Entergy Arkansas, Inc., Third Revised Rate Schedule FERC No. 94 Entergy Gulf States Louisiana, L.L.C., Rate Schedule FERC No. 181 Entergy Louisiana, LLC, Third Revised Rate Schedule FERC No. 69 Entergy Mississippi, Inc., Third Revised Rate Schedule FERC No. 262 Entergy New Orleans, Inc., Third Revised Rate Schedule FERC No. 8 Entergy Texas, Inc., Rate Schedule FERC No. 181

This Service Schedule MSS-6 shall be attached to and become a part of the Agreement dated the <u>23rd</u> day of <u>April</u>, <u>1982</u> and shall be effective with said Agreement or at such later date as may be fixed by any requisite regulatory approval or acceptance for filing.

Attest

## **ARKANSAS POWER & LIGHT COMPANY**

Original signed by R. J. Estrada Assistant Secretary Original signed by Jerry Maulden President

Attest

# LOUISIANA POWER & LIGHT COMPANY

Original signed by W. H. Talbot Secretary Original signed by J. M. Wyatt President

Attest

# MISSISSIPPI POWER & LIGHT COMPANY

Original signed by R. J. Estrada Assistant Secretary Original signed by D. C. Lutken President

Attest

# NEW ORLEANS PUBLIC SERVICE INC.

Original signed by William C. Nelson Secretary

Original signed by James M. Cain President

Effective:

November 22, 2008

Issued by:	Kimberly Despeaux
	Associate General Counsel

Issued on: November 21, 2008

Filed to comply with unpublished letter order of the Federal Energy Regulatory Commission, Docket No. ER08-460, issued April 22, 2008.

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Original Sheet No. 76

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#### **SERVICE SCHEDULE MSS-7**

#### **MERGER FUEL PROTECTION PROCEDURE**

#### 70.01 Purpose

This Service Schedule provides a procedure for protecting the participating Companies from incurring higher fuel and purchased power costs as a result of the merger with Gulf States. For a Company which incurs an increase in its fuel costs as a result of the merger, the increase in cost will be transferred back to the companies obtaining fuel savings in proportion to those savings, in accordance with the following provisions.

#### 70.02 Participating Companies

Companies covered by this Service Schedule shall include Gulf States and any other Company notifying the Operating Committee prior to the first calculation performed pursuant to 70.03 of its intent to participate and that its participation has the approval of the regulatory agency with jurisdiction over the Company's retail rates. Any Company directed to participate by its retail regulator shall do so.

#### 70.03 Calculation Procedure of Fuel Cost Changes

Each year after the effective date of the Entergy-Gulf States Merger (Merger), merger-related fuel cost changes (MRFC) will be Calculated for each Company in accordance with 70.05. The MRFC will be used to calculate a Cumulative Fuel Change Balance (CFCB) for each Company, as follows:

Year ending CFCB = (Year beginning CFCB x (1 + i)) + MRFC) where: i = the average yield on ten-year U.S. Treasury Notes for the year just ended.

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At the end of each of the years prior to the final year, if the CFCB is negative for one or more Companies and positive for one or more Companies, then 50 percent of the Company's positive CFCB (i.e., higher fuel costs due to the merger) shall be transferred to the CFCB of the Company or Companies with a negative balance. At the end of the tenth year (or such shorter period of time as set forth in Section 70.04) of this procedure, the above procedure will apply except that the full amount (100%) of a positive CFCB will be transferred subject to the limitation that such transfer does not cause the CFCB to become positive for another Company. For the Companies receiving the transferred amount, the transfer shall be allocated in proportion to each Company's percentage of the total of the negative balances of the participating companies.

Any year after a positive amount is transferred from a Company's CFCB and that Company's CFCB subsequently becomes negative, then such previous transfers will be reversed to the extent the reversals do not cause the Company's CFCB to become positive.

## 70.04 Limitation of Term

This procedure shall apply for the shorter of: (1) the ten years following the effective date of the merger, or (2) the period between the effective date of the merger and the date of implementation of retail access in a jurisdiction in which one of the Companies operate.

# 70.05 Fuel Cost Change Measurement Procedure

Merger-related fuel cost changes (MRFC) for each Company are measured annually as the difference between estimated stand-alone fuel costs (SAFC) and estimated merger fuel costs (MFC), where:

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Original Sheet No. 78

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> SAFC = The estimated annual cost of fuel and purchased energy incurred to serve the Company's net area dispatch, as determined by a simulation of the dispatch of generating units and system operations under stand-alone (non-combined) operation of the Gulf States and Entergy System (excluding Gulf States) using Entergy's most current delivery of the PROMOD III production cost model and the input assumptions set forth in 70.06.

> MFC = The estimated annual cost of fuel and purchased energy incurred to serve a Company's net area requirements as determined by a simulation of the dispatch of generating units and system operations under merged operation (combined) of the system using Entergy's most current delivery of the PROMOD III production cost model and the input assumptions set forth in 70.06.

#### 70.06 Input Assumptions for Production Cost Simulations

#### Customer Loads

Actual hourly net area load, without off-system sales transactions, will be used as hourly load inputs.

#### Resources

The Gulf States and Entergy resources available to meet customer loads shall be those reflected in Entergy's most recent Business Plan applicable to that year.

#### Generating Unit Efficiency

The heat rate data shall be the then current data used in Entergy's Bulk Power Management system (BPMS).

#### Generating Unit Availability

Generating unit availability data (available MW's for each generating unit) shall be those reflected in the BPMS data for that time period.

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#### System Operating Constraints

All generating unit constraints, fuel constraints, and transmission constraints as represented in Entergy's most current Business Plan applicable to that year will be reflected in the input assumptions. However, the transmission constraint known as Amite South shall be changed after the end of the fifth post merger year in the Entergy standalone analysis to that contained in the merger analysis for the remaining time period.

#### Fuel Costs

Nuclear	Actual monthly fuel cost as used in the Intra-System Billing (ISB)			
	program will be used as the nuclear fuel cost input.			
Coal	Actual monthly fuel cost as used in the ISB program will be used as the			
	coal fuel cost input except that the stand-alone fuel cost for North Antelope			
	coal shall be multiplied by the ratio of the stand-alone cost of North			
	Antelope coal to the merger cost of North Antelope coal for each Entergy			
	coal unit as reflected in 70.08.			
Gas/Oil	Fuel cost for each gas/oil unit will be based on actual weighted average			

fuel cost for each unit as calculated from fuel cost inputs to the ISB program.

