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Final Report
Management/Performance Audit
and Financial Audit
Duke Energy Ohio
Case No. 07-723-EL-UNC

Redacted Version

Presented to:

The Public Utilities Commission of Ohio

By:

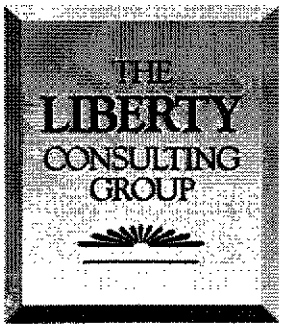

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Table of Contents

List of Figures

List of Tables

Executive Summary

A. Purpose and Scope of this Report

1. Background

Pursuant to the Order in Case No. 03-93-EL-ATA, Duke Energy Ohio, Inc. (then known as The Cincinnati Gas & Electric Company) implemented a rate stabilization plan for electricity prices. The Fuel and Purchased Power Rider (FPP) comprises one principal component of the rate stabilization plan. The System Reliability Tracker Rider (SRT) comprises a second.

An Order of The Public Utilities Commission of Ohio (the PUCO or the Commission) requires an audit of the management/performance and financial aspects of these two recovery mechanisms. The Commission issued Request for Proposal No. U07-FPP-1, (the RFP) to provide for the necessary management/performance and financial audit of Rider FPP and the Rider SRT. Previous Appendix D and Appendix E to Chapter 4901:1-11, Ohio Administrative Code provide general guidance about the standard work to be performed and the requirements of the audit. The RFP called for an initial audit to include the actual costs for Rider FPP and the Rider SRT for the months of July 2006 through June 2007. The audit report is to be based on the guidelines of Section L of Appendix D and Section M of Appendix E to Chapter 4901:1-11, Ohio Administrative Code.

The Liberty Consulting Group (Liberty) responded to this RFP and was subsequently awarded the contract to conduct the audit of Duke Energy Ohio. Liberty is a management and technical consulting firm that specializes in the public-utility industries. Liberty has extensive experience in conducting management and operations audits of utilities in the electric power, natural gas, and telecommunications industries. Liberty has served commissions in thirty-five different states and the District of Columbia in conducting management/performance and financial audits similar to this audit of Duke Energy Ohio.

This report presents the results of Liberty's management/performance and financial audit of Duke Energy Ohio for the Audit Period of July 2006 through June 2007.

2. Audit Scope and Objectives

a. Standardized Work Requirements

There previously existed uniform statutory standards for the Electric Fuel Component (EFC) financial and management/performance audits of Ohio's investor-owned electric utilities. Appendix D and Appendix E of the Ohio Administrative Code, presented as Attachment 2 and Attachment 3 of the RFP, set forth standardized work requirements. Liberty understands that these previously rescinded standards must guide the conduct of this audit. In addition to these Standardized Work Requirements, the RFP also included the following special items related to the Company's electric fuel procurement policies and practices.

b. Coal Prices

Liberty conducted a review of purchasing decisions to ensure the reasonableness of prices paid by the Company during the Audit Period. This review benchmarked coal purchases against market-prices.

c. Environmental Compliance

Liberty included in its investigations a review of the Company's environmental compliance activities, as they relate to fuel procurement and utilization. This review covered topics such as:

- Compliance with the Clean Air Act Amendments (CAAA) of 1990
- Any proposed or newly enacted environmental regulations, including but not limited to, NO_x, ozone, and particulates.

Liberty also analyzed and addressed the following environmental compliance related issues:

- The impact that compliance activities had on the Company's fuel procurement strategy and on the type and cost of fuel procured and used
- Overall emission-allowance management strategy and any emission allowance transactions entered
- Methods used to analyze compliance options, and develop overall mitigation strategies.

d. MISO-Related Charges – Financial Review

The FPP includes MISO-related charges. Liberty's financial audit examined these charges by:

- Reviewing and reporting on the costs incurred and revenues received
- Verifying the consistency of costs and revenues with actual MISO invoices
- Verifying that the Company is passing through only those charges and all appropriate revenues associated solely with retail Ohio customers.

The MISO-related charges that Liberty reviewed include:

- Congestion Costs/Revenues
- Financial Transmission Rights (*FTR*) Revenues/Costs
- Losses (Marginal Loss Overcollection Allocation)
- Marginal Loss Surplus Distribution
- Revenue Sufficiency Guarantee (*RSG*) Make Whole Payments

e. MISO-Related Charges – Management/Performance Review

Liberty reviewed FTR management, Congestion Costs/Revenues and Marginal Losses and reported on the following activities:

- Assessing the degree to which the Company has control over the costs
- Investigating management practices for minimizing the costs, including an assessment of the FTR portfolio and strategy of obtaining and maintaining FTRs to hedge congestion costs
- Evaluating the trend on costs since MISO Day 2 markets began
- Proposing any recommendations that will assist in minimizing costs.

f. Power Plant Performance

Liberty reviewed and reported on significant plant outages or other declines in the operating availability, equivalent availability, or capacity factors of major generating plants. Liberty assessed their impact on customers in the form of higher fuel or purchased power costs. Liberty conducted on-site investigations of the Beckjord Station and the Zimmer Station. This report includes the results of these investigations, where the following areas were examined: fuel handling and quality control (*e.g.*, weighing, sampling, scale calibrations, among others), inventory surveying methods and results, performance monitoring (*e.g.*, heat rate), and maintenance.

g. Power Interruptions

Liberty investigated instances during the audit period in which the Company's customers' power supplies were interrupted or requested to be interrupted. The investigation included a review of the following topics:

- The cause(s) of the interruption(s)
- Steps taken to minimize the impacts of the interruption
- Efforts made to secure replacement power, if applicable
- The methods employed to price the replacement power, if applicable
- Cost impacts resulting from the periods during which the interruptions occurred.

B. Duke Energy Ohio Operating Summary

On May 5, 2005, it was announced that Cinergy Corporation would be acquired by Duke Energy Corporation of Charlotte, North Carolina. Eleven months later on April 3, 2006 Duke Energy and Cinergy merged. The combined operations are now referred to as Duke Energy. The Cincinnati Gas & Electric Company became Duke Energy Ohio.

The Commercial Asset Management (CAM) Group within Duke Energy Ohio is responsible for fuel procurement and management, emission allowance procurement and management, and power trading. CAM is one of several business units/functions that reside in the Commercial Businesses Group, which is headed by the Group Executive and President. The Commercial Businesses Group consists of Duke Energy's unregulated businesses, including CAM and Commercial Power, Duke Energy Generation Services, Duke Energy International, Duke Telecom, and others. The Group Executive and President reports directly to the Chairman, President and Chief Executive Officer of Duke Energy Corporation.

C. Recommendations from Previous Audit Period

All of the recommendations listed below for the previous audit period are quoted directly from the EVA/Larkin report dated October 12, 2006. Following each recommendation, in italics, is a brief summary of the current status of the recommendation.

1. Management/Performance Audit

1. EVA recommends for the audit period that the Company pass through the native load portion of the net margins associated with the trading of DE-Ohio coal assets purchased for delivery during the audit period except for these specifically excluded by paragraph D of the

stipulation. This includes [redacted] The margin from the re-sale of this coal during the audit period was

Addressed by Stipulation dated April 19, 2007, with recommendation that this recommendation be withdrawn.

2. EVA recommends that DE-Ohio adopt traditional utility procurement strategies related to the procurement of coal and emission allowances and cease its "active management" of such procurements throughout the balance of the RSP period. Accordingly, DE-Ohio should develop and implement a portfolio strategy such that it purchases coal through a variety of short, medium and long-term agreements with appropriate supply and supplier diversification with credit-worthy counterparties. EVA further recommends that DE-Ohio no longer seek to flatten its position on a daily basis.

Addressed by Stipulation dated April 19, 2007, with recommendation that this recommendation be withdrawn.

3. EVA recommends that as long as the FPP is in effect coal suppliers should not be required to allow the resale of their coal for the offers to be considered.

Discussed in Section II.9 of this report.

4. EVA recommends that DE-Ohio initiate a study to report on the recurring overstatement of coal inventory at the Zimmer station.

Discussed in Section III.10 of this report.

5. EVA recommends that DE-Ohio present several alternate sensitivity analyses of key variables, i.e., emission allowance prices and market coal prices, in its transaction review and approval process.

Discussed in Section II.6 of this report.

6. EVA recommends that purchases of reserve capacity from DENA Assets should not be eligible for inclusion in the SRT, as is currently the case.

Addressed by Stipulation dated April 19, 2007, with recommendation that this recommendation be accepted.

2. Financial Audit

1. The response to LA-02-037 indicated that, during the period July 2005 through June 2006, DE-Ohio plants were designated as "must run" units by MISO for reliability or voltage control reasons during a number of hours. Unless it has already been presented in another forum, the Commission may want to have DE-Ohio explain further how the "must run" generating unit designations are affecting the Company's fuel and purchased power costs that are includible in the FPP rider.

Discussed in Section VI.B of this report.

2. As described in this chapter of the report, and in the response to LA-02-041, DE-Ohio's objective for the term of the RSP is to actively manage its native load obligations on a daily basis. By actively managing the load and generation position, DE-Ohio attempts to smooth the FPP component of the RSP price and reduce the volatility of the customer's bill. However, the active management can add additional transactions and related transaction costs, and tends to create a much more complex and difficult to understand audit trail. Testing by Larkin of amounts being included in the FPP (such as from the documentation provided in response to LA-02-035, LA-02-040 and LA-02-042) suggests that the costs related to DE-Ohio's active management can ultimately be tracked to supporting documentation. However, because DE-Ohio's active management reflects a reaction to daily market changes, it can be very challenging to understand the reasoning for each active management transaction (e.g., where DE-Ohio is adjusting a position based on market or cost changes), and how it relates to DE-Ohio's RSP load obligation position. For this reason, it is imperative that DE-Ohio maintain documentation not only of the costs being included in the FPP, but also of the reasons and support for the Company's active management decisions.

Discussed in Section II.9 of this report.

3. DE-Ohio should analyze and document the net impact of its active management of FPP components and should report to the Commission and the parties to this docket concerning whether the added activity, including transaction costs of the additional activity, has resulted in increased or reduced FPP costs over time. The Company implemented the FPP on January 1, 2005. The two-year period, 2005 and 2006, should be used for this analysis.

Discussed in Section II.9 of this report.

4. Currently, the FPP is to be in place through December 31, 2008. Because of the potential for additional Reconciliation Adjustments occurring months or years after the FPP rates were charged, due to MISO invoice revisions or other factors, the Company and Commission should address whether a cut-off period is needed for RAs after 2008 and what that cut-off period should be. DE-Ohio has filed an application to extend the FPP beyond 2008 however, consideration of RAs after the FPP could cease application is nevertheless something that deserves consideration.

This issue is still open.

5. DE-Ohio has made a number of changes to the specific costs that are included in the FPP by including its identified corrections and the effect of changed interpretations of FPP includible costs in its filed RA adjustments. DE-Ohio's quarterly FPP filings typically include a narrative discussion of the RA and that narrative identifies total amounts of changes and the RA components; however, the narratives filed for the RA adjustments could be improved by including a listing of the reasons for the changes by identifying and briefly describing significant changes and corrections that are being included in the RAs. For example, DE-Ohio's 4th quarter 2006 FPP filing included cost for an item, Fuels Realized Derivative Gain and Fuels Realized Derivative Loss for August 2005 through March 2006 in its RAs based on a discovery by the Company prior to that 4th quarter FPP filing that such amounts had been inadvertently omitted in the previous filings. A clear identification of such changes in the RA narrative would be helpful to the reader in understanding the RAs filed by DE-Ohio.

The Company has not implemented any changes as a result of this recommendation.

D. Audit Period Recommendation Summary

During the course of this project, Liberty used a complementary set of work steps and methods. Liberty interviewed personnel in several departments within the Duke Energy Ohio organization, and reviewed data and documents. In addition, site visits were made to the Beckjord and Zimmer Generating Stations. At the completion of its data gathering and analysis, Liberty prepared observations and findings about performance in each of the areas of management and performance under review. Liberty then drew conclusions and formed recommendations for each conclusion that identified an open need. The detailed recommendations list summarizes these recommendations categorized by each of the principal areas of investigation.

This list of recommendations provides an overall perspective on the operation of Duke Energy Ohio's fuel procurement and management, emission allowance procurement and management, and power trading functions.

All of these areas of operations at Duke Energy Ohio are more complex than typically found in utility organizations responsible for these functional areas. This complexity has been added

because of the Active Management approach to each of these areas that has attempted to be responsive to the above mentioned RSP.

The basic assumption of Active Management is that the intent of the RSP is to have the native customer pay a market-based rate for electrical energy. Thus, Duke Energy Ohio's objective for the term of the RSP is to manage all future native load obligations by striving to provide a reliable, low, market-based cost supply of electricity. The basis of Active Management is that for any future period, the least cost supply will be made up of generation and purchased power. For those periods when generation is sufficient to cover the forecasted load obligation under the RSP, Duke Energy Ohio will procure the necessary fuel and emission allowances required for the generation when this is the least cost option. For periods where economic generation is not sufficient to meet the load obligation, the Company will purchase power forward to meet the remaining load obligation. The Company believes that this process insures that each forward period has the lowest market-based cost of supply.

Duke Energy Ohio does not have any specific, documented Active Management procedures under which it operates. Nor does it operate under traditional electric utility fuel procurement and management, and emission allowance procurement and management procedures. The Company has stated that such procedures are not necessary because of the close-knit nature of the organization, and the frequent communication within the organization on operational issues of importance.

Liberty does not believe that the Company has demonstrated that the frequent trading that is part of Active Management is in the best interests of the native load customers of Duke Energy Ohio. Active Management causes the Company to try continually to optimize its coal, emission allowance, and power positions. For example, for coal, the Company would either be buying coal to correct a short position on coal, or selling coal to correct a long position on coal. These cycles repeat themselves a number of times over the course of a year, and during the Audit Period the margins charged to customers as a result of these transactions [redacted]

Detailed Recommendations

Chapter One – Organization, Policies and Procedures

Develop standard CAM procedures for the procurement and management of fuel and emission allowances, including procedures, guidelines and limits on Active Management.

Chapter Two – Coal Procurement and Contracts

1. Evaluate the procedures and methods for forecasting coal consumption in an effort to bring forecasts more in line with actual coal consumption.

2. Demonstrate the economic effectiveness of Active Management as a condition to its continued use by Duke Energy Ohio.

Chapter Three – Supply Management

Institute a security program to protect the integrity of coal samples from the time samples are bagged and ready for shipment until the samples arrive at the Gibson Laboratory.

Chapter Four – Emission Allowance Management

Liberty has no recommendations in this area of its audit.

Chapter Five – Plant Operations

1. Exclude replacement power costs associated with the Zimmer outage from FPP recovery.

2. Act swiftly to establish high expectations for safety consciousness, cleanliness, and employee attitude at the Beckjord Station.

3. Do not reduce the 2008 capital and O&M budgets at Beckjord below budgeted level, and provide further budget support beyond 2008 for station maintenance if required.

4. Conduct a staffing level review of the Duke Energy Ohio coal plants to assure that staffing reductions are not resulting in, and do not have a significant potential for resulting in adverse operational performance.

5. Perform economic analyses to determine the level of spare parts at, the ability to share parts among, and the use of on line maintenance/redundant equipment at its generating stations.

Chapter Six – MISO

Liberty has no recommendations in this area of its audit.

Chapter Seven – Financial Audit

Examine the cause of the Company's under-collection on Fuel Costs.

I. Organization, Policies and Procedures

A. Background

This chapter of Liberty's report addresses the following topics in Duke Energy Ohio's organization, staffing and controls area:

- Organization
- Staffing
- Procedures

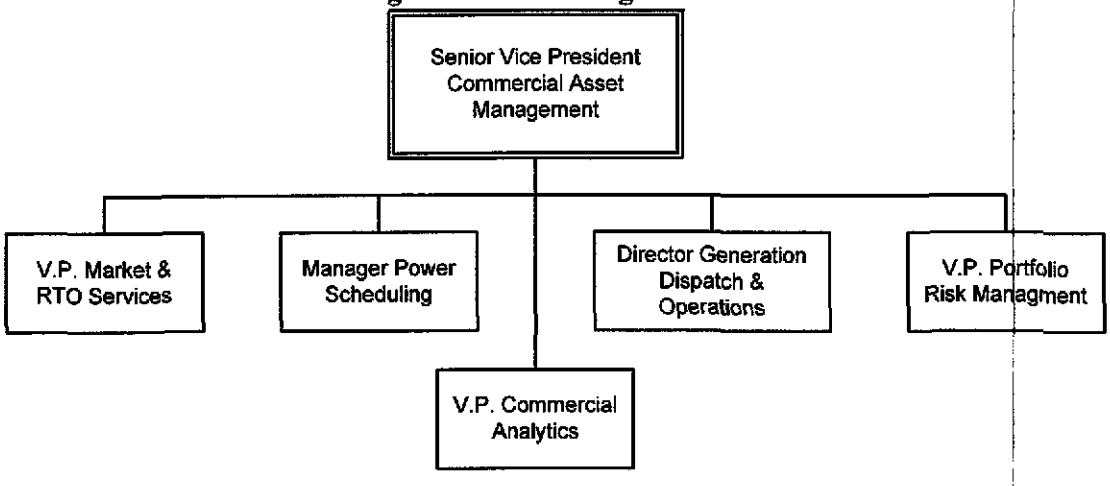
B. Findings

1. Organization

The Senior Vice President, Commercial Asset Management (CAM) is responsible for the fuel procurement and management, emission allowance procurement and management, and power trading activities that affect Duke Energy Ohio's FPP costs. The Commercial Asset Management group operates as one of several business units/functions of the Commercial Businesses Group. The Group Executive and President heads this Commercial Businesses Group, that includes Duke Energy's non-utility businesses. These businesses include CAM, Duke Energy Generation Services, Duke Energy International, Duke Telecom, and others. The Group Executive and President reports directly to the Chairman, President and Chief Executive Officer of Duke Energy Corporation (Duke Energy).

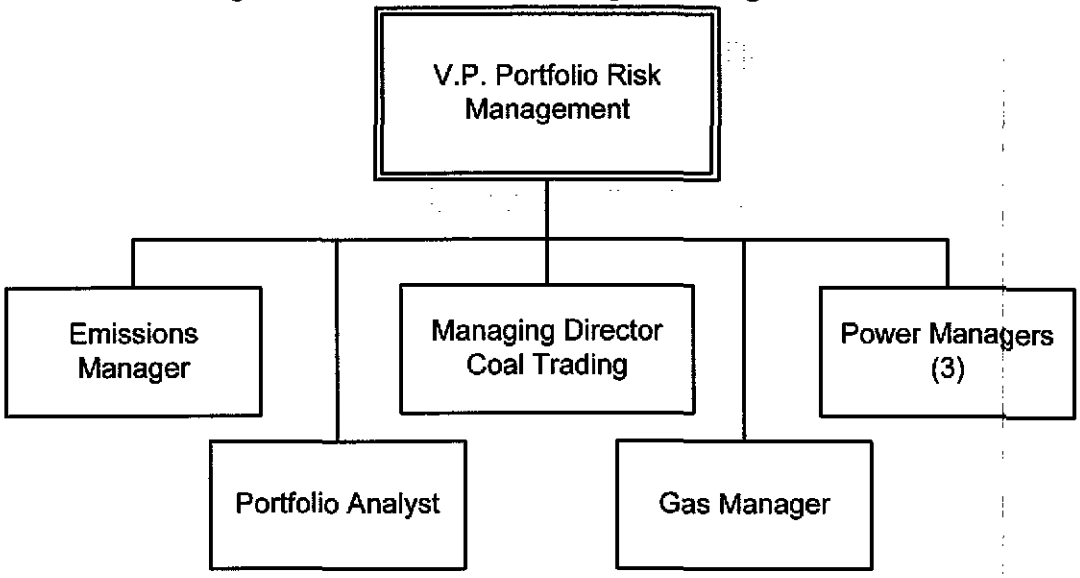
The following chart illustrates the basic organization of the Senior Vice President, CAM.[1]

Figure I.1. CAM Organization



The Vice President, Portfolio Risk Management manages fuel and emission allowance management functions. The following chart illustrates this vice president's organization.[2]

Figure I.2. Portfolio Risk Management Organization



The Managing Director, Coal Trading has responsibility for all coal management functions. These functions include coal procurement, coal trading, and coal contract administration. The Emissions Manager handles emission allowance management functions. The Power Managers conduct power trading activities.

All of the individuals in the CAM organization work together in an office environment that is physically open, including the Senior Vice President. All personnel sit in a large room that is free of dividing panels or private offices. The Senior Vice President uses this arrangement to foster close communication among all individuals. His goals are to establish a culture that promotes communication and camaraderie, and to provide a unified sense of mission within the group.

2. Staffing

a. Personnel

The individuals within the CAM organization have many specialties. On a combined basis, they possess the capabilities and experience necessary to perform effectively those functions important to successful functioning of the activities related to FPP-related costs and reliability. The Senior Vice President, CAM has many years of experience in trading in the oil, natural gas and electricity areas, although he has limited experience in coal procurement and management. He joined Cinergy in 2000 as a power trader and he assumed his current position in April 2006. He worked previously as a Senior Power Trader with Statoil Energy. The Vice President, Portfolio Risk Management served as a coal analyst with another utility for two years prior to assuming responsibility for emission allowance management with CG&E in 2004. He was promoted to his current position in early 2006. The Managing Director, Coal Trading has worked in his current position for approximately 18 months. Prior to that, he had served as a coal trader in Cinergy's CM&T Group since 2002. Prior to that, he traded coal for 2 ½ years with Aquilla. Prior to joining Aquilla, he had trading responsibilities in the agricultural business. The individuals working for the Managing Director, Coal Trading have extensive experience in the

coal procurement and management business. Some have been with CG&E or Cinergy for over 25 years. For example, the Manager, Fuel Supply started in engineering with CG&E in 1982 and has been in the fuels area since 1989. The Director, Origination started in accounting with CG&E in 1982 and has also been in the fuels area since 1989.

b. Career Profiles

Duke maintains a career profile program in which all non-union members of Duke Energy Ohio annually have the opportunity to express career interests and objectives. These forms include details of the employees' work experience, education, training and development, and career interests. Career interests describe the employees' career objectives over the short-term (within the next three years), and for the longer term (from three to five years).

In addition to the structured program for career management, Duke Energy Ohio uses a formal succession planning system that provides a listing of from three to five individuals who should be considered as candidates for any manager level position. This listing ranks the candidates, and indicates whether such candidates will be ready for the position within one to three years, or whether they will be ready within three to five years. Part of the plan identifies the high performers within the CAM organization, and indicates what actions may be necessary to fill any gaps in qualifications.

c. Incentives

An issue in the previous audit was that traders in the CAM organization had monetary incentives to profit from the fuel trading transactions for which they were responsible. Duke Energy Ohio discontinued this incentive program. During the Audit Period, two distinct Short Term Incentive Plans affected the compensation of CAM employees. For the time period from July 1, 2006 through December 31, 2006 a "bridge plan" applied. It used CAMS earnings before interest and taxes (EBIT), with certain adjustments, to provide individual incentives. Distributions under the plan were based on management discretion.

From January 1, 2007 through the end of the Audit Period, the "Duke Energy – Commercial Businesses, Principal Terms of the CAM Discretionary Pool Plan" addressed CAM employee compensation. This plan consists of a primary pool and a supplemental pool. Targeted funding is split about equally between the two pools. The primary pool is funded on the basis of Duke Energy earnings per share and CAM EBIT, with certain adjustments. The supplemental pool is based on subjective measures established by the Group Executive & President – Commercial Businesses. The dollars will be allocated based upon management discretion. None of the incentives in place during the Audit Period were tied to profits achieved by traders in their fuel trades.

