Quarterly Report:

Entergy's Weekly Procurement Process (WPP)
December 2012 to February 2013

Prepared by:

Potomac Economics, Ltd.
WPP Independent Monitor

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I. Overview

Potomac Economics submits this Quarterly Independent Monitoring report on Entergy's Weekly Procurement Process ("WPP") for the quarter December 2012 to February 2013 on behalf of the Independent Coordinator of Transmission ("ICT") for Entergy Services, Inc. ("Entergy"). This report is submitted in accordance with requirements of the Federal Energy Regulatory Commission ("Commission") to monitor the operations and effectiveness of the WPP[1]

The WPP was approved by the Commission in conjunction with its approval establishing the ICT in 2006.[2] The WPP was designed to facilitate the integration of non-affiliated resources with Entergy's own network resources to serve its native load.[3] The WPP is implemented by Entergy's Weekly Operations and monitored by Potomac Economics. In addition to overall monitoring and reporting responsibilities for the WPP, the ICT also grants transmission service to successful offers selected in the WPP.

The WPP is implemented by estimating system-wide production costs over a seven-day horizon under two alternatives model "runs." First, a "Run 0" is estimated that relies only on resources owned or under contract by Entergy. Then a "Run 1" is estimated that uses the same Entergy resources but also includes third-party offers. Third-party offers that are dispatched in Run 1 are selected and paid their as-offered costs as long as Run 1 production costs are lower.

The approval of the WPP was based on anticipated benefits from the broader integration of resources. As a result, the Commission required quarterly reporting to assess the performance of the WPP through a variety of metrics and other analysis. These reporting requirements are reflected in this report and are in two categories. First, we report on the weekly outcomes and

[1] See *Entergy Servs., Inc.*, 115 FERC ¶ 61,095, at P 305 ("ICT Approval Order"), *order on reh'g*, 116 FERC ¶ 61,275 (2006); *Entergy Servs., Inc.*, 126 FERC ¶ 61,227, at PP 85-86, 90 ("March 2009 WPP Order"), *order on clarification and reh'g*, 127 FERC ¶ 61,225 (2009). See also sections 7(a)(2) and (3) of Attachment S and section 9.2 of Attachment V to Entergy's Open Access Transmission Tariff.

[2] ICT Approval Order, *op. cit.*

[3] The WPP is also available for other Entergy network customers to use to serve their load, but none has chosen to use it.

WPP-related activities during quarter. Second, we provide information on aggregated statistics associated with the WPP model (specified by the Commission) and compiled by Entergy.

The estimated production-cost savings from accepted offers in the WPP during the quarter was $2.9 million. In the prior three months, the total was $9.1 million. As explained herein, there were five weeks during the quarter when no offers were accepted. This includes four weeks when "hold-harmless provision" of the Entergy's Open Access Transmission Tariff ("Tariff") was invoked and one week when the WPP was cancelled.

Overall, we find the WPP has been implemented in accordance with the provisions of the Tariff and that the WPP continues to provide opportunity for third-party suppliers to participant in serving Entergy network load. However, we are investigating certain outcomes and modeling issues, as explained herein.

II. Quarterly Review

Subsection 7(a)(3) of Attachment S to Entergy's Tariff establishes quarterly reporting requirements. The Commission has specifically required a series of metrics to assess the WPP performance and we include these metrics in our review.[4] These include:

- Number of Merchant Generators participating in the WPP and the corresponding MW committed;
- Effects the WPP implementation has had on actual output of Entergy's legacy oil and natural gas units;
- Description of any operational adjustments that Entergy and the ICT made with respect to soft constraints; and
- WPP savings.

In addition to reporting on these metrics, we also report on other notable activities and events that affected the WPP during the quarter. These include:

- Hold-harmless events;
- The cancelled WPP for the week of December 29th;
- WPP Modeling

A. WPP Performance Metrics

In this subsection, we present the metrics specified by the Commission in its various orders relating to the WPP.

1. Third-Party Supplier Statistics

Table 1 shows the weekly participation statistics for third-party suppliers during quarter.

[4] See March 2009 Order, op. cit., ¶¶85-90.