#### Off System Economy Purchases

The simulations will reflect the off-system economy sources listed in 70.09. For the stand-alone simulations, these sources will be allocated to Gulf States and Entergy based on the most current year ending load responsibility ratios. The pricing of these transactions will be based on the actual monthly average on-peak and off-peak price of economy energy purchases, as determined by the ISB, plus a \$2/MWH markup for each transaction for which Gulf States would require wheeling service from Entergy.

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In addition, the Gulf States stand-alone simulation will also reflect a 300 MW offpeak source to be priced at the actual average monthly off-peak price of economy energy purchases as determined by the ISB. The available capacity for each Entergy stand-alone off-system economy source, as determined above, will be increased (to reflect economy energy not taken in the Gulf States stand-alone simulation) by the following method:

IMW = Monthly on-peak and off-peak increase for each Entergy standalone off-system economy source rounded at the nearest whole MW.

$$= AMW x (1-CF)$$

where:

AMW =	The available capacity (MW) for the off-system economy source in the Gulf States stand-alone.
CF =	Monthly on-peak or off-peak capacity factor at which energy is taken in the Gulf States stand-alone simulation for the off-system economy source.

## **Operating Reserves**

An operating reserve level of 6 percent of annual peak will be reflected in the input assumptions.

#### 70.07 PROMOD Benchmark

A benchmark of PROMOD based on the actual 1992 and 1997 operating data will be made to verify the reasonableness of the model.

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#### 70.08 North Antelope Coal Prices

The following ratios will be used to increase the actual North Antelope coal prices used in the stand-alone simulation case:

Year	Stand Alone	Combined	
	(\$/MMBtu)	(\$/MMBtu)	Ratio
1994	1.8261	1.7910	1.0196
1995	1.8997	1.8500	1.0269
1996	1.9423	1.9190	1.0122
1997	2.0918	2.0240	1.0335
1998	2.2096	2.1760	1.0155
1999	2.2556	2.2160	1.0179
2000	2.3466	2.2960	1.0221
2001	2.4274	2.3800	1.0199
2002	2.5114	2.4830	1.0114
2003	2.6041	2.5690	1.0137

#### 70.09 Joint Dispatch Economy Purchase Capacities

The following off-system economy resources will be used in the PROMOD simulations, with the figures below being capacity in MW:

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Company	Type of		1994	1995	1996	1997	1998	1999	2000	0001		
L	Purchase	Month								2001	2002	2003
AECI	On Peak &	Year	400	400	400	400	400	400	400	400	400	400
	Off Peak	Round	200	200								
Cajun	On Peak & Off Peak	Jan.	200	200	200	200	200	200	200	200	200	200
Cajun	Off Peak &	Feb.	200	200	200	200	200	200				200
Cajun	Off Peak	FeD.	200	200	200	200	200	200	200	200	200	200
Cajun	On Peak &	Mar.	200	200	200	200	200	200	200	200	200	200
cajun	Off Peak	Mar.	200	200	200	200	200	200	200	200	200	200
Cajun	On Peak &	Apr.	200	200	200	200	200	200	200	200	200	200
cajun	Off Peak	APL.		200		200	200	200	200	200	200	200
Cajun	On Peak &	May	110	95	80	120	100	160	160	160	160	160
	Off Peak	1										
Cajun	On Peak &	Jun.	110	95	80	120	100	160	160	160	160	160
	Off Peak											
Cajun	On Peak &	Jul.	110	95	80	120	100	160	160	160	160	160
_	Off Peak											
Cajun	On Peak &	Aug.	110	95	80	120	100	160	160	160	160	160
	Off Peak											
Cajun	On Peak &	Sep.	200	200	200	200	200	200	200	200	200	200
	Off Peak											
Cajun	On Peak &	Oct.	200	200	200	200	200	200	200	200	200	200
	Off Peak											
Cajun	On Peak &	Nov.	200	200	200	200	200	200	200	200	200	200
<b>a</b>	Off Peak	l										
Cajun	On Peak & Off Peak	Dec.	200	200	200	200	200	200	200	200	200	200
Empire	On Peak &	Year	50	50	50	50	50	50	50	50	50	50
Empire	Off Peak	Round	50	50	50	50	50	50	50	50	50	50
Oklahoma	On Peak	Year	300	300	300	300	300	300	300	300	300	300
OKIANOMA	Only	Round	500	500	300	300	300	300	300	300	300	300
Oklahoma	On Peak &	Year	250	150	60	0	0	0	0	0	0	o
	Off Peak	Round				Ŭ	Ű	ľ	ľ	Ŭ	ľ	Ň
Southern	On Peak &	Year	75	75	75	75	50	50	50	50	50	50
	Off Peak	Round										- "
SWEPCO	On Peak &	Year	100	100	100	100	100	100	100	100	100	100
	Off Peak	Round				-	_					
SWEPCO	On Peak	Year	200	200	200	200	200	200	200	200	200	200
	Only	Round										
TVA	On Peak &	Year	1,00	1,00	1,00	750	500	500	500	500	500	500
	Off Peak	Round	0	0	0							
Union EL	On Peak &	Year	400	400	400	400	400	400	400	400	400	400
	Off Peak	Round										

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Kimberly Despeaux Associate General Counsel Effective:

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This exhibit contains information that is highly sensitive and will be provided under the terms of the terms of the Protective Order (Confidentiality Disclosure Agreement) entered in this case. This page has been intentionally left blank.

# DOCKET NO. 41791

APPLICATION OF ENTERGY	§	PUBLIC UTILITY COMMISSION
TEXAS, INC. FOR AUTHORITY TO	§	
CHANGE RATES AND RECONCILE	§	OF TEXAS
FUEL COSTS	§	

# DIRECT TESTIMONY

OF

ANDREW J. O'BRIEN

ON BEHALF OF

ENTERGY TEXAS, INC.

