Audit Report

ERCOT Billing and Settlement System

February 2004

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February 24, 2004

To: Mayor and Council Members

From: Stephen L. Morgan

Subject: ERCOT Billing and Settlement System Audit Report

Attached is our audit report on Austin Energy's ERCOT Billing and Settlement system. We found that Austin Energy has a system in place that provides reasonable assurance that payments to and from ERCOT are correct. Furthermore, our work indicated that AE has developed appropriate controls for reviewing and analyzing ERCOT billing statements, and that AE successfully used those controls to accurately track expenses and revenues related to ERCOT activities.

We have made two recommendations to provide additional assurance to City Council regarding transactions with ERCOT. Management concurs with both recommendations.

We appreciate the cooperation we have received from staff and management at AE and look forward to our continuing efforts to improve the utility.

Stephen L. Morgan, CIA, CGAP, CFE, CGFM
City Auditor

ERCOT BILLING AND SETTLEMENT SYSTEM
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BACKGROUND

In 1999, the Texas Legislature passed Senate Bill 7 (SB 7), which provided for retail deregulation of the electric industry in the state of Texas. Per SB 7, the electric industry was opened to competition on January 1, 2002, and the Electric Reliability Council of Texas (ERCOT) became the independent system operator (ISO) for the state from that day forward. In addition, an open wholesale market for energy, capacity and ancillary services to be administered by ERCOT was created as of July 31, 2001.

Austin Energy, as a municipally owned and operated utility, was not required to participate in retail competition under SB 7. It is, however, a member of ERCOT, and as such conducts transactions with the ISO in the wholesale market (SB 7 allows AE to participate in the retail market only if AE opts into competition). AE is involved in the following types of transactions with ERCOT:

- Sale of electricity
- Purchase of electricity
- Sale of Ancillary Services such as reserve capacity, load following, and frequency control
- Submission of transactions negotiated with other entities for approval
- ERCOT can require AE to engage in transactions where the transaction is necessary to maintain system reliability or to relieve transmission congestion and there is no available market solution (known as "Out-of-Merit" instructions)

In addition, all market participants are required to provide a proportional share of ancillary services to the statewide electric grid, either from their own system or through purchasing the services from others.

Both the Electric Operations group and the Market Systems group are part of the Wholesale and Retail Markets division of AE. The Electric Operations group initiates ERCOT transactions, while the Market Systems group is responsible for ERCOT billing and settlements. Since AE began participating in the wholesale market on July 31, 2001 the utility has engaged in transactions totaling nearly $160 million dollars covering 43 charge types from ERCOT. Net payments to ERCOT have been $28 million since inception of the wholesale market in 2001. In addition, AE estimates that is has received approximately $50 million in energy value and savings as a result of ERCOT transactions.

AE's Internal Audit group has not conducted an audit of the wholesale market transactions or the ERCOT Billing and Settlement system since the wholesale market came into existence. AE management has stated that they consider the ERCOT Billing and Settlement system to be a high impact area of operations due to the large volume of transactions, and the large dollar amount involved. This audit was approved by City Council as part of OCA's FY 2003 Service Plan.

OBJECTIVES, SCOPE, & METHODOLOGY

Objectives:
Determine whether AE has an adequate process in place to assure that ERCOT fees and revenues are accurate and complete. With specific emphasis on the Bidding and Scheduling System (BASS) settlement program determine:

- *Were adequate controls developed?* Determine whether AE has developed an appropriate process for reviewing and analyzing ERCOT billing statements.
- *Were the controls properly implemented?* Determine whether reviews and analyses of ERCOT billings and settlements were conducted as intended.
- *Were exceptions properly noted and resolved?* Determine whether AE has appropriate controls in place and working as intended for filing disputes.

Scope:

- We focused primarily on the Market Systems Group, and on some parts of Electric Operations within the Wholesale and Retail Markets division within Austin Energy.
- We included ERCOT transactions since inception of the open wholesale market July 31, 2001 through September 30, 2003.
- We reviewed general controls for all of the 43 charge types for ERCOT transactions.
- We set a materiality limit of $3M in total transactions since inception of the market to select the following charge types (representing approximately 60 percent of the $160M in total activity) to target for in-depth review:
    - ERCOT Administration Fee
    - Load Imbalance
    - Resource Imbalance
    - Regulation Down Service Payment to QSE
    - Regulation Up Service Payment to QSE
    - Non-Spin Reserve Service Payment to QSE
    - Responsive Reserve Service Payment to QSE

Methodology:

- We met with managers and staff throughout the Wholesale and Retail Markets division of Austin Energy to discuss their methodologies and the control systems in place
- We analyzed the reliability of the data we would rely on to complete our analysis
- We reviewed sections of the ERCOT protocols directing settlements and billing
- Based on the protocols, we recalculated payments to and from ERCOT
- We compared test results with actual results from the BASS settlement program to measure accuracy and completeness of the verification process

This audit was conducted in accordance with generally accepted governmental auditing standards.