Table 1: Summary of Third-Party Suppliers

OperatingWeek	Third-Party Suppliers	Offers	Offer MW	Accepted Offers	Accepted MW
12/01/2012 - 12/07/2012	8	15	3814	0	0
12/08/2012 - 12/14/2012	8	15	3565	6	1827
12/15/2012 - 12/21/2012	8	15	3839	5	498
12/22/2012 - 12/28/2012	8	15	3814	11	2014
12/29/2012 - 01/04/2013	0	0	0	0	0
01/05/2013 - 01/11/2013	6	12	3363	7	2085
01/12/2013 - 01/18/2013	6	15	4163	10	2513
01/19/2013 - 01/25/2013	7	15	3505	0	0
01/26/2013 - 02/01/2013	5	13	3063	6	2050
02/02/2013 - 02/08/2013	6	15	3863	0	0
02/09/2013 - 02/15/2013	4	11	3460	6	1610
02/16/2013 - 02/22/2013	5	15	3853	0	0
02/23/2013 - 03/01/2013	7	15	4163	11	3053
Average	6.0	13.2	3420	4.8	1204
Average Previous Quarter	4.9	9.4	2623	5.2	1470

Note: Because some offers may specify different MW quantities for different days and hours, "Offer MW" is the sum of each offer's max daily MW and "Accepted MW" is the sum of each offer's max daily MW accepted.

As explained more fully in subsection B below, in five weeks no offers were accepted. In four of the five weeks, the hold-harmless provision of the Tariff was invoked and the WPP was cancelled in one week (week beginning December 29th).

The statistics in the table show that participation in the WPP during the quarter was consistent from week to week with an average of six third-party suppliers each week. This was a slight improvement over the participation of third-party suppliers in the quarter ending November 2012, when the average participation was about five third-party suppliers. The average number of weekly offers was 13, compared to an average number of about nine offers in the previous quarter. The average number of offers accepted was about five in both quarters but the average MW accepted was significantly higher in the previous quarter. Hence, while participation rose with respect to number of participants and number of offers, the number of offers accepted remained the same. This is partly due to the five weeks when the WPP accepted no offers during the quarter, which occurred in only three weeks in the previous quarter.

2. Effects of WPP on Entergy's Legacy Oil and Natural Gas Units

The Commission initially requested that the WPP's effect on legacy units be judged based on an historical comparison to the commitment and dispatch of the legacy units in the 12 months prior to WPP implementation. This was in 2009 and the comparison is no longer useful. However, the effect on legacy units based on the comparison of their commitment and dispatch between Run 0 and Run 1 is useful and this is provided below in item #6 in Section III as part of Entergy's standard reporting metrics.

3. Description of any "Operational Adjustments" relating to Soft Constraints

Soft Constraints are constraints in the WPP model that are relaxed in the model solution algorithm but incur penalties to the objective function (the overall cost minimization) of the WPP model. Once the Run 1 results are available (usually late Wednesday), Weekly Operations reviews any soft constraint violations to determine if they exceed certain specified levels. These are like secondary constraint levels that signal a need for manual evaluation of the original soft constraint violations. If the soft constraint violations are not substantial (i.e., they do not exceed these secondary levels), the results are set for approval without further consideration of soft constraints. If, however, any soft constraint exceeds its secondary level, Weekly Operations will consider whether "operational adjustments" would be available to address such violation. Operational adjustments are modest changes to commitment schedules that could be expected to ease the soft constraint violation if the violation actually arose in real-time. For example, if a flexibility constraint arises (i.e., all flexible units are at their minimum), a decommitment of an on-line unit can allow other units to ramp up to add flexibility. An operational adjustment in such a case could be decommitting a unit that can come off and back on line quickly, like a CCGT.

If Weekly Operations, in conjunction with ICT, determines that Operational Adjustments are possible, the results are set for approval without further consideration of soft constraints. If Weekly Operations, in conjunction with the ICT, determines that Operational Adjustments may not be available, then the WPP results for that week are not accepted.

During the quarter, the soft constraint violations did not exceed the secondary levels. Hence, no Operational Adjustments were necessary.

4. WPP Savings

Based on the difference in production cost estimates between Run 0 and Run 1, estimated production-cost savings from accepted offers in the WPP during the quarter was $2.9 million. In the prior three months, the total was $9.1 million. As explained in the next subsection, there were five weeks during the quarter when no offers were accepted and, hence, no production cost savings from the WPP. This includes four weeks when the Tariff's hold-harmless provision was invoked and one week when the WPP was cancelled.

B. Other WPP-Related Issues

1. Hold-Harmless Events.

In four weeks during the quarter, no offers were taken because the Tariff's hold-harmless provision was triggered. The hold-harmless provision is invoked when the WPP model is unable to find a lower-cost solution in the case where IPP offers are available (i.e., Run 1) compared to the case where only Entergy-owned resources are available (i.e., Run 0). When the hold-harmless provision is invoked, all IPP offers are rejected. This provision is intended to prevent WPP procurements that are inefficient because they increase production costs. After three hold-harmless events occurred in a five week period during the quarter, we sought to determine empirically the circumstances which can lead to such events. We had discussed the issue with Entergy after the first hold-harmless event in December. Our main question is why the model finds a higher-cost solution when IPP offers are included in Run 1. Logically, with more options, the model should at least find the original Run0 solution and accept no offers.