SEPTEMBER 2013

# ENTERGY TEXAS, INC. DIRECT TESTIMONY OF ANDREW J. O'BRIEN 2013 RATE CASE

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# **EXHIBITS**

Exhibit AJO-1	Relationship of Various Wholesale Transactions
Exhibit AJO-2	ETI Non-Associated System Purchases
Exhibit AJO-3	Summary of ETI Cogeneration Purchases

<u>Page</u>

1		I. INTRODUCTION
2	Q1.	PLEASE STATE YOUR NAME, BUSINESS ADDRESS, EMPLOYER,
3		JOB TITLE AND RESPONSIBILITIES.
4	Α.	May name is Andrew J. O'Brien. My business address is 10055 Grogans
5		Mill Road, Parkwood II Building, Suite 300, The Woodlands, 77380. I am
6		employed by Entergy Services, Inc. ("ESI"), as Director, Power
7		Transactions and Dispatch in the Energy Management Organization
8		("EMO") within the System Planning and Operations ("SPO") organization.
9		In that capacity, among other activities, I am responsible for overseeing
10		the group responsible for the purchase and sale of bulk power for the
11		electric utility Operating Companies of the Entergy System. <sup>1</sup> ESI is an
12		affiliate of the Operating Companies which provides engineering, planning,
13		accounting, technical, and regulatory support services to each of the
14		Operating Companies, including ETI. These services include those
15		performed by the SPO organization, such as the procurement of fuel and
16		purchased power for the Operating Companies and the operation of the
17		Entergy System. ESI frequently serves as agent for the Operating
18		Companies in connection with wholesale transactions. Although each
19		individual Operating Company owns its generating resources and
20		transmission assets, the Entergy System is planned and operated as a

The six Entergy Operating Companies are Entergy Arkansas, Inc. ("EAI"), Entergy Gulf States Louisiana, L.L.C. ("EGSL"), Entergy Louisiana, LLC ("ELL"), Entergy Mississippi, Inc. ("EMI"), Entergy Texas, Inc. ("ETI") and Entergy New Orleans, Inc. ("ENO"). The electric generation and bulk transmission assets of these six Operating Companies are operated on a coordinated basis as a single electric system, referred to as the "Entergy System" or the "System."

1

single, integrated system pursuant to the terms and conditions of the
 Entergy System Agreement.<sup>2</sup>

3

4 Q2. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND
5 PROFESSIONAL EXPERIENCE.

I have been employed by ESI since June 2001. During my career, I have 6 Α. 7 held numerous positions, including my current leadership position, in the 8 areas of commercial negotiations, regulatory, generation dispatch 9 operations as well as resource and operations planning. In June 2001, I 10 accepted a position as Next Day Scheduler in the power marketing 11 department of the EMO. From 2003 to 2006, I worked as a Generation 12 System Dispatcher and then as the Senior Lead Analyst in the Current In 2007, I accepted the role of Wholesale 13 Day Operations group. 14 Executive in the Supply Procurement department and was promoted in 15 2008 to Manager, Supply Procurement. In this role, I gained significant 16 experience negotiating long-term resource acquisitions, both asset 17 purchases and power purchase agreements. In 2010, I accepted a 18 position within the EMO as Manager, Operations Support with 19 responsibility for overseeing the development and implementation of the

<sup>&</sup>lt;sup>2</sup> The Entergy System Agreement, discussed in the testimony of Company witness Michael J. Goin, is a FERC-approved rate schedule and contract entered into among ESI and the Operating Companies, which requires the Operating Companies to plan, construct and operate their electric generation and bulk transmission facilities as a single, integrated electric system. It is administered by the Entergy Operating Committee. EAI and EMI have provided notice to the other Operating Companies that they are terminating their participation in the System Agreement effective December 2013 and November 2015, respectively, or on such earlier dates as the FERC may permit.

1		next-day resource plan including generation commitment and system load
2		forecast. In September 2011, I assumed the position of Manager, Power
3		Marketing, and in February 2013, I was promoted to my current role. I
4		have a Master of Business Administration degree from Texas A&M
5		University and a Bachelor of Science degree in Psychology from
6		Louisiana State University.
7		
8	Q3.	ON WHOSE BEHALF ARE YOU TESTIFYING?
9	A.	I am testifying on behalf of ETI.
10		
11		II. <u>PURPOSE OF TESTIMONY</u>
12	Q4.	WHAT IS THE PURPOSE OF YOUR TESTIMONY?
13	A.	The purpose of my testimony is to provide an overview of the Power
13 14	A.	The purpose of my testimony is to provide an overview of the Power Marketing Team and its wholesale power procurement strategies,
	A.	
14	A.	Marketing Team and its wholesale power procurement strategies,
14 15	A.	Marketing Team and its wholesale power procurement strategies, practices, and procedures during the period July 1, 2011 through
14 15 16	A.	Marketing Team and its wholesale power procurement strategies, practices, and procedures during the period July 1, 2011 through March 31, 2013 (the "Reconciliation Period"). My testimony:
14 15 16 17	A.	<ul> <li>Marketing Team and its wholesale power procurement strategies, practices, and procedures during the period July 1, 2011 through March 31, 2013 (the "Reconciliation Period"). My testimony:</li> <li>describes the Entergy System's purchase power mix in the context</li> </ul>
14 15 16 17 18	A.	<ul> <li>Marketing Team and its wholesale power procurement strategies, practices, and procedures during the period July 1, 2011 through March 31, 2013 (the "Reconciliation Period"). My testimony:</li> <li>describes the Entergy System's purchase power mix in the context of overall System planning objectives;</li> </ul>
14 15 16 17 18 19	A.	<ul> <li>Marketing Team and its wholesale power procurement strategies, practices, and procedures during the period July 1, 2011 through March 31, 2013 (the "Reconciliation Period"). My testimony:</li> <li>describes the Entergy System's purchase power mix in the context of overall System planning objectives;</li> <li>describes contract negotiations, contract administration and</li> </ul>

