



# **Audit of the Available Flowgate Capacity Process**

**Entergy Services, Inc.**

PERFORMED BY  
Southwest Power Pool

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PRELIMINARY

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## **I. Executive Summary**

### **A. OVERVIEW**

Pursuant to Federal Energy Regulatory Commission (FERC) Order No. 888, the Commission requires that transmission providers calculate and publicly post Available Transfer Capability (“ATC”). Although FERC established minimum requirements for ATC calculations and postings on a contract-path basis, it did not mandate a uniform methodology. Instead, each individual transmission owner has been allowed to file its own ATC methodology as Attachment C to its Open Access Transmission Tariff (“OATT”).

In 2002, some time after its initial institution of formal ATC calculations, Entergy began computing Generator Operator Limits (“GOL”) to supplement its ATC calculations. Seeking an improvement over the ATC/GOL methodology, in 2003 Entergy introduced a flow-based process for ATC calculation, which was implemented on April 27, 2004.

After conditional approval and a series of FERC orders, Entergy compliance and informational filings, and various intervenors’ comment filings, FERC launched a Section 206 investigation into Entergy’s implementation of its Available Flowgate Capacity (“AFC”) program to determine whether Entergy has complied with prior AFC-related orders; whether Entergy’s provision of transmission system accessibility is just, reasonable and not unduly discriminatory; and whether quality control issues may exist with Entergy’s AFC methodology.

Since March 22, 2005, FERC has held the AFC hearing in abeyance pending the outcome of the Entergy Independent Coordinator of Transmission (“ICT”) proposal

developed by Entergy.

Entergy requested that Southwest Power Pool (SPP), as the proposed Entergy ICT, conduct an audit of the implementation of the AFC process that Entergy uses to calculate its available transmission and to evaluate its customers' transmission service requests. This report is presented for a preliminary response to that request.

No recommendations have been made in this preliminary report on the state of Entergy's AFC process. Findings and conclusions have been reported where available. Statements of continued processing are made in other instances.

## B. OBJECTIVE

SPP's objective was to evaluate Entergy's implementation of its AFC process, which is used to determine the validity of transmission service requests by its customers, and make findings and recommendations as needed.

## C. METHODOLOGY

SPP used the following methodology to perform a process audit on Entergy's implementation of its AFC process:

- Perform tests of data inputs and model parameters on benchmark models.
- Compare data inputs to benchmark models and then to the appropriate model in which the perceived problem occurred.
- Research prior FERC orders and regulations for comparison with Entergy's current AFC processes

## D. FINDINGS AND RECOMMENDATIONS

No recommendations have been made in this preliminary report on the state of Entergy's AFC process. Findings and conclusions have been reported where available, while statements of continued processing are made in other instances.

## II. Procedural Background (Audit Scope T2)

On April 24, 1996, FERC issued Order 888, which required, *inter alia*, that all transmission providers calculate and publicly post ATC values.<sup>1</sup> This Order opened the electric transmission system to wholesale competition and allowed customers to reserve transmission service based on the ATC calculations. Accordingly, transmission providers must evaluate new requests for short-term transmission service using these ATC calculations. If sufficient ATC is available, the transmission service request ("TSR") must be approved, and if sufficient ATC is not available, the TSR must be denied. However, any denial is subject to the transmission customer's right to request a system impact study, which includes an evaluation of any upgrades to the transmission system that are necessary to increase the capacity of the system to accommodate the request.

Although Order No. 888 established minimum requirements for calculating and posting ATC, FERC did not require a uniform process for performing ATC calculations. Rather, FERC allowed all transmission providers to file individual methodologies for

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<sup>1</sup> *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities*, Order No. 888, 61 Fed. Reg. 21,540 (May 10, 1996), FERC Stats. & Regs. ¶ 31,036 (1996), *order on reh'g*, Order 888-A, 62 Fed. Reg. 12,274 (March 14, 1997), FERC Stats. & Regs. ¶ 31,048 (1997), *order on reh'g*, Order 888-B, 81 FERC ¶ 61,248 (1997).

calculating ATC. This allowed transmission providers to account for regional differences in calculating the amount of capacity that was available.

Shortly after Order 888 was issued, Entergy formally began calculating ATC to measure the transfer capability. Then, in 2002, Entergy implemented a system of calculating GOL to make transmission capacity decisions. Finally, on August 29, 2003, Entergy filed revisions to its OATT to implement a flow-based methodology for the determination of transmission capacity.<sup>2</sup>

On February 11, 2004, FERC granted conditional approval of Entergy's proposal, and the AFC methodology became effective on April 27, 2004.<sup>3</sup> FERC conditioned its approval on numerous modifications to Entergy's proposal, including greater specificity of the criteria, methods and process used in the AFC process,<sup>4</sup> a requirement to make certain information publicly available and other requirements to clearly define language in the Entergy OATT. Entergy made a compliance filing on March 12, 2004 and then made an additional informational filing on March 19, 2004 to conform to the requirements issued by FERC. A major aspect of these compliance filings was the preparation and publication of an AFC process manual. The AFC manual provided a detailed description of the AFC process, the operating and reliability assumptions underlying the AFC calculations, and any remaining business practices that were not required in the tariff sheet revisions.