3. Procedures

a. Risk Management

When asked to describe the procedures that guide operations of the CAM organization, Duke Energy Ohio provided three documents. The first procedural document supplied to Liberty was the Cinergy Commercial Asset Management Risk Management Control Policy Manual, dated

November 1, 2006. This comprehensive document defines the guidelines governing CAM's asset-related marketing and commodity risk-management activities. The purpose of these risk management procedures is to minimize and mitigate the credit exposure of the Company and its affiliates resulting from wholesale energy commodities transactions. The Enterprise Credit Risk Management Department (*Credit Department*) oversees all aspects of Credit Risk management, and reports directly to the General Manager – Global Risk Management & Insurance of Duke Energy, and indirectly to the Risk Policy Committee of Duke Energy (*RPC*).

The CAM organization has considerable and frequent interaction with Global Risk Management on issues such as counterparty credit and CAM compliance with risk management guidelines. Global Risk Management determines that CAM transactions remain within established guidelines and that the appropriate guarantees exist. CAM also provides Global Risk Management with the supplier listings so that counterparty risk may be determined for potential suppliers to Duke.

b. Delegation of Authorities Matrix

The second procedural document supplied to Liberty was a Delegation of Authorities matrix that defines the limits of authority for the various levels of management within the organization. This document has been revised and updated to reflect the organizational changes associated with the merger between Cinergy and Duke. CAM does adhere to these approval authorities, and personnel in the department were knowledgeable of the existence of these procedures and their limits.

c. Active Management

The third procedural document supplied to Liberty was a one-page summary entitled "Active Management of Duke Energy Ohio Native Load Requirements". Underlying all of the fuel, emission allowance and power trading operations is the concept of "Active Management", as described in this third document. This document does not comprise a procedure, but Duke Energy Ohio personnel referred to it as the document that guides its Active Management operations from a procedural point of view.

A basic assumption of Active Management is that the intent of the Rate Stabilization Period (RSP) is to have native customers pay a market-based rate for electrical energy. Thus, Duke Energy Ohio's objective for the term of the RSP is to manage all future native load obligations by striving to provide a reliable, low cost, market-based cost supply of electricity. Active Management is best described by quoting from this referenced document:

> *For any future period, the least cost supply will be made up of generation and/or purchased power. For those periods when generation is sufficient to cover the forecasted load obligation under the RSP, we will procure the necessary fuel and emission allowances required for the generation when this is the least cost option. For periods where economic generation is not sufficient to meet the load obligation, we will purchase power forward to meet the remaining load obligation. This process insures that each forward period has the lowest market-based cost of supply.*

> *Demand under the RSP is affected by power prices and changes in the load and switching forecast. The load number on a forward basis is not very dynamic because we assume and plan for a weather normal demand for each month. In the short term, the load forecast can change considerably because of changes in the actual weather pattern. The switching forecasts are also updated monthly based on current market prices and the price to compare.*
>
> *As demand forecasts and prices for power, fuel and emission allowances change, the lowest cost mix of generation and purchased power required to serve the RSP load will change. Duke Energy Ohio plans to monitor and adjust the supply mix all the way thru physical delivery. These adjustments will result in the buying or selling the fuel, emission allowances and forward power. The mix of generation and purchased power for the term of the RSP will be monitored and adjusted periodically until delivery. We believe that this active management results in the lowest market-based cost to native load customers.*

The net effect of this Active Management philosophy is that Duke Energy Ohio seeks a least cost solution to its coal, emission allowance and power positions. One of the results is that the Company will often be attempting to "flatten" its coal position on a daily basis based upon short-term market events. Duke Energy Ohio runs its models every day to determine economic generation and the resulting coal and emission allowance requirements, as well as the amount of necessary energy purchases or sales. Events such as weather, natural gas prices and unit outages can cause fluctuations. If the daily model run shows Duke Energy Ohio to be long on coal, Duke Energy Ohio will attempt to sell coal to "flatten" its exposure. Conversely, if the results of the daily model run show Duke Energy Ohio to be short, then the Company will try to buy coal. Under this process, Duke Energy Ohio can actually be in the position of buying coal one week, selling it the next, and buying it back the third week. As Duke Energy Ohio flattens its position, the forecast of future coal prices is a determining factor. The coal typically bought or sold under Active Management is low sulfur NYMEX coal. Duke Energy Ohio's high sulfur coal is not bought or sold under Active Management, because there is a much less liquid market for such coal. Moreover, the stations using high sulfur coal tend to be the least-cost generators; therefore, their positions do not change often due to usage fluctuations.

Duke Energy Ohio does not have any internal documents analyzing the merits of introducing the Active Management approach, nor are there any documents that report either qualitatively or quantitatively on the effectiveness of Active Management since its introduction.

In summary, the CAM group is not guided by formal procurement and management policies and procedures typically found in fuel procurement organizations. Nor are there hedging procedures, as are typically found in utility fuel management organizations. When asked to explain the rationale for operating without such procedures, the Senior Vice President indicated that because of the close-knit organization, all team members knew their roles and how to perform them.

Beyond the procedures as described above, Duke Energy Ohio does use a Commercial Business Model (CBM) in support of its operations, and as the primary tool used to generate the positions associated with Active Management. This model is a Monte Carlo simulation based on a cross

commodity valuation system that incorporates financial and mathematical theory, with physical operational constraints. On a daily basis, the model produces a five-year forward-looking position view for generation, load, fuels, emissions and other commodities. It can value and quantify the risk of exotically structured contracts, load following deals and generation assets whose value is contingent on the inter-dependence between weather, load, fuel, power prices and emission prices. It is configured to produce standard outputs for annual budgeting, five-year planning and power operational plans. It also allows sensitivity analysis and stress testing against all market risk factors, including commodity prices and volatilities and non-market risk factors.

The CBM has been regularly updated and customized in order to provide support features necessary for Active Management, including coal sensitivities reports, curves for use in coal blending enhancement, adjustments for new MISO unit ordering, utility and non-utility splits, and various emissions data and reports. Duke Energy Ohio has a thorough process and set of procedures that control any changes to the CBM. Basically, any changes are approved and tested in the production environment. Users of the system are involved in monitoring tests of the system after changes have been made in order to confirm that ensuing results are reasonable. Approval of any changes must come from three separate parties, the Senior Vice President CAM, the Vice President of Commercial Analytics, and the General Manager, Production Services – Non Reg. Control of changes is driven by requirements of corporate integrity and earnings certifications required by Sarbanes-Oxley, by Integrated Portfolio Model recommendations, and by the need for consistency between utility and non-utility operations.

d. Goals and Objectives

During the Audit Period, the CAM organization operated under specific goals and objectives developed by senior management. These goals and objectives were circulated to employees electronically, and discussed at internal meetings. The following seven goals and objectives applied during the Audit Period:

1. Manage the power, coal and emission allowance positions in accordance with the Active Management philosophy.

2. Align the processes of the Budgeting Group, Modeling Group, Portfolio Risk Management, Settlement Group and Accounting Group to improve transparency and generate/manage a consistent position.

3. Make significant improvements to the coal settlement process thru alignment of CXL/COMTRAC/Portfolio Risk Management Position and Accounting.

4. Work closely with stations, operations, and engineering groups to evaluate and optimize different aspects of fuel compatibility with the scrubber environment developing rapidly thru 2009 across all stations except Beckjord. This was achieved by creating a database of potential high sulfur coals and evaluating them thru the VISTA Model. Test burns were and are being performed on the short list of approved coals from the VISTA Model output. The objective is to broaden fuel options and enhance the flexibility of fuel procurement.

5. Work closely with station, analytical labs, nuclear analyzer vendors and coal suppliers to streamline the fuel sampling and analysis process. This is critical given that there is considerable detail in the specifications and sources in the high sulfur coal mix originating from the Northern Appalachia and Illinois coal basins for consumption in the scrubbed units. This process is designed to help tighten the fuel specification language in new coal contracts and help enforce the language in established coal contracts.

6. Work closely with the Operations Group and the stations to outline quick-hit projects that will help optimize the overall costs across fuel and O&M. The SO_3 skid at Beckjord is a classic product of this effort. This allowed Duke Energy Ohio to burn lower sulfur economic fuel without compromising on the opacity front.

7. Comply appropriately with emission allowances in conjunction with capturing commercial value in accordance with Active Management.

C. Conclusions

1. The CAM organization is staffed with individuals possessing a broad cross-section of skills that effectively match the overall requirements of the organization.

The CAM organization has responsibilities that require a broad cross-section of talents related to fuel supply procurement and management, emission allowance procurement and management, as well as energy trading. The organization currently has sufficient capability and experience in all of these areas, from the director and manager level through the Senior Vice President, Commercial Asset Management. The strengths of the Senior Vice President, and those reporting directly to him, are in the area of energy trading, not coal procurement and management. However, the next level of staffing down, those reporting to the Managing Director, Coal Trading, have extensive experience in coal procurement and management functions. Several of these individuals have key responsibilities in the coal procurement, supply management and administration areas and have been functioning in their areas of responsibility for over 25 years.

2. The Traders in the CAM organization are motivated by incentives that relate to the overall performance of the organization, rather than by incentives tied to the specific trades for which they are responsible.

An issue in the previous audit was that Traders in the CAM organization had monetary incentives to profit from the fuel trading transactions for which they were responsible. Subsequently, Duke Energy Ohio discontinued this incentive program. During the Audit Period, personnel in the CAM organization operated under incentive programs based on the CAMS EBIT and Duke Energy EPS, with certain adjustments. Additional portions of the incentive program included subjective measures based on management discretion. None of the incentives in place during the Audit Period were tied to profits achieved by traders in their fuel trades.

3. The CAM organization is guided by a particularly effective set of procedures that cover the areas of Risk Management and Delegation of Authority.

Guidance for the CAM organization in the area of Risk Management is provided by the Cinergy Commercial Asset Management Risk Management Control Policy Manual, dated November 1,

2006. This is a very comprehensive document that defines the guidelines governing asset related marketing and commodity risk management activities of CAM. The purpose of these risk management procedures is to minimize and mitigate the credit exposure of the Company and its affiliates resulting from wholesale energy commodities transactions.

In addition, definition of responsibilities and authorities for decision-making is provided by a complete set of guidelines contained in the Delegation of Authority Matrix. This document has been revised and updated to reflect the organizational changes associated with the merger between Cinergy and Duke. CAM does adhere to these approval authorities, and personnel in the department were knowledgeable of the existence of these procedures and their limits.

4. **The CAM organization does not operate under any formalized policies or procedures specifically related to the fundamentals of fuel procurement and management, emission-allowance procurement and management, and the broader concept of Active Management. (*Recommendation #1*)**

Most utility fuel procurement and management organizations operate under well-defined policies and procedures. Formalized procedures are important for a number of reasons. They serve as the framework for guidance of day-to-day activities, and they serve the important purpose of formalizing institutional memory. Formalized procedures are important in order to provide a standardized basis and point of reference for performance evaluations; the level playing field defined by procedures helps accomplish this. Procedures essentially provide the handbook and guide to operations that is vital for training of individuals new to the organization, for guidance in operations when individuals are suddenly unable to perform their responsibilities because of illness, or other reasons, or when they leave the organization suddenly.

Management of the CAM organization states that procedures are not necessary because of the close working relationships within the organization. Management believes that the manner in which the organization works causes people know what other people are doing, and prepares them to fill in for others as necessary in times of illness or vacation. Management also believes that the culture of the organization has caused people to learn to question the reasonableness of their individual work products, and not continue working when an outcome seems unreasonable, but instead to bring it to the attention of a superior, or cohort, who can help cross-check and understand the issue. Management claims that the proper way to do things has been instilled in everyone because of the culture of the organization.

D. Recommendations

1. **Develop standard CAM procedures for the procurement and management of fuel and emission allowances, including procedures, guidelines and limits on Active Management. (*Conclusion #4*)**

The Duke Energy Ohio CAM organization should develop a standard set of procedures that will support the procurement and management of fuel and emission allowances, including procedures, guidelines and limits on Active Management. The procedures should include the following basic categories of these activities:

- Overall goals and objectives

- Organization and definitions of responsibilities for various facets of fuel and EA procurement and management
- Planning processes that result in definition of requirements for procurement
- Solicitation, or RFP, processes
- Identification, qualification and maintenance of vendor lists
- Control processes for incoming bids
- Bid evaluation objectives and processes
- Supplier credit and risk evaluation criteria
- Portfolio diversification goals and criteria
- Bid award processes and requirements for management information and approval
- Purchase order controls and processes
- Contract administration controls and processes, related to contract provisions, fuel qualities, fuel quantities, scheduling and deliveries
- Invoicing controls and processes.

II. Coal Procurement and Contracts

A. Background

This chapter addresses the following areas related to coal procurement, coal pricing and contracts:

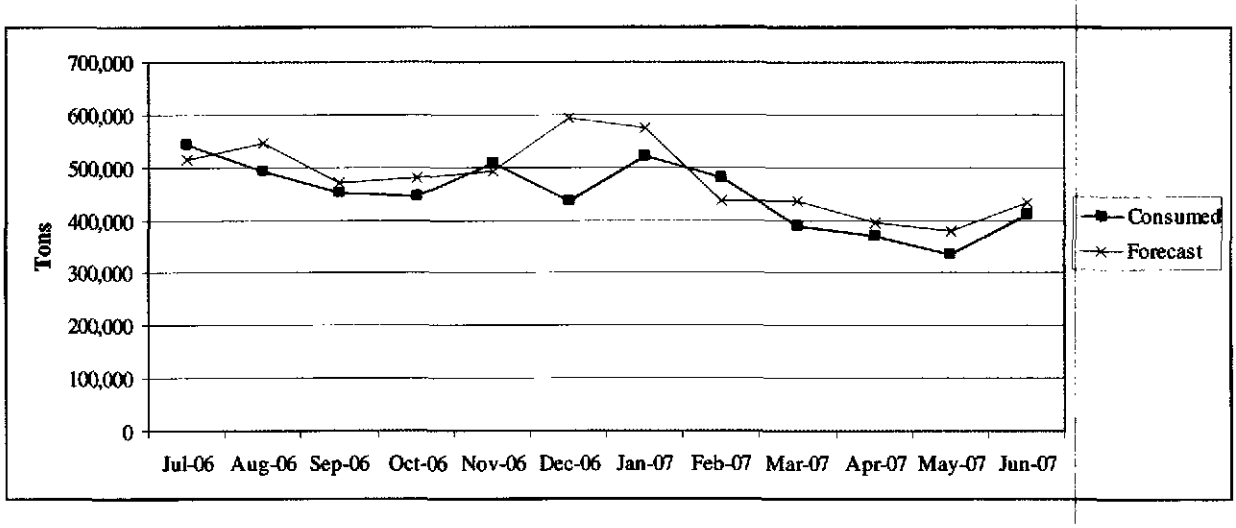
- Coal Burned
- Coal Prices
- Coal Allocations
- Contract Purchases
- Contract Summaries
- Contract Renegotiations, Amendments & Extensions
- Spot Coal Procurement
- Contract Swaps
- Active Management
- Transportation

B. Findings

1. Coal Burned

All coal consumed by Duke Energy Ohio is delivered to the Company's stations by barge. This coal is delivered under a combination of long-term and short-term (or spot) contracts. A long-term contract is any contract with a term of greater than one year, and spot coal is procured under agreements that are of one year or less in duration. For the Duke Energy Ohio operated stations of Beckjord, Miami Fort and Zimmer, on an equity basis, coal consumption for each month of the Audit Period is shown on the following graph. For comparison, the graph also shows the Duke Energy Ohio forecast for consumption during each of these months.

Figure II.1. Duke Energy Ohio Operated Units – Beckjord, Miami Fort and Zimmer Coal Consumption vs. Forecast Consumption – Equity Share Basis



Total coal consumption for the Audit Period, for the three Duke Energy Ohio Operated Stations, on an equity basis, was 5,392,044 tons, compared to the forecast consumption for this period of 5,757,848 tons.[3] The graph shows that the forecast was reasonably close to actual coal consumption, except for the months of December 2006 and January 2007. Actual consumption was considerably less than forecasts for these two months. The Active Management approach of procuring coal can cause such a mismatch between forecast and actual consumption to have a significant impact. The approach means that for these two months of December and January there will be larger than normal amounts of spot coal procurement in anticipation of coal burns that will match the forecast. Then, when consumption is significantly lower than the forecasts, there will be larger than normal amounts of coal sales that are made to "flatten" the coal position, in accordance with the Active Management philosophy. For the Audit Period as a whole, the difference of 365,804 tons by which the forecast exceeded actual consumption translates into 6.8 percent more coal. Extra coal was procured in anticipation of a need, but then was sold again when consumption was not as great as the forecast.

In order to better understand this mismatch between forecasts and consumptions, Liberty looked at the major unplanned and forced outages during December 2006 for Beckjord, Miami Fort and Zimmer units. There were 2 days for Beckjord #2, 6 days for Beckjord #5, 3 days for Beckjord #6, and 5 days for Zimmer. Using megawatt unit ratings, heat rates, and an average Btu coal content of 11,000 Btu/lb, these figures generate lost consumption of approximately 101,000 tons of coal. The forecast consumption for December was 594,004 tons and the actual consumption was 437,570 tons. If the actual consumption is adjusted upward by this 101,000 tons, to compensate for the coal that was not burned because of the outages, the total actual consumption would have been 538,000 tons of coal. Thus, even with the adjustment for the outages, the forecast was still higher than the actual consumption.

2. Coal Prices

The graph below in Figure II.2 shows coal prices from all of the major coal producing basins in the United States for the three-year period from October 2004 to October 2007.[4] Of particular interest is the decline in prices from several of Duke Energy Ohio's supply sources, most significantly Central Appalachia, but also the Illinois Basin and the Uinta Basin (Colorado) compared to the previous audit period.

Figure II.2. Average Weekly Coal Spot Prices

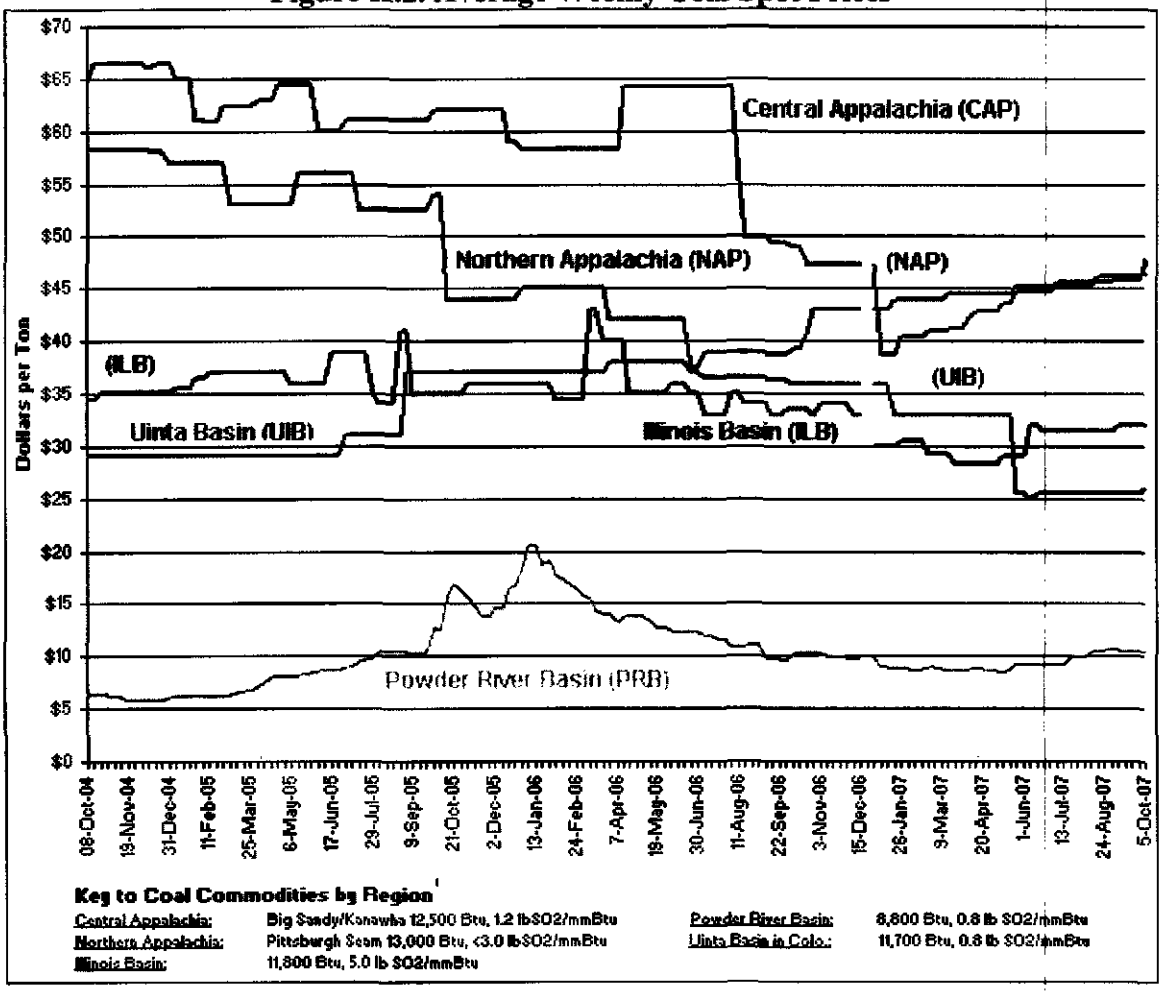


Table II.1 below summarizes Duke Energy Ohio's coal procurement costs during the Audit Period.[5] FERC Form 423 provided the source of this information. Therefore, these coal prices reflect those prices for coal actually delivered to the stations for consumption. During the Audit Period, Duke Energy Ohio purchased a total of 9,413,300 tons of coal for consumption in its own generating stations at an average price of $1.683/MMBtu. This excludes the coal that Duke Energy Ohio purchased and then resold to third parties, and it therefore excludes the significant negative margin experienced during the audit period associated with coal trading, as discussed in detail in Section II.9 below.

Table II.1. Duke Energy Ohio Coal Purchases During the Audit Period

Plant	Contract					Spot					Total				
	Tons (000)	BTU/ lb	% Sulfur	$/ Ton	c/ MMBTU	Tons (000)	BTU/ lb	% Sulfur	$/ Ton	c/ MMBTU	Tons (000)	BTU/ lb	% Sulfur	$/ Ton	c/ MMBTU
Beckjord	710.0	11,991	1.6	41.15	171.6	2,110.3	11,736	1.0	45.23	192.7	2,820.3	11,800	1.12	44.21	187.3
Miami Fort	1386.5	11,633	1.3	48.90	210.2	1,833.5	11,522	1.4	41.69	180.9	3,219.9	11,570	1.34	44.79	193.6
Zimmer	2808.0	12,433	3.8	32.68	131.4	565.2	12,218	3.7	30.87	126.3	3,373.1	12,397	3.78	32.37	130.6
Total	4904.4	12,143	2.8	38.49	158.5	4,508.9	11,709	1.5	41.99	179.3	9,413.3	11,935	2.2	40.17	168.3

Table II.2 below summarizes the Company's fuel expenses for the previous audit period. This table shows that Duke Energy Ohio's total fuel costs dropped from $1.702/MMBtu in the

previous period to $1.683 in the current Audit Period. Duke Energy Ohio's coal prices behaved during the Audit Period as one would have expected; contract prices increased in the current Audit Period compared to the previous period due to the traditional nature of long-term coal contract pricing. Spot prices decreased significantly, consistent with the overall decline in market prices as shown in Figure II.1 above.