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1		III. WHOLESALE POWER MARKETS
2		A. Overview of Market Conditions
3	Q5.	PLEASE EXPLAIN THE SIGNIFICANCE OF PURCHASED POWER
4		DURING THE RECONCILIATION PERIOD.
5	A.	During the Reconciliation Period, purchased power served base load,
6		intermediate, and peaking functions in meeting the Company's load
7		obligations. Because of the reliance on purchased power during the
8		Reconciliation Period, it was important that the purchased power portfolio
9		be reliable and flexible as well as economical.
10		
11	Q6.	PLEASE DESCRIBE THE WHOLESALE POWER MARKET
12		CONDITIONS THAT THE COMPANY FACED DURING THE
12 13		CONDITIONS THAT THE COMPANY FACED DURING THE RECONCILIATION PERIOD.
	A.	
13	A.	RECONCILIATION PERIOD.
13 14	A.	RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable
13 14 15	A.	RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable with some mild volatility. However, the Company continued to receive
13 14 15 16	A.	RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable with some mild volatility. However, the Company continued to receive substantial amounts of energy "put" to the Operating Companies by
13 14 15 16 17	A.	RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable with some mild volatility. However, the Company continued to receive substantial amounts of energy "put" to the Operating Companies by Qualifying Facilities ("QFs"), reducing the ability to utilize the market for
13 14 15 16 17 18	A. Q7.	RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable with some mild volatility. However, the Company continued to receive substantial amounts of energy "put" to the Operating Companies by Qualifying Facilities ("QFs"), reducing the ability to utilize the market for
13 14 15 16 17 18 19		RECONCILIATION PERIOD. During the Reconciliation Period the wholesale power markets were stable with some mild volatility. However, the Company continued to receive substantial amounts of energy "put" to the Operating Companies by Qualifying Facilities ("QFs"), reducing the ability to utilize the market for standard products.

23 purchase energy from other third-party merchant generators because

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those two types of suppliers generally offer limited types of power products. Neither the QFs nor other third-party merchant generators have been willing to provide material levels of power that can be used to match the ever-changing load of the Company. However, the System has worked to provide opportunities for third-party generators to supply energy when they can do so at a lower cost than the cost of the Company's owned or controlled resources.

8

9 Q8. WHAT EFFORTS WERE UNDERTAKEN TO ADDRESS THE
10 CHALLENGES PRESENTED BY THE LARGE NUMBER OF QF PUTS?

A. The Company's efforts included the use of weekly, monthly, and other
short-term purchases (less than one year) from these generators at a
defined heat rate that locked in more efficient generation for the Operating
Companies. These purchases are described in more detail in the direct
testimony of Company witness Devon S. Jaycox and later in
my testimony.

17 The Company's efforts further included long-term resource 18 planning. During the Reconciliation Period, the SPO determined the types 19 of resources that were necessary to meet the load requirements and the 20 various supply role needs of the Entergy System, including ETI, based on 21 the planning objectives laid out in the Strategic Resource Plan ("SRP"). 22 Company witness Robert R. Cooper discusses long-term planning and

- strategies, as well as acquisitions that were made pursuant to the Summer
   2009 RFP.
- 3

4

B. <u>Wholesale Purchase Power Mix</u>

5 Q9. PLEASE SUMMARIZE THE EXPENSES THAT YOU WILL ADDRESS IN
6 THIS SECTION OF YOUR TESTIMONY.

7 Α. The Power Marketing Team is responsible for the procurement and sale of 8 short-term wholesale power. In this section of my testimony, I discuss the 9 mix of long-term purchases, short-term purchases, and purchases from 10 QFs during the Reconciliation Period that are shown in Figure AJO-1 of 11 my testimony. As previously discussed, Company witness Cooper 12 addresses the procurement of longer-term purchased power transactions. 13 Company witnesses Michael J. Goin and Cooper address the allocation of 14 the costs and revenues associated with wholesale power transactions, 15 including power purchased or exchanged with ETI's affiliated (or 16 "Associated") Operating Companies, pursuant to the FERC-approved 17 Entergy System Agreement.

- 1 Q10. WHAT IS THE MIX OF POWER PURCHASED FOR THE SYSTEM
- 2 **DURING THE RECONCILIATION PERIOD?**
- Figure AJO-1, below, shows the mix of long-term purchases, short-term 3 Α.
- purchases, and purchases from QFs during the Reconciliation Period. 4







1 Testimony of Company witness Jaycox, these decisions are made by 2 various teams within SPO, including EMO. Members of the Power 3 Marketing Team participate with various planning teams, providing input about market conditions, especially price and availability of purchased 4 5 power. Once these planning teams determine the appropriate quantities 6 of power that should be purchased or sold for the benefit of the System, 7 the Power Marketing Team performs the actual procurement or sale of 8 short-term purchased power. 9 The overall responsibilities of the Power Marketing Team are to:

conduct wholesale transactions operations in a manner that
 supports the System's commitment to provide quality service and a
 reliable supply of electric energy;

acquire supplies of power that provide flexibility at a reasonable
 price under the facts and circumstances known or reasonably
 knowable at the time;

administer existing wholesale contracts in a manner that ensures a
 reasonable System cost;

market excess energy when the sales price exceeds the anticipated
System incremental cost to supply the sales; and

participate in the planning process by supplying market prices,
 availability, and other information regarding purchased power
 resources.

1 Α. Wholesale Transactions 2 Q12. PLEASE DESCRIBE THE ROLE OF WHOLESALE TRANSACTIONS IN 3 THE COMPANY'S ENERGY MIX. 4 Α. Exhibit AJO-1 summarizes the relationship of various wholesale 5 transactions that contribute to the System's overall energy mix. There are 6 two categories of purchases and sales: System and Non-System. System 7 Transactions refer to the acquisition or allocation of power by or among 8 the six Operating Companies pursuant to the terms of the System 9 Agreement. Non-System Transactions are wholesale purchases made

10 directly by ETI.

11 System Transactions are broken out into sub-categories: 12 Associated and Non-Associated. Associated transactions consist of the 13 allocations of power or costs under the System Agreement Service 14 Schedules MSS-1 Reserve Equalization, MSS-3 Exchange of Energy 15 among Companies, and MSS-4 Unit Power Purchase.

Service Schedule MSS-1 prescribes the method for equalizing among the Operating Companies the capability and ownership cost of the reserve generating capability of the System. The reserve capability is the capability in excess of the System's actual or planned load that was built or acquired in order to ensure reliable and efficient operation of the System.

22 Service Schedule MSS-3 provides for the joint economic dispatch 23 of the System, requiring that the energy from each of the Operating

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#### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

1 Companies' available resources, and the associated costs, be allocated 2 among the Operating Companies. As a result of the joint economic 3 dispatch of the System, ETI may provide energy from its generation to 4 other Operating Companies and vice versa. Service Schedule MSS-4 is 5 used for the purchase and sale of unit contingent power between 6 Operating Companies.