AUDIT RESULTS

Austin Energy has a system in place that provides reasonable assurance that ERCOT expenses and revenues are correct.

The systems used by Austin Energy (AE) to calculate and verify ERCOT charges are adequate for verifying the correctness and completeness of these charges. In addition, the review process provides reasonable assurance that where variances occur, they are investigated and disputes are filed with ERCOT when it is proper to do so (See Appendix B for an overview of the settlement process). The significant variances we noted during our work had already been found and addressed by AE.

We did note that AE lacked written policies to address how and when variances are pursued and resolved. In addition, we were able to confirm that some charge types are not readily auditable by the City, and have recommended to AE that they formally request ERCOT's auditor to focus on these charge types. Finally, we suggested that future audit work might need to revisit how AE secures the calculation formulas embedded in the spreadsheets used by staff.

Our work indicated that AE has developed appropriate controls for reviewing and analyzing ERCOT billing statements. The Electric Operations group initiates transactions with ERCOT. Energy Marketers set the day-ahead schedule that lists AE's expected requirements for the next day. This information is sent to ERCOT. Electric Controllers monitor operations in real time and execute the schedule set by the Energy Marketers. The Controllers also monitor real-time market conditions and engage in transactions (both with ERCOT and other utilities) when it is beneficial to do so. The Controllers are also responsible for executing any instructions received from ERCOT.

The Electric Operations group keeps a logbook of situations that occur on the ERCOT system that could affect transactions with ERCOT. This includes but is not limited to when a generating plant is unavailable, or when ERCOT issues instructions different from the schedule AE submits in the day-ahead market. In addition, the Electric Operations group also records all telephone communications with ERCOT for review purposes.

Energy Schedulers in the Market Systems group reconcile ERCOT charges to AE records and analyze variances. They calculate what the charges from ERCOT should be for each day of operation. The calculation is usually completed the next day. ERCOT calculates its charges to AE and sends a billing invoice 17 days after the day of operation. The Energy Schedulers compare the two calculations. They analyze any variances between the two and decide whether to file a dispute with ERCOT. The Energy Schedulers can review the telephone communications and the logbook when they discover a variance to see if anything occurred which would explain it. They report their findings to the Manager of Market Systems, who then signs off on the ERCOT invoices and sends them to accounting. Accounting enters the transactions onto the accounting system, and then sends the invoices to accounts payable. Market Systems also maintains a Dispute Tracker spreadsheet to follow through on the disposition of each dispute.

AE relies on the Bidding and Scheduling System (BASS) settlement program developed by the Market Systems group to track payments to and from ERCOT and determine their accuracy. The BASS settlement program was designed as a shadow system to ERCOT's own protocols, and is updated when changes occur to the protocols. The protocols are ERCOT's rules for determining the charges for energy, capacity, and services. AE compares information it calculates using the BASS settlement program to the bill received from ERCOT to determine any variances and decide whether to dispute any charges. The Market Systems group is also in charge of programming changes for the BASS settlement program and maintaining the settlement data. AE monitors the protocols, and when ERCOT makes changes AE makes the appropriate changes to the BASS settlement program.

The BASS settlement program includes a set of spreadsheets with embedded macros used to calculate expenses and revenues based on information downloaded from an ORACLE database and AE's ERCOT Polled Settlement (EPS) meters. AE is required to maintain the EPS meters within quality standards for accuracy set by ERCOT. There are approximately 60 of these meters on AE's system. They record the amount of energy that travels across AE's system in the same way that the meter outside a residence records monthly use for the customer. Energy Schedulers use Resultant 15-minute data generated by AE's EPS Meters to calculate what they expect ERCOT charges to be. This is real-time data that is generated every 2 to 4 seconds and then aggregated into 15-minute intervals. These intervals are then automatically fed into the BASS settlement program. The Regulated Operations group maintains the EPS meter data. It sends a file to Market Systems, who periodically use the information as a check against the Resultant 15-minute data when variances occur. Market Systems does not have direct access to the EPS data.