Table II.2. Duke Energy Ohio Coal Purchases During the Previous Audit Period

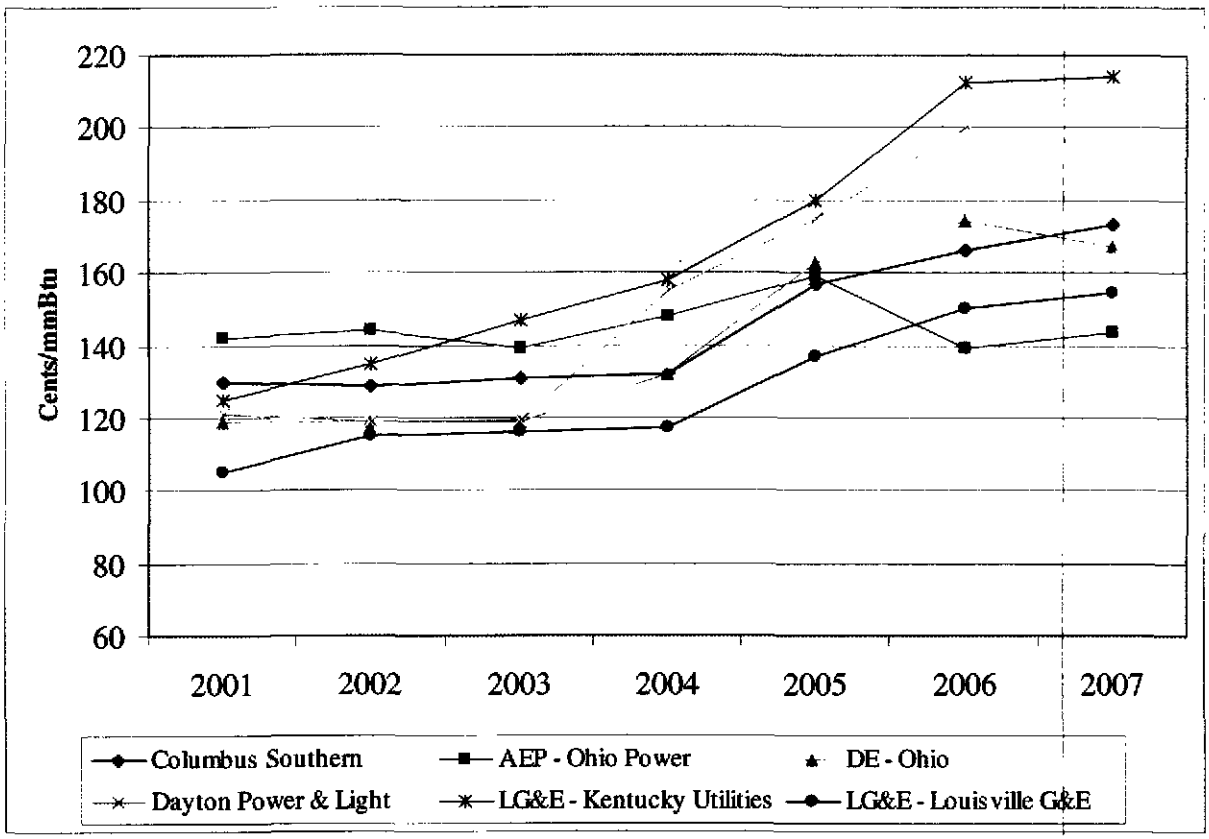
Plant	Contract					Spot					Total				
	Tons (000)	BTU/ lb	#SO2/ MMBTU	$/ Ton	c/ MMBTU	Tons (000)	BTU/ lb	#SO2/ MMBTU	$/ Ton	c/ MMBTU	Tons (000)	BTU/ lb	#SO2/ MMBTU	$/ Ton	c/ MMBTU
Beckjord	755.0	12,123	2.6	41.02	169.2	2,372.5	11,558	1.4	51.29	221.9	3,127.5	11,694	1.7	48.81	208.7
East Bend	655.4	12,198	4.4	31.89	130.7	0.0	0	0.0	0.00	0.0	655.4	12,198	4.4	31.89	130.7
Miami Fort 5-7	857.6	12,249	3.1	42.67	174.2	993.9	11,369	1.4	49.23	216.5	1,851.5	11,777	2.4	46.19	196.1
Miami Fort 8	917.1	11,149	0.7	48.70	218.4	757.1	11,039	0.9	41.13	186.3	1,674.2	11,099	0.9	45.28	204.0
W.H. Zimmer	3,047.1	12,408	5.2	28.98	116.8	850.8	11,894	4.4	34.30	144.2	3,897.9	12,296	5.0	30.14	122.6
Total	6,232.2	12,144	4.0	35.53	146.3	4,974.3	11,499	1.8	46.43	201.9	11,206.5	11,858	3.2	30.37	170.2

Table II.3 and the companion graph in Figure II.3 show Duke Energy Ohio's coal prices for the current Audit Period compared to pricing for the neighboring electric utilities. Clearly, Duke Energy Ohio's prices by this measure are competitive with the prices of surrounding utilities. Liberty considers the most significant measure of Duke Energy Ohio coal procurement performance to be how its prices changed with time, rather than what specific prices it achieved. Direct price comparisons are troublesome. Prices for coal delivered to different Duke Energy Ohio generating stations vary considerably, as the data in Table II.1 shows. Many factors produce the variances, including: (a) station capabilities for handling various levels of ash, sulfur, and BTU, (b) the region within which the station is located, (c) the mode of transportation available for coal delivery to the station, (d) the general availability or scarcity of coal in that region, and (e) the vintage of the contracts for that particular station. Over time, the pricing on some coal contracts may appear to be out of line with market conditions, but this observation does not mean that Duke Energy Ohio did a poor job of price negotiations at the time when it had to make binding decisions. Duke Energy Ohio's best protections against contract prices that may move out of line with the market over time are the various techniques that it has already built into its contract strategy, such as market price reopeners, shorter term contracts, and portfolio diversity.

Table II.3. Audit Period Coal Cost Comparisons

Utility	Quantity (000 tons)			¢/MMBTU		
	Contract	Spot	Total	Contract	Spot	Total
AEP- Columbus Southern	4,114.9	152.8	4,267.7	168.91	217.21	170.61
AEP – Ohio Power	12,080.7	2,199.0	14,279.7	142.23	140.67	141.99
DE – Ohio	4,904.4	4,508.9	9,413.3	158.49	179.30	168.27
Dayton Power & Light	7,099.7	1,007.3	8,107.0	199.95	173.13	196.69
LG&E - Kentucky Utilities	6,541.2	994.8	7,536.0	213.19	215.24	213.43
LG&E - Louisville G&E	7,573.2	446.3	8,019.5	152.36	163.19	152.95

Figure II.3. Historical Coal Price Comparisons



Note – 2007 prices reflect only the first 6 months of 2007.

The differences in prices among neighboring electric utilities, as shown in Table II.3 and Figure II.3, reflects differences in buying strategies, and vintages and differences in philosophies for the mix between contract and spot coal, as well as transportation differences and the advantage that accrues to Duke Energy Ohio because all of its stations have barge transportation access due to their on-river sites. Liberty considers the most important factor to be that, during the Audit Period, Duke Energy Ohio has not lost ground when compared to surrounding utilities. In fact, Duke Energy Ohio has improved its comparative position respect to overall coal pricing. Duke

Energy Ohio's overall coal prices declined more in the most recent period than did the coal prices for the other surrounding utilities. The price for Dayton Power & Light also declined, but not to as great an extent. The coal prices for the other utilities of Columbus Southern, Ohio Power, Kentucky Utilities and LG&E all increased over the same period of time.

The following table shows the percent changes in the coal prices for each of the six neighboring electric utilities from calendar year 2006 to mid 2007.

Table II.4. – Changes in Regional Coal Prices

Utility	2006 ¢/MMBtu	2007 ¢/MMBtu	% Change
AEP- Columbus Southern	166.39	173.50	4.3
AEP – Ohio Power	139.01	143.43	3.2
DE – Ohio	174.28	167.07	(4.3)
Dayton Power & Light	200.28	194.71	(2.8)
LG&E - Kentucky Utilities	212.33	214.09	0.8
LG&E - Louisville G&E	150.16	154.77	3.1

This drop in fuel prices for Duke Energy Ohio must be kept in proper perspective. It only reflects the price of coal delivered to generating stations for consumption, and it should not be anticipated that energy prices to customers will drop as a result. As discussed in Section II.9 of this chapter, Active Management, fuel swaps and the trading of coal with third parties has produced [redacted] in negative coal margins that will increase the FPP Rider for the Audit Period, resulting in increased costs to customers.

3. Coal Allocations

On a forward basis, the allocation of coal contracts among Duke Energy Ohio's generating units results from a manual process based on economics and unit constraints (both environmental and operational). Duke Energy Ohio allocates contracts to the units based on the unit's percentage of economic burn of that type of coal compared to the portfolio percentage of economic burn of that type of coal. For example, assume that in 2009 Beckjord Unit #1 and Beckjord Unit #6 burn 153,003 tons and 942,251 tons of NYMEX coal on a total burn basis, which produces a combined coal burn of 1,095,254 tons. If 1,000,000 tons of NYMEX coal have been purchased on a total burn basis, then 153,003/1,095,254*1,000,000 = 139,696 tons of NYMEX coal would be allocated to Beckjord Unit #1. Similarly, 942,251/1,095,254*1,000,000 = 860,304 tons of NYMEX coal would be allocated to Beckjord Unit #6.

4. Contract Purchases

Duke Energy Ohio coal procurement is complex because of the Active Management approach to fuel management. The Company views each coal procurement transaction as a hedge, and continually works to optimize its hedged position. Duke Energy Ohio therefore has many more

transactions for coal than actually required to supply its own generation. During the Audit Period, there were no purchases of coal from any affiliates of Duke Energy Ohio.

Measured by actual consumption, Duke Energy Ohio purchased [redacted] during the Audit Period, based on data as reported on FERC Form 423. This volume amounted to [redacted] of contract coal that were actually burned in the Company's Beckjord, Miami Fort, and Zimmer stations.[6] The Company states that a more realistic percentage of long-term contract coal is in the range [redacted] Many of its transactions are reported as spot on Form 423, but subsequently rolled out into longer term transactions.

During the Audit Period, Duke Energy Ohio did not issue any formal solicitations, or RFPs, for the procurement of long-term contract coal, or for fuel transportation.[7] Duke Energy Ohio primarily buys two types of coal, low sulfur coal, and high sulfur coal. The Company states that it does not require RFPs for low-sulfur coal because these fuels are liquid in the marketplace, and the prices are readily discernable. The Company's high-sulfur coal requirements are increasing significantly, because of the addition of scrubbers on Miami Fort Units #7 and #8. Duke Energy Ohio may use RFPs for the next long-term procurement of high sulfur coal. Duke Energy Ohio is now conducting significant evaluations of coal quality and compatibility related to high sulfur coals. RFPs in advance of the conclusions of these evaluations would not be of value.

In early 2007, Duke Energy Ohio formulated a detailed "High Sulfur Purchasing Program".[8] The purposes of this program included:

- [redacted]
- Achieving supply diversity both by supplier, and on the river system
- Basing procurement on coals that have acceptable chlorine levels and are otherwise compatible from a quality perspective, with the requirements of the scrubbed units.

Duke Energy Ohio has assigned one of its Originators to each of the high sulfur coal basins – Northern Appalachian and Illinois. The focus on each of these basins keeps the Company current on pricing, transportation, and coal production issues. Lists of producers meeting the Company's credit criteria have been developed. From this list of producers, the Company has created a catalog of coals and as-received analyses that it run through its Vista Model to determine coal compatibility with generating units. The Vista Model, sometimes referred to as a coal quality impact model, assists the Company in making procurement decisions that are based on evaluated costs to produce electrical energy, rather than simply base decisions on delivered costs of coal. This catalog currently lists 21 producers and 67 coals.[9] Part of the cataloging process includes placing the coals into one of three groups, based on compatibility with unit quality requirements. Group 1 contains acceptable coals; group 2 contains coals that need to be test burned; and group 3 contains coals that are not acceptable. At this point, the Originator will check price and availability of the coals, and if necessary, the potential to buy a small quantity for test burn. Duke Energy Ohio uses for these coals a spread-sheet that ranks them on an evaluated cost basis, including price, and adjustments for BTU, SO_2 and transportation to the stations.

The Credit Department reviews the vendor lists developed as a result of this process, and updates and makes available on a daily basis the approved counterparty list. Suppliers on the approved list are approved for deals with terms of greater than 3 months or 60,000 tons of coal. Suppliers not on the approved list are limited to a maximum contract term of 3 months and 60,000 tons of coal. The Credit Department distributes each morning an approved counterparty list that includes available credit lines, tenor limits, and contract information.

Other evaluation factors for these coals are:

- Fungibility of the coals across all of the high sulfur units, because of the value of having coals that can be burned at both Zimmer and Miami Fort
- Reliability of the supplier on meeting quality, shipping schedules, and guarantees
- Supplier diversification to develop supply and price protection
- Geographic diversity to reduce transportation risk
- Liquidity of the coal that would support Active Management
- Blending characteristics around ash fusion temperatures and chlorine content.

Duke Energy has been conducting test burns on various high sulfur coals. Outside consultant evaluations are in process, and lists of potential high sulfur coal suppliers are being refined, consistent with available coals that will satisfy the quality and compatibility issues.

In conjunction with its Active Management, Duke Energy Ohio did engage in transactions for significant quantities of coal during the Audit Period under agreements that had terms of greater than one year. Almost all of this coal was low sulfur NYMEX coal. The Active Management method of coal procurement generated a significant number of Audit period transactions or trades. There were a total of [redacted] contracts having a term of greater than one year. There were [redacted] Liberty discussed these transactions with Duke Energy Ohio in order to better understand the dynamic of the transactions. In some cases, the Company was willing to pay a slight premium on a series of transactions in order to gain liquidity in the market. In other cases, the Company had to [redacted] the skids improves precipitator performance for certain low sodium coals, and consequently changes the mix of potential coals, and their sulfur contents, that can be burned in the units.

Duke Energy Ohio bought a total of [redacted] tons of coal at an [redacted] and sold a total of [redacted] The net result of these [redacted] was that Duke Energy Ohio increased its long-term coal contract position by [redacted], at a net cost of [redacted] It is clear that Duke Energy Ohio improved its position through these transactions related to long-term coal deals by acquiring significant additional tonnage at relatively low prices. Nevertheless, the situation is a fluid one. Through Active Management, the Company will continually evaluate its position such that there could be further trading activity involving some of the same individual positions that were involved in these [redacted] One measure of the effectiveness of all of this activity is to look at overall Duke Energy Ohio coal prices, as burned, and as discussed earlier in this chapter. That discussion showed that Duke Energy Ohio improved its coal price position during the Audit Period relative to the neighboring utilities.

As part of its justification for the Active Management method of portfolio management, Duke Energy Ohio states that the FPP component of the Market Based Standard Service Offer (MBSSO) is fully avoidable. This means, in theory, that customers have the option to leave Duke Energy Ohio for a lower cost electricity supplier if they can find one. The Company observes that, under the MBSSO approach, it is in Duke Energy Ohio's economic interest to secure the least cost fuel on behalf of native load customers in order to maintain its customer base. Duke Energy Ohio further states that it tests the fuel market for price discovery and transparency to determine the least cost fuel through meetings and conversations with fuel suppliers. The current MBSSO expires at the end of 2008. Key parameters that will guide fuel procurement beyond this time therefore remain uncertain.

5. Contract Summaries

Duke Energy Ohio had in effect during the Audit Period 16 coal contracts that had terms for a period of one year or greater. The following table summarizes these contracts:[10]

Table II.5. – Long Term Contracts

Supplier	Term	Annual Tons (000)	Year	Price $/ton	BTU/lb	SO_2 #/MMBTU
[redacted]	[redacted]	3,200	2005 2006 2007	[redacted]	12,600	7.40
[redacted]	[redacted]	200 600 300 165	2005 2006 2007 2008	[redacted]	8,800	0.80
[redacted]	[redacted]	700	2005 2006 2007	[redacted]	12,000	1.20
[redacted]	[redacted]	450 250	A B	[redacted]	12,000 11,500	1% S 1% S
[redacted]	[redacted]	300	2006	[redacted]	11,900	0.80
[redacted]	[redacted]	725	2007	[redacted]	12,200	3.965% S
[redacted]	[redacted]	2,200	2006 2007 2008	[redacted]	12,100	5.00
[redacted]	[redacted]	120 375 200 100	2005 2006 2007 2008	[redacted]	8,800	0.80
[redacted]	[redacted]	435	2006 2007 2008	[redacted]	11,750	6.50
[redacted]	[redacted]	600 1,200	2006 2007&2008	[redacted]	13,000	4.50
[redacted]	[redacted]	300	2005	[redacted]	11,800	4.40
[redacted]	[redacted]	300	2005 2006 2007	[redacted]	12,000	0.90
[redacted]	[redacted]	250	2005 2006	[redacted]	12,000	4.50
[redacted]	[redacted]	1,000 500 500	2005 2006 2007	[redacted]	12,100	4.80
[redacted]	[redacted]	300	2005-barge mine 2006-barge mine 2007-barge mine	[redacted]	10,850	0.54% S
[redacted]	[redacted]	570	2007	[redacted]	12,000	4.50

Three of these contracts terminated during the Audit Period. [redacted]

[redacted]

6. Contract Renegotiations, Amendments, and Extensions

Duke Energy Ohio undertook during the Audit Period a number of actions on coal contracts related to renegotiations, amendments, or extensions.

a. [redacted]

In the spring of 2007 there was an extended outage at the Zimmer Station. [redacted] Duke Energy Ohio and Cravat amended the coal contract and agreed to reschedule the delivery of these [redacted] in 2008. The price for this rescheduled coal was the same as the price originally established for 2007 delivery.

b. [redacted]

In the spring of 2007 there was an extended outage at the Zimmer Station. Consequently, [redacted] Duke Energy Ohio and [redacted] amended the coal contract and agreed to reschedule the delivery of [redacted] The price for this rescheduled coal was the same as the price originally established for delivery of this coal earlier in 2007.

c. [redacted]

Duke Energy Ohio and [redacted] agreed to amend the contract in order to [redacted] There were no other changes to the terms and conditions of this coal contract.

d [redacted]

The coal supply agreement with Infinity formally ended on [redacted] but at that time [redacted] remained to be delivered. By letter of agreement, the parties agreed to schedule delivery of this coal in late 2006 and 2007.

e. [redacted]

Duke Energy Ohio and [redacted] agreed to amend the contract in order to [redacted] contractual tonnage by [redacted] deliveries during the second quarter of 2007. Consideration for this reduction was [redacted] Prior to agreeing to this [redacted] There were no other changes to the terms and conditions of this coal contract.

f. [redacted]

As of the end of the Audit Period, discussions were continuing between the parties because of concerns related to whether [redacted] At issue are [redacted]

[redacted] and the additional market re-openers that are part of this coal supply agreement.

g. [redacted]

Significant negotiations took place during the Audit Period, and were planned subsequent to the end of the current Audit Period. At issue is the extension of the existing Coal Supply Agreement [redacted] The extension includes increasing the total tonnage, adding new coal specifications, tightening the contract default provisions, and requiring [redacted] to supply higher quality coal that can be burned more effectively by the Zimmer and Miami Fort Stations. Included in these discussions is anticipated resolution of the *force majeure* situation, and the *open contractual issues*, as discussed in these sections of Chapter III, Supply Management.

This negotiation is particularly significant in terms of Duke Energy Ohio fuel management. The Company has created a "White Paper" that presents not only all facets of the [redacted] but also creates a fuel procurement analysis model that the Company intends to continue using for major procurements. It is intended that such a White Paper will be used to support all future procurements for [redacted] transactions [redacted] The White Paper was prepared by the Manager Fuel Supply and approved by 13 other managers and executives within the Company, up to and including, the President of the Commercial Business Unit. It covers all aspects of operational, net present value financial evaluations, supplier credit, risk, accounting, legal and regulatory responsibility. The contents of the White Paper include:

- Action Requested
- Deal Summary
- Strategic Rationale
- Counterparty Background
- Detailed Strategic Rationale
- Accounting/Tax Impact
- Earnings/Financial Impact
- Legal/Regulatory Issues
- Credit Summary
- Valuation Analysis – this is a complete net present value analysis that illustrates the value to the Company compared to alternatives.

Another notable aspect of this negotiation with American is the close communication that has occurred between fuel supply personnel and personnel at the Zimmer Station. Station personnel have been consulted on many aspects of the proposed new coal supply agreement as they relate to coal quality and coal delivery issues important to operation of the station. There have been multiple meetings during these negotiations, covering a period of several years, between the Zimmer Station Manager and the Senior Vice President, Commercial Asset Management.

7. Spot Coal Procurement

The application of the Active Management approach during the Audit Period generated many transactions as the Company sought on a daily basis to manage economically its commodity position for coal, emission allowances, and power. One component of this portfolio management

was the analysis of its coal supply position in response to daily model runs showing the Company to be either short or long on coal. Overall, during the Audit Period, Duke Energy Ohio actually procured [redacted] based on data as reported on FERC Form 423. The Company burned [redacted] in the Beckjord, Miami Fort and Zimmer generating stations on this basis. The Company states that a more realistic percentage of spot coal is [redacted] because many of its transactions are reported as spot on Form 423, but subsequently rolled out into longer term transactions.

The vast majority of the spot coal transactions were for NYMEX coal with the following specifications:

Trading Unit	1,550 tons of coal
BTU/lb	12,000 plus or minus 250
Ash	13.5% Maximum
Sulfur	1.05% Maximum
Moisture	10.00% Maximum
Volatile	30.00% Minimum
Hardgrove	41 Minimum, with a 3 point analysis tolerance below
Size	Three inches topsize, with a maximum of 55% passing one-quarter-inch-square wire cloth sieve or smaller.

Once procured and delivered to Duke Energy Ohio, NYMEX coal is used in Company's non-scrubbed units of Beckjord, or currently Miami Fort #7. The typical units that Duke Energy Ohio uses to accomplish trading deals or transactions are [redacted] These sums comprise a calendar strip representing delivery of [redacted]

8. Contract Swaps

During the Audit Period, Duke Energy Ohio engaged in two different types of transactions involving reselling or swapping of coal contracts. The first type, termed a [redacted] Duke Energy Ohio has stated that both types of transactions fall into the category of Active Management.

Approximately [redacted] occurred during the Audit Period. Liberty was not able to evaluate [redacted] cause the only data provided related to the coal prices; power prices and emission allowance prices necessary to complete the calculation were not available. However, the Company achieved a margin of [redacted] The size of this margin is significant in view of the fact that four of the swaps were at a [redacted]

9. Active Management

The details of Duke Energy Ohio's Active Management philosophy for coal procurement and management are described in Chapter I, Organization, Policies and Procedures. Basically, Duke Energy Ohio actively manages its coal, emission allowance, and forward economy energy positions. Duke Energy Ohio will trade its position when it determines there is a financial advantage to do so. The margins from these trades flow through the FPP only if the following four criteria are met:

- The sale was from the Duke Energy Ohio burn book
- The sale can result from either a long position, or a short position, in the Duke Energy Ohio burn book
- The sale was executed during the RSP period of January 1, 2005 through December 31, 2008
- The deliveries of the associated coal occurred during the RSP period of January 1, 2005 through December 31, 2008.

CAM prefers to deal with coal suppliers that will permit their coal to be resold, but does not impose this preference as a requirement of most fuel contracts. Resale of coal appears not to have been an issue for fuel suppliers. CAM is aware of only one Northern Appalachian fuel supplier that prohibits the resale of its fuel for competitive reasons. However, even with such a restriction, CAM maintains an active business relationship with this supplier.

Table II.6 shows the margins from Active Management that have flowed through the FPP during each of the recent Audit Periods. The margins reduced fuel costs due to the FPP Rider for Audit Periods 1 and 2, but increased them by a more than offsetting amount during the Current Audit Period.

Table II.6. Active Management Margins Generated

Audit Period	Margin Dollars
FPP Period 1: Jan-June 2005	[redacted]
FPP Period 2: July 2005-June 2006	[redacted]
FPP Period 3: July 2006-June 2007	[redacted]
Total Since Initiation of FPP	[redacted]

The Company states that a large portion of these costs [redacted]

Duke Energy Ohio calculates the margins on Active Management as the difference between the purchase price and the sale price. It does not take into account the cost of any replacement coal. For example, if Duke Energy Ohio buys coal at a price of $40/ton, and subsequently sells it for $50/ton, then the Company records a margin of $10/ton. If replacement coal is subsequently purchased for $46/ton, the margin is not reduced by $6/ton.