7 Non-Associated System Purchases and Sales consist of transactions with non-affiliated third parties. These transactions may be 8 made for the benefit of the System as a whole and allocated among all of 9 10 the Operating Companies, or the purchases or sales may be made on 11 behalf of fewer than all of the Operating Companies. Company witnesses 12 Goin and Jaycox explain how the energy, costs, and revenues from these 13 transactions are allocated among the Operating Companies under the 14 terms of the System Agreement. I will address how and when the System 15 enters into these transactions.

Non-System Purchases and Sales are those purchases and sales executed directly between ETI and other non-affiliated entities. The energy, costs, and revenues of these purchases and sales are initially assigned to the Company. Non-System Purchases include capacity purchases and cogeneration purchases as shown in Schedule H-12.4a-g. Non-System Sales include the sale of emergency (or backup) power to third parties.

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Q13. WHO IS RESPONSIBLE FOR MANAGING THE ABOVE-MENTIONED
 NON-ASSOCIATED SYSTEM AND NON-SYSTEM PURCHASES AND
 SALES?

A. With the exception of QF non-firm energy put to the Entergy System,
which I describe later in my testimony, the Power Marketing Team is
responsible for managing Non-Associated System and Non-System
purchases and sales. The Power Marketing Team also manages longterm and limited-term contracts after their execution, having the
responsibility for scheduling the power and obtaining the transmission.

10

#### 11 Q14. WHAT ARE THE OBJECTIVES OF THE POWER MARKETING TEAM?

12 Α. One objective of the Power Marketing Team is to purchase energy in the 13 wholesale market when it is more economical than utilizing the System's 14 own generation. Another objective is to purchase energy in the wholesale 15 market when necessary to maintain system reliability. Additionally, the 16 Power Marketing Team may sell energy into the wholesale market that is 17 not committed to the needs of the customers of the Operating Companies, 18 or when such sales are necessary to maintain system reliability. The 19 revenues from the sale of power are credited to fuel and purchased power 20 expenses.

# 1 Q15. WHAT PROCESS IS USED FOR ACCOMPLISHING THE ABOVE 2 OBJECTIVES?

A. The Power Marketing Team monitors the wholesale power markets for
price and availability of power to purchase and for opportunities to make
sales. To accomplish this, the Power Marketing Team is divided into five
sub-teams based on the time frame of the intended transaction.

7 The first sub-team, which is part of the Current Day Team 8 described in Company witness Jaycox's testimony, deals with the hourly 9 power markets and works in shifts in order to cover the market 24 hours a 10 day, seven days a week, 52 weeks a year. This sub-team focuses on 11 short-term economic purchase opportunities, and reliability purchases 12 necessitated by changes in System operations or load.

13 The second sub-team interfaces with the next-day, next-week, and 14 monthly power markets and looks for opportunities to avoid dispatching 15 generation resources or buying fuel when purchased power is a more 16 economical alternative. This sub-team is a part of the Next-Day Team 17 described by Company witness Jaycox.

18 The third sub-team interfaces closely with the Monthly Energy 19 Planning Process team. Company witness Jaycox describes the monthly 20 process in more detail. The Monthly Energy Planning Process includes a 21 Monthly RFP that requires a survey by the Power Marketing Team 22 regarding the purchased power price and availability for the upcoming 23 month. Concurrently, market participants are solicited for monthly

proposals to sell power to the System. Analysis of the offers is completed,
 and contracts are negotiated with those suppliers who provided proposals
 that result in expected savings in production costs over the applicable
 month.

5 The fourth sub-team interfaces closely with the Weekly 6 Procurement Process team. As indicated, for the Weekly Procurement 7 Process, the Power Marketing Team assists with the process but is not 8 responsible for the selection of bids. The Entergy Energy Delivery 9 Organization, with oversight from the Independent Coordinator of 10 Transmission ("ICT"), evaluates resources and determines whether the 11 bids or offers should be accepted. The accepted offers are granted 12 transmission service.

The fifth sub-team deals with the market for purchases of one year or longer in term, which are discussed by Company witness Cooper. The SPO's Commercial Operations Group is responsible for the selection and execution of these types of transactions. The Power Marketing Team is responsible for managing these long-term and limited-term contracts on a daily and hourly basis.

Each sub-team monitors its respective market for both the price and availability of wholesale energy. This information is presented to the appropriate planning teams for analyses that consider the cost of alternative resources. If the analysis performed by a planning team

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- indicates that a transaction is necessary and/or economical, the Power
   Marketing Team will arrange and implement the transaction.
- 3

# 4 Q16. WHAT TOOLS ARE USED BY THE POWER MARKETING TEAM TO5 MONITOR THE POWER MARKETS?

6 Α. The Power Marketing Team uses several methods to ascertain market prices and availability of purchase power. These include electronic trading 7 8 platforms, personal contacts with third parties, and publications that report 9 historical market activity and other market news. A real-time online program known as Intercontinental Exchange ("ICE") reports real-time 10 11 offers, bids, and actual transactions for power in various time frames such 12 as next day, next week, weekend, on-peak, off-peak, next month, next 13 year, and other specific time periods into the future, in both the Entergy System and in surrounding markets. The Power Marketing Team uses 14 15 ICE to monitor the real-time market activity associated with power bought 16 and sold in the Entergy System as well as in the surrounding regions. This real-time trading platform assists the Power Marketing Team in 17 negotiating with potential counterparties and deciding whether an offer 18 19 from a marketer is competitive with the market at that time. The Power Marketing Team also surveys the market through person-to-person 20 communication with power traders from utilities, power marketers, 21 and Independent Power Producers ("IPPs"). In addition, the Power 22 Marketing Team also reviews published trading data, such as Platts' 23

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#### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

Megawatt Daily ("MW Daily") to keep abreast of current market trends and
 industry news to gain greater insight into market conditions, price, and
 availability of power.

4

Q17. WHAT TOOLS ARE USED BY THE POWER MARKETING TEAM TO
TRACK AND MANAGE THE ENTERGY SYSTEM'S PURCHASE POWER
TRANSACTIONS?

The TRADES database was developed by SPO to facilitate the 8 Α. 9 documentation and accounting for all power purchases and sales transactions for the System. This program is used to record all power 10 11 purchases or sales entered into by the Power Marketing Team with 12 another party. The accounting departments use the TRADES database to verify each transaction for invoicing or paying a counterparty. In addition 13 to providing documentation for power transactions made by the Company, 14 the TRADES database also records a list of valid offers for purchased 15 power that were not accepted by the Power Marketing Team, and 16 indicates the reasons for the rejections. The records of the TRADES 17 18 database for the Reconciliation Period have been provided in the 19 workpapers to my testimony, under the provisions of an appropriate 20 Protective Order.