Entergy's consultants explained that the seven-day production-cost model is imperfect and when there are only minimal beneficial trade-offs between IPP offers and Entergy's own dispatchable capacity, the model must contend with solutions in a relatively "flat" part of its objective function. When the model has few if any beneficial trade-offs, it may find a "local" solution that actually results in higher costs. This may occur, for example, when (1) the Run 0 solution does

not rely on many expensive legacy oil or gas units to serve load or (2) the IPP offer prices are relatively high compared to costs for Entergy's dispatchable units.

As a preliminary evaluation of this issue, we measured IPP offers relative to Entergy's costs by calculating the ratio of the output-weighted average running cost for all IPP offers accepted by the model in Run 1 to the output-weighted average running cost of Entergy oil and gas units dispatched in Run 0. While this is a highly-aggregated measure of costs (and ignores commitment costs), it gives some general indication of cost factors. With respect to the available legacy units, we use the definition of legacy units used by the Commission, i.e., those dispatchable oil and gas units installed prior to 1995. Some legacy units are located inside load pockets where they cannot be replaced by newer, lower-cost Entergy resources or IPPs. In these cases, the model identifies the units as "must-run" for reliability. Therefore, to measure the legacy units available for displacement in Run 1, we identify legacy capacity in Run 0 and reduce that amount by the legacy capacity identified as must-run in Run 1. Table 1 summarizes the empirical values.

Table 2: Legacy Units' Non-Reliability-Must-Run Capacity

Week Beginning	Hold Harmless?	IPP cost relative to Entergy	Legacy Units Non-RMR Run 0
12/1/2012	Yes	86%	78,817
12/8/2012		88%	161,017
12/15/2012		81%	265,363
12/22/2012		85%	153,032
1/5/2013		88%	176,943
1/12/2013		85%	294,479
1/19/2013	Yes	99%	219,124
1/26/2013		88%	184,524
2/2/2013	Yes	88%	25,129
2/9/2013		81%	103,505
2/16/2013	Yes	87%	240,023
2/23/2013		85%	279,400
Average		87%	181,780

The table shows the four hold-harmless events during the quarter. In two weeks during the period, the hold-harmless events corresponded with relatively small amounts of non-reliability-must-run legacy capacity in Run 0 (i.e., weeks of 12/1 and 2/2). This provides some support to

the hypothesis that the hold-harmless events arise when the model is unable to find significant tradeoffs between legacy units and IPP offers. However, we note that the IPP offers appear relatively attractive for these weeks (the ratio of IPP offer prices to Entergy costs is under 90 percent).

For the weeks of 1/19, and 2/16, hold-harmless was invoked even though a large amount of legacy capacity was serving load in Run 0. For the week of 1/19, the available IPP offer prices were higher than in the other weeks in the period, but were roughly equivalent to the Entergy units. More interesting is the week of 2/16 when the legacy capacity on line was large and the IPP offers were relatively attractive (87 percent of the Entergy cost, on average).

The week of 2/16 raised concerns because both empirical metrics indicated favorable conditions for cost savings from the IPP offers. Therefore, we have been investigating the outcomes of this particular week in more detail in order to help illuminate the underlying causes of hold-harmless events.

For that week, the hold-harmless provision was triggered because the production costs in Run 1 were $83,000 higher than in Run 0. This increase in production costs was partly the result of a combination of factors:

- A number of relatively expensive IPP offers were taken and sufficient unloaded capacity on low-cost resources was available to displace a substantial portion of these offers during hours in which these offers were taken.

- Relatively low-cost resources owned by Entergy were ramped down, but were not decommitted in Run 1. Hence, the start-up costs were incurred, but the low-cost energy was not utilized.

- More than 5000 MWh of additional energy was scheduled in Run 1 than Run 0. Because the load is the same in both cases, this is likely the result of higher network losses in Run 1.

These results raise potential concerns because they suggest the model is making costly choices in Run 1 that lead to the triggering of the hold-harmless provision. We are working with Ventex to determine why these choices were made in Run 1. It is possible that each of these choices was made to resolve a reliability need or other constraints. We will report our final conclusions in a subsequent report.