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<sup>2</sup> *Entergy Services Inc.*, 109 FERC ¶ 61,281 (2004).

<sup>3</sup> *Entergy Services, Inc.*, 106 FERC ¶ 61,115 (2004) (February 11 Order).

<sup>4</sup> The Commission listed five items in particular: (1) the specific criteria used to identify the flowgates that Entergy will monitor; (2) the criteria and procedures for adding or delisting flowgates; (3) the method for evaluating the percentage of counterflows to use in the power flow model; (4) the response factor threshold and the criteria for modifications to the threshold; and (5) the bases for transmission line ratings. *Id.*

On July 12, 2004, FERC issued an order on Entergy’s March 12th Compliance filing.<sup>5</sup> This order required Entergy to provide additional information regarding the AFC process and further revisions to Attachment C. Specifically, the July 12th Order required several substantive changes to the OATT Attachment C and the AFC Process Manual. The Order also required Entergy to clarify some of the language used in Attachment C and requested further information on various computational issues. On August 13, 2004, Entergy made its second compliance filing.

On December 17, 2004, the Commission instituted hearing procedures under Section 206 of the Federal Power Act (“FPA”)<sup>6</sup> to investigate the implementation of “Entergy’s Available Flowgate Capacity (AFC) program, whether Entergy has complied with the Commission’s prior orders on AFC matters, and whether Entergy’s provision of access to its transmission system is just, reasonable and not unduly discriminatory.”<sup>7</sup> The second compliance filing was accepted by the Commission on December 17, 2004 and was made subject to the outcome of the AFC hearing.

Finally, on March 22, 2005, FERC ordered that the AFC hearing be held in abeyance pending Entergy’s response to the Entergy ICT proposal in Docket No. EL05-52.<sup>8</sup> During the interim time period, Entergy has held numerous stakeholder meetings and proposed to have Southwest Power Pool, Inc., as the Entergy ICT, to conduct an audit of its AFC process.

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<sup>5</sup> *Entergy Services, Inc.*, 108 FERC ¶ 61,046 (2004) (July 12 Order).

<sup>6</sup> 16 U.S.C. § 824e (2000).

<sup>7</sup> *Entergy Services Inc.*, 109 FERC ¶ 61,281 (2004).

<sup>8</sup> 110 FERC ¶ 61,295 (2005).

### **III. Methodology (Audit Scope T4, T5)**

On August 17, 2005, SPP committed, in its function as the Entergy ICT, to perform a process audit on Entergy's implementation of an AFC process used by Entergy to determine the validity of transmission service requests by its customers. Through several meetings with Entergy and its stakeholders, SPP developed the scope of the process audit and publicly posted it on Entergy's OASIS website (<http://oasis.energysolutions.com/OASIS/EES/>) as well as on the SPP-hosted Documentum eRoom.<sup>9</sup> An email distribution list of AFC Audit Stakeholders is maintained by SPP, and the official audit scope was also distributed through this means. SPP then began gathering all filings, documents and any data from Entergy that was related to the development and implementation of the current AFC process. This information was assimilated and scrutinized by SPP for use in the audit and then compared to the requirements mandated by FERC. SPP also completed a limited technical review of the data used in Entergy's planning models and AFC processes to confirm that Entergy is following the processes outlined in their filings.

At this preliminary stage of the audit, all tests of data inputs and model parameters have been performed on two benchmark models for peak hourly and monthly load for Summer 2005, the peak hourly model from July 25, 2005 (1:17 a.m. resynchronization) and the August 2005 monthly model (posted July 29, 2005). It is important to note that the hourly model is an Energy Management System (EMS) model, while the monthly model is a power flow model. As perceived problems with timestamps are provided to the Auditor, these issues will be evaluated based upon the Stakeholder weighted prioritization of issues. The respective data inputs to the AFC process will be compared

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<sup>9</sup> See Exhibit 1.

to the two benchmark models first and then respective data inputs to the appropriate model in which the perceived problem occurred.

## **IV. Audit Findings**

### **A. SOFTWARE COMPARISON (AUDIT SCOPE T3)**

#### *a. Background and Analysis*

SPP is in the process of identifying and documenting all instances where RFCalc or OA are different from the 'off-the-shelf' versions, including macros, modules, or other software created or modified for Entergy's use in the AFC process.

#### *b. Findings/Conclusions*

Entergy uses customized versions of two AREVA software packages, RFCalc and OA, in its AFC process. RFCalc provides Response Factor Calculations, hence the acronym. Entergy's RFCalc generates response factors on a source specific basis rather than a control area to control area basis. Proxy flowgates are used to limit service sales to levels equal to source output as well as limiting service sales across an interface to levels equal to interface capacity. All positive and negative impacts are considered in power flow calculations (i.e. no transmission distribution factor cutoff is applied at this point in the calculation process), and all negative impacts (or counterflows) are summed to determine the total counterflow. Generator-specific participation factors entered through the unit commitment input file allow for the accounting of zonal import limits. A special feature allows a zeroing out of disconnected sources. Entergy's RFCalc also contains enhanced model and data posting options, which provide for daily posting of four random hourly models and one peak hour model.