Table II.7 below shows the costs to Duke Energy Ohio during the Audit Period of the financial and physical swaps. Portfolio Optimization reflects the physical swaps made for fuel or power

optimization. During the previous Audit Period, the total of these costs was only [redacted] compared to a total cost during the current Audit Period of [redacted]

Table II.7. Physical and Financial Swaps

Month	NYMEX Financial	Portfolio Optimization NYMEX	Total Cost
Jul 06	[redacted]	[redacted]	[redacted]
Aug 06	[redacted]	[redacted]	[redacted]
Sept 06	[redacted]	[redacted]	[redacted]
Oct 06	[redacted]	[redacted]	[redacted]
Nov 06	[redacted]	[redacted]	[redacted]
Dec 06	[redacted]	[redacted]	[redacted]
Jan 07	[redacted]	[redacted]	[redacted]
Feb 07	[redacted]	[redacted]	[redacted]
Mar 07	[redacted]	[redacted]	[redacted]
Apr 07	[redacted]	[redacted]	[redacted]
May 07	[redacted]	[redacted]	[redacted]
Jun 07	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]

Liberty asked Duke Energy Ohio a number of questions related to Active Management in order to establish clear justification for this form of portfolio management. Liberty asked the Company to provide all documents that analyze the merits of introducing the Active Management approach. The response was that there were no internal documents that had analyzed the merits of Active Management.[11] The Company was asked to provide all documents that report qualitatively and quantitatively on the effectiveness of Active Management since its introduction. The response was that there were no such documents.[12] The Company was asked what other electric utilities that it was aware of used the Active Management approach as their fuel management philosophy. The response was that the Company could not cite specific examples.[13] The Company was asked to identify all other Duke Energy subsidiaries, business units, or operations segments that make use of the Active Management approach. The response was that the Code of Conduct prevents CAM from knowing if other Duke Energy subsidiaries make use of Active Management in a manner similar to CAM's.[14]

As this report approached completion, the Company provided a spreadsheet illustrating how Active Management worked for the month of December 2006. Weather conditions that month allowed for lower power expenditures, but an offsetting loss on sales of coal, made to flatten the coal position. The net effect was a demonstrated overall savings, when coal positions, emission allowance positions and power positions were all considered. However, Liberty did not find evidence that such calculations, or demonstrations of savings through Active Management, were routinely conducted during the Audit Period.

10. Transportation

[redacted]

[redacted]

[redacted]

C. Conclusions

1. Duke Energy Ohio used a notably effective approach in negotiation of [redacted] contract extension.

Inadequate communication between the utility organizations that procure coal and those that operate the generating stations, especially in times of contract negotiations occurs frequently in Liberty's experience. However, at Duke Energy Ohio, Liberty found exceptional teamwork during negotiations related [redacted] Personnel at the Zimmer Station were very involved in discussions with CAM senior management, and were involved in actual negotiations. The important element of this teamwork was that coal contract issues important to sound operation of the generating station were the subject of regular discussions between Zimmer personnel and CAM personnel. The result was that negotiations between Duke Energy Ohio and [redacted] These negotiations had not been completed as of the end of the Audit Period, but both CAM personnel, and station operating personnel, were optimistic that Duke Energy Ohio was on a path that would best optimize the overall interests of the Company in this important coal contract negotiation process.

2. Duke Energy Ohio prices during the Audit Period for coal actually delivered to generating stations outperformed coal prices for other neighboring electric utilities.

Price comparisons among electric utilities are difficult because of many differences that can produce divergent prices despite effective performance. The differences include, for example, portfolio parameters (spot/contract ratios), locations, generating unit requirements. However

examining relative changes in price direction over time does provide one reasonable indicator for neighboring electric utilities that operate in the same general geographic region, and generally burn coal from the same coal supply basins.

At the beginning of the Audit Period, Duke Energy Ohio's coal prices were fourth lowest of the six comparable neighboring electric utilities. As of the end of the Audit Period, Duke Energy Ohio's prices were third lowest of the six utilities. Only two of the six utilities experienced declines in overall delivered coal prices. The prices of Duke Energy Ohio dropped by [redacted] but the prices of Dayton Power and Light only dropped by [redacted] Prices for the other four neighboring utilities all rose over this same period of time.

This drop in fuel prices for Duke Energy Ohio must be kept in proper perspective. It only reflects the price of coal delivered to generating stations for consumption, and it should not be anticipated that energy prices to customers will drop as a result. As discussed in Section II.9 of this chapter, [redacted] that will increase the FPP Rider for the Audit Period, resulting in increased costs to customers. Duke Energy Ohio stated that this figure includes costs attributable to normal fuel management; nevertheless, the overall impact of the Company's activities to manage fuel, emission allowances and power was that the average FPP rate increased.

3. **Duke Energy Ohio's Audit-Period forecasts of coal consumption were consistently higher than actual coal burns, which produced a need under its Active Management approach to consider many transactions to "flatten" its coal position. (*Recommendation #1*)**

During the Audit Period, Duke Energy Ohio consistently produced forecasts for coal consumption that proved ultimately to exceed actual coal consumption. Adjusting those forecasts for unplanned forced outages did not account for all of the difference. The resulting mismatch has placed Duke Energy Ohio regularly in a "long" position on coal. That position necessitated trades to flatten the position and bring the position more in line with actual requirements. The economic cost or benefit of such mismatch is difficult to quantify. It will in large measure follow uncertain market trends. For this Audit Period, the long-position, when combined with the Active Management approach to modifying that position, appears to have been a contributing factor to the *significant negative margins* of [redacted] and a corresponding increase in FPP costs. Moreover, even in the absence of an Active Management approach, mismatches between coal forecasts and actual consumption will often result in the need for volume adjustments in markets conditions where prices vary significantly from those that applied when supply commitments were made.

4. **Duke Energy Ohio has formulated a sound "High Sulfur Purchasing Program" to address its changing requirements for high sulfur coal.**

The Company has appropriately realized that not only is its own position changing with respect to high sulfur coal requirements because of installation of scrubbers on Miami Fort Units #7 and #8, but that the coal market in general is being influenced by other electric utilities that are also installing scrubbers. In addition, the Company is addressing the fact that coal qualities under certain of its contracts present operational problems for the new scrubbers, and that a better

understanding of the operational dynamics within generating units must be gained. The "High Sulfur Purchasing Program" contains the necessary elements of coal quality analyses, test burns, consultant studies, market surveys, and discussions with coal suppliers. The results of this program have produced appropriate specifications for portfolio diversification, in terms of pricing, quality, contract terms, and regional and supplier diversity.

5. **Duke Energy Ohio has acted appropriately to amend or renegotiate coal contracts as necessary.**

During the Audit Period, Duke Energy Ohio was faced with a number of coal supply agreements that required action to address situations where delivery schedules had slipped, where coal quality issues were causing operational problems, or where there was an opportunity to extend a contract with a good coal supplier. In each of these situations, the Company amended the existing coal supply agreement as necessary to resolve the issue. In cases requiring renegotiation, as of the end of the Audit Period, discussions were ongoing with several coal suppliers in efforts to reach agreement with reliable suppliers.

6. **Duke Energy Ohio has developed an excellent "White Paper" that serves as a notably strong model for conducting a complete analysis of new coal contract opportunities.**

The CAM organization has developed what it calls a White Paper that it intends to use in support of all coal procurements in the future that are for any [redacted] more tons. The White Paper was prepared by the Manager Fuel Supply and approved by 13 other managers and executives within the Company, up to and including, the President of the Commercial Business Unit. This document is detailed and thorough, and covers all of the important elements of coal procurement including operational issues, net present value financial evaluations, supplier credit, risk, accounting, legal and regulatory responsibility.

7. **Active Management during the Audit Period contributed to the generation of negative margins of [redacted] that served to increase the costs that flowed through the FPP.** ***(Recommendation #2)***

During the Audit Period, the Company made the transactions required by its Active Management approach to maintain a relatively flat coal supply position. Coal was sold when the position indicated more coal than required to meet requirements, and coal was bought when the position indicated that more coal was required in order to meet requirements. In addition, the Company [redacted] The net of all of these transactions was that buying prices were higher than selling prices, such that a margin of [redacted] was flowed through the FPP as increased fuel costs. This is particularly significant in view of the fact that for the previous Audit Period, the equivalent number was [redacted] representing a reduction of fuel costs through the FPP by this amount. Overall, the swing from the previous period to the present period amounted to a swing of [redacted] across the two periods.

D. Recommendations

1. **Evaluate the procedures and methods for forecasting coal consumption in an effort to bring forecasts more in line with actual coal consumption. (*Conclusion #3*)**

Generally, comparisons of forecasts to actual results are not unidirectional; some prove high and some prove low. The current pattern at Duke Energy Ohio is that forecasts are generally higher than actual consumption. The Company should evaluate its forecasting procedures in an effort to bring them more in line with actual consumption on an average basis.

2. Demonstrate the economic effectiveness of Active Management as a condition to its continued use by Duke Energy Ohio. ***(Conclusion #7).***

Active Management is governed by a very abbreviated document. Duke Energy Ohio operates under no written procedures or guidelines for measuring its effectiveness. Duke Energy Ohio provided no quantitative measures of that effectiveness. The Company has cited no other utility-type user of the approach. Margins generated have varied widely in the recent past. In this Audit Period, the transactions conducted have generated adverse margins amounting to some [redacted] The Company states that this figure includes normal fuel management activities. More is required to justify the continuation of the approach. The Company needs to prepare and present:

- An objective, thorough, and quantified analysis of its benefits to date
- A listing, description, and support for the benefits it is expected to provide if continued
- A listing, description, and support for the risks it will impose if continued
- A comprehensive, objective set of measures for gauging its effectiveness in detail
- A clear and comprehensive set of procedures and limits that address the portions of the portfolio that are subject to transactions and the specific triggers that allow identified portions and magnitudes of the portfolio to be traded
- An effective system of controls over the preceding procedures and limits.

III. Supply Management

A. Background

This chapter addresses the following areas related to fuel supply management:

- Receipt Information
- Weighing, Sampling and Analysis
- Contract Administration
- Inventory Control

B. Findings

1. Receipt Information

Duke Energy Ohio uses its COMTRAC fuel tracking system to manage coal receipt information for its generating stations. The system contains a data base of contract information, coal weights received, coal analysis, and shipping information.

Coal barge receipt and unloading information, barge numbers, coal weights and purchase order information are collected in the coal unloading area, and recorded on paper logs. The paper logs are sent to the clerk in the station office building on a daily basis, where this information is entered into the COMTRAC system.

The COMTRAC system already contains the shipping information that has been previously entered by contract administration personnel in the headquarters office building. Thus, Duke Energy Ohio is able to match coal received at the stations with coal shipped by the various coal supply vendors. The COMTRAC system contains a complete record that indicates quantities of coal shipped by supplier, coal received at the station and waiting to be unloaded, and coal unloaded.

Duke Energy Ohio has complete and detailed operating procedures for receipt and unloading of coal at each station. The Company's "Fuel Delivery/Reporting Procedure" details them. These procedures define the roles and responsibilities for individuals involved in the fuel delivery and reporting processes. These processes include delivery of coal, unloading, reporting, and auditing. The procedures specify what information is to be collected at each step of the receiving and unloading process, how the information collected will actually be entered into the COMTRAC system, and associated timeline requirements. The procedures examined by Liberty were current.

2. Weighing, Sampling, and Analysis

a. Weighing

Coal weight and quality information for Duke Energy Ohio contracts comes from weights, samples, and analyses performed by the Company when coal is unloaded at the stations. Coal weights are determined by belt scales installed on the conveyors leaving the barge unloading area of the stations. All of the coal weighing and scale calibration activities take place in accordance with the procedures for belt-conveyor scale systems as found in The National Institute of Standards and Technology (NIST) Handbook 44. The NIST procedures provide the baseline

guidance for scale calibration. Each generating station has developed its own station-specific procedures for compliance with the requirements of Handbook 44. Duke Energy Ohio performed the required scale calibrations during the Audit Period, and the procedures examined by Liberty were current.

b. Sampling

Coal samples are taken at each station by automatic sampling equipment that has been installed, maintained and tested in accordance with ASTM procedures for such equipment. The Company also has its own procedures, guidelines and checklists for operation and inspection of its sampling systems. The procedures examined by Liberty were thorough and current. The automatic samplers are full-stream-cut, cross belt sweep arm coal sampling systems. This equipment takes sufficient samples of coal received and unloaded by Duke Energy Ohio to allow the Company to determine the quality of coal in each barge it receives from coal suppliers. Liberty's inspection of this equipment at the Zimmer Station, and the associated coal sample splitter and riffle found that the equipment was operational and clean, but that the splitter was in a poor state of repair. Station personnel indicated that a new splitter had been ordered, and should be available in the near future.

Coal samples taken at the generating stations are collected in sealed plastic bags, and marked with a sample tag that includes only the barge number, whether the sample was collected manually or automatically, the date of sample collection, and the initials of the operator collecting the sample. The identity of the coal supplier associated with samples is not marked on the sample tags. This is a positive feature of coal sample collection and analysis at Duke Energy Ohio. A supplier's identity should not be known to coal-laboratory personnel who actually conduct the analyses on coal samples.

Coal samples from each station are delivered by an internal Company courier on a daily basis to the Gibson Analytical Laboratory for analysis. At no point in the process from sample collection and bagging at the stations through delivery to Gibson are the coal samples kept secure or protected from tampering. It is important to keep coal samples in a secure environment until they are received at the Gibson Laboratory and in the custody of laboratory personnel.

c. Analysis

Coal samples from all Duke Energy Ohio stations are analyzed at the Gibson Laboratory and the Company reports that it uses modern equipment and that analyses are conducted in accordance with ASTM procedures. The results of coal analyses are fed into the COMTRAC system, which allows fuel management personnel in the headquarters building appropriately to monitor vendor performance and compliance with specifications for coal quality within coal contracts.

In addition, the Company maintains various control charts to track the performance of Duke Energy Ohio systems and equipment. These charts track both weight and quality information, and serve as guides in the continual evaluations of the performance of Company systems. These control charts track sample system performance, coal scale performance, and laboratory analyses. The station-versus-vendor quality control charts compare the differences between station and vendor analysis of coal samples. Dry percent ash, dry percent sulfur, dry BTU value and percent moisture are all compared; each coal contract has its own control charts. These

charts do not indicate which analysis is correct; they simply provide information for cases where further investigations might be appropriate.

3. Contract Administration

Administration of coal contracts for Duke Energy Ohio is the responsibility of the Manager, Fuel Supply, who reports directly to the Managing Director Coal Trading. The primary tool used for managing coal and transportation contracts is the COMTRAC system. This system contains all of the necessary contract information to monitor quantity and quality requirements, as well as actual quantity and qualities of coal delivered, and the timing of these deliveries.

On a daily basis, the Manager, Fuel Supply reviews recap reports on fuel deliveries, and makes the necessary approvals for payment of invoices. He monitors all fuel deliveries for compliance with contracts, in terms of both quantity and quality of fuel. He is in daily contact with personnel at the generating stations, and with fuel schedulers, in order to ensure that the required fuel is delivered to the stations on the proper schedule. He is also in frequent contact with Duke Energy Ohio field personnel, who are responsible for staying in touch with the various coal mines supplying the Company. For example, part of this regular contact is with the Coal Origination Director, who is responsible for managing the dock space at the Arch Coal Terminal. This Director buys coal as necessary for delivery to the dock. Upon coal delivery to the dock, the terminal serves as a staging and blending area and source of supply for the Miami Fort and Beckjord stations. The Manager, Fuel Supply does not use any written procedures as guidance for his activities in contract administration. He has been doing this type of work in the fuels area for CG&E since 1989, and does not feel that procedures are required.

4. Coal Order Processing

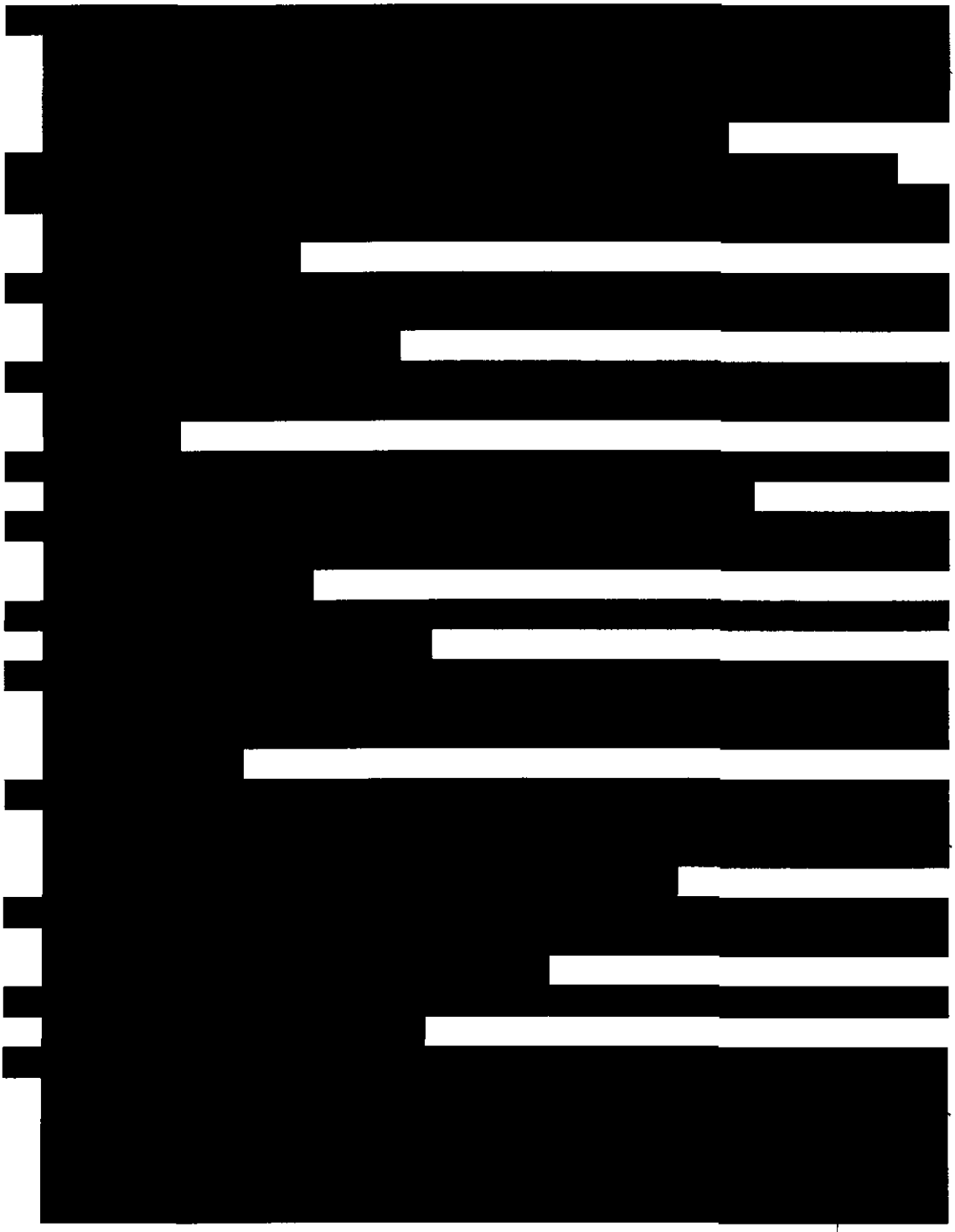
While not part of any published policies or procedures, the Company has stated that its procedure for processing coal orders is as follows:[15]

- Trades with approved counterparties are executed and confirmed through the Global Risk Management (GRM) trading platform
- After execution, details of the trade are recorded immediately in the trading blotter
- A trade ticket (*e.g.*, purchase order) identifying all the terms of the trade is written up, at which time, the Coal Risk Manager, or representative, enters the transaction into the CXL system by the GRM approved *time frame*
- Associated fuel quantities, qualities and schedules are entered into COMTRAC
- Once in the systems, copies of the trade ticket are distributed to the confirm group and the back office
- At the close of business, the Coal Risk Manager confirms that all deals are entered into the systems and are correct
- After confirmation is established, the Coal Risk Manager signs the contract to execute the trade
- The counterparty needs to sign the contract for non-NYMEX deals.

5. Contract Compliance

During the Audit Period, there were a number of instances where suppliers did not deliver coal in accordance with the requirements of contracts. Such instances were primarily related to coal

quality issues, but a few related to quantity variations from schedules for which delivery commitments had been made. A summary of these situations is as follows for Duke Energy Ohio's coal contracts:



[redacted]

6. Force Majeure

During the Audit Period, there were force majeure situations with [redacted]

7. Contract Price Redeterminations

During the Audit Period there were five situations where the price of coal under existing contracts was changed for reasons other than normal price escalations, but due to contract renegotiations or contract price reopeners. A summary of these situations is as follows for Duke Energy Ohio's coal contracts:

[redacted]

[redacted]

8. Open Contractual Issues

As of the end of the Audit Period, there were open contractual issues with two of the suppliers to Duke Energy Ohio, [redacted]

[redacted] situation, there is a dispute on the status of coal that was not delivered between 2002 and 2006, due to planned outages at the Zimmer Station. The dispute relates to the meaning of contractual terms. The Duke Energy Ohio [redacted]

In the [redacted] the issue is the significant contractual tonnage of [redacted]

9. Coal Inventory Targets

Duke Energy Ohio's [redacted]

Inventory targets are based on a number of factors, including the Company's own historical experiences in inventory management, the longest river freeze durations, barge unloader outages, the inventory of critical unloader parts, the experiences of other utilities and industrial coal users, and the availability of off-system power purchases at times of low coal inventory. Duke Energy Ohio believes that [redacted]

The following table summarizes the inventory targets for Duke Energy Ohio's stations.

Table III.1. Coal Inventory Targets

Station	Maximum Daily Burn (tons)	Days Burn in Tons	
		20 Days	30 Days
Zimmer	[redacted]	[redacted]	[redacted]
Beckjord	[redacted]	[redacted]	[redacted]
Miami Fort	[redacted]	[redacted]	[redacted]

During the Audit Period, there were two coal piles for the Miami Fort Station. One pile contained compliance coal required for non-scrubbed units, and one pile contained high sulfur coal for the scrubbed units. The Miami Fort Unit #8 scrubber was installed during the Audit Period. The unit commenced burning high sulfur coal on approximately April 11, 2007. The Miami Fort #7 scrubber will be installed on November 28, 2007, and the unit will begin burning high sulfur coal at that time. As of the end of the Audit Period, Duke Energy Ohio was transitioning to only one pile of high sulfur coal. After all units are scrubbed, there will no longer be a requirement for compliance coal.