2. WPP Cancellation

For the WPP week of December 29th, the WPP was canceled because Weekly Operations failed to receive transmission topology files from Entergy's EMS APPS group. EMS APPS is a group within Entergy that processes AFC topology data for use in the WPP model. On December 26, 2012, severe weather in Arkansas caused EMS APPS personnel to work remotely at home. Subsequent power outage prevented the personnel from executing the file transfer to Weekly Operations. This in turn prevented Weekly operations from populating the WPP model and resulted in cancelling the WPP.

Following this incident, EMS APPS, in conjunction with the ICT, sought a contingency plan to avoid similar situations in the future. This contingency plan includes procedures to prepare for remote access when adverse weather is forecasted and, in such instances, to deploy portable large capacity batteries for remote access. We believe this additional preparation is adequate to avoid future disruptions.

3. Modeling Changes

During the quarter, two modeling changes were discussed. One was to change the way the model reflects the delivery of energy from Qualifying Facilities (QFs). The other was the change in the Western Region Reliability Must Run (RMR) rule to include additional generators.

QF Changes. Weekly Operations has been studying a possible alternative to modeling QF puts in the WPP model. Currently, the model requires substantial flexibility for online units to ramp down or be de-committed in order to accommodate energy from QF puts. This approach establishes a substantial "flexibility requirement," which causes the WPP model to keep a large amount of flexible capacity online. Weekly Operations is proposing to reduce the flexibility

requirement by forecasting the QF put energy and modeling that energy as an injection at the QF nodes. This would essentially reduce load on the system in accordance with the forecasted QF puts. Weekly Operations studied the effects of this change by re-running the WPP model for a sample of 20 weeks from 2012 and comparing the original results to results where the QF puts were modeled in accordance with the proposed change.

The general conclusion from this study was that IPP offers were less likely to be accepted under the alternative QF modeling. Although we do not judge this effect to be substantial, it was logical because the effect of the modeling change was to reduce the amount of energy to be served by dispatchable resources (energy demand would be "absorbed" at QF locations). Weekly Operations presented the study to the ICTWPP Task Force in January and further study was recommended. Therefore, the proposal remains under consideration.

RMR Rule Changes. During the quarter Ventyx made changes to the Lewis Creek RMR to allow additional assets to participate in satisfying the RMR requirement. We agreed with this change and it was implemented for the WPP week of January 15, 2013.

III. WPP Statistics

In accordance with section 9.2 of Attachment V of Entergy's Tariff, Entergy is required to maintain quarterly statistics relating to the operation of the WPP and provide them to the ICT for posting and reporting. The following are the required operating statistics for the period December 2012 through February 2013.

1. Flowgate Statistics

This metric identifies each flowgate that was congested in optimization Run 1 during the quarter and the total number of hours each flowgate was congested in Run 1 during the quarter. See Appendix 1 for the table presenting these statistics.

2. WPP Participant Operating Reserves Requirements

A WPP Participant is a network transmission customer that uses the WPP to integrate its load and resources. Entergy was the only WPP Participant during the quarter. Its average operating reserve was 603 MW.

3. Soft Constraint Statistics

The metric reports the total number of WPP Operating Weeks during the quarter that the following soft constraints were binding in Run 1: (a) AGC; (b) Operating Reserves; (c) hourly flexibility for a WPP Participant; (d) daily flexibility for a WPP Participant; (e) dump energy or WPP Participant load balance; and (f) line flow limits. Such information shall be identified separately for each such soft constraint.

Soft constraints are limits and requirements in the WPP model that result in penalties when the model violates the constraint. For example, when the model violates a line flow (flowgate) constraint, the iteration is penalized $4000 for each MWh for which the constraint is violated. Therefore, the model may find a solution where a soft constraint is in violation. However, because of the soft-constraint penalties, the model will tend to avoid solutions where violations are substantial. The Table 3 shows the number of times in Run 1 that the soft constraints were at or violated their limits.

Table 3: Soft Constraint Violations in Run 1

Soft Constraint	Frequency
AGC	12
Operating Reserve	0
Hourly Flex	7
Daily Flex	2
Load Balance	0
Flow Limit	12

4. Third-Party Supply of Reserves

This metric reports the percentage of offers and of MWs selected in Run 1 during the quarter that provided AGC capability or Operating Reserves. Such percentage shall be calculated as the ratio of the number of offers and of MWs selected that provided AGC capability or Operating Reserves to the total number of offers and the total number of MWs selected during the quarter, respectively.

There were a total of 62 third-party offers accepted in the WPP for the quarter which totaled 15,650 MW. Of these 62 offers, only one was an offer for AGC and none were operating reserve offers. The single AGC offer was not selected in Run 1.