# Q18. WHAT TYPES OF PRODUCTS DOES THE SYSTEM BUY AND SELL IN THE WHOLESALE MARKET?

3 The majority of the System's short-term power purchases are made Α. 4 pursuant to enabling or umbrella agreements that permit the parties to specify the particular terms of a transaction in a confirmation sheet or by 5 6 oral agreement. For example, the Western Systems Power Pool 7 ("WSPP") enabling agreement is a FERC-approved agreement under 8 which parties transact for the purchase and sale of power. The SPO also 9 uses the Edison Electric Institute ("EEI") Purchase and Sale Agreement, which is also widely accepted by the electric industry. Copies of enabling 10 agreements utilized by the Company during the Reconciliation Period 11 12 have been provided in the workpapers for Schedule I-4.

With these enabling agreements in place, the System is able to 13 utilize a wide range of options available in the marketplace to meet the 14 15 System's needs. The available products vary in duration, pricing, and deliverability. With respect to duration, power is available on an hourly, 16 daily, weekly, monthly and longer-term basis. These various products can 17 18 be purchased during on-peak, super-peak, or off-peak hours. The System 19 can also benefit from these pricing options to lessen price volatility. Long-20 term contracts, which provide the capability to schedule delivery of energy 21 at the specified price, can also offer price certainty and protect against the effects of price spikes. Finally, the System can choose different degrees 22 23 of certainty of deliverability to suit its needs. Non-firm power can be cut by

1		either party without notice and is typically more economical than firm
2		energy which must be delivered as agreed, that is, backed by a specific
3		unit(s) or the promise to pay liquidated damages in the event of default.
4		The System utilizes a variety of products offered, selecting on duration,
5		price, and firmness to optimize flexibility while reducing overall fuel cost
6		and price volatility.
7		
8	Q19.	FROM WHAT ENTITIES DOES THE SYSTEM BUY POWER AND TO
9		WHAT ENTITIES DOES THE SYSTEM SELL POWER?
10	A.	The System primarily enters into purchase and sale transactions with
11		utilities, power marketers, and IPPs. A complete list of the wholesale
12		power counterparties during the Reconciliation Period is included in
13		Schedules H-12.4a-g and I-15.
14		
15		B. <u>Non-Associated System Transactions</u>
16	Q20.	PLEASE DESCRIBE THE NON-ASSOCIATED SYSTEM PURCHASES.
17	A.	As previously defined, Non-Associated System purchases are purchases
18		from third-parties made for the benefit of the System. The Power
19		Marketing Team enters into these purchases on an hourly, daily, weekly,
20		monthly, or longer-term basis. As shown in Exhibit AJO-2, the quantity of
21		power purchased each month varies. This variability is a reflection of the
22		role these purchases play as an economic alternative to self-generation.
23		During periods when purchased power costs are below the System's cost

1		of generation, purchased power will be used as an economic alternative.
2		During periods when purchased power costs are above the System's cost
3		of generation, the System will purchase power only as needed to maintain
4		system reliability. See Schedules H-12.4a-g and H-12.5b-e for a complete
5		listing of all Non-Associated System Purchases and Sales.
6		
_	0.04	WERE THERE ANY RURLINGER MARKET RELATE FOR MUCH FOR F

Q21. WERE THERE ANY PUBLISHED MARKET PRICES FOR WHOLESALE
POWER DURING THE RECONCILIATION PERIOD?

9 A. Yes. There are a number of published indices that provide an indication of
10 trading volume and prices in the wholesale markets for "standard
11 products," including publications such as MW *Daily*, that provide indices
12 for daily and monthly standard product prices. As I discuss further below,
13 the value of these indices for determining forward-looking prices has
14 decreased substantially due to the emergence of the availability of
15 non-standard products in the wholesale markets.

16

17 Q22. PLEASE EXPLAIN YOUR REFERENCE TO "STANDARD PRODUCTS"18 WITH RESPECT TO MARKET INDICES?

A. As described more fully in Exhibit AJO-3, the next-day and monthly
indices are based on purchases and sales of on-peak firm power with
liquidated damages over a defined period. As such, these indices reflect a
"standard product" block of power that must be delivered and taken ratably
(that is, at equal amounts across all hours) over the 16-hour period

1		between 6:00 a.m. and 10:00 p.m. on a business day. If the purchase is a
2		standard daily product, then the power is delivered over this 16-hour block
3		for one day. If the purchase is a monthly product, the power is delivered
4		over this 16-hour block for every workday, with the exception of
5		some holidays.
6		
7	Q23.	DO THE MARKET INDEX PRICES INCLUDE NON-STANDARD
8		PRODUCTS?
9	Α.	No. The power markets are dynamic and buyers and sellers may agree to
10		terms that define a product that differs from the standard product. These
11		"customized" agreements are not represented by the market index price.
12		Significantly, the vast majority of the System's non-associated
13		transactions are for non-standard products. In fact, less than 2% of the
14		System's over 11,000 non-associated transactions are for a
15		standard product. Thus, while the published indices provide a source for
16		evaluating standard products, these indices have become less important
17		as a tool as a result of the power markets' increased availability of non-
18		standard products in recent years.
19		

20 Q24. WHY DOES THE COMPANY PURCHASE POWER USING A NON-21 STANDARD PRODUCT?

A. The System enters into short-term non-associated power transactions fora host of reasons, all of which can justify and even require the purchase of