Entergy’s Oasis Automation software (“OA”) also differs from the ‘off-the-shelf’ version. Through the AFC stakeholder process, the desire for a second Scenario Analyzer was recognized by Entergy and implemented in their version of OA. This Scenario Analyzer displays all limiting flowgates and polls only confirmed services. Redirected transmission for network resources can be processed by this customized version of OA. In instances where an outage of OA or OASIS prevents a request entered before the noon deadline from being acted on until after noon, the ATC calculator has been modified to calculate firm AFC numbers in the operating horizon. Effective ATC values are calculated on a five-minute interval and uploaded to the [www.entergytransmission.com](http://www.entergytransmission.com) website, allowing for a multiple path view in lieu of a single path view given in the scenario analyzer. The transmission request processor user interface (TRPUI) filter lock has been modified to allow the customization of more parameters shown on the user interface rather than simply the time parameter. Service type validation checks against POR, POD, source, sink, and customer have been added. The csv export capability was modified to allow embedded commas in the reservation comment field. A notification popup alerts the user when the communication link between the client and the host, known as the repeater, fails. Other variations from the ‘off-the-shelf’ version of OA include access to resynchronization times on the TRPUI and cancellation of updating and posting AFC values for the current hour.

## **B. DATA SELECTION AND USE (AUDIT SCOPE T6, T9, T10)**

### **1. Entergy Transmission and Network Customer Data (Audit Scope T6, T9)**

#### *a. Background and Analysis*

In the February 11, 2005 Order, the Commission requested that Entergy describe any operating reliability assumptions that influence its modeling, including any transmission margins assumed in AFC power flow cases and any other relevant

information. FERC also required that Entergy clearly state how it selected numerous types of data including: the specific criteria used to identify the flowgates that Entergy will monitor; the method for evaluating the percentage of counterflows to use in the power flow model; the response factor threshold and the criteria for modifications to the threshold; the bases for transmission line ratings. Entergy responded in its March 12th compliance filing by stating that the AFC Process Manual includes a description of the AFC process, the operating and reliability assumptions underlying the AFC calculations, and any remaining business practices that Entergy uses in its AFC analysis. Entergy also revised its OATT to include many of the requested specifications in Attachment C.

In order to validate that Entergy conformed to stated FERC positions on the issue of data selection and use, SPP researched FERC policy and precedent to gain a clear understanding of the requirements for implementation of an AFC process. SPP then thoroughly examined Entergy's Attachment C, the AFC Process Manual and various compliance filings to determine whether Entergy had complied with FERC standards.

Data inputs to the model development process (EMS and power flow) were checked against the benchmark models for each specific type. The inputs included transmission facility outages, generation outages, unit commitment, generation dispatch, projected load levels, transaction data, and flowgate listings. Special inputs to the EMS models for the Operating Horizon (12-36 hours, depending on proximity to noon) include firm reservations and firm schedules. The data was reviewed as it was received from various sources such as Transmission Automated Outage Request System ("TAORS") for transmission outages, Entergy System Planning Organization ("SPO") inputs for unit commitment and dispatch, network resources from other network customers, purchase and sales transactions from OASIS, and net interchange schedules from the scheduling system.

Concerning data from network customers, provision of unit commitment (or designated network resource {DNR} levels) occurs through OASIS transmission service requests. New requests are entered to designate a new DNR or increase the designation of an existing DNR. Existing requests are recalled in order to reduce a designation or de-list a DNR. As stated in Section 5.8.1.2 of Entergy's Response to Staff Question 2-1 in Docket No. EL05-22, other factors affecting the generation dispatch can include unplanned unit outages and unplanned de-rating of transmission facilities, Qualified Facility puts, load forecasting, and short-term purchases by network customers.

*b. Findings/Conclusions*

Transaction data and generation dispatch in both benchmark models are still under scrutiny. All other data inputs matched the respective models. An evaluation of a sample of Transmission Service Requests (TSRs) processed by the benchmark models is also underway.

An evaluation of the software logic for committing and dispatching units in the AFC process and an evaluation of any changes to commitment or dispatch data by Entergy Transmission is currently in process.

**2. Effect of Network Customer Decisions (Audit Scope T10)**

*a. Background and Analysis*

Another focus of the Audit is the determination of the impact that Network Customer's decisions to purchase energy or capacity from third parties have on AFC calculation. For instance, short-term purchases can affect generation dispatch by reducing the designation of a contracted network resource. Therefore, in addition to

evaluating Entergy's use of Entergy Transmission data in AFC calculation, it is clear that the collection and use of network customer data is an important function performed by Entergy that should be subject to close examination.

A characteristic of the Operating Horizon (hour 0 to hour 12-36, depending on time of day) that can change AFCs is the exclusion of confirmed firm reservations without schedules. Without this firm capacity reflected in the Operating Horizon, remarkable AFC differences can occur. Transition from the Operating Horizon to the Planning Horizon (day 2 through day 31) can also affect AFCs because schedules are not available for the Planning Horizon and confirmed firm reservations are included in this time period. Likewise, transition from the Planning Horizon to the Study Horizon (month 2 through month 18) can introduce modeling differences generated by deriving AFCs from off-line planning models that represent peak-hour conditions for a given month.