5. Third-Party Supply of Flexibility Requirement

This metric reports the percentage of offers and of MWs selected in Run 1 during the quarter that could meet Entergy's flexibility requirements. Such percentage shall be calculated as the ratio of the number of offers and of MWs selected that could meet flexibility requirements to the total number of offers and the total number of MWs selected during the quarter, respectively.

Table 4: Third-Party Offers Contributing to Flexibility Requirements

Total Third Party Offers	62			
Total MW from Third-Party Offers	15,650			
	Number of Offers	MW	Percentage of Offers Contributing	Percentage of MW Contributing
Offers Contributing to Hourly Flexibility	17	7,200	27%	46%
Offers Contributing to Daily Flexibility	0	0	0%	0%

6. Displacement of Entergy's Legacy Resources

This metric reports the MWh of displacement of the oil and gas fueled generating facilities that are owned by the Transmission Provider and that were in service prior to January 1, 1995, published on an aggregated basis (not unit-by-unit or facility-by-facility) for the quarter, and calculated as the difference between the MWh of production estimated for such units in Run 1 and the MWh of production estimated for such units in Run 0.

The effect on these legacy units from the WPP is calculated based on the volume of displaced output from these units as a result of third-party suppliers. It is simply the difference in output of these plants between the WPP base case (Run 0) and the WPP Run 1 (when third-party offers are available). The total displacement of legacy oil and natural gas units during the quarter was 1,071,395 MWh.

IV. CONCLUSION

The WPP continues to provide opportunities for third-party suppliers to participate in Entergy's procurement of network resources and reduce Entergy's overall production cost for serving its network load. However, we have potential concerns regarding the frequent triggering of the hold-harmless provision and are investigating the potential modeling causes. If feasible modeling improvements are identified, this may benefit both the IPPs and Entergy.

Appendix 1 – Summary of Binding Flowgate Constraints in Run 1

All Hours in the Quarter

Flowgate Name	Hours Binding
ALCHEM-MONOCHEM 138 FTLO WILLOW GLEN-WATERFORD 500	83
AMITE SOUTH	46
ATTALA-CONEHOMA 115 FTLO MCADAMS-LAKEOVER 500	111
BAGATELLE-SUNSHINE 230 FTLO WILLOW GLEN-WATERFORD 500	2
BROOKHAVEN-MALLILIEU 115 FTLO FRANKLIN-BOGALUSA 500	9
CARPENTER-HOT SPRINGS SOUTH 115 FTLO ARKLAHOMA-TIGRE BAY 115	58
GRIMES-MT. ZION 138 FTLO GRIMES-BENTWATER 138	118
MCLEWIS-HELBIG 230 FTLO HARTBURG-CYPRESS 500	79
HOT SPRINGS EHV-HOT SPRINGS INDUSTRIAL 115 FTLO ARKLAHOMA-CARPENTER 115	28
STAR-MENDENHALL 115 FTLO CHOCTAW-CLAY 500	154
STAR-MENDENHALL 115 FTLO SOUTH JACKSON-POPLAR SPRINGS 115	33
STAR-MENDENHALL 115 FTLO FRANKLIN-BOGALUSA 500	196
LAKEOVER 500/115 FTLO LAKEOVER-RAY BRASWELL 500	8
LITTLE GYPSY-LULING 115 FTLO LITTLE GYPSY 115/230	3
MCADAMS 500/230 FTLO CHOCTAW-CLAY 500	20
MELBOURNE-CALICO ROCK 161 FTLO ISES-HOLLAND BOTTOMS 500	198
MOSSVILLE-MARSHALL 138 FTLO CARLYSS-BIG THREE 230	607
LAKE CHARLES BULK-NELSON 138 FTLO RICHARD-NELSON 500	4
NELSON 500/230 FTLO HARTBURG-CYPRESS 500	141
NEWPORT-FISHER 161 FTLO ISES-DELL 500	4
PELAHATCHIE-MORTON 115 FTLO CHOCTAW-CLAY 500	5
PELAHATCHIE-MORTON 115 FTLO FRANKLIN-BOGALUSA 500	137
PERRYVILLE-BAXTER WILSON 500 PTDF	8
PPG-ROSEBLUFF 230 FTLO NELSON-CARLYSS 230	30
ST GABRIEL-A.A.C. 230 FTLO WILLOW GLEN-WATERFORD 500	3
TEMP11	7
TEMP13	1
TEMP3	6
TEMP30	1
TEMP9	13
WATERFORD-LITTLE GYPSY 230 #1 FTLO WATERFORD-LITTLE GYPSY 230 #2	85
WOTAB	692
WATERLOO-BIG CAJUN 1 230 FTLO MCKNIGHT-COLY 500	1
Total All Flowgates	2891