1		a non-standard product. Stated another way, these various reasons
2		require or make it appropriate for the System to not commit to purchase a
3		level of power ratably during the hours of 6:00 am to 10:00 pm. For
4		example, the System purchases non-standard products for reasons,
5		including: (1) the need for flexibility associated with load volatility;
6		(2) economics; (3) reliability; (4) as part of a reserve sharing agreement;
7		and (5) pursuant to a FERC-filed Generator Imbalance Agreement ("GIA")
8		tariff, to name a few.
9		
10	Q25.	PLEASE EXPLAIN YOUR REFERENCE TO FLEXIBILITY AND
11		ECONOMICS AS REASONS FOR NON-STANDARD PURCHASES.
12	A.	The need for flexibility and the opportunity for economic non-standard
12 13	A.	The need for flexibility and the opportunity for economic non-standard purchases are interrelated. As discussed above, the standard power
	A.	
13	Α.	purchases are interrelated. As discussed above, the standard power
13 14	A.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each
13 14 15	A.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each hour for a 16-hour period, from 6:00 a.m. to 10:00 p.m. Because System
13 14 15 16	Α.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each hour for a 16-hour period, from 6:00 a.m. to 10:00 p.m. Because System load fluctuates throughout the day, the purchase of power ratably over a
13 14 15 16 17	Α.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each hour for a 16-hour period, from 6:00 a.m. to 10:00 p.m. Because System load fluctuates throughout the day, the purchase of power ratably over a prescribed period of time can result in an over-supply in some hours,
13 14 15 16 17 18	A.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each hour for a 16-hour period, from 6:00 a.m. to 10:00 p.m. Because System load fluctuates throughout the day, the purchase of power ratably over a prescribed period of time can result in an over-supply in some hours, forcing the System to back down more economic energy from other
13 14 15 16 17 18 19	A.	purchases are interrelated. As discussed above, the standard power product requires the System to take the same amount of power in each hour for a 16-hour period, from 6:00 a.m. to 10:00 p.m. Because System load fluctuates throughout the day, the purchase of power ratably over a prescribed period of time can result in an over-supply in some hours, forcing the System to back down more economic energy from other sources, resulting in a net higher cost to the customer. Non-standard

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#### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

1 As an example, assume that the System is offered a purchase for a 2 standard 16-hour block for a price of \$50/MWh. Alternatively, the System 3 has the option to make a purchase or strike on a call option at \$100/MWh 4 for a 4-hour period during that same day. Since the System's load varies 5 substantially during the day, it may only need the power for the 4-hour 6 period. The total cost of the purchase for 1 MW would be \$800 for the 7 16-hour block and only \$400 for the four-hour purchase. This is a simple 8 hypothetical that ignores the System's cost for the other 12 hours, but it 9 highlights that making a purchase based on the \$/MWh price and not 10 taking into account the total cost to the customer can add costs to our 11 customers.

12

# 13 Q26. PLEASE EXPLAIN YOUR REFERENCE TO RELIABILITY.

A. Reliability purchases are necessary to maintain System reliability. These
 purchases can be made for a variety of reasons, including transmission
 constraints, a lack of resources, and problems in local areas.

17

# 18 Q27. PLEASE DISCUSS PURCHASES PURSUANT TO THE SPP RESERVE19 SHARING AGREEMENT.

A. The System is required to make purchases pursuant to an SPP reserve
 sharing agreement. The reserve sharing agreement allows the System to
 carry a lower reserve margin, thereby saving on capital expenditures and
 lowering overall costs, in exchange for the System's obligation to provide

- power when requested by the SPP. The agreement provides the System
   the ability to obtain emergency power when needed. Such purchases are
   typically for short periods and are priced at the supplier's incremental cost
   pursuant to a FERC-filed formula rate.
- 5
- 6 Q28. PLEASE EXPLAIN GIA PURCHASES.
- 7 A. GIA purchases refer to System purchases of power generated by
  8 non-System resources in excess of scheduled amounts. As such, the
  9 System has no control over such purchases and reimburses the supplier
  10 at a cost prescribed by the FERC tariff.
- 11
- 12

C. Non-System Transactions

13 Q29. PLEASE DESCRIBE NON-SYSTEM TRANSACTIONS.

- A. Non-System purchases are those made either under long-term contracts
   or under the requirements of the Public Utility Regulatory Policies Act
   ("PURPA").<sup>3</sup> Non-System sales are sales to third parties and provide
   emergency (or backup) power in the event that a unit is not available.
- 18
- 19 Q30. PLEASE DESCRIBE THE PURCHASES MADE UNDER PURPA20 DURING THE RECONCILIATION PERIOD.
- A. A supplier of this type of power is generally referred to as a Qualifying
   Facility or QF because it qualifies to supply power to the Company under

<sup>&</sup>lt;sup>3</sup> Public Utilities Regulatory Policies Act of 1978; 16 U.S.C. 824a-3.
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### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

1		PURPA. The Company is obligated to purchase the unscheduled, non-						
2		firm energy a QF chooses to supply; however, the Company cannot						
3		require the QF to supply power under PURPA. The price paid for this						
4		energy is equal to the System's avoided energy cost. As shown in Figure						
5		AJO-1 and Exhibit AJO-3, the QF non-firm, as-available energy put to the						
6		Entergy System was a considerable amount during the Reconciliation						
7		Period. Pursuant to P.U.C. Subst. R. 25.242(g)(2), any energy purchased						
8		by the Company at a price equal to or below its avoided cost is reasonable						
9		and necessary.						
10								
11		D. <u>Affiliate Transactions</u>						
12	Q31.	DID THE COMPANY MAKE ANY DISCRETIONARY PURCHASES OF						
13		SHORT-TERM ENERGY FROM AFFILIATED COMPANIES DURING						
14		THE RECONCILIATION PERIOD?						
15	Α.	No. However, during the Reconciliation Period, ETI was allocated its						
16		responsibility ratio of a limited amount of purchases from affiliates of ETI						
17		through the GIA, which is part of the Entergy System's Open Access						
18		Transmission Tariff.						
19								
20	Q32.	WERE THE PURCHASES FROM ETI AFFILIATES DURING THE						
21		RECONCILIATION PERIOD REASONABLE AND NECESSARY?						
22	Α.	Yes. These purchases were made pursuant to PURPA or a						
23		FERC-approved tariff that required the purchases to be made.						