AE reorganized some positions as of August 1, 2003. The Energy Schedulers responsible for independently validating and verifying ERCOT settlement statements now report to the Senior Vice President of Finance and Corporate Services. Previously they had reported to the Market Systems Manager, who in turn reported to the Senior Vice President of Wholesale and Retail Markets. The reorganization was completed to improve internal controls by segregating the individuals who initiate transactions from those who review them.

The invoice AE receives from ERCOT is for a week's worth of transactions. For control purposes, the Energy Schedulers review data for alternate days, thereby assuring that both of them will have reviewed a portion of the data contained in each invoice.

AE successfully used these controls to accurately track expenses and revenues related to ERCOT activities. For the charge types analyzed, the BASS settlement program accurately tracked charges incurred for ERCOT transactions. Our initial review covered over 90 percent of the charges to date and found that general controls had been successfully implemented. In addition, our subsequent detail test work targeted seven charge types and was able to confirm nearly $100 million in charges that the system adequately tracked between the beginning of the market on July 31, 2001 and September 30, 2003.

OCA developed an abbreviated version of the BASS settlement program to perform an in-depth analysis of the seven charge types. For the seven charge types analyzed by OCA, AE has

adequately monitored ERCOT charges and identified and analyzed variances between their data and data contained in the ERCOT invoices. For those trade dates where there were variances, AE was aware of the reasons a variance occurred and had determined whether the ERCOT charges were accurate. AE had also consistently filed disputes with ERCOT when the facts of the situation dictated doing so, and tracked the disputes through to their final resolution.

For one charge type, "Load Imbalance", OCA test results show abnormal variances for 65 trade days since 2001. An abnormal variance occurs when AE's total calculated load for a trade day varies by 2 percent or more of ERCOT's total calculated load for the same day. Energy Schedulers identified the same 65 days that show an abnormal variance and identified the cause of the variances.

Most of the variances under Load Imbalance were traced to a Bastrop Energy Corporation (BEPCO) generating unit that was located in AE's service area but was not part of AE's system. The generating unit began operation in 2002, and ERCOT credited AE with the generation. As a result, AE was overpaid for Load Imbalance during three consecutive months in 2002. AE subsequently realized the problem, notified ERCOT, and paid back about $7 million through resettlements.

Where variances occurred, Energy Schedulers investigated the reasons and documented them in the settlement system. AE also noted on the settlement system when disputes had been filed. Market Systems maintained the Dispute Tracking system with information on disputes including amount, charge type, trade date, and disposition. The system accurately tracked disputes through the AE system. In addition, a sample of disputes filed on the ERCOT web site matched the amounts, dates, charge types and final settlement amount listed in the dispute tracker.

Our work confirmed that some of the charge types are not verifiable. There are 43 charge types related to ERCOT transactions (see Appendix C of this report for an overview). Many of the charge types had little or no activity during the period audited. Of those 43, seventeen charge types had cumulative dollar transactions expected to be greater than $3 million by the end of 2003. Of those seventeen, five charge types were classified by AE as not verifiable.

Our work determined that calculating these five charge types does in fact require information that is held confidential under ERCOT rules for 6 to 12 months following the original trade date. In addition, verifiable data would have to be collected from all the other market participants in order to compare to the ERCOT data, which is not practical. In fact, this work is theoretically part of the work to be covered by the CPA firm hired by ERCOT to perform testing related to the charge types. However, we have been unable to determine the extent of testing provided by the CPA firm related to these unverifiable charge types.

We did note that, for the unverifiable charge types, the Market Systems Manager accesses the data once it is available and performs limited reasonableness checks on the charge types. The manager asserts that, because the charges are based on AE's percentage of the total ERCOT system generation, once aggregate data is available he can determine if AE's portion of the total system-wide charge is somewhat reasonable (compared to what other utilities are asked to pay).

AE will still dispute charges and payments in these charge types if it does not think they are reasonable based on trends, history or aggregate data published by ERCOT on its web site.

The Market Systems group does not have written policies on when to file disputes with ERCOT. The Energy Schedulers have no written procedures for determining when a variance is considered material or when a dispute will be filed. There is no standard threshold percentage or amount that will automatically be considered a material variance. The Energy Schedulers described their method as a judgment based on their analysis of the amount of the variance and the situation that caused it. In addition, the Energy Schedulers put a priority on investigating variances that are detrimental to AE, while, depending on their workload, they may wait to see if other variances are corrected by ERCOT in resettlement statements.