*b. Findings/Conclusions*

As previously mentioned, transaction data (including confirmed firm reservations with schedules and non-firm reservations) in the benchmark models is being evaluated.

As a reminder of discussions at recent AFC Stakeholder meetings, Qualifying Facilities (QF) are dispatched at zero in the models.

**C. DATA ADJUSTMENT PROCESS (AUDIT SCOPE T7)**

*a. Background and Analysis*

In the February 11 Order, FERC mandated that Entergy indicate, with greater

specificity, the criteria, methods and procedures it will use in its AFC process. In response, Entergy submitted a March 12th compliance filing, followed by a March 19th informational filing.

Consequently, documentation of the types of adjustments to data inputs or model parameters made by Entergy Transmission engineering is warranted. Therefore, SPP evaluated the process by which changes or adjustments to AFC data, models, outputs, and software are made by Entergy Transmission engineering.

AFC data is received from a variety of sources including OASIS, customers, and internal and external control areas. Transmission facility outages, generation outages, unit commitment, generation dispatch, projected load levels, transaction data, and flowgate listings are included in the list of data inputs. Changes or adjustments to AFC data, models, outputs, and software may, at times, be required.

*b. Findings/Conclusions*

AFC data modifications, such as flowgate rating increases due to topology changes or the development of a temporary flowgate due to the planned outage of the monitored element of an existing flowgate, are tracked using software known as HRM. Change tickets for adjustments are archived.

Changes to the network (or base case) model are made according to an Entergy documented procedure. This procedure is still under review by SPP.

Model outputs are not adjusted. As described above, inputs to processes that generate AFC outputs may be changed according to the specific procedures that have been developed by Entergy.

Entergy follows Sarbanes-Oxley (“SOX”) guidelines for EMS software changes. It should be noted that SOX is voluntary for these types of software changes. Entergy utilizes software known as Remedy to document changes to software, hardware, and data. The procedure in place is described below:

A change is defined as any activity that impacts the production environment beyond the desktop. Changes are generally requested for one of three reasons: (1) A problem with regard to software, hardware, or data exists. (The problems are currently submitted via HRM or Remedy; transition from HRM to Remedy is underway.); (2) A system component needs to be changed as part of the routine operation of Information Technology (IT) infrastructure. (This includes scheduled outages for backups and OS patches.); (3) Improvements are to be made as part of an IT project. (An IT project is a scoped and planned initiative that may deliver enhancements to existing systems or the creation of entirely new IT solutions.)

Regardless of why it may be requested, every change in the software, hardware, or data must be clearly defined in Remedy and evaluated for cost, schedule, and system impact. Changes must be scheduled and approved by management before implementation in production.

## **D. MODEL PARAMETERS (AUDIT SCOPE T8)**

### **1. Parameter Selection (Audit Scope T8a)**

#### *a. Background and Analysis*

In keeping with FERC’s directives, SPP determined that an evaluation of the accuracy of model parameters used in AFC models, including flowgates, participation

factors, response factors, and counterflows, was also warranted for the purpose of the Audit.

The accuracy of results depends upon the accuracy of the process and process inputs and parameters. Inputs were previously discussed. Model parameters such as flowgates, participation factors, response factors on those flowgates, and transaction counterflows are selected based upon criteria defined above in Section C of this report.

*b. Findings/Conclusions*

The AFC Process Manual documents three processes for adding a flowgate and four steps for removing a flowgate. A verification of the accuracy of this process has not yet been performed. Separately, a comparison of the appropriate revision of the flowgate list to the monthly benchmark model demonstrated full compliance. The flowgate list, along with a revision log, is posted on Entergy's OASIS.

Participation factors were a topic of discussion at early AFC Stakeholder Meetings. A criterion was settled to bring conclusion to this particular stakeholder issue. The review of this participation factor list in comparison to the benchmark models has yet to be completed.

The AFC Process Manual states that all counterflows are to be included in all three horizons. Additionally, 100% of counterflows due to firm schedules are included in the Operating Horizon. The review of the transaction counterflows in comparison to those included in the benchmark models is underway.

In the sense that a reservation is refused due to at least one overloaded flowgate whose response factor for that path is greater than or equal to 3%, response factor verification is also underway.

## **2. Uniform Application of the Process and Audit Trail (Audit Scope T8b, T8c)**

### *a. Background and Analysis*

SPP is also evaluating and documenting Entergy's processes for ensuring uniform application of criteria to the entire system and for creating auditable trails for any variances from the criteria.

### *b. Findings/Conclusions*

“Criteria” and “inputs” are synonymous in many instances because software algorithms calculate outputs that are used as inputs to future process steps. According to the AFC Process Flowchart in Section 1.3 of the AFC Process Manual, the majority of inputs to the Operating and Planning horizon calculation engines are the same. Accordingly, the software engines themselves (RFCalc and RFLOADER) have responsibility for both horizons. Inputs to the study horizon come from many of the same sources also, although the PAAC Offline Calculator does not share responsibility with any other horizon.