The graphs below show how coal inventory levels varied during the Audit Period for the Beckjord, Miami Fort and Zimmer Stations. Inventory at the Beckjord Stations was controlled within the target coal inventory band for the entire Audit Period. The coal inventory at Miami Fort appeared to increase during the latter part of the period, but this was due to a change in record keeping that did not keep pace with the change in coal supplies as a result of the conversion of Miami Fort #8 to a scrubbed unit in April of 2007. The graph presents the coal inventory for Units #5 - #7, but in actuality it includes the buildup of high sulfur coal required for Unit #8, and thus levels appear to be greater than the target maximum [redacted]

Zimmer coal inventory began increasing over the upper target level in September 2006 and has steadily increased since then. Duke Energy Ohio has allowed the inventory level to increase in order to preserve the value of current coal contracts while there have been disruptions in the burn at Zimmer. The Company believes that the [redacted]

Figure III.1. Beckjord Coal Inventory

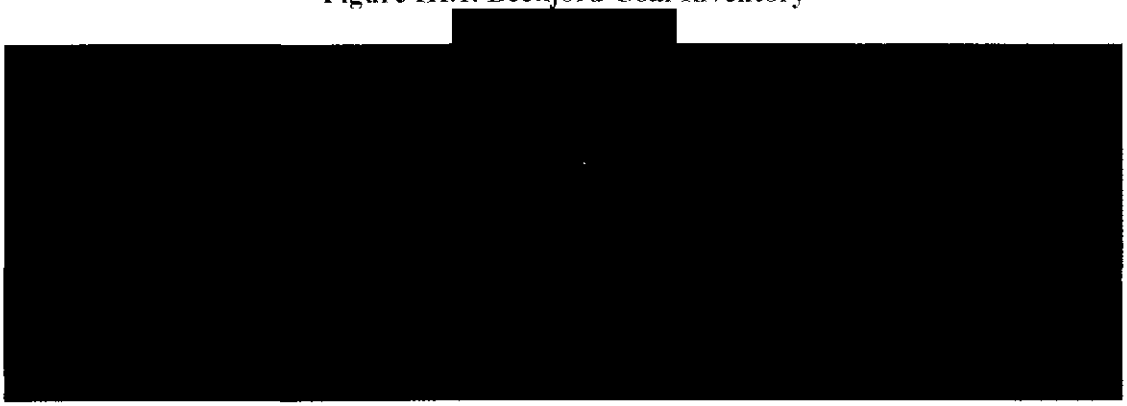
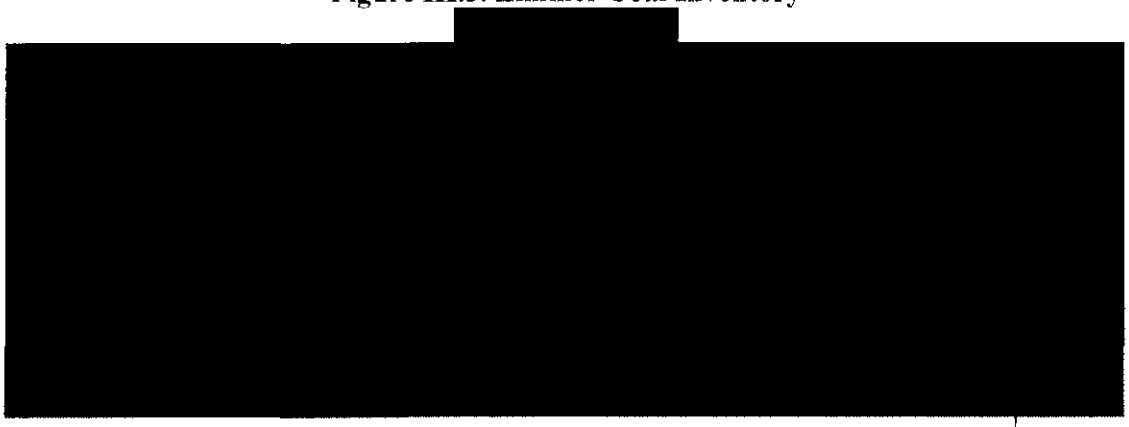


Figure III.2. Miami Fort Coal Inventory

Figure III.3. Zimmer Coal Inventory



10. Physical Inventory Measurements

Duke Energy Ohio conducts annual physical surveys of coal stockpile inventory levels in July of each year. The surveys employ using aerial flyover techniques and density testing and moisture analysis to quantify stockpile quantities.

Duke Energy Ohio has a detailed procedure that specifies how physical inventory measurements of coal piles are to be conducted. These procedures include the detail related to preparation of the stockpile, the various contacts necessary for the aerial survey and the density tests, computation of the measured tonnage, and procedures for adjustments. Guidelines for actual adjustment of book inventory values, based on survey results, are as follows:

- When the indicated adjustment; *i.e.*, indicated difference between the physical inventory tonnage and the book tonnage, is less than three percent of book tonnage or not in the same direction for two consecutive periodic inventories, no adjustment of book inventories or consumed fuel costs should be made.
- When the indicated adjustment is three percent or greater of book tonnage, and the indicted adjustment is in the same direction for two consecutive periodic inventories the Company will make an inventory adjustment of one-half of the most recent indicated adjustment. The utility shall book the inventory adjustment as a credit or debit to the quantity of fuel on hand and shall reconcile includable consumed fuel costs accordingly.
- When the indicated adjustment is greater than twelve percent of book tonnage, and the indicated adjustment is in the same direction for two consecutive periodic inventories the inventory adjustment are to be limited to six percent of book tonnage.

The audit report from the previous management/performance audit contained a recommendation that Duke Energy Ohio initiate a study to report on the recurring overstatement of coal inventory at the Zimmer Station. This recommendation resulted from the observation that, since 2001, the book inventory had been greater than the inventory shown on physical surveys, and that in each year downward adjustments were made to the book inventory.

Personnel at the Zimmer Station initiated the necessary study and took two responsive actions thereafter. The elevation control of markers on the base maps was rechecked and verified, and improvements to the reclaim scales were made to improve their accuracy. In conjunction with these two initiatives, new electronics were installed on the scales. As an ongoing check of inventory variations, on a monthly basis, station personnel will review station physical inventories and compare them with the inventory reported in COMTRAC at the end of each month. If there are variances, station personnel and accounting personnel will work to resolve the issue and make any necessary adjustments.

The physical inventory taken in July 2006 followed these actions. The variation between book inventory and physical inventory was less than three percent; therefore, no adjustments to the book inventory were necessary. This was the first time since 2001 that book inventory adjustments were not necessary.

The following table summarizes the results of physical inventory surveys for the last three years, for the Beckjord, Miami Fort and Zimmer Stations.

Table III.2. Results of Coal Pile Physical Inventory Surveys

Station	Year	Tons per Fuel Ledger	Physical Survey	Variance Tons	Variance Percent	Adjustment Tons	Adjustment Percent
Beckjord	2004	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	2005						
	2006						
Miami Fort	2004	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	2005						
	2006						
Zimmer	2004	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	2005						
	2006						

C. Conclusions

1. Duke Energy Ohio has adequate processes and procedures for the weighing, sampling and analysis of coal received at its generating stations.

Duke Energy Ohio's weighing, sampling and analysis of coal at its generating stations are supported by current and appropriate procedures for these activities. The procedures are up to date. Weighing, sampling and analytical equipment systems are tested appropriately. Samples sent from the stations have their identities disguised so that laboratory personnel do not know the origin of the coal samples.

2. Coal samples sent to the [redacted] from the stations are not sufficiently safeguarded to ensure protection of sample integrity. (*Recommendation #1*)

From the time a coal sample is bagged and marked and made ready for shipment to the [redacted] until the sample actually arrives at the [redacted] its integrity is not safeguarded. There is no time while the sample is at the station where the sample is kept under lock and key, and there is no time during transit to the [redacted] while under care of the Company internal courier that the sample is kept under lock and key.

3. Duke Energy Ohio has effectively administered its coal contracts.

Administration of coal contracts is a complex and demanding business. Contracts must be managed in ways that ensure delivery of the appropriate quantities and qualities of coal in accordance with agreed upon schedules, while at the same time maintaining appropriate relationships between the Company and its many coal suppliers. The job requires experience and skill, and Duke Energy Ohio has demonstrated that it has been effective in all aspects of coal contract administration during the Audit Period.

Duke Energy Ohio has acted appropriately to manage the various quality provisions of its coal contracts, and has taken action as necessary to monitor quality and assess penalties, or award premiums, when coal quality variations have warranted such actions. When situations have arisen that have restricted the Company's ability to receive coal deliveries, it has taken the

necessary action to declare force majeure such that the Company would not be obligated to take coal that it was physically unable to receive. There are also cases of open and unresolved contractual issues where the Company has been unable to burn certain coals with high chlorine content. The Company has taken appropriate action not only to engage the appropriate outside assistance to analyze and *understand* the situation, but also to work closely with the suppliers involved in order to reach a satisfactory long-term solution.

4. **Except for inventory control at the Zimmer Station, Duke Energy Ohio has been effective in controlling coal inventory at the Beckjord and Miami Fort Stations within the target inventory band [redacted] of coal supply in inventory. Inventory at the Zimmer Station has [redacted]**

Inventory levels at the Beckjord and Miami Fort Stations have been within target inventory bands during the Audit Period. The inventory level at the Zimmer Station has been [redacted] but Company analysis has shown that [redacted] In addition, the Company believes that it [redacted]

5. **Duke Energy Ohio took appropriate action to resolve the Zimmer coal inventory situation where the results of physical inventory surveys had been less than book inventory levels, and requiring adjustments to book inventory values, since 2001.**

The audit report from the previous management/performance audit recommended that Duke Energy Ohio perform a study to report on the recurring overstatement of coal inventory at the Zimmer Station. This recommendation resulted from the fact that book inventory had been greater than the inventory shown on physical surveys since 2001, and that in each year downward adjustments were made to the book inventory.

Personnel at the Zimmer Station took appropriate action to investigate this problem. Studies were initiated, data was checked and cross-checked, equipment was replaced and improvements in scales were made. New procedures were instituted to more closely monitor coal inventory levels. The result of these actions was that the variations between physical inventory and book inventory after the July 2006 survey were less than three percent. For the first time since 2001 book inventory adjustments were not necessary.

D. Recommendations

1. **Institute a security program to protect the integrity of coal samples from the time samples are bagged and ready for shipment until the samples arrive at [redacted] (*Conclusion #2*)**

Open access to coal samples creates the opportunity for a sufficiently motivated individual to select a coal sample, or samples, and alter the sample analysis process by switching sample bags.

It would not be difficult to obtain the appropriate sample tags such that there would be no way of knowing that coal samples had been switched. Sample integrity is an ongoing issue because of the relationship between the results of coal sample analyses and penalties or premiums paid to coal suppliers for coal that is either below, or above, the specified contractual coal quality guarantee. Supplier motivation to arrange for such a scheme of switching sample bags would be either to avoid penalties for coal that was know to be inferior, or to achieve premium payments for coal that appeared to be superior, but was not. Therefore, Duke Energy Ohio should adopt an appropriate security program to protect the integrity of coal samples from the time samples are bagged and ready for shipment until they are delivered by Company courier to the [redacted]

IV. Emission Allowance Management

A. Background

This chapter examines Duke Energy Ohio's environmental compliance activities as they relate to fuel procurement and utilization. Liberty specifically examined the following three environmental compliance related issues:

- The impact that compliance activities had on both the type and cost of fuel that was procured/utilized, and the company's fuel procurement strategy
- Overall allowance management strategy, including any emission allowance transactions in which the Company participated
- Methods used internally to analyze compliance options/develop overall mitigation strategies.

B. Findings

1. Environmental Requirements

Requirements governing sulfur dioxide (SO_2) emissions from electric utility generating stations were initially established by Title IV of the 1990 Amendments to the Clean Air Act. In March 2005 the Environmental Protection Agency (EPA) finalized two additional rules called the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR). They contain even more stringent national ambient air quality standards for ozone and fine particulates, and the CAMR will permanently cap and reduce mercury emissions from coal-fired power plants for the first time ever. These rules require reductions in emissions of SO_2, nitrogen oxides (NO_x) and mercury in order to achieve compliance. The CAIR rule covers 28 eastern states, including Ohio. In ways that are similar to Title IV, reductions are to be achieved in two phases, by 2010, and by 2015.

From an operational perspective, Duke Energy Ohio is installing flue gas desulfurization systems (FGD), or scrubbers on the Miami Fort Units #7 and #8. The scrubber on Unit #8 was installed in April 2007, and it is anticipated that the scrubber on Unit #7 will be installed in late November 2007. Recently, Selective Catalytic Reduction Systems (SCRs) were installed at Zimmer and Miami Fort Units #7 and #8. Beginning in 2009, Duke Energy Ohio will start operating the SCRs on the Miami Fort and Zimmer stations in order to comply with CAIR requirements for reduction in NO_x emissions. In order to comply with CAMR, Duke Energy Ohio is installing mercury monitors on all of its coal fired units in order to assist with compliance.

2. Station Emission Limits

The following table lists the emission limits for SO_2 and NO_x during the Audit Period for the Beckjord, Miami Fort and Zimmer Stations.[16]

Table IV.1. Duke Energy Ohio Station Emission Limits

Station	Emission Limit	Pollutant
Beckjord Unit #1	1.84 lbs/MMBtu	SO_2, 30 day rolling average
Beckjord Unit #2	1.84 lbs/MMBtu	SO_2, 30 day rolling average
Beckjord Unit #3	1.84 lbs/MMBtu	SO_2, 30 day rolling average
Beckjord Unit #4	1.84 lbs/MMBtu	SO_2, 30 day rolling average
Beckjord Unit #5	7.19 lbs/MMBtu	SO_2, 30 day rolling average
Beckjord Unit #6	7.19 lbs/MMBtu	SO_2, 30 day rolling average
Miami Fort Unit #5	5.0 lbs/MMBtu	SO_2, 30 day rolling average
Miami Fort Unit #7	5.5 lbs/MMBtu 20% 2.37 lbs/MMBtu	SO_2, 30 day rolling average Opacity, 6 minute average SO_2, 30 day rolling average (To be added when the scrubber is operational)
Miami Fort Unit #8	1.2 lbs/MMBtu 0.7 lbs/MMBtu	SO_2, 3 hour rolling average NO_x, 3 hour rolling average
Zimmer	0.548 lbs/MMBtu 28,726 tons/yr 0.60 lbs/MMBtu 31,452 tons/yr	SO_2, 30 day rolling average SO_2 NO_x, 30 day rolling average NO_x

During the Audit Period, Duke Energy Ohio did not receive any citations, government authority contentions, or investigations related to environmental non-compliance or violation of any of these emission limits.

3. Compliance Planning

Duke Energy Ohio's planning for compliance with emission requirements incorporates analysis of the many factors that impact emissions, including fuel selection, generating unit equipment and capabilities (including necessary modifications or additions), the bank of emission allowances and the accompanying buffer, and regulatory requirements. Duke Energy Ohio has balanced these factors, and modified its generating units as necessary to keep pace with regulatory requirements, as discussed. The Company has changed fuel consumption as necessary to meet emission requirements. The data examined by Liberty clearly shows changes in procurement patterns as a result of changes in pollution control equipment at the Miami Fort Station, for example. In this case, compliance coal was no longer required for Unit #8 after April 2007. Compliance coal will not be required in Unit #7 after November 2007. Costs for coal delivered to Miami Fort show the declines in prices as compliance coal procurement was replaced by high sulfur coal procurement. In developing compliance options, Duke Energy Ohio has used its Commercial Business Model process to evaluate alternatives and associated costs.

4. SO_2 Protocol

During the Audit Period, Duke Energy Ohio managed its SO_2 emissions and emission allowances under what was called the SO_2 protocol. The primary features of this protocol were as follows:

- Duke Energy Ohio will manage its SO_2 inventory for native load in accordance with the Active Management Philosophy. Daily model runs will show allowance requirements

compared to allowance inventory. To the extent that the report shows a surplus, excess allowances will be sold. To the extent the report shows a deficit, additional allowances will be purchased.

- As of March 2006, the entire allowance position will be actively managed, which is a reversal of the previous protocol that required approval from the Transaction Risk Committee in order to trade allocations outside of the current year.
- Duke Energy Ohio has established allowance buffers to reduce risk associated with deviations between forecasted emissions and actual emissions, and serve as a cushion in order to ensure compliance. The buffer is based on expected variations in allowance requirements determined through an evaluation of activity for the last quarter, and it results in a cushion on the annual requirement number.

5. SO_2 Allowance Trading

Management of emission allowances had been the responsibility of one individual during the previous audit period. In March 2006 that person was promoted to the position of Vice President, Portfolio Risk Management. During the early part of the current Audit Period, responsibility for EA management was transferred to the Emissions Manager, reporting to the Vice President, Portfolio Risk Management.

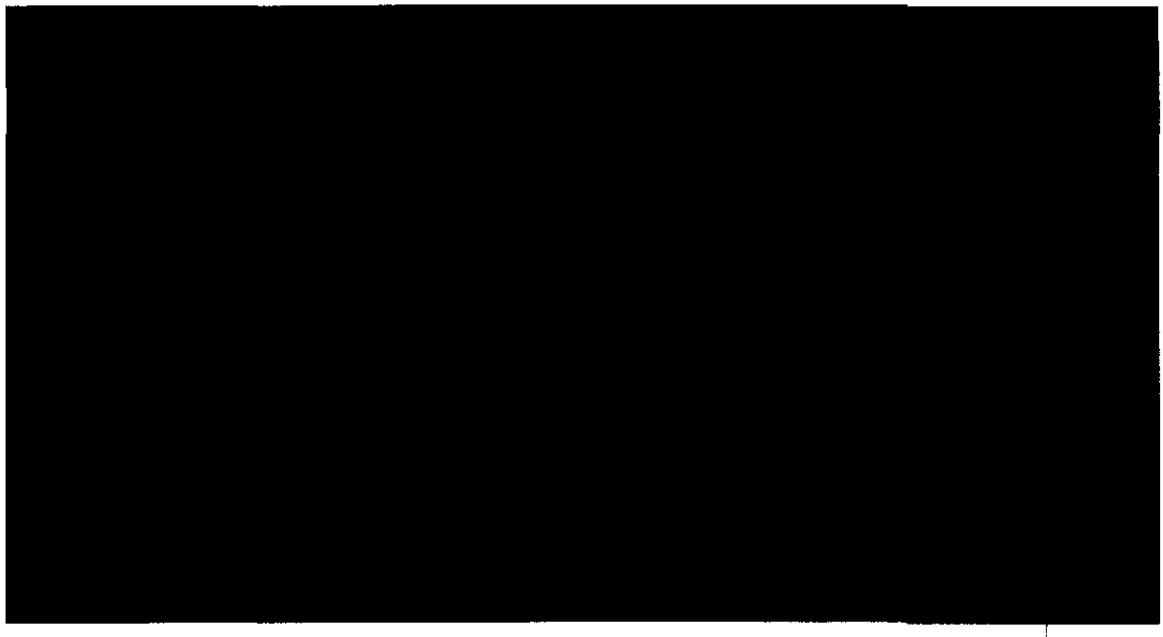
The following table summaries EA management and trading activity.[17] [redacted] EA trading is one component of Active Management, and the positions of fuel and power must also be considered in evaluating the merits of trades. Liberty was not provided with sufficient information to conduct such analyses. However, Liberty did confirm that the FPP appropriately includes EA costs, gains, and auction proceeds for the current Audit Period, as discussed in detail in Chapter VII of this report.

Table IV.2. Duke Energy Ohio Audit Period Trading Activity

Month	[redacted]
Jul 2006	
Aug 2006	
Sep 2006	
Oct 2006	
Nov 2006	
Dec 2006	
Jan 2007	
Feb 2007	
Mar 2007	
Apr 2007	
May 2007	
Jun 2007	
Total	

The graph below shows how emission allowance prices have varied through the current Audit Period. Prices shown are closing prices.

Figure IV.1. Audit Period SO_2 Emission Allowance [redacted]



6. SO_2 Emission Allowance Inventory

During the Audit Period, Duke Energy Ohio managed its emission allowance inventory using the concepts of Active Management, and included the buffer described in the SO_2 protocol to ensure that sufficient allowances were in inventory to effectively manage risk and allow for variations in emissions from those predicted. Daily model runs compared allowance requirements to allowance inventory. To the extent that the report showed a surplus, excess allowances were sold. To the extent the report showed a deficit, additional allowances were purchased. Section 4 above shows the trading activity during the Audit Period that was conducted in order to maintain a relatively flat emission allowance position. Allowance trading was not conducted during the last few months of the Audit Period from March 2007 through June 2007 because of CAM's re-evaluation of its position during this time. CAM had questions about the frequency of changes in requirements it was receiving from other internal groups, and wanted to be sure that any trades it did conduct were based on the appropriate information. CAM's questions were resolved toward the end of the Audit Period, and trading resumed in July 2007.

The following table shows the emission allowance inventory at both the beginning and at the end of the Audit Period.[18]

Table IV.3. Duke Energy Ohio Native Load Emission Allowance Inventory

	EAs	Dollar Balance	Weighted Average EA Cost
Inventory Bank at 6/30/06	105,677	47,395,539	[redacted]
Vintage 2007-6/30/06	94,248	8,694,155	[redacted]
Vintage 2008-6/30/06	73,009	1,973,910	[redacted]
Consumption in Audit Period	136,855	43,873,350	[redacted]
Audit Period net Trades	-11,601	N.A.	[redacted]
Inventory Bank at 6/30/07	51,469	8,679,416	[redacted]
Vintage 2008-6/30/07	76,280	1,261,812	[redacted]

C. Conclusions

1. **Duke Energy Ohio managed its generating stations emissions during the Audit Period such that no notices of emissions violations were received.**

During the Audit Period, Duke Energy Ohio used a combination of sound fuel procurement, operational equipment and EA management to comply with emission requirements for its generating stations. As a result, the Company did not receive any citations, government authority contentions, or investigations related to environmental non-compliance or violation of any emission limits.

2. **The variation of emission allowance prices over the Audit Period illustrates the problem of continued adherence to Active Management of EAs.**

Emission allowance prices experiences two fairly significant peaks in pricing at the $650 to $750 level in August 2006, and at about the same level in June 2007. In the period in between these peaks, prices went through a valley that reached lows of around $450 from November 2006 through April 2007. Duke Energy Ohio continued trading in accordance with Active Management during these swings in EA prices until trading was stopped in about March 2007 due to the position re-evaluation as discussed earlier in this chapter. Liberty would expect that EA managers possess sufficient expertise to analyze markets and make judgments related to these markets, rather than regularly engage in tractions designed only to flatten the Company's position. Recommendation #2 in Chapter II addresses the need for demonstration of the economic effectiveness of Active Management as a condition to its continued use by Duke Energy Ohio

D. Recommendations

Liberty has no recommendations in this area of its audit.

V. Plant Operations

A. Background

This chapter includes discussion of the following areas related to Plant Operations at Duke Energy Ohio:

- Plant Outages
- Capacity Factors
- Availabilities
- Heat Rates
- Budgets
- Plant Tour
- Other Issues

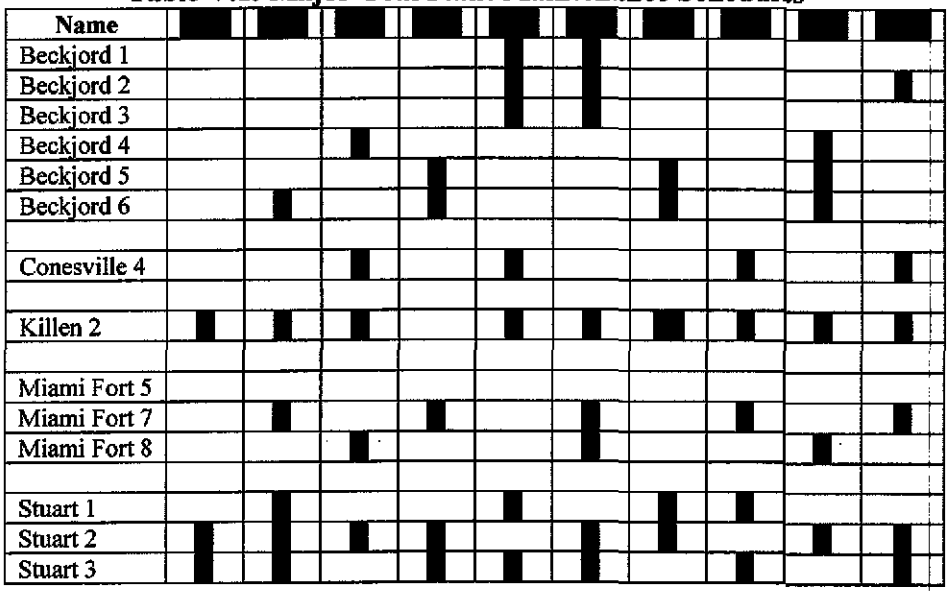
B. Findings

1. Plant Outages

Power plants require periodic maintenance that depends on the mode of operation and on the type and design of the unit. Not all maintenance is performed each year. For example, boiler work may be performed each year, but the turbine may only be over hauled every five years.