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1	Q33.	WERE THE PRICES THAT ETI PAID TO AFFILIATES NO HIGHER					
2		THAN THE PRICES CHARGED BY THOSE AFFILIATES TO THEIR					
3		OTHER AFFILIATES OR DIVISIONS OR TO A NON-AFFILIATED					
4		PERSON FOR THE SAME SERVICES?					
5	A.	Yes. The prices paid as a result of these purchases were governed by					
6		statute or FERC-approved tariff, and were no higher than prices charged					
7		to other affiliates for the same product.					
8		·					
9		E. <u>Surveys of Wholesale Power Markets</u>					
10	Q34.	PLEASE DESCRIBE THE ACTIONS THAT EMO HAS TAKEN TO					
11		COMPLY WITH THE COMMISSION'S REQUIREMENT FOR NEXT-DAY					
12		AND INTRA-DAY SURVEYS OF THE ELECTRIC MARKET.					
13	Α.	The TRADES database includes all valid purchased power offers received					
14		by the System. To be considered, an offer must specify price, quantity,					
15		and duration. For accepted offers, the database includes information					
16		documenting the reasons particular purchases are made, such as whether					
17		the purchase was made to ensure the reliability of the System or was an					
18		economy purchase. For offers that are not accepted, in addition to					
19		specifying price, quantity, and duration information, the database also					
20		includes information documenting the reason that the offer was declined					
21		(e.g., that the price was not economical, the counterparty was not					
22		pre-approved, or that the purchase was not made because of operating					
23		constraints, including minimum load issues or transmission constraints).					

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### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

- 1 Thus, the EMO has not only a survey of the market, but in fact, an 2 inventory of valid offers.
- 3

4 Q35. PLEASE DESCRIBE THE INFORMATION THAT IS COLLECTED
5 REGARDING OFFERS FOR THE SALE OF ELECTRICITY THAT ARE
6 ACCEPTED.

7 Α. In order to collect information on wholesale power transactions, the 8 traders identify the reason for the purchase (e.g., either economic 9 dispatch, economic commit, or reliability) at the time that the purchase 10 was made. If the purchase is made for economic dispatch reasons, the 11 purchase is more economical than existing online generation. If the 12 purchase is made for economic commit reasons, then the purchase is 13 generally avoiding a plant startup. The reasons that reliability may be 14 selected include a plant trip/failure/derate, an unexpected increase in the 15 load forecast, or a transmission constraint.

16

Q36. PLEASE DESCRIBE THE INFORMATION THAT IS COLLECTED
REGARDING OFFERS FOR THE SALE OF ELECTRICITY THAT ARE
NOT ACCEPTED.

A. The TRADES database also requires the traders to record information on
the valid offers that are received, but that are not accepted. An offer is
defined as valid, and therefore recorded, if it includes the following
information: price (\$/MWh), quantity (MWh), start time, duration (days or

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### Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

hours), and if it is received from an Entergy-approved counterparty. Offers 1 2 may be rejected because they are not economically attractive (e.g., the price is greater than the avoided cost for the relevant time period) or 3 4 because of operational reasons. If an offer is rejected, the information that is collected includes the name of the seller, the amount and price of the 5 6 power, the schedule proposed for sale, and the relevant avoided cost 7 estimate that led to the rejection. The trader must also identify the reason for the rejection. These explanations are recorded and stored in the 8 TRADES database. To the extent that the trader is informed of a specific 9 10 transmission constraint, that information is also retained.

11

Q37. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE
 PURCHASED POWER EXPENSES OF THE COMPANY DURING THE
 RECONCILIATION PERIOD.

A. The strategies, practices, and procedures employed by the Power
Marketing Team during the Reconciliation Period resulted in a diverse
portfolio of products from the evolving purchased power markets that
provided electricity for customers at a reasonable total cost.

Entergy Texas, Inc. Direct Testimony of Andrew J. O'Brien 2013 Rate Case

1		V. <u>CONCLUSION</u>						
2	Q38.	PLEASE SUMMARIZE THE COMPANY'S PARTICIPATION IN THE						
3		WHOLESALE MARKETS DURING THE RECONCILIATION PERIOD.						
4	A.	The purchased power expense that the Company incurred was the result						
5		of prudent planning and acquisition processes. These expenses were						
6		necessary to reliably meet ETI's customers' needs. The Entergy System						
7		utilizes a comprehensive process to manage its power acquisitions and						
8		sales, consisting of a series of planning and procurement processes that						
9		bring together sophisticated analytical tools and a wide range of personnel						
10		so that the optimum portfolio of energy sources is developed. The System						
11		was also operated pursuant to the terms of the System Agreement						
12		regarding participation in the wholesale electric markets and in decisions						
13		to utilize purchases of wholesale power to displace owned generation.						
14								
15	Q39.	DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?						

16 A. Yes.



# **Relationship of Various Wholesale Transactions**

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Exhibit AJO-2 2013 TX Rate Case Page 1 of 1



# **ETI Non-Associated System Purchases**

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Exhibit AJO-3 2013 TX Rate Case Page 1 of 1



# **Summary of ETI Cogeneration Purchases**

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# **DOCKET NO. 41791**

APPLICATION OF ENTERGY	§	PUBLIC UTILITY COMMISSION
TEXAS, INC. FOR AUTHORITY TO	§	
CHANGE RATES AND RECONCILE	§	OF TEXAS
FUEL COSTS	§	

## DIRECT TESTIMONY

OF

MICHELLE H. THIRY

ON BEHALF OF

ENTERGY TEXAS, INC.

SEPTEMBER 2013

### ENTERGY TEXAS, INC. DIRECT TESTIMONY OF MICHELLE H. THIRY 2013 RATE CASE

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### **EXHIBITS**

- Exhibit MHT-1 Organizational Chart of the Gas & Oil Group
- Exhibit MHT-2 Sabine & Lewis Creek Location vs. Houston Ship Channel Area
- Exhibit MHT-3 Explanations of Published Indices (*Gas Daily* and *Inside FERC*)
- Exhibit MHT-4 Lewis Creek Monthly Bid-week WACOG Compared to Houston Ship Channel Monthly Price Range
- Exhibit MHT-5 Sabine Monthly Bid-week WACOG Compared to Houston Ship Channel Monthly Price Range
- Exhibit MHT-6 Lewis Creek Daily GDA WACOG Compared to Houston Ship Channel GDA Price Range
- Exhibit MHT-7 Sabine Daily GDA WACOG Compared to Houston Ship Channel GDA Price Range
- Exhibit MHT-8 San Jacinto GDA WACOG Compared to Houston Ship Channel GDA Price Range
- Exhibit MHT-9 Hardin GDA WACOG Compared to Houston Ship Channel GDA Price Range
- Exhibit MHT-10 Volumes of Gas Purchased and Transported by the Company
- Exhibit MHT-11 Calculated Storage Cavern Capacity
- Exhibit MHT-12 Analysis of Daily Natural Gas Storage Inventory
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