC COMPANY
DOCKET NO. 130040-EI
EXHIBIT NO. ___ (JBC-1)
WITNESS: CALDWELL
DOCUMENT NO. 4
PAGE 1 OF 1
FILED: 04/05/2013

## 2014 PROPOSED FUEL INVENTORY

| | Amount ($000) |
|---|---|
| Coal | $92,202 |
| Natural Gas | 3,604 |
| Light (#2) Oil | 10,701 |
| **Total 2014 Proposed Fuel Inventory** | **$106,507** |

* Total system wide 13 month average, based on end of the month inventory.