Duke Energy Ohio classifies major outages as those with durations from 3 to 11 weeks, major boiler outages as those with durations from 3 to 5 weeks, and major turbine outages as those with durations from 6 to 11 weeks.[19] The table below indicates the years in which major maintenance has been performed at Duke Energy Ohio's major coal plants. Conesville 4 is operated by Columbus Southern Power (CSP). Stuart 1-4 is operated by Dayton Power & Light (DP&L). Killen 2 is operated by DP&L.

Table V.1.-Major Coal Plant Maintenance Schedules[20]



Stuart 4											
Zimmer 1											

*-Two outages taken in this year.
**-Major maintenance is scheduled after audit period ends.

The table shows that, for the Duke Energy Ohio-operated units, regular major maintenance has been performed on the more efficient units on a regular basis. Major maintenance has been less regular for the less efficient units. Maintenance has generally followed the following guidelines:[21]

Liberty considers outages longer than two days in duration to be major outages. Duke Energy Ohio supplied data about all such Audit-Period outages and the Company included unit reductions that exceeded two days in duration. Liberty classified those reductions as minor if the equivalent output of the unit was less than 2 days of unit output, and major if more than 2 days of unit output.[22] The following table depicts the number and types of major outages and reductions at the major coal plants during the Audit Period.[23]

Table V.2.-Major Outages/Reductions Breakdown at the Major Coal Plants[24]

Name	# Outage/ Reductions > 2 Days	# Planned Outages	# Minor Reductions	# Major Reductions	# Outages	Liberty Comments on Outages

[redacted]

These outages and reductions are for the most part of the types expected for coal units, especially for less efficient units that must cycle more often. Liberty did find one planned outage [redacted] meriting further review, which is discussed in more detail below. Liberty also observed a relatively high level of boiler related outages [redacted] The following table shows the lost equivalent availability for the Audit Period for all boiler related outages.

Table V.3.-Lost Equivalent Availability Due to Boiler Leaks[25]

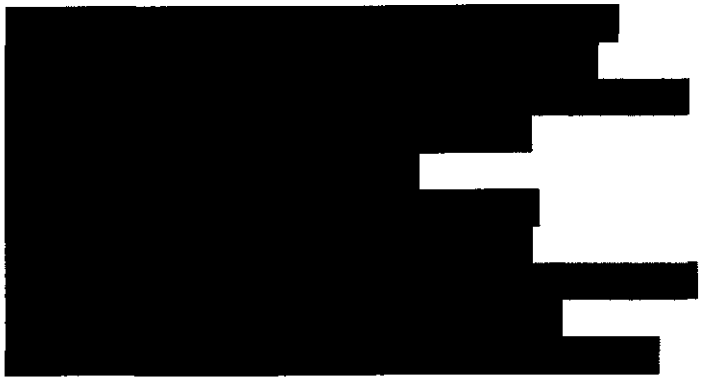
Name	# Boiler Leaks	Lost Equivalent Availability	Name	# Boiler Leaks	Lost Equivalent Availability
[redacted]					

Boiler related outages for [redacted] stand out when compared to similar outages for the other coal units. Duke Energy Ohio stated that [redacted], has been made aware that Duke Energy Ohio desires better operation of this unit and that a major reliability improvement project has been under way at [redacted] to address [redacted] Duke Energy Ohio stated that the operator of [redacted] has a maintenance approach similar to that of Duke Energy Ohio, and that the owners have agreed with the Duke Energy Ohio suggestion [redacted] Duke Energy Ohio also stated that [redacted] Suggestions from minority owners, and non-operators, are considered, just as suggestions from minority owners of Duke Energy Ohio's plants would be considered.[26]

Duke Energy Ohio stated that both capital and O&M budgets had recently increased at [redacted] Liberty reviewed the 2007 preliminary and final budgets and the [redacted] The document shows an approximate [redacted] in capital and O&M spending for 2008.[27]

Liberty reviewed further information regarding the length of the outage at the following units:

[redacted]



[redacted] had a planned outage that was to begin on [redacted] The planned outage was for a boiler and turbine inspection. Duke Energy Ohio officially extended that planned outage on [redacted] in recognition of problems identified with the [redacted] The outage concluded on [redacted] and the unit came back on line on this date, earlier than the planned date of [redacted]

Duke Energy Ohio stated that during the low pressure turbine inspection it found unexpected damage on [redacted] This discovery resulted in significant additional repair work that led to the outage extension. Duke Energy Ohio determined that the steam parameters and water chemistry were different for a coal plant and a nuclear plant and that those differences had caused the blade damage. [redacted] originally designed as a nuclear plant, was converted to coal-fired operation. The low pressure turbine originally intended for use in the nuclear unit was used in the coal fired operations. The low pressure turbine blades were specifically designed for the steam temperature and water chemistry of a nuclear plant. Only eight low pressure turbines like [redacted] had been built. Duke Energy Ohio stated that when they determined the cause for the low pressure turbine blade problems, over [redacted] components were checked to ensure coal-fired steam temperature and water chemistry compatibility.[28]

Liberty examined how Duke Energy Ohio calculates replacement-power costs. Duke Energy Ohio stated that it does not develop replacement-power costs on an individual unit basis and that such data was therefore not available.[29] Upon further questioning, Duke Energy Ohio did state that replacement power costs would have to be calculated hour-by-hour in the market considering the Day Ahead market, the Real Time market, and the Day 2 market.[30]

2. Capacity Factors

The Duke Energy Ohio generating units consist of aging steam coal units and simple-cycle combustion turbine units, fueled either by natural gas or fuel oil. These units are dispatched according to their economics; however, Midwest Independent System Operator (MISO) adds an environmental penalty to their dispatch order if the units do not have flue gas desulfurization equipment (also known as scrubbers.). The following table describes each of these units.

Table V.4.-Duke Energy Ohio Unit Description, Ownership Interest, and Unit Operator[31]

Name	Fuel	Pollution Control Devices	Date of Commercial Operation	Unit Size (Summer MW)	Ownership (Percent)	Duke-OH Share (MW)	Plant Operator
Beckjord 1	Coal	ESP, LNB	1952	94	100.0	94	Duke-OH
Beckjord 2	Coal	ESP, LNB	1953	94	100.0	94	Duke-OH
Beckjord 3	Coal	ESP, LNB	1954	128	100.0	128	Duke-OH
Beckjord 4	Coal	ESP, LNB	1958	150	100.0	150	Duke-OH
Beckjord 5	Coal	ESP, LNB	1962	238	100.0	238	Duke-OH
Beckjord 6	Coal	ESP, LNB	1969	414	37.5	155	Duke-OH
Conesville 4	Coal	ESP, LNB, CT	1973	780	40.0	312	CSP
Killen 2	Coal	ESP, LNB, SCR, FDG, CT	1982	620	33.0	205	DP&L
Miami Fort 5	Coal	ESP	1949	80	100.0	80	Duke-OH
Miami Fort 7	Coal	ESP, LNB, SCR, CT	1975	500	64.0	320	Duke-OH
Miami Fort 8	Coal	ESP, LNB, SCR, CT	1978	500	64.0	320	Duke-OH
Stuart 1	Coal	ESP, LNB, SCR	1971	597	39.0	233	DP&L
Stuart 2	Coal	ESP, LNB, SCR	1970	597	39.0	233	DP&L
Stuart 3	Coal	ESP, LNB, SCR	1972	597	39.0	233	DP&L
Stuart 4	Coal	ESP, LNB, SCR, CT	1974	597	39.0	233	DP&L
Zimmer 1	Coal	ESP, LNB, SCR, FGD, CT	1991	1,300	46.7	605	Duke-OH
Beckjord CT1	Fuel Oil	None	1972	47	100.0	47	Duke-OH
Beckjord CT2	Fuel Oil	None	1972	47	100.0	47	Duke-OH
Beckjord CT3	Fuel Oil	None	1972	47	100.0	47	Duke-OH
Beckjord CT4	Fuel Oil	None	1972	47	100.0	47	Duke-OH
Dicks Creek CT1	Natural Gas	None	1965	92	100.0	92	Duke-OH
Dicks Creek CT3	Natural Gas	None	1965	14	100.0	14	Duke-OH
Dicks Creek CT4	Natural Gas	None	1965	15	100.0	15	Duke-OH
Dicks Creek CT4	Natural Gas	None	1969	15	100.0	15	Duke-OH
Miami Fort CT3	Fuel Oil	None	1971	14	100.0	14	Duke-OH
Miami Fort CT4	Fuel Oil	None	1971	14	100.0	14	Duke-OH
Miami Fort CT5	Fuel Oil	None	1971	14	100.0	14	Duke-OH
Miami Fort CT6	Fuel Oil	None	1971	14	100.0	14	Duke-OH

Notes: ESP- *Electrostatic Precipitator*
LNB- Low NOX Burner
SCR-Selective Catalytic Reduction
FGD-Flue Gas Desulphurization
CT-Cooling Tower
CSP-Columbus Southern Power
DP&L-Dayton Power and Light

The table shows the age of the steam coal fleet to be 30 to 40 years old and older, with the exception of Zimmer 1, which achieved commercial operation in 1991. The table also shows that only Zimmer 1, Killen 2, and Miami Fort 8 have what could be considered a full complement of pollution control devices. Scrubbers were installed on Miami Fort 8 and Killen 2 toward the end

of the Audit Period. These units would be expected to operate at a higher capacity factor in the future, because of the credits given to these units for pollution control. The units that have Selective Catalytic Reduction installed are the Stuart units, Zimmer and Miami Fort 7 and 8. All units at Beckjord and Miami Fort 5 have minimal pollution control devices. As would then be expected, the units that have a full compliment of pollution control device have higher capacity factors. The following table correlates pollution control device installation to approximate capacity factors for the coal units.

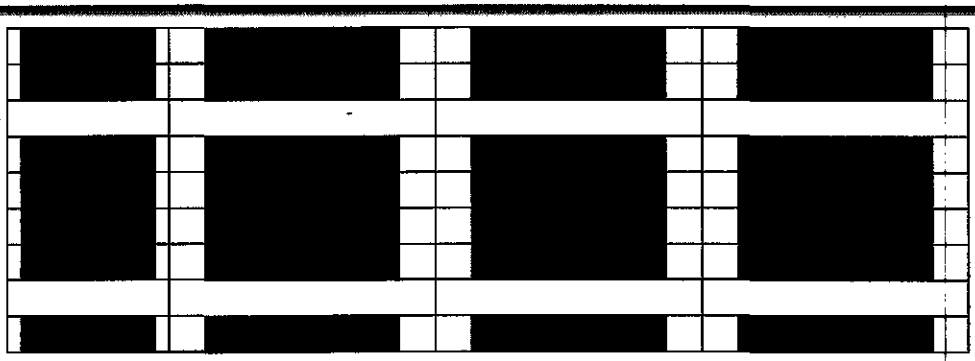
Table V.5.-Dispatch Order Plant Capacity Factors[32]

Name	Pollution Control Devices	Capacity Factor (Percent)	Notes

Liberty found that these units operate as would be expected in the MISO market area, given the efficiencies of the units. Liberty also reviewed the actual historic capacity factors of the units to determine if any unit deviated in actual operation from the expected operation. The table below depicts actual capacity factors for the last three audit periods, the equivalent availability lost due to major maintenance occurring and a "normalized capacity factor." Liberty understands that using equivalent availability to compare capacity factors is not technically correct, however, it provides here a proxy to normalize an uneven maintenance schedule. The actual capacity factor is on the left, the lost equivalent availability is centered and in parenthesis, and the "normalized capacity factor" is to the right and rounded to the nearest whole digit.

Table V.6.-Historical and "Normalized" Coal Plant Capacity Factors[33]

Unit Name	Audit Period 7/2004 – 6/2005 Act.-Lost EA-Norm. (Percent)	Audit Period 7/2005 – 6/2006 Act.-Lost EA-Norm. (Percent)	Audit Period 7/2006 – 6/2007 Act.-Lost EA-Norm. (Percent)



The table shows that, when "normalized capacity factors" are compared, the unit's capacity factors are relatively stable, with the exception [redacted] There actually appears to be a slight improvement in capacity factors across the board, except for [redacted] scheduled for major boiler work in [redacted] It appears that [redacted] is becoming less economic. The MISO has recently expanded to approximately [redacted] as new systems have joined.[34] When new participants bring more efficient generation into the MISO market, inefficient units like [redacted] already high on the dispatch curve) are pushed further along that curve.

3. Availabilities

Availability is defined as the percentage of time that a unit is capable of running over some time period. There is a drawback to using availability as a measurement of unit operational capability. If the unit is not capable of full load, but still available to the system at reduced operational capability, it is still counted as available. For example, if a unit was available to run at full load for one half of the time and at 50 percent load for one half of the time, the unit would have an availability of 100 percent. This profile is much like that of combustion turbines, which generally have very high availability, but a very low capacity factor.

The traditional availability measurement thus has diminished usefulness for many purposes. "Equivalent availability factor" provides a more useful definition for purposes relevant to Liberty's examination. Equivalent availability is defined as the amount of time that a unit could have run at full load over some time period, expressed in percent. In the previous example, that same unit would have and equivalent availability of 75 percent.

Another measure of availability is unit availability when requested to run. This factor is the same as availability, but only for the time period when the unit was requested to run; it eliminates planned unit maintenance. This factor is useful when reviewing units that are not base loaded.

Table V.7.-Historical Coal Unit Availability Data[35]

		7/04-6/05			7/05-6/06			7/06-6/07	
Name	Avail. (%	E. Avail. (%)	Avail. When Reqstd. To Run (%)	Avail. (%)	E. Avail. (%	Avail. When Reqstd. To Run (%)	Avail. (%)	E. Avail. (%)	Avail. When Reqstd. To Run (%)
[redacted]									

[redacted]

Note-All values rounded to nearest percent.
*-Major maintenance performed in this time period which can impact figures.
#-Liberty questions the validity of the data supplied as the availability when requested to run cannot be less than the annual capacity factor.

As stated above, equivalent availability is a measure that takes into consideration operation of a unit at a reduced load level. Liberty uses a 5 percent differential as a trigger for identifying when unit reductions play a part in overall unit output capability. [redacted] reached this level in [redacted] reached this level [redacted] reached this level in [redacted] reached this level in [redacted]

[redacted] is a small and inefficient unit, which had a 3 percent capacity factor in [redacted] One would therefore expect a lower priority on its operational capabilities. With regard to the [redacted] unit reductions of any significance have only surfaced in the current Audit Period, and largely on the smaller, less efficient units. Duke Energy Ohio has committed significantly more expenditures for capital and maintenance to restore operational capability of the [redacted] it is anticipated that this plan will address these types of operational problems.[36]

Liberty had intended to review unit data on their availability when requested to run. As noted above, some data points for these data are less than the annual capacity factor. Liberty believes the data is suspect or that the data requested was misinterpreted by Duke Energy Ohio. Liberty has not determined the cause, but anticipates a more thorough review of the data in the next Audit Period.

4. Heat Rates

The heat rate for a generating unit is defined as the amount of thermal energy contained in the fuel that must be converted to produce one kWh of electrical energy. The measure is usually expressed as an average over some time period. It is a measure of efficiency that can be used to track changes in unit performance. Liberty reviewed the heat rates of the major Duke Energy Ohio coal units to determine if any trends were evident regarding unit efficiency. Their values are tabulated below.

Table V.8.-Major Coal Unit Heat Rates[37]

Unit Name	2004 BTUs/kWh	2005 BTUs/kWh	2006 BTUs/kWh	Mid 2007 BTUs/kWh
[redacted]				

The table shows that, except for [redacted] unit heat rates have not changed significantly since [redacted] a small, low capacity factor, and inefficient unit. The many start ups, short run times, and reduced load operation that typify such units can have a notable impact on a year's average heat rate. [redacted] shows a heat rate of [redacted] had a capacity factor of [redacted] (indicating that the unit ran [redacted] with an output [redacted] for the period of [redacted] A zero heat rate for the first half of [redacted] that the unit has not run [redacted]

5. Budgets

Good practice in operating power plants requires that adequate maintenance be performed. Maintenance requires expenditures of both capital and expense dollars. Duke Energy Ohio and its partners are currently engaged in a major capital program to install flue gas desulfurization equipment at their major plants. These installations will allow the units to operate at a higher capacity factor, compared to those units not so equipped. The table below shows historic and mid-year 2007 capital expenditures at both Duke Energy Ohio operated and Duke Energy Ohio non-operated plants. The table shows significant capital expenditures [redacted] Much of the large capital expenditures are tied to pollution control projects.[38]

Table V.9.-Historic and Mid-2007 Capital Expenditure Levels at Coal Plants[39]

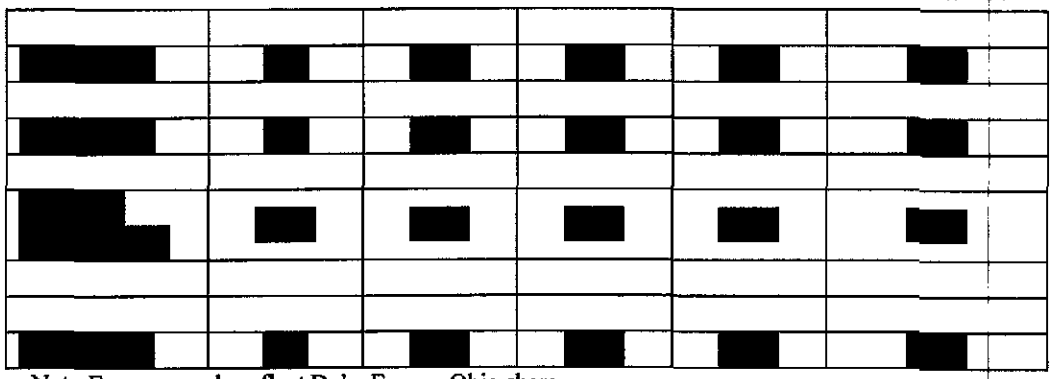
Station Name	2003 $ Millions	2004 $ Millions	2005 $ Millions	2006 $ Millions	2007 Mid-Year $ Millions
[redacted]					

Note-Capital Expenditures only reflect Duke Energy Ohio share.

The table below shows historic and mid-year [redacted] expenses at both Duke Energy Ohio operated and Duke Energy Ohio non-operated plants. The table clearly shows that maintenance spending has remained relatively constant from [redacted] especially if one considers the lumpiness introduced by an uneven major maintenance schedule. The table also shows that maintenance spending is increasing across the board at Duke Energy Ohio operated plants and at [redacted]

Table V.10.-Historic and Mid-2007 Expense Levels at Coal Plants[40]

Station Name	2003 $ Millions	2004 $ Millions	2005 $ Millions	2006 $ Millions	2007 Mid-Year $ Millions
[redacted]					



Note-Expenses only reflect Duke Energy Ohio share.

6. Plant Tour

Liberty conducted a tour of the [redacted] station as part of its review of Duke Energy Ohio unit operations. The purpose of the tour was to observe conditions and operations in a normal work environment. Duke Energy Ohio indicated that station management had changed in February 2007.[41]

The entire [redacted] is designated as a "hard-hat" environment. No hard hats were issued at the entrance gate to the Station. Liberty questioned if hard hats were needed to proceed to the administrative building, and was told that hard hats were not required in the office building. Liberty observed employees entering the station and hard hat area without wearing hard hats. During the tour, the only safety related material observed was in the men's room. Liberty also observed what it considered to be safety infractions involving tools not properly secured, which created the possibility of accidents.[42] Station management indicated that there had been four safety incidents [redacted] this year. Duke Energy Ohio also stated that an internal private OSHA review of the plant had just been completed.[43]

Liberty observed that overall, the plant was not tidy. Litter was evident in many parts of the station, dirt and coal dust had not been picked up, and there was evidence of smoking on the roof, with many cigarette butts scattered about. Smoking in this area is prohibited. Liberty also observed that the turbine hall was much cleaner than other parts of the station. Liberty's observations are based on its expectations for the level of cleanliness that should be found in a coal fired power plant, and not an office environment. Liberty observed very few personnel during its tour of the station, but some of those observed were involved in cleaning activities.[44] Duke Energy Ohio stated it recognized that the plant needed attention to cleanliness, had devoted resources to that task, and that further efforts were required.[45]

Liberty observed that maintenance/replacement of equipment had taken place at the station[46]. Duke Energy Ohio stated that new station management had immediately conducted a reliability survey of all boilers at the station in April 2007,[47] and had used that condition report to secure an increased budget for capital and O&M spending at the station for 2008.[48]

Liberty observed signage and hardhats that still carried the name of the previous owners. Liberty also observed graffiti that it considers unprofessional for power plant operators.[49]

7. Other Issues

a. Staffing

Liberty requested that Duke Energy Ohio supply historic staffing levels at each of the coal plants. The table below depicts staffing levels categorized by management and bargaining unit function, with coal handling personnel reported separately. The table shows that the trend in staffing levels has been down. The decrease in employment levels has not been across the board; at least one area has increased in employment level.

Liberty understands that staff reductions are possible through higher productivity, more efficient systems, and focusing on higher priority work that is more vital to the overall mission of power plant performance. Liberty's experience has shown that other utilities have cut staff by approximately the same percentages as Duke Energy Ohio.

Liberty is concerned that staffing levels, if too low, may contribute to outages that result in less than optimum performance of the coal units for customers.

Table V.11.-Historic Coal Plant Staffing Levels[50]

Name	2001	2002	2003	2004	2005	2006	Aug. 2007	Percent of 2001 Levels

b. FPP Impact of Customers Interruptions

Power supplies to customers can be interrupted for a variety of reasons. When customers are interrupted because of disturbances to the distribution system, transmission system, or substations, no replacement power is required.[51] Customers can also be interrupted on a voluntary contractual basis through the "Call Option" or "Power Share" programs. These programs are market based programs that allow customers to decide whether to participate or not, with incentives for participating. Generation outages have no impact on these programs.[52]

Generation outages in themselves do not affect customer service as all load is supplied from the MISO, whether a specific generator is in service or not.[53]

Liberty notes that any change in customer load, whether involuntarily interrupted because of system disturbances or voluntarily interrupted through incentive based programs, will require less power from the market. When load is reduced, costs allocated to the FPP are reduced by the system decrement, which may or may not change in response to the customer load lost. Those cost changes are captured in current accounting methods.[54]

c. Economic Evaluations for Component Redundancy and Spare Parts

A generating unit that interfaces with an energy market must consider the economic consequences of an outage or unit reduction. Those economic consequences can vary through time as market conditions change. One type of analysis that should be performed is a review of spare parts on a unit-by-unit basis in order to determine the economic consequence of not having that part on hand should it be needed. Part of that analysis would also include inventory sharing across the generating fleet. Another type of analysis that should be completed is that of conducting on line maintenance or installing redundant equipment such as critical valves/motors that would normally be maintained with the unit off line. A third type of market analysis is a review of outage scheduling that looks for ways to reduce planned maintenance. If additional spare parts, inventory sharing, on line maintenance/redundant equipment, or outage reductions can be economically justified by market conditions, the costs passed on to customers through the FPP will decrease.

Liberty requested a listing all analyses related to spare parts, inventory sharing, or using on line maintenance/redundant equipment[55] conducted from 2002 through June 2007. Duke Energy Ohio responded that such studies were not applicable.[56]

C. Conclusions

1. Boiler related problems have been identified by Duke Energy Ohio, which is addressing them in an orderly fashion consistent with outage schedules.

Boiler related problems are the major contributor to outages at Duke Energy Ohio's units. [redacted] are particularly susceptible to these outages. Liberty further found that Duke Energy Ohio either on its own or with partners in joint owned units, is addressing boiler related problems.

2. The major maintenance schedules established by Duke Energy Ohio are reasonable.

The major maintenance schedules for the Duke Energy Ohio units are reasonable, especially given the significant capital requirement required for the installation of flue gas desulfurization equipment as documented in the budget section of this chapter.