A verification of whether these inputs are uniformly applied to the entire system can be generated through evaluation of specific instances of questionable results reported by stakeholders. This evaluation is underway.

### **3. Flowgate Change Process (Audit Scope T8d)**

#### *a. Background and Analysis*

In the July 22, 2005 Order, FERC required Entergy to clearly indicate the criteria and their associated numerical values that were used to identify relevant flowgates and to select or de-list flowgates. The criteria consists of the following data: percent loading and limiting element for summer/nominal ratings for normal operation; percent loading criteria during contingency; minimum per unit bus voltage; fault current thresholds; and stability threshold criteria. Entergy responded in its August 13th compliance filing by issuing revised tariff sheets that included the numerical values as well as updating the AFC process manual.

SPP utilized the July 22 FERC Order and Entergy's subsequent compliance filing to gauge Entergy's compliance with FERC's mandates regarding flowgate identification and removal.

#### *b. Findings/Conclusions*

A verification of the application of the three processes for adding a flowgate and four steps for removing a flowgate as described in the AFC Process Manual is currently in progress.

### **E. OASIS POSTING PRACTICES AND ARCHIVAL POLICIES (AUDIT SCOPE T11B, T14)**

#### *a. Background and Analysis*

In the February 11 Order, FERC requested that Entergy post certain other data and models on Entergy's OASIS so that transmission customers and other interested parties

could verify the AFC results computed by Entergy. More specifically, FERC asked for Entergy to post engineering data and model assumptions, such as the list of identified flowgates and power flow cases and unit-specific supporting input files that can be downloaded for both the real-time AFC database and the longer-term planning monthly databases in a common text exchange power flow format. Entergy responded in the March 12th compliance filing by committing to post the models that are used in the AFC process to allow Transmission Customers to reproduce the AFC results. This included a daily peak model for each day from day 1 through day 31. Entergy also committed to post a monthly model for each month for 18 months. All models would be available for customers to download from OASIS in PSS/E RAWD format.

In the July 22 Order, the Commission stated that Entergy needed to evaluate alternative ways to provide customers with information that the customers could use to assess the reasons for service denials, including evaluation of an automated procedure. Entergy responded to this Order in its August 13th compliance filing and stated that the development of an automated process for evaluating the complex interaction of the factors that result in approval or denial of transmission service was not possible prior to the AFC implementation date. However, Entergy committed to contact a third party vendor to inquire about the feasibility of developing software to convert EMS-based models into a format that can be used by transmission customers.

To evaluate whether Entergy had fully complied with FERC directives on the subject of its archival processes, SPP identified and reviewed Entergy's existing policies for preserving information about the AFC process, as outlined below.

Entergy produces hourly and monthly power flow models of its transmission system by using various data inputs of the AFC process. Examples include load,

generation dispatch, transactions, and transmission facility status. Subsequently, the AFC software generates a numeric value representing the amount of additional transfer capability available for specific flowgates under certain projected system conditions. The daily peak-hour models and related inputs and outputs are posted on Entergy's OASIS site, and the monthly AFC data<sup>10</sup>, hourly AFC data<sup>11</sup>, and AFC impact logs<sup>12</sup> are archived as zip files and stored on EMS servers, backup tapes and DVDs. Entergy's archival policies expressly state that DVDs are to be retained indefinitely.

Although Entergy's Transmission Operational Planning group administers the AFC process, the Technology Delivery group (TDG)<sup>13</sup> archives the AFC data, and has done so since April 27, 2004. Initially, the TDG saved hourly AFC data by coding the AFC software and related applications to automatically "write" all hourly AFC data to a file system located on the locally-connected storage area network attached to Entergy's EMS servers at the System Operations Center in Pine Bluff, Arkansas. Additional copies of the hourly AFC data were then made by use of a commercial, robotic tape library and backup system.

In early April 2005, the archival processes were disrupted when the backup process for saving all EMS operational data failed due to the accumulation of approximately 19,000 hourly AFC data-related files on the EMS servers. The TDG responded by restoring the normal backup process and designing a new archiving operation which would create two copies of the historic data on computer tapes; one copy being stored off-site and the other copy being stored within the robotic tape library. After

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<sup>10</sup>Monthly power flow models, AFC values and data inputs

<sup>11</sup>Hourly power flow models, AFC values and data inputs

<sup>12</sup> The logs which track the evaluation of individual TSRs and the respective AFC values applied

<sup>13</sup> An organization with the Entergy Transmission Business Unit of Entergy which provides software and IT services for the Transmission Operational Planning group.

the duplication of the hourly AFC data, the data on the EMS servers would be deleted to free up storage space.

On April 18, 2005, the TDG attempted to archive the hourly AFC historical data for the period of April 27, 2004 through January 31, 2005. Unfortunately, however, the archiving attempt resulted in the “loss” of that period’s hourly AFC historical data. Entergy attributes the failure to errors made by the TDG during archival implementation and handling of the computer tapes.

Although a portion of the hourly AFC-related data on the computer tapes may have been overwritten, Entergy continues to pursue recovery and retrieval of the historic data. Moreover, Entergy is “conducting a top-to-bottom review of the archive and backup processes currently employed to maintain all transmission system operational data that will include review by an outside expert.”<sup>14</sup> Also, on October 31, 2005, Entergy filed a notice with FERC in Docket No. ER05-1065-000 regarding this incident.