ISSUE FOR FURTHER STUDY

The macros used in the BASS settlement program are not password protected. Users of the system can access the macros' source code in the spreadsheets used to make the calculations and knowingly or unknowingly change them without the knowledge or permission of the Market Systems Manager. During our extensive testing we did not find any instances where the source code had been changed. However, it could pose a minor risk in the future and management or future auditors may wish to revisit the issue.

Recommendations

1. To provide City Council with added assurance regarding transactions with ERCOT, Austin Energy's General Manager should send a memo under his signature to ERCOT and the independent CPA firm hired by ERCOT to audit its operations. In the memo, he should request, for the record, that the independent CPA firm select unverifiable charge types for fieldwork emphasis. The unverifiable charge types of most importance or highest risk to Austin Energy include:
    - Balancing Energy Neutrality Adjustment (BENA),
    - Out of Merit Energy Charge (ELAOOM),
    - Out of Merit Replacement Capacity Charge (LAOOM),
    - Reliability Must Run Reserve Service Charge (LARMR), and
    - Local Balancing Energy Service Charge (LBESC)

2. The Market Systems Manager should develop and recommend a written policy to AE management related to the BASS settlement program. The policy should address procedures for determining when a variance is considered material, when a dispute will be filed, and whether the process changes depending upon whose favor the variance is in.

APPENDIX A
MANAGEMENT ACTION PLAN

ACTION PLAN
AUSTIN ENERGY'S ERCOT BILLING AND SETTLEMENT SYSTEM

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
1	To provide City Council with added assurance regarding transactions with ERCOT, Austin Energy's General Manager should send a memo under his signature to ERCOT and the independent CPA firm hired by ERCOT to audit its operations. In the memo, he should request, for the record, that the independent CPA firm select unverifiable charge types for fieldwork emphasis. The unverifiable charge types of most importance or highest risk to Austin Energy include: • Balancing Energy Neutrality Adjustment (BENA), • Out of Merit Energy Charge (ELAOOM), • Out of Merit Replacement Capacity Charge (LAOOM), • Reliability Must Run Reserve Service Charge (LARMR), and • Local Balancing Energy Service Charge (LBESC)	Austin Energy concurs with this recommendation.	Austin Energy's General Manager will issue a memo as recommended.	Planned.	Senior Vice President Wholesale & Retail Markets	June 1, 2004

2	The Market Systems Manager should develop and recommend a written policy to AE management related to the BASS settlement program. The policy should address procedures for determining when a variance is considered material, when a dispute will be filed, and whether the process changes depending upon whose favor the variance is in.	Austin Energy concurs with this recommendation	Proper channels might be through publishing an Austin Energy Guideline and Work Process (GWP) or inclusion in Austin Energy's Risk Management Policy, Procedures and Processes (3P document).	Planned.	Market Systems Manager	June 1, 2004

Concurrence: concur, partially concur, or disagree.
Status of strategies: planned, underway, or implemented.

Department Director

2/10/04
Date

APPENDIX B
THE SETTLEMENT PROCESS

AE receives information from its ERCOT Polled Settlement (EPS) meters and inputs the information into the BASS settlement program. BASS is then used to calculate the expected charges from ERCOT. AE then compares their calculation to ERCOT's billing invoice to determine if ERCOT's charges are accurate.

There are three reads of the EPS meters:

1. AE uploads data in real-time to the SCADA/Harris Energy Management System. SCADA is a data collection system. The Harris EMS is the system AE uses to control its generating units. The SCADA/ Harris EMS information is read in 2- or 4-second increments that are then accumulated into 15-minute intervals. This is known as the Resultant 15-minute Data. This data is used by the Electric Operations group to set the day-ahead schedule submitted to ERCOT, and to make decisions in the real-time market.
2. AE's Metering Operations group in the Regulated Operations department downloads data at the end of each day, summarized in 15-minute intervals. This is known as the AE EPS data.
3. ERCOT also downloads data at the end of each day, summarized in 15-minute increments. This is known as the ERCOT EPS data. It should be identical to the AE EPS data.

The Energy Schedulers in the Market Systems group use the Resultant 15-minute data in their calculations. They use this data because it is the same data used by the Electric Operations group to set the day-ahead schedule and make real-time decisions. In addition, the Market Systems group considers the Resultant 15-minute data to be more independent than the AE EPS data. This is because it is monitored every 2 to 4 seconds, thus any problems with the system will be detected very quickly. The EPS data is downloaded only once a day.