3. Outages experienced at Duke Energy Ohio's generating units were of the type and duration expected.

The outages that occurred at Duke Energy Ohio's units were of the type and duration that would be expected in operating units of these types, age, and operational characteristics. The only exception relates to the [redacted] outage as discussed in Conclusion #4 below. However, Liberty does anticipate in the next Audit Period conducting more detailed reviews of the underlying drivers of outages such as staffing levels, training, and procedures.

4. The significant extension of an outage at [redacted] resulted from factors that good utility practice would have avoided. (*Recommendation #1*)

During the outage, Duke Energy Ohio discovered that the design of the low pressure turbine, originally destined for use in a nuclear plant, was not compatible with the different steam conditions produced in a coal fired unit. Consequently, the Company checked over 3,000 additional components for coal steam condition compatibility after its discovery, indicating that it had not previously considered this condition. Liberty believes that an examination of the effects of differing steam conditions between nuclear and coal operations should have been undertaken far earlier.

5. Duke Energy Ohio unit capacity factors have been stable, and appear to be slightly increasing.

Liberty found that Duke Energy Ohio capacity factors have not deteriorated during the Audit Period, and show evidence of improvement. This positive performance reflects appropriate maintenance practices that maintain the Company's generating units in sound operating condition.

6. The [redacted] had significant reductions in availability during the Audit Period.

While Duke Energy Ohio's [redacted] had significant reductions in availability during the Audit Period, Liberty does not believe that these reductions had a material impact on the FPP, given the small size of these units, and their lower capacity factors. Further Liberty believes that the Company is taking appropriate measures in its maintenance planning to resolve these issues.

7. The heat rates of the Duke Energy Ohio coal units have remained relatively constant [redacted]

Effective maintenance practices have resulted in Duke Energy Ohio base-load coal unit efficiencies, or heat rates, that have not deteriorated during the Audit Period. The heat rate fluctuations of [redacted] resulted form its inefficiency, small size, and operational characteristics. Those fluctuations have not had a material impact on overall fleet efficiency.

8. Capital and maintenance spending at Duke Energy Ohio have been maintained appropriately through a period of expensive environmental equipment installation.

Significant capital spending has taken place at Duke Energy Ohio to accommodate environmental requirements and to improve unit dispatch order in the MISO. Even with increased capital expenditures, maintenance spending has continued at a reasonable level for the current construction program.

9. Duke Energy Ohio has increased both capital and maintenance spending in 2007 as major environmental project requirements have decreased.

As funding requirements for major environmental projects have decreased, Duke Energy Ohio has begun to increase maintenance spending in 2007 at the Duke Energy Ohio operated plants, and at [redacted]

10. Liberty's observed safety, cleanliness and attitude factors at [redacted] do not fully conform to practices required as part of an overall program for promoting optimal station operating performance. (*Recommendation #2*)

Liberty found indicators of a lack of safety consciousness at the [redacted] Liberty's observations did not demonstrate consistent adherence to established safety rules and directives. Liberty also found the station to be less clean than it should be. Liberty did not see convincing evidence that cleanliness is given a sufficiently high priority.

11. Liberty's [redacted] observations reinforced the fact that station reliability needs to be improved and that projected expenditures beyond 2008 will likely be required. (*Recommendation #3*)

Liberty believes that station maintenance requirements at [redacted] been properly identified and are being addressed in the [redacted] as discussed earlier in Section V.5 of this report. However, it is likely that additional expenditures will be required [redacted]

12. The staffing reductions at Duke Energy Ohio plants are significant enough to warrant an examination of their potential impacts on unit performance. (*Recommendation #4*)

Staffing levels at the coal fired power plants are consistently down. Liberty's experience with coal fired generating units is that reductions of the types and magnitudes at issue here have contributed to reductions in unit performance. A more formal review of the effects of reductions is warranted.

13. The FPP may only be affected by the system decrement for lost customer load, and any associated costs are captured in current accounting methods.

Changes in customer load, whether involuntarily interrupted because of system disturbances, or voluntarily interrupted through incentive based programs, will require less power from the market. When load is reduced, costs allocated to the FPP are reduced by the system decrement, which may or may not change because of the customer load lost. Those cost changes are captured in current accounting methods.

14. Operating costs may be negatively affected by the lack of analysis related to spare parts, inventory sharing, or using on line maintenance/redundant equipment. (*Recommendation #5*)

Duke Energy Ohio has not conducted any economic analysis seeking ways to reduce costs to customers through increasing spare parts, inventory sharing, or using on line maintenance/redundant equipment.

D. Recommendations

1. Exclude replacement power costs associated with the [redacted] outage from FPP recovery. (*Conclusion #4*)

A planned outage at [redacted] There was an unplanned extension to this outage in order to replace damaged low pressure turbine blades. The costs associated with this outage extension should be calculated, and these costs should not be passed on to Ohio native load customers. The calculation of these costs should be based on replacement power costs, calculated for hour-by-hour power market costs, considering the Day Ahead market, the Real Time market, and the Day 2 market.

2. Act swiftly to establish high expectations for safety consciousness, cleanliness, and employee attitude at [redacted] (*Conclusion #10*)

Liberty believes that conditions at generating stations related to safety, cleanliness and attitudes reflect an overall station ethic that can have impacts on the operating performance of the station over time. Station management must quickly set high expectations for issues of safety and cleanliness, and create a program that will establish and maintain the kinds of employee attitudes that foster positive station operating performance.

3. Do not reduce the [redacted] and O&M budgets at Beckjord below budgeted level, and provide further budget support beyond [redacted] for station maintenance if required. (*Conclusion #11*)

The reliability survey of all [redacted] boilers conducted in April 2007[57] established a solid baseline justifying an increased budget for capital and O&M spending at the station for 2008.[58] Liberty believes that the operational data in this chapter corresponds to this need for [redacted] expenditures and that the Company should carefully monitor conditions at [redacted] in order to extend funding [redacted] if the currently budgeted improvements and maintenance do not sufficiently resolve all outstanding issues.

4. Conduct a staffing level review of the Duke Energy Ohio coal plants to assure that staffing reductions are not resulting in, and do not have a significant potential for resulting in adverse operational performance. (*Conclusion #12*)

An in depth study is required to evaluate the relationship between reduced staffing levels at Duke Energy Ohio generating stations and operational performance of these units.

5. Perform economic analyses to determine the level of spare parts at its generating stations, the ability to share parts among its generating stations, and the use of on line maintenance/redundant equipment at its generating stations. (*Conclusion #14*)

Duke Energy Ohio should perform economic studies that evaluate improvement in operations at its generating units by evaluating the level of spare parts carried, the ability to share parts, and the use of on-line maintenance and redundant equipment at its generating stations. In conjunction with such a study, Duke Energy Ohio should also analyze, with outside assistance as required, outage scheduling in order to develop techniques to reduce outage time.

VI. MISO

A. Background

This chapter addresses the financial audit and the management/performance audit aspects of the special project area related to the Midwest Independent System Operator (MISO) operations.

1. Financial Audit

The FPP includes MISO-related charges. Liberty's financial audit examined these charges by:

- Reviewing and reporting on the costs incurred and revenues received
- Verifying the consistency of costs and revenues with actual MISO invoices
- Verifying that the Company is passing through only those charges and all appropriate revenues associated solely with retail Ohio customers.

The MISO-related charges that Liberty reviewed included:

- Congestion Costs/Revenues
- Financial Transmission Rights (*FTR*) Revenues/Costs
- Losses (Marginal Loss Overcollection Allocation)
- Revenue Sufficiency Guarantee (*RSG*) Make Whole Payments

2. Management/Performance Audit

Liberty reviewed FTR management, Congestion Costs/Revenues and Marginal Losses and addressed the following activities:

- Assessing the degree to which the Company has control over the costs
- Investigating management practices for minimizing the costs, including an assessment of the FTR portfolio and strategy of obtaining and maintaining FTRs to hedge congestion costs
- Evaluating the trend on costs since MISO Day 2 markets began
- Proposing any recommendations that will assist in minimizing costs.

B. Findings

Liberty reviewed each of the areas of Congestion Costs/Revenues, Financial Transmission Rights (FTR) Revenues/Costs, Losses (Marginal Loss Overcollection Allocation), and Revenue Sufficiency Guarantee (RSG) Make Whole Payments. The following tables present the results of each of these reviews. Liberty's examination confirmed the consistency of costs/revenues in each of these areas with the actual MISO invoices, and all the components for the above MISO categories were tracked to the Company's general ledger. Liberty also confirmed that the Company is passing through charges, and all appropriate revenues, associated only with serving retail load customers in Ohio.

There are a number of ways in which the Company allocates the different MISO components. These include Load Ratio Share Allocation percent, Generation Ration Share Allocation percent, FTR Ratio Share Allocation percent, and Financial Ration Share Allocation percent. Liberty examined the individual allocation methodologies that were applied to the individual MISO cost

components and did not see anything inappropriate about the Company's rationale for selecting and using a particular allocation methodology.

During the Audit Period, all of the Duke Energy Ohio generating units were under control of MISO[59]. No units were designated as "must run" for security or reliability purposes and no units were run out of rate for voltage control[60]. This means that no units' MW output was increased, or decreased, to change the supply of VARS to the grid at the request of MISO or the transmission owner. With respect to power transfers, a unit's dispatch level is determined by MISO locational price signals that will direct the unit to either maintain, increase, or decrease its dispatch.

Liberty examined how the MISO compensates generator owners for all types of unit output changes ordered by MISO, including those to facilitate power transfers, "must run" status of units, and voltage control. Basically, MISO pays generators through the concept of Locational Marginal Pricing (LMP). If there is congestion, then that congestion is addressed by MISO direction to adjust the generation up or down. If a unit is declared "must run", then this is a signal that the generator has indicated to MISO that it is a price taker and it will receive whatever the LMP is. In this case, the generator is not entitled to being kept whole to its offer curve.[61]

If MISO commits a unit through the Reliability Assessment and Commitment (RAC) process, then MISO will keep a generator whole relative to its offer. This means that if the LMP does not pay a generator its three-part offer over the commitment period, then the MISO will provide a "make whole" payment to the generator. When MISO commits units through the RAC process, the reason for the commitment is not communicated to the provider.[62]

There are some circumstances under which MISO does not keep generators whole. For example, if MISO decommits in real time for reliability reasons a unit that had a day-ahead award, then MISO does not keep the generator whole for the day-ahead to real-time deviations. However, in this case, MISO does exempt the generator from Revenue Sufficiency Guarantee (RSG) make-whole distribution payments.

Another circumstance where MISO does not keep a generator whole is if MISO orders a manual redispatch of generation.[63] MISO might do this if its own Unit Dispatch System (UDS) could not resolve the constraint either in a timely fashion, or because the constraint had not been modeled in the MISO UDS. In the case where MISO must manually redispatch a unit, the LMP would indicate that the unit should move in one direction, and MISO would call and direct that the unit be moved in a direction opposite to that indicated by the LMP.[64]

The following tables present the data associated with each of these areas of investigation. The tables do not provide data for the last three months of the Audit Period (April, May and June of 2007). There is a six-month lag between the time that costs are initially incurred and the time that they are first recognized in the FPP Rider. For example, fuel costs incurred in January 2007 won't be included in the FPP Rider until the third quarter filing of 2007. Because of this lag, some of the fuel costs incurred during the current Audit Period (July 1, 2006 - June 30, 2007) are not included in Liberty's report because they will not be included in an FPP filing during the Audit Period. These costs were not included in the data provided by the Company. Correspondingly, some costs that were incurred in the prior audit period (July 2005 through June

30 2006) are included, because they were first included in the FPP filings during the current Audit Period.

Duke Energy Ohio stated that the data in the categories of "FTR Revenues/Costs" and "Marginal Loss Overcollection Allocations" through December 2006 had been audited previously as part of a TCR audit.

1. FTR Revenues/Costs

The following table shows the trends in FTR Revenues/Costs since December 2005.

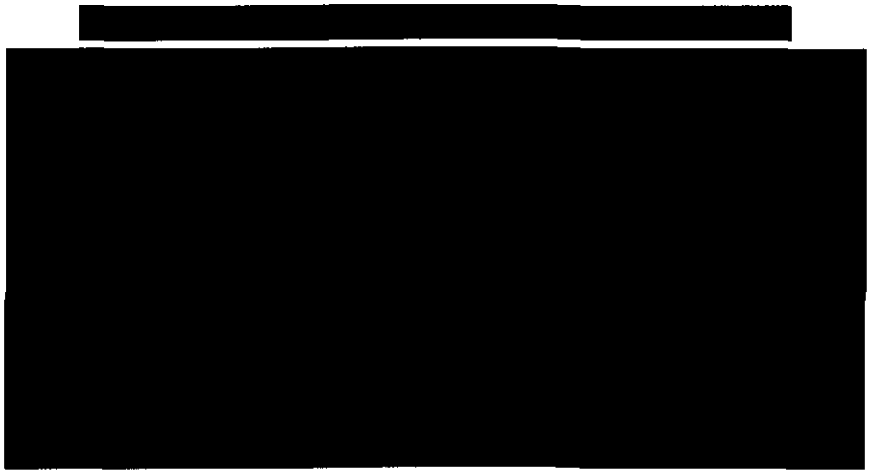
The table shows that, at the beginning of the Audit Period, significant revenues to the Company resulted in reduction of costs to customers through the FPP. Toward the end of the Audit Period, the FTR component had mixed values, both positive and negative. Negative values reflect increased costs to customers.

Duke Energy Ohio has limited control over the FTR revenues/costs. The Company uses its Commercial Business Model to analyze its options with respect to the FTR, and requests from MISO FTRs that it believes will be required to deal with congestion. FTRs serve as a hedge against congestion costs. The Company tries to hedge exactly the amount of FTRs it believes it will require for congestion. Duke Energy Ohio Company participates in the monthly auction to balance the FTR position, but once completed, the Company cannot make any further changes in this position until the next monthly auction. In the interim, there will be continual daily changes in energy requirements. The Company cannot control these requirements changes. In addition, the FTR only serves as a hedge for the day ahead. The Company is not always fully compensated for congestion costs by MISO; however in 2006, the Company was kept whole. In 2007, MISO

has been underfunding and the Company has not always been fully compensated for congestion costs by the FTR.

2. Congestion Costs

The following table shows congestion costs, including both the day ahead and real time costs, for those months of the Audit Period for which data is available. As discussed immediately above, the objective of the FTR is to offset these congestion costs, and these offsetting costs are also shown. The net number in the far right hand column of the table indicates whether or not the FTR has been successful in offsetting these congestion costs. The objective of FTR management, as noted above, is to have this net number be as close to zero as possible. Positive net revenues reflect payments to customers, and negative numbers reflect costs to customers.

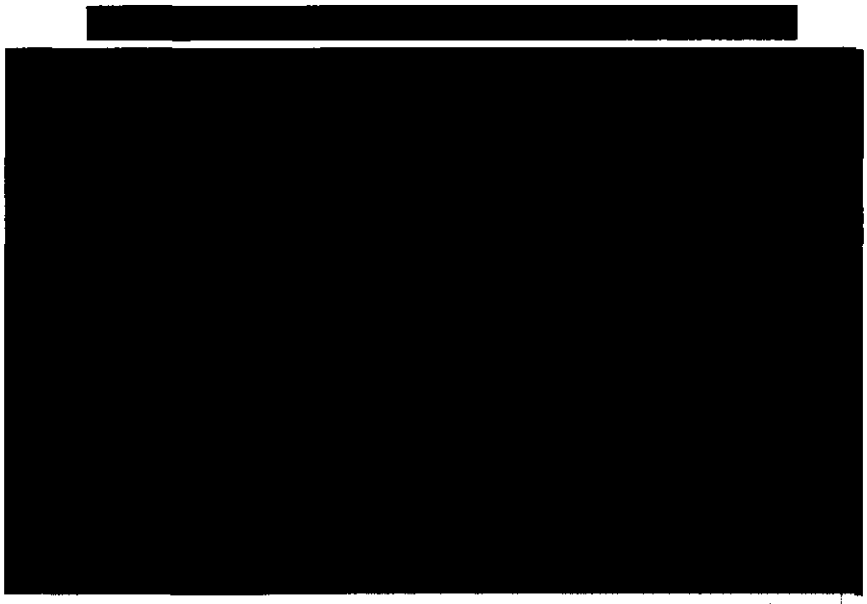


Note: Through December 2006, figures are for native load. The only data available for 2007 is for both native and non-native load.

The data in Table VI.2 show that the Company has been effective in controlling congestion costs. The particularly high numbers in mid 2006 reflect the extremely hot weather during this time. That weather produced severe congestion on the MISO system. The objective of the Company's management of FTR is to keep the balances shown in Table VI.2 as close to zero as possible. As the Company has gained experience in this area, performance has improved, and net revenues have in fact been close to zero.

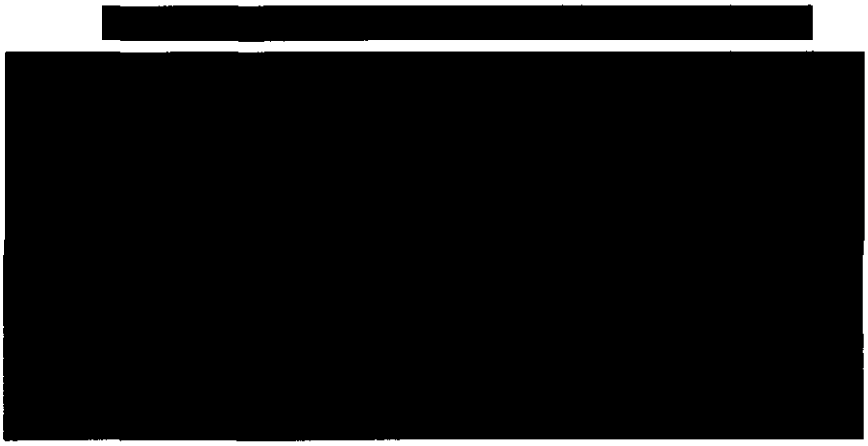
3. Marginal Loss Overcollection Allocation

Marginal losses provide a dispatch signal that relates to the distance of the load from the point of generation; this signal helps to provide efficient dispatch of generating units. The dollar amounts shown in the table below reflect a return to the Company from MISO of over-collected dollars that will reduce costs to customers. The Company has no control over these costs.



4. Losses

The following table shows losses, including both the day ahead and real time losses, for those months of the Audit Period for which data is available. Losses are compensated for by the Marginal Loss Overcollection Allocation. A comparison of how the overcollection allocation has reduced costs is presented in Table VI.4 below. The net number in the far right hand column of the table indicates to what extent this compensation has occurred. A positive net loss reflects a cost to customers, and negative numbers reflect payments to customers. The Company has no control over these costs.

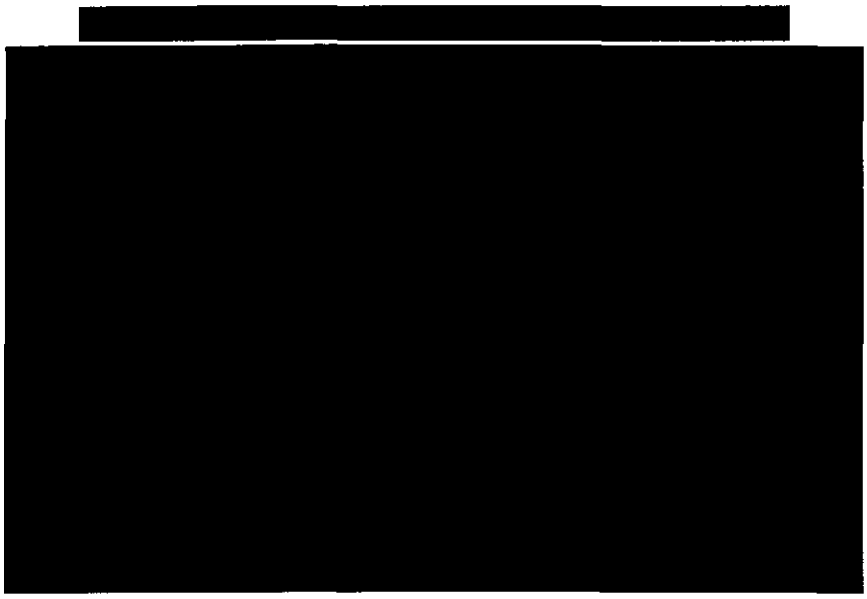


Note: Through December 2006, figures are for native load. The only data available for 2007 is for both native and non-native load.

5. RSG Make Whole Payments

RSG Make Whole Payments reflect dollars retuned to the Company as compensation for the fuel costs it incurs when: (a) generation has been requested by MISO for reliability reasons, and (b)

that generation was outside of what the Company had planned for the day ahead. The dollars in Table VI.5 below reflect these payments to the utility by MISO and work to reduce fuel costs. The Company has no control over these payments.



While Duke Energy Ohio has only limited control over FTR Revenues and Costs, and therefore Congestion Costs, it has taken several actions that indirectly work to influence these factors to improve outcomes for its customers. Duke Energy Ohio regularly monitors all regulations related to these MISO factors, and files comments with *FERC* as appropriate in order to make the proactive position it takes on behalf of its customers known to FERC. During the Audit Period, Duke Energy Ohio filed either an intervention, protest or comments on 37 different dockets related to MISO specific issues. In addition, the Company responded similarly to 8 other dockets that were related to more general proceedings affecting MISO and other markets.

In addition, Duke Energy Ohio is active in MISO activities. The Company has its own employees covering a total of 14 different MISO committees, including the Advisory Committee that oversees the activity of all other committees. For example, the Company participates in the Ancillary Services Market Working Group that has been meeting for over two years, and meets regularly two to three times per month. Such a working group or committee will eventually be involved in a FERC filing and participants. Through such participation, Duke Energy Ohio has been able to monitor MISO activities and influence MISO processes that can ultimately result in actions that are beneficial to customers.

C. Conclusions

1. **Liberty confirmed the consistency of costs/revenues in invoices received from MISO and that the Company is passing through charges, and all appropriate revenues, associated only with serving retail load customers in Ohio.**

Liberty reviewed each of the areas of Congestion Costs/Revenues, Financial Transmission Rights (FTR) Revenues/Costs, Losses (Marginal Loss Overcollection Allocation), Marginal Loss Surplus Distribution, and Revenue Sufficiency Guarantee (RSG) Make Whole Payments. There was consistency of costs/revenues in the actual invoices received from MISO. Further, Liberty confirmed that Duke Energy Ohio is passing through charges, and all appropriate revenues associated only with serving retail load customers in Ohio.

2. **Duke Energy Ohio has limited direct control over costs and revenues received from MISO.**

Of all of the categories of MISO costs and revenues discussed in this chapter, the only area where Duke Energy Ohio has any direct control is in the area of FTR costs/revenues, and consequently congestion costs. In this instance, the Company can control what it requests from MISO, and it can participate in monthly auctions in order to balance its FTR position. But there are many other variables at play, such as the energy changes that can take place between monthly auctions. The Company's policy is to try to estimate its FTR requirements as exactly as possible.

3. ***Duke Energy Ohio is very involved in industry activities that can have an indirect effect on MISO costs and revenues, and on overall MISO positions within the industry.***

Duke Energy Ohio actively monitors all MISO FERC filings and will intervene whenever appropriate. The Company has filed either an intervention, protest or comments on 45 dockets related to MISO issues. Also, Duke Energy Ohio is actively involved in 14 MISO committees. These committees are instrumental in formulating MISO policies and procedures, and thus the Company is able to stay abreast of MISO activities as well as have a voice in MISO policies and procedures. In the long run, these Company activities enable it to appropriately protect its interests and those of its customers.

D. Recommendations

Liberty has no recommendations in this area of its audit.

VII. Financial Audit

A. Background

This chapter contains Liberty's analysis of two Riders, the Fuel and Purchased Power Rider (Rider FPP) and the System Reliability Tracker Rider (Rider SRT), as well as Liberty comments on FAS 71 issues that relate to this audit. While not strictly a component of the financial audit, also included in this chapter is Liberty's management analysis of the Rider SRT. Liberty's analysis of the management aspects of the Rider FPP is included in other chapters of this report.