*b. Findings/Conclusions*

A verification of posting practices can be generated through evaluation of specific instances of questionable postings reported by stakeholders. This evaluation is underway.

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<sup>14</sup> Entergy Services, Inc., Certified Statement of Douglas J. Mader at P 14.

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## **F. COORDINATION WITH OTHER REGIONS (AUDIT SCOPE T13)**

### *a. Background and Analysis*

Another important factor with respect to AFC calculation is the coordination of AFCs with other entities outside of Entergy's control area. Entergy has a history of coordination with SPP, TVA, Southern Company and other large organizations that are connected to the Entergy system. However, with the development of the AFC process, the magnitude of effectual communication with these systems has increased greatly, and Entergy should be making efforts to successfully coordinate its AFC process with surrounding regions.

### *b. Findings/Conclusions*

Section 10 of the AFC Process Manual and Section 7 of Attachment C to Entergy's OATT outline the general process for regional coordination concerning transfer capability. An evaluation of specific tasks undertaken in order to provide coordination is necessary and currently being evaluated.

## **G. QUALITY CONTROL (AUDIT SCOPE T12)**

### *a. Background and Analysis*

Pursuant to comments filed by intervenors in the December 17 Order, FERC also agreed to investigate quality control issues that may exist with respect to Entergy's AFC methodology.

*b. Findings/Conclusions*

Entergy transmission engineering maintains a written policy for its RFCalc quality control process. The policy dictates that RFCalc quality control checks be performed at specific times every weekday and after every EMS failover for the following items: UC data, LF data, outage data, RFCalc power flow options, RFCalc options and OA postings. Entergy also preserves daily logs of its RFFCALC quality control checks. Research into the current Quality Control Procedures and the effectiveness of these procedures will continue.

## **H. SPECIFIC STAKEHOLDER ISSUES (AUDIT SCOPE T16)**

### **1. Flowgate Issues**

#### **a. Flowgate Ratings**

##### *1. Background and Analysis*

Through the stakeholder process, Entergy was made aware of a specific discrepancy in the rating of the Danville-Magazine 161 kV tie line jointly owned by Entergy and AEP West. AEP West rated the line as a 148 MVA, while Entergy initially assigned a 127 MVA rating. The discrepancy was discovered in the daily model for August 8, 2005 posted on August 5, 2005. As a result of an internal examination of the rating difference, Entergy claimed to have applied the revised change on August 16, 2005.

## 2. Findings/Conclusions

The Auditor reviewed the August 8th daily model and verified the rating of 127 MVA for the Danville-Magazine 161 kV tie line. The Auditor then reviewed models posted after the revision was to have been made to the flowgate rating. The monthly model for July 2006 created on December 23, 2005 reflected the revised rating of 148 MVA as recorded in version 3.0 of the AFC Revision Log posted on OASIS. However, the daily model for December 27, 2005 posted on December 28, 2005 did not reflect the revised rating of 148 MVA.

The conclusion drawn from this instance is that a disconnect may exist between the AFC Revision Log and the Flowgate List that would facilitate revision to the monthly (or study horizon) models but not to the EMS (or operating/planning horizon) models. Further investigation is required to determine whether Quality Control procedures are in place to insure the uniform application of parameters to both models, and if so, what changes can be recommended to prevent future discrepancies.

### 2. Transmission Outage Issues

#### a. TAORS vs. OASIS outage posting

##### 1. Background and Analysis

As a result of the Entergy Stakeholder process, a specific concern was raised regarding Entergy's modeling of the scheduled outage time period for an outage caused by Hurricane Rita. As a result of an unplanned outage, Entergy entered outage data into TAORS to track the progress. That data was then imported into OASIS to calculate updated AFC values. The Entergy Stakeholders alleged that the modeled outage

resolution information offered by Entergy was incorrect, first predicting the date as February 2006, then as December 31, 2005.

## *2. Findings/Conclusions*

SPP examined the alleged inconsistency by examining the two systems used by Entergy to enter outage data, TAORS and OASIS and exploring the mechanisms used to report outages in the AFC process. While similar data on outages is maintained in both these systems, the data is used for different purposes. TAORS posts outage data intended to make users aware of planned outages throughout transmission systems. This information is not utilized in creating models and is not related to the AFC process. In maintaining accurate and updated outage information, OASIS outage postings are used to calculate hourly AFC power flow models. The outage information used to create models is only completely accurate during the modeled time frame.

In examining this particular situation, SPP found that a model using the OASIS system was created on October 20, 2005, which was the deadline for the November 1 monthly model posting. This information predicted February 2006 as the resolution date and was reflected in the January 2006 model. Entergy subsequently used updated outage data collected after the November reporting deadline, October 26, to shorten the resolution date to December 31, 2005, and reflected this data on TAORS. However, the nature of the outage, the inherent usage differences between the two data systems, and model posting deadlines explained the inconsistency between the two systems used to post outages, TAORS and OASIS.