The Energy Schedulers go through the following steps to determine when to file disputes:

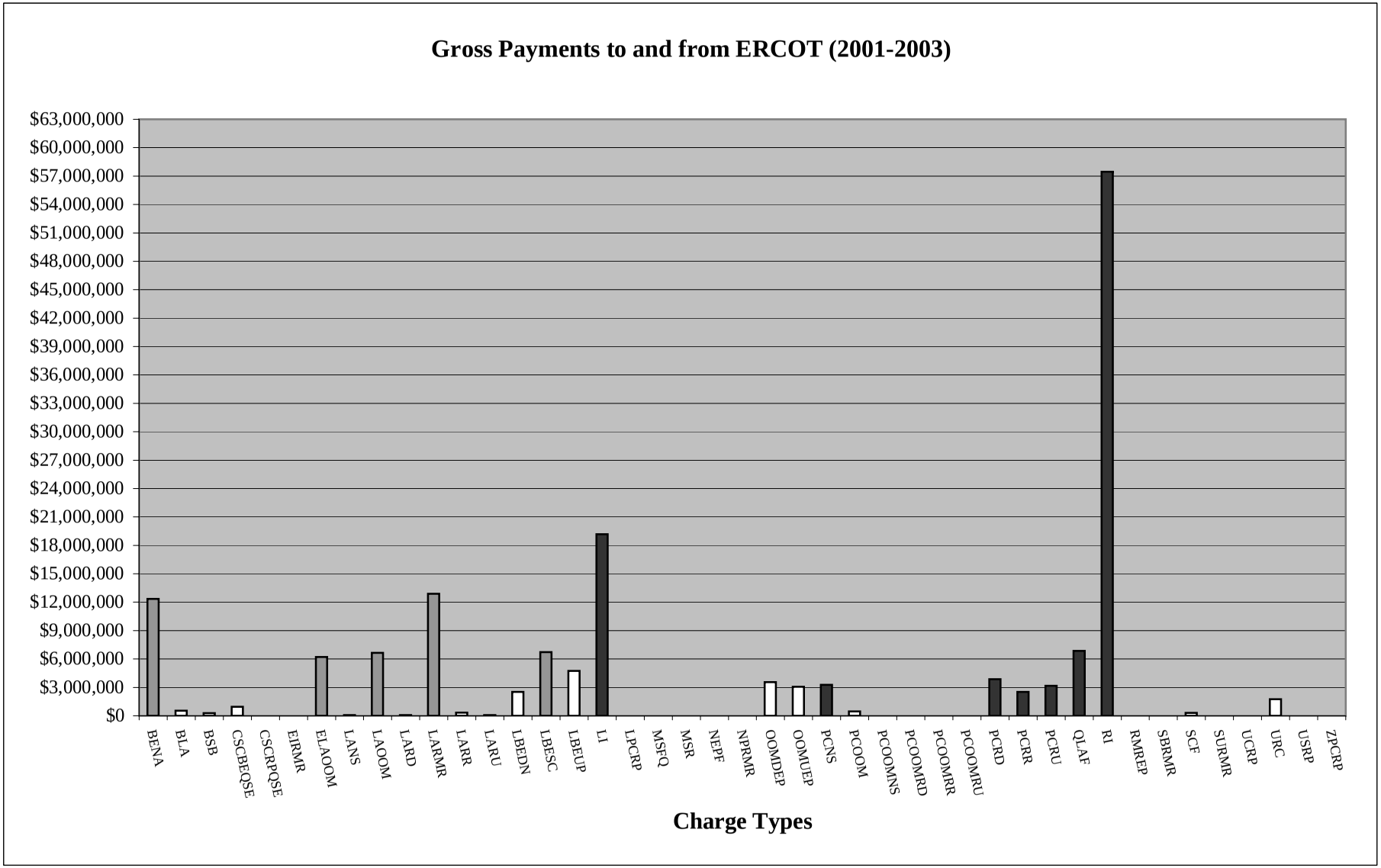
1. Compare the AE Resultant 15-Minute data to the invoice received from ERCOT.
2. Where there is a variance between those two sources, compare the AE EPS data to the ERCOT invoice to see where the variance has occurred.
    a. If AE EPS data = ERCOT, then the problem which caused the variance is internal to AE.
    b. If AE EPS data doesn't equal ERCOT, then the problem may be with ERCOT, and AE has to analyze additional data to determine the materiality and reason for the variance and decide whether to file a dispute.
3. Analyze the operators' schedules and log books from the day-ahead and real-time traders' desk for the time period to see if there were any problems or changes that could have caused the variance. When necessary, refer to the recorded telephone communications with ERCOT to determine whether instructions were received to deviate from the day-ahead schedule.