### 3. Dispatch Issues

#### a. Base Case Overloads

##### 1. Background and Analysis

According to the Entergy stakeholders, a significant issue that should be addressed in the AFC Audit is the presence of overloaded flowgates in AFC power flow cases. Areas of concern include AFC power flow cases with no additional transfers, i.e. post-contingency overloads, and power flow cases used for ATC calculations and base case overloads under no contingency and no additional transfer, i.e. pre-contingency overloads.

FERC addressed the specific issue of Entergy's use of base case overloads in their ATC calculations when Entergy used the GOL process. In that proceeding, the intervenors argued that Entergy's use of overloads in the base case was prejudicial to non-network resources. Entergy responded that its process and base case models were fully compliant with NERC standards, and Entergy should not be required to redispatch in order to provide additional capacity on its transmission system. FERC agreed with Entergy that "[Entergy was] not required to investigate redispatch alternatives for new transmission requests unless an SIS has been requested by a transmission customer."<sup>15</sup> However, FERC noted that Entergy was required to calculate transmission capacity according to good utility practices, and analysis of short-term requests should simulate likely near-term conditions. FERC also suggested that Entergy's use of static load and its lack of seasonal ratings should be investigated in a technical conference. This technical

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<sup>15</sup> *Entergy Services, Inc.*, 103 FERC ¶ 61,271, at P 16 (2003).

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conference was never convened because Entergy revised its ATC calculation proposal to abandon the GOL process and pursue an AFC process instead.

## *2. Findings/Conclusions*

SPP examined the models used in the AFC process to confirm that Entergy incorporated base case overloads in the models. SPP also examined relevant FERC Orders, NERC criteria, and the VASTE Study Group Procedure Manual (Revision 18, dated March 18, 2005) to determine whether overloaded facilities in the AFC models are appropriate and consistent with good utility practice. Further investigation is required to determine whether base case overloads were reported to the VASTE Study Group according to Version 18 of the Procedure Manual.

**EXHIBIT 1**  
**Final Scope of the Process Audit**

<b>Task No.</b>	<b>AFC AUDIT Tasks</b>	<b>Subtask No.</b>	<b>Subtasks</b>	<b>scheduled commencement</b>	<b>scheduled completion</b>
1	Publicly solicit comments and concerns from stakeholders			10/13/05	10/28/05
2	Research the prior FERC filings and proceedings to obtain historical perspective of AFC process	2a	Evaluate issues regarding the AFC process raised by stakeholders in the ICT and AFC proceedings as well as the recent AFC stakeholder meetings hosted by Entergy	10/3/05	10/13/05
3	Identify and document any and all instances where RFCalc or OA are different from the 'off-the-shelf' versions, including macros, modules, or other software created or modified for Entergy's use in the AFC process	3a	Contact Entergy and software developers	10/13/05	10/28/05
4	Request non-posted data	4a	Data needs: Databases associated with AFC model development (transaction data; full names, TRM, CBM, and a and b coefficients pertaining to TRM for flowgate list), csv-type archived TLR log from commencement of AFC process to present, NITS applications, software logic (9b), csv-type archived commitment/dispatch data and change log from commencement of AFC process to present(9c), AFC Impact Log (11b), posting practices document (11c), process document for service denial (11d), QC&A documents (12b), 6/1/05 transmission system map (AutoCad)(15b)	10/13/05	10/28/05
5	Review data used in AFC program	5a	Transmission facility status, generation facility status	10/3/05	10/28/05

		<b>5b</b>	Projected load levels	"	"
		<b>5c</b>	Generation commitment data	"	"
		<b>5d</b>	Transaction data	"	"
		<b>5e</b>	Any other power flow inputs, including flowgate list (monitored element, contingent element, rating, a and b coefficients pertaining to TRM), paths	"	"
<b>6</b>	Assess whether processes for data selection and use of data result in compliance with Commission orders, Entergy's OATT, and other applicable statutory and regulatory requirements	<b>6a</b>	Include VSTE model inputs	10/26/05	10/31/05
		<b>6b</b>	Include a sampling of TSRs processed by the current software to the extent necessary to evaluate current compliance---not all TSRs or models	"	"
		<b>6c</b>	Possibly perform more detailed analysis of individual TSRs or models	"	"
<b>7</b>	Document each type of adjustment to data inputs or model parameters made by Entergy Transmission engineering	<b>7a</b>	Include a complete evaluation of the process by which changes or adjustments to AFC data, models, outputs, and software are made by Entergy Transmission engineering	10/27/05	11/4/05
		<b>7b</b>	Possibly recommend plan for modifications specifying criteria and procedures	"	"
		<b>7c</b>	Possibly recommend a system for recording and preserving adjustments in an auditable log	"	"
<b>8</b>	Evaluate the accuracy of model parameters used in AFC models including flowgates, response factors, and counterflows used in models	<b>8a</b>	Evaluate and document criteria for parameter selection and/or calculation	10/28/05	11/9/05

		<b>8b</b>	Evaluate and document process for ensuring uniform application of criteria to the entire system	"	"
		<b>8c</b>	Evaluate and document process for creating an auditable trail for any variances from criteria	"	"
		<b>8d</b>	Evaluate and document process for changing and updating list of flowgates, including process for creating an auditable trail for such changes	"	"
<b>9</b>	Evaluate the process used to incorporate information provided by network customers in the AFC models	<b>9a</b>	Information concerning unit commitment and generation dispatch levels of existing DNRs	11/4/05	11/14/05
		<b>9b</b>	Evaluate software logic for committing or dispatching units in AFC process	"	"
		<b>9c</b>	Evaluate any changes to commitment or dispatch data by Entergy Transmission engineering	"	"
<b>10</b>	Evaluate the actual unit commitment and dispatch modeled by Entergy Transmission	<b>10a</b>	Evaluate how network customers decisions on whether to purchase energy or capacity from third parties are represented by Entergy Transmission engineering for purposes of making transmission capacity available	11/7/05	11/16/05
		<b>10b</b>	Possibly recommend changes	"	"
<b>11</b>	Assess AFC Business Practices designed to ensure compliance with applicable requirements	<b>11a</b>	AFC Business Practices to include Entergy OATT, including Attachment C, and Entergy's AFC Process Manual	11/14/05	11/18/05
		<b>11b</b>	Assess compliance with OASIS record-keeping and posting requirements, including evaluation of the "AFC Impact Log" generated by AFC process	"	"
		<b>11c</b>	Assess posting practices for updates and schedules on Entergy OASIS, including resynchronization of data sets following modifications	"	"
		<b>11d</b>	Evaluate process and data used to provide information regarding denial of transmission service to customer	"	"
		<b>11e</b>	Possibly recommend changes to current BPs	"	"

<b>12</b>	Assess Quality Control Procedures for ensuring that the data and engineering inputs are properly incorporated into the AFC process and for ensuring quality controls are in place for software development	<b>12a</b>	Identify and evaluate any written policies used by Entergy Transmission engineering regarding rollover rights, data modifications, and other modeling assumptions or practices	11/21/05	11/29/05
		<b>12b</b>	Evaluate current quality control and assurance procedures applicable to the AFC process and models	"	"
		<b>12c</b>	Possibly recommend modifications or changes to procedures including recommendations for a process to ensure that all data and software requirements of the AFC program are conveyed to all affected Entergy Transmission personnel	"	"
<b>13</b>	Evaluate AFC coordination with external control areas	<b>13a</b>	Evaluate process for AFC coordination with external control areas including area interchange and updates of external model data	11/28/05	12/1/05
		<b>13b</b>	Possibly recommend changes	"	"
<b>14</b>	Identify existing policies for preserving information about the AFC process	<b>14a</b>	Identify current archival processes	11/28/05	12/1/05
		<b>14b</b>	Possibly recommend changes or modifications to policies in order to ensure that historical data is preserved as necessary to comply with applicable regulatory requirements	"	"
<b>15</b>	Evaluate any enhancements proposed by Entergy with respect to the AFC process	<b>15a</b>	Additional enhancements to the AFC process, software, or business practices	11/22/05	12/1/05
<b>16</b>	Evaluate issues regarding the AFC process raised in the ICT and AFC proceedings, consistent with the AFC Audit	<b>16a</b>	Evaluate specific issues that can be investigated in the scope of this audit	11/22/05	12/7/05
		<b>16b</b>	Specific stakeholder issues with weighted prioritization are provided in document titled "Exhibit 1 --- Summary of IPP AFC Issue Types with weighted prioritization 11282005"		"

		<b>16c</b>	Specific stakeholder AFC Audit scope recommendations are provided in document titled "Exhibit 2 --- Stakeholder AFC_audit_scope_recommendations_11282005"	"	"
		<b>16d</b>	Entergy comments to 16c are provided in document titled "Exhibit 3 --- EntergyComments-Stakeholder_AFC_audit_scope_recommendations_11282005"	"	"
<b>17</b>	Issue preliminary findings			12/16/05	12/16/05
<b>18</b>	Host a stakeholder and transmission provider meeting to present audit process and initial findings			1/4/06	1/4/06
<b>19</b>	Perform follow up actions from stakeholder meeting			1/5/06	1/30/06
<b>20</b>	Host a second stakeholder meeting to consider the additional SPP findings and proposed enhancements, if any (Optional depending on outcome of first meeting)			TBD	TBD
<b>21</b>	Develop final independent report based on audit review and investigation	<b>21a</b>	The report must evaluate whether the current AFC process is being implemented in a manner consistent with the Commissions AFC orders, the existing Entergy OATT provisions, and good utility practice. Report should also include modifications or improvements to the current AFC process that Entergy may consider on a going forward basis.	1/5/06	2/14/06
<b>22</b>	Submit report to Entergy for filing no later than February 15, 2006.			2/15/06	2/15/06
<b>23</b>	If necessary, submit a confidential audit report to Entergy for filing with the FERC	<b>23a</b>	SPP shall specifically identify any information, documents, or processes that stakeholders and SPP consider confidential as part of the AFC audit.	2/15/06	2/15/06
		<b>23c</b>	SPP shall keep all agreed to records confidential.		
		<b>23d</b>	Non-confidential information collected specifically for the AFC audit shall be subject to public release		