4. Scan for patterns within data where amounts are off consistently to determine the cause for variances.
5. Review the calculation worksheets to see if an amount close to the variance is being left out or counted twice.

Austin Energy is required to file disputes within 10 days of receiving the ERCOT invoice. For the unverifiable charge types that require confidential information to calculate, the deadline is 60 days following the date when the confidential information becomes available.

APPENDIX C
ERCOT CHARGE TYPES

APPENDIX C
43 ERCOT CHARGE TYPES



NOTE: OCA audited dark colored charge types, and reviewed gray colored charge types for reasonableness.
SOURCE: ERCOT Initial Settlement Statements from 2001 through 2003.

Glossary of Acronyms

Charge Type	Charge Description
BENA	BALANCING_ENRGY_NEUTRALITY_ADJUSTMENT
BLA	BLACK_START_CAPACITY_CHARGE
BSB	BLACK_START_STANDBY
CSCBEQSE	BALANCING_ENERGY_CSC_COSTS_PER_QSE
CSCRPQSE	REPLACEMENT_RESERVE_CSC_COSTS_PER_QSE
EIRMR	RMR_ENERGY_IMBALANCE
ELAOOM	OOM_ENERGY_CHARGE
LANS	NON_SPIN_RESERVE_SERVICE_CHARGE
LAOOM	OOM_REPLACEMENT_CAPACITY_CHARGE
LARD	REGULATION_DOWN_SERVICE_CHARGE
LARMR	RMR_RESERVE_SERVICE_CHARGE
LARR	RESPONSVE_RESRVE_SERVICE_CHARGE
LARU	REGULATION_UP_SERVICE_CHARGE
LBEDN	LOCAL_BALANCING_ENERGY_DOWN_TO_PROVIDER
LBESC	LOCAL_BALANCING_ENERGY_SERVICE_CHARGE
LBEUP	LOCAL_BALANCING_ENERGY_UP_TO_PROVIDER
LI	LOAD_IMBALANCE
LPCRP	LOCAL_REPLACEMENT_RESERVE_TO_PROVIDER
MSFQ	MISMATCHED_SCHEDULE_PROCESSING_FEE
MSR	MISMATCHED_INTERQSE_SCHEDULE_RECEIVED
NEPF	TEXAS_NON_ERCOT_PARTICIPANT_FEES
NPRMR	RMR_NON_PERFORMANCE
OOMDEP	OOM_ENERGY_DOWN_TO_PROVIDER
OOMUEP	OOM_ENERGY_PAYMENT_TO_PROVIDER
PCNS	NON_SPIN_RESERVE_SERVICE_PAYMENT_TO_QSE
PCOOM	OOM_REPLACEMENT_CAPACITY_PAYMENT
PCOOMNS	OOM_NON_SPINNING_CAPACITY_PAYMENT
PCOOMRD	OOM_REGULATION_DOWN_CAPACITY_PAYMENT
PCOOMRR	OOM_RESPONSIVE_CAPACITY_PAYMENT
PCOOMRU	OOM_REGULATION_UP_CAPACITY_PAYMENT
PCRD	REGULATION_DOWN_SERVICE_PAYMENT_TO_QSE
PCRR	RESPONSIVE_RESERVE_SERVICE_PAYMENT_TO_QSE
PCRU	REGULATION_UP_SERVICE_PAYMENT_TO_QSE
QLAF	ERCOT_ADMINISTRATION_FEE
RI	RESOURCE_IMBALANCE
RMREP	RMR_ENERGY_TO_PROVIDER
SBRMR	RMR_STANDBY
SCF	CSC_CONGESTION_COLLECTION
SURMR	RMR_STARTUP
UCRP	REPLACEMENT_RESERVE_UPLIFT_CHARGE
URC	UNINSTRUCTED_RESOURCE_CHARGE
USRP	REPLACEMENT_RESERVE_UNDERSCHEDULED_CHARGE
ZPCRP	ZONAL_REPLACEMENT_RESERVE_TO_PROVIDER

NOTE: OCA audited dark colored charge types, reviewed gray colored charge types for reasonableness, and did not audit/review the white colored charge types.