1. Fuel and Purchased Power Rider (Rider FPP)

The overall audit objectives of the financial audit of the Rider FPP were to:

- Verify that procedures are in place and are being followed to achieve control for the processing of fuel receipts and consumption transactions, processing of energy purchase and sale transactions, processing of emission allowance purchases, swaps and sales, and accurately calculating the FPP rate, including compliance with the financial procedural aspects of former Chapter 4901:1-11 of the Administrative Code
- Verify the arithmetic accuracy of the fuel component and other allowable amounts passed through the FPP rate and into the bills of the electric utility customers
- Verify the arithmetic accuracy of the electric utility's calculation of the FPP rate
- Verify the proper FPP rates were being applied in customer billing
- Review the procedures and control for assembly and reporting of information in the FPP forms
- Determine whether the Company is following procedures for processing fuel data and whether the procedures are reasonable
- Determine whether fuel delivered to the Company meets quality and quantity specifications
- Determine whether the Company correctly reported payments made for acquisition and delivery costs of fuel
- Calculate the difference between actual net revenues and actual net fuel costs.

The Rider FPP comprises one of many components of the total billing rate for Duke Energy - Ohio. The purpose of Rider FPP is to capture the difference between the current and baseline amounts for fuel and emission costs. For March 2007, the Rider FPP represented [redacted] of the residential customer's total billing rate, for usage below 1000 kWh. The following table shows the components of bills at this usage level.

Table VII.1.-Components of Bills

Billing Item	Rate/ KWh	Billing Rate %
Generation	$0.037553	39.72
Distribution	0.019949	21.10
Rider FPP	**0.012405**	**13.12**
Rider RSC	0.006627	7.01
Rider RTC	0.006484	6.86

Rider OET	0.004650	4.92
Rider AAC	0.002651	2.80
Rider IMF	0.002651	2.80
Rider TCR	0.002299	2.43
Rider USR	0.000898	0.95
Rider RSS	-0.000800	-0.85
Rider MSR-E	-0.000817	-0.86
Total Billing Rate per kWh	**$0.094550**	**100.00%**

Liberty conducted the following baseline test activities:

- Obtained all of the Company's quarterly filings from the Ohio Commission's website
- Obtained Duke Energy - Ohio's workpapers supporting the quarterly filings and computing the FPP Rate during the audit period
- Compared these rates with those filed with the Commission
- Traced the recovery of the revenues produced from the individual components of the FPP rate to the sales volumes included in the Company's financial statements
- Reviewed Duke Energy – Ohio's Company's calculations of its cost-effectiveness-measure and efficiency-incentive factors during the audit period
- Tested these factors for arithmetic accuracy
- Verified that the actual revenues recovered from the total FPP rate were reconciled against the projected costs of the FPP
- Randomly selected and tested customer bills from each quarter of the audit period to confirm appropriate application of the FPP rate in the Company's billing system.

Liberty conducted other procedures specific to each individual component of Rider FPP, as discussed in the following sections of this report.

2. System Reliability Tracker Rider (Rider SRT)

The System Reliability Tracker Rider (SRT) was established as a component of the Company's rates in order to permit the Company to apply annually to recover actual costs of covering peak and reserve capacity requirements. The initial SRT rate for calendar year 2005 was approved by the Commission in case #04-1820-EL-ATA. The SRT rate for 2006 was established through case #05-724-EL-UNC and further reviewed in the FPP financial and management/performance audit as part of case #05-725-EL-UNC.

Rider SRT allows the Company to track and collect costs associated with meeting its market-based standard service offer load obligation plus a fifteen percent (15 percent) planning reserve margin. Funding for Rider SRT during 2006 was approved by the Commission in Case No. 05-724-EL-UNC.

For 2006, Duke Energy – Ohio based Rider SRT upon the estimated cost of capacity products required to maintain a reserve margin of at least 15 percent after adjusting the over-recovered 2005 costs that were to be refunded to non-residential customers. Residential customers were excluded from the refund of the over-collected 2005 cost since Rider SRT did not apply to them during this time period.

On appeal of the Ohio Commission's decision in Case No. 03-93-EL-ATA, the Ohio Supreme Court remanded the proceedings back to the Commission, requesting, *inter alia*, that the Commission provide additional evidence and sufficient reasoning to support the modification of its opinion and order. This remand included the establishment of the SRT Rider. On December 20, 2006, the Commission addressed the remand as it applies to Rider SRT as follows:[65]

> [*W*]e *find that the best option is to allow the SRT rider to expire by its current terms on January 1, 2007. We will determine whether a true-up to January 1, 2007, as proposed by DE-Ohio, is reasonable when we are resolving all of the other issues in these proceedings.*

As a result of the Commission's decision, Rider SRT was suspended from January 1, 2007 through the end of the audit period, with no true-up between prior projected costs and costs actually collected.

3. FAS 71

Prior to the deregulation of electric generation in Ohio, Duke Energy treated any over-collection of FPP costs as a regulatory asset and any under-collection as a regulatory liability. Duke Energy recorded these regulatory assets (receivables due from the customer) and regulatory liabilities (payables due to the customer) in one accounting period; it then either surcharged or refunded to the customer in a subsequent accounting period through the Reconciliation Adjustment (RA) component of the FPP. FASB Statement No. 71, "Accounting for the Effects of Certain Types of Regulation" (FAS 71) governs the accounting requirements for the regulatory treatment of under and over collected costs for Duke Energy.

B. Findings

1. Fuel and Purchased Power Rider (Rider FPP)

During the audit period, the Rider FPP consisted of four separate components: Fuel Cost (FC), Emission Allowances (EA), Reconciliation Adjustment (RA), and System Loss Adjustment (SLA). In accordance with PUCO Order in Case No. 05-806-EL-UNC, the Environmental Reagent (ER) component was eliminated from the FPP Rate with any monies previously collected to be refunded during the 2nd quarter of 2006. The following table shows the contribution of each component of the quarterly FPP Rider rate during the Audit Period.

Table VII.2.-FPP Rider Components

Time Period/Component	Residential	Non-Residential	Voltage Reduction[66]
3rd Quarter 2006			
Fuel Cost	0.6950	0.6950	0.6950
Emission Allowance	0.2733	0.2733	0.2733
Reconciliation Adjustment	-0.1544	-0.4340	-0.4323
System Loss Adjustment	0.0299	0.0299	0.0153
Total FPP Rate ¢/kWh	**0.8438**	**0.5642**	**0.5513**

4th Quarter 2006			
Fuel Cost	0.5410	0.5410	0.5410
Emission Allowance	0.2904	0.2904	0.2904
Reconciliation Adjustment	-0.1071	0.0054	0.0991
System Loss Adjustment	0.0181	0.0181	0.0093
Total FPP Rate ¢/kWh	**0.7424**	**0.8549**	**0.9398**
1st Quarter 2007			
Fuel Cost	0.7213	0.7213	0.7213
Emission Allowance	0.1007	0.1007	0.1007
Reconciliation Adjustment	0.3866	0.4660	0.4871
System Loss Adjustment	0.0319	0.0319	0.0163
Total FPP Rate ¢/kWh	**1.2405**	**1.3199**	**1.3254**
2nd Quarter 2007			
Fuel Cost	0.8806	0.8806	0.8806
Emission Allowance	0.0972	0.0972	0.0972
Reconciliation Adjustment	0.2911	0.3171	0.3518
System Loss Adjustment	0.0439	0.0439	0.0224
Total FPP Rate ¢/kWh	**1.3128**	**1.3388**	**1.3520**

a. Fuel and Economy Purchased Power (FC) Component

Duke Energy – Ohio bases the FC component of the Rider FPP upon a forecast of expected electric load and associated costs for the upcoming quarter. The Company forecasts the costs for fuel, purchased power and price hedges required to meet expected load. These projected costs then form the FC portion of the FPP Rider. A Reconciliation Adjustment (RA) component to the FPP Rider then operates to true up any future difference between these forecasted FC costs and the actual FC costs experienced.

Liberty reviewed the Company's proposed fuel costs to be included in the FC rate, and verified the mathematical accuracy of the load projections and associated cost. Liberty discussed with Company personnel the forecasting methods used to project customer loads and associated costs. Liberty also verified the entry of the FC rate into the Company's billing system.

The following table shows Duke Energy's projected fuel cost and associated load and the resulting FC rate for each quarter during the Audit Period.

Table VII.3.-FC Rate Projections

	Q3 2006	Q4 2006	Q1 2007	Q2 2007
Projected Fuel Cost	$140,747,258	$110,712,219	$121,329,077	$111,921,738
Projected Load (kWh)	7,306,556,036	6,241,880,363	6,209,259,125	5,296,124,864
Total Fuel Rate ¢/kWh	**1.9277**	**1.7737**	**1.9540**	**2.1133**
Less baseline FC Rate[67]	1.2327	1.2327	1.2327	1.2327
Net FC included in FPP ¢/kWh	**0.6950**	**0.5410**	**0.7213**	**0.8806**

b. Emission Allowances (EA) Component

The EA component of the FPP Rider recovers the projected costs of Emission Allowances associated with electric generation. Duke Energy - Ohio bases the EA upon a forecast of

expected electric load and associated emission cost for the upcoming quarter. The Company forecasts its emission costs on the basis of expected load. These projected costs then form the EA rate that is included within the FPP Rider. A future Reconciliation Adjustment (RA) component to the FPP Rider then trues up any difference between these forecasted EA costs and the actual EA costs experienced including any gains or losses from SO_2 allowance trading necessary to meet actual load requirements.

Liberty reviewed Duke Energy - Ohio's proposed emission costs to be included in the EA rate, and verified the mathematical accuracy of the load projections and associated cost. Liberty reviewed forecasting methods with Company personnel involved with projecting customer loads and emission costs. Liberty also verified the entry of the EA rate into the Company's billing system. Liberty confirmed that the FPP appropriately includes EA cost, gains and auction proceeds for the Audit Period.

The amounts included in the FPP for the EA were traced by Liberty to the Company's general ledger. An analysis of the general ledger entries revealed that costs, gains and auction proceeds transactions were recorded. The Company has set up a series of internal controls (as required by Sarbanes Oxley and audited by the Company's independent auditor) to ensure that EA transactions are appropriately recorded to the Company's general ledger. The Company's general ledger contains all of the entries corresponding to every EA transaction.

The next table shows the Company's projected emission cost and associated load, along with the resulting EA rate for each quarter during the Audit Period.

Table VII.4.-EA Rate Projections

	Q3 2006	Q4 2006	Q1 2007	Q2 2007
Projected Emission Cost	$16,937,042	$14,811,729	$5,564,092	$4,924,208
Projected Load (kWh)	5,924,245,802	4,487,976,507	4,909,635,068	4,484,380,366
Total Emission Rate ¢/kWh	**0.2859**	**0.3030**	**0.1133**	**0.1098**
Less baseline EA Rate[68]	0.0126	0.0126	0.0126	0.0126
Net EA included in FPP ¢/kWh	**0.2733**	**0.2904**	**0.1007**	**0.0972**

c. Reconciliation Adjustment (RA) Component

The RA component of the FPP Rider represents the true up between the projected FC and EA costs (discussed in the immediately preceding sections of this report) and the actual FC and EA costs experienced. Liberty reviewed the Company's proposed reconciliation costs to be included in the RA rate, and verified the mathematical accuracy of the calculations. Liberty interviewed Company personnel involved with calculating the RA items. Liberty reviewed a detailed set of workpapers of the RA calculation, including the relevant pages from the Company's General Ledger, Fuel Ledger, purchase order and invoices and journal entries along with journal entry supporting data. Liberty traced the individual invoices supporting the purchased power for the month of March 2007. Liberty traced the amounts reported in the Company's RAs for each quarter to the supporting documentation. Liberty also verified the entry of the RA rate into the Company's billing system.

The next table presents the Company's reconciliation adjustment, along with the resulting RA rate for each quarter during the Audit Period.

Table VII.5.-Reconciliation Adjustments

Time Period/Component	Residential	Non Residential	Voltage Reduction[69]
3rd Quarter 2006			
Current Period Adjustment	$-3,239,683	$-5,521,292	$-1,762,370
Prior Period Adjustment	0	-5,831,003	-1,875,650
Total Adjustment	**$-3,239,683**	**$-11,352,295**	**$-3,968,020**
Projected Load (kWh)	2,098,305,000	2,615,957,000	841,471,000
Total RA Rate ¢/kWh	**-0.1544**	**-0.4340**	**-0.4323**
4th Quarter 2006			
Current Period Adjustment	$-1,739,684	$-2,272,337	$-44,857
Prior Period Adjustment	0	2,396,626	843,008
Total Adjustment	**$-1,739,684**	**$124,289**	**$798,151**
Projected Load (kWh)	1,625,026,000	2,288,177,000	804,861,000
Total RA Rate ¢/kWh	**-0.1071**	**0.0054**	**0.0991**
1st Quarter 2007			
Current Period Adjustment	$8,023,032	$10,364,282	$3,696,698
Prior Period Adjustment	0	-19,537	-6,667
Total Adjustment	**$8,023,032**	**$10,344,745**	**$3,690,031**
Projected Load (kWh)	2,075,073,000	2,219,876,000	757,507,000
Total RA Rate ¢/kWh	**0.3866**	**0.4660**	**0.4871**
2 Quarter 2007			
Current Period Adjustment	$4,427,599	$7,066,614	$2,730,470
Prior Period Adjustment	0	0	0
Total Adjustment	**$4,427,599**	**$7,066,614**	**$2,730,470**
Projected Load (kWh)	1,520,988,000	2,228,176,000	776,187,000
Total RA Rate ¢/kWh	**0.2911**	**0.3171**	**0.3518**

d. System Loss Adjustment (SLA) Component

The SLA component of the FPP Rider represents the projected cost of lost energy from the point of generation to the final customer. Duke Energy – Ohio bases the SLA upon a forecast by the Company of its projected meter load, which the Company applies to the energy loss factor from Docket 92-1464-EL-AIR and the current FC rate for the upcoming quarter. This projected current loss is then adjusted for the historic losses in MBSSO along with a synchronization adjustment for total system-wide losses to form the SLA rate that is included within the FPP Rider. However, any difference between these forecasted SLA costs and the actual SLA costs experienced are trued up in a future Reconciliation Adjustment (RA) component to the FPP Rider.

Liberty reviewed the Company's proposed system-loss costs to be included in the SLA rate, and verified the mathematical accuracy of the load projections and associated cost. Liberty also discussed the applicable forecasting methods with Company personnel involved with projecting

customer loads and system loss costs. Liberty also verified the entry of the SLA rate into the Company's billing system.

The next table presents the Company's projected loss rate, along with the losses in MBSSO and the synchronization adjustments and the resulting SLA rate for each quarter during the Audit Period.

Table VII.6.-System Loss Adjustments

Time Period/Component	Residential	Non Residential	Voltage Reduction[70]
3rd Quarter 2006			
Average Loss Rate	$0.1320	$0.1320	$0.0604
Losses in MBSSO	-0.1051	-0.1051	-0.0481
Synchronization Adjustment	0.0030	0.0030	0.0030
Total SLA Rate ¢/kWh	**$0.0299**	**$0.0299**	**$0.0153**
4th Quarter 2006			
Average Loss Rate	$0.1214	$0.1214	$0.0556
Losses in MBSSO	-0.1051	-0.1051	-0.0481
Synchronization Adjustment	0.0018	0.0018	0.0018
Total SLA Rate ¢/kWh	**$0.0181**	**$0.0181**	**$0.0093**
1st Quarter 2007			
Average Loss Rate	$0.1338	$0.1338	$0.0612
Losses in MBSSO	-0.1051	-0.1051	-0.0481
Synchronization Adjustment	0.0032	0.0032	0.0032
Total SLA Rate ¢/kWh	**$0.0319**	**$0.0319**	**$0.0163**
2nd Quarter 2007			
Average Loss Rate	$0.1447	$0.1447	$0.0662
Losses in MBSSO	-0.1051	-0.1051	-0.0481
Synchronization Adjustment	0.0043	0.0043	0.0043
Total SLA Rate ¢/kWh	**$0.0439**	**$0.0439**	**$0.0224**

2. System Reliability Tracker Rider (Rider SRT)

Liberty reviewed the Company's proposed costs to be included in the SRT rate, and verified the mathematical accuracy of the load projections and associated cost. Liberty also discussed the applicable forecasting methods with Company personnel involved with projecting customer loads and system reliability costs. Liberty also verified the entry of the SRT rate into the Company's billing system. From a management perspective, the Commission's decision to suspend the Rider SRT as of January 1, 2007, means that that there has been no reconciliation between actual and recovered cost by the Company. Therefore, Liberty was unable to examine any reconciliation of costs for the SRT Rider, and this remains an open issue.

From a management perspective, Liberty confirmed that estimated costs of capacity products were appropriately included in the 2006 Audit Period Rider SRT calculations. This also included the fifteen percent planning reserve margin. Also, residential customers were excluded

from the refund of the over-collected 2005 costs, since the Rider SRT did not apply to these customers during this time.

Also, from a management perspective, in its Order dated November 24, 2007, the Commission confirmed that the methodology approved for the SRT, and the avoidability also approved for the SRT, should be continued. The Commission also found in this Order that it was appropriate for SRT transactions to be audited. Such audit has been conducted by Liberty through December 2006, and Liberty found no exceptions or concerns. The Company's budgeting system for reliability costs was appropriate, and resulted in reasonable estimates that were implemented in a reasonable manner.

The net table presents the Company's projected costs and associated rates to be recovered through the SRT Rider during the Audit Period.

Table VII.7.-SRT Rider Costs & Rates

	Allocated Capacity and Power Costs	Projected kWh Sales	Projected kW Demand	SRT Rate ¢/kWh, ¢/kW
3rd Quarter 2006				
Residential:				
Rate Group RS, ORH, HEC, TD, CUR	-$1,240,005	4,135,553,993		-0.0300
Non Residential:				
Rate DS:				
First 1000 kW	-2,145,462		7,724,280	-27.7756
Additional kW	-54,110		249,854	-21.6567
First 300 kWh	-1,404,884	2,025,649,195		-0.0694
Additional kWh	-273,300	520,267,426		-0.0525
Rate GS-FL	-18,316	14,485,323		-0.1264
Rate EH	-58,418	30,384,930		-0.1923
Rate DM	-344,276	297,097,478		-0.1159
Rate DP:				
First 1000 kW	-215,851		979,808	-22.0299
Additional kW	-254,355		1,534,872	-16.5718
First 300 kWh	-493,174	718,861,936		-0.0686
Additional kWh	-267,578	504,085,466		-0.0531
Rate TS:				
First 50,000 kVA	-539,399		1,958,008	-27.5483
Additional kVA	-181,162		937,142	-19.3313
First 300 kWh	-379,071	820,467,205		-0.0462
Additional kWh	-399,337	792,082,994		-0.0504
Lighting:				
Rate Group SL, TL, OL, NSU, NSP, SC, SE UOLS	-49,524	61,287,460		-0.0808
Total 3rd Quarter	**-$8,318,222**	**9,920,223,406**		
4th Quarter 2006				
Residential:				
Rate Group RS, ORH, HEC, TD, CUR	-$1,028,928	1,752,360,062		-0.0587

Non Residential:				
Rate DS:				
First 1000 kW	-1,062,205		3,778,172	-28.1143
Additional kW	-26,790		117,969	-22.7090
First 300 kWh	-695,549	956,378,619		-0.0727
Additional kWh	-135,309	206,618,184		-0.0655
Rate GS-FL	-10,812	7,283,029		-0.1485
Rate EH	-63,985	19,891,056		-0.3217
Rate DM	-195,890	127,494,541		-0.1536
Rate DP:				
First 1000 kW	-119,275		488,695	-24.4069
Additional kW	-140,552		744,124	-18.8882
First 300 kWh	-272,518	347,809,791		-0.0784
Additional kWh	-147,859	228,310,588		-0.0648
Rate TS:				
First 50,000 kVA	-302,995		936,701	-32.3471
Additional kVA	-101,764		468,987	-21.6986
First 300 kWh	-212,935	397,117,800		-0.0536
Additional kWh	-224,318	384,328,021		-0.0584
Lighting:				
Rate Group SL, TL, OL, NSU, NSP, SC, SE UOLS	-29,922	30,545,081		-0.0980
Total 4th Quarter	**-$4,771,606**	**4,458,136,772**		

3. FAS 71

Duke Energy and its independent auditors have determined that Ohio's changes to the electricity generation markets in the state make FAS 71 no longer applicable to over- and under-collections of FPP costs. The basis for this determination is that customers are now free to choose another electric supplier at any time. The application of FAS 71 to govern accounting for these costs previously permitted over- and under-collections of FPP costs to be capitalized. Those costs now must flow through the current period's income statement; therefore, unlike before, there results either an increase or decrease in current period earnings.

FAS 71 applies to general purpose external financial statements of utilities that have regulated operations, provided that all of the following criteria are met:

- The utility's rates for regulated services or products provided to its customers are established by or are subject to approval by an independent, third-party regulator or by its own governing board empowered by statute or contract to establish rates that bind customers
- The regulated rates are designed to recover the specific utility's costs of providing the regulated services or products
- In view of the demand for the regulated service or product and the level of competition, direct and indirect, it is reasonable to assume that rates set at levels that will recover the utility's costs can be charged to and collected from customers.

Duke Energy's independent accountants advised Liberty that, in its view, the provisions of FAS 71 were properly terminated for Duke Energy at the onset of competition for generation in the Ohio marketplace. Duke Energy retains 97 percent of the competitive market for electric

generation and has not experienced variability in market share at a level that would put at risk the ability to adjust future charges in a manner that will provide surety of recovery or refund of the amounts in question. The independent accountants do not view the absence of recovery risk in practical terms to be material, holding instead that the ability for customer migration is sufficient to call for abandonment of FAS 71, no matter how small the risk that migration will be substantial or variable. Their view is that the provisions of FAS 71 could not be reinstated for Duke Energy as long as any competitive market, no matter how small, was in place since the customers of Duke Energy could migrate to another electric generation supplier at any time.

4. Cost Estimating

Duke Energy Ohio uses a model called the Commercial Business Model (CBM) to produce estimates of fuel costs, purchased power costs, and emissions costs. The CBM is a dispatch model that has been developed in-house and updated over 10 years. The CBM produces projections for two components of the Rider FPP: Fuel Cost (FC) and Emission Allowances (EA). The following table summarizes the amount of fuel costs recovered vs. the projections from the CBM for the filings during the Audit Period.

Table VII.8.-FC Under-Recovery (Dollars)[71]

	Q3 2006	Q4 2006	Q1 2007	Q2 2007
Total Fuel Costs Recovered	110,952,068.83	83,496,948.60	103,464,649.78	103,612,050.27
Total Actual Fuel Costs Attributable to FPP Sales	135,949,648.50	104,299,756.80	121,235,834.77	127,460,398.58
Under Recovery of Fuel Costs	24,997,579.67	20,802,808.20	17,771,184.99	23,848,348.31

The Company has had an average under-recovery on Fuel Costs of $21,854,980.29, or 17.93 percent of estimated Fuel Costs during the Audit Period.

On the other hand, Duke Energy Ohio over-recovered Emission Allowance Costs during the Audit Period. The following table summarizes the amount of emission allowance costs recovered vs. the projections from the CBM for the filings during the Audit Period. The Company has had an average over-recovery of $5,345,896.46 during the Audit Period.

Table VII.9.-EA Over-Recovery (Dollars)[72]

	Q3 2006	Q4 2006	Q1 2007	Q2 2007
EA Expense Recovered	16,428,772.42	14,262,267.85	6,000,962.37	5,377,523.25
EA Expense Allocated to the FPP	17,223,716.00	13,909,887.56	6,961,903.01	5,684,234.00
EA Sales Margin Allocated to the FPP	(8,687,490.00)	(4,934,838.00)	(8,924,131.00)	(547,341.53)
Over Recovery of EA Costs	7,892,546.42	5,287,218.29	7,963,190.36	240,630.78

The following table summarizes the amount of fuel cost and emission allowance costs recovered vs. the projections from the CBM for the filings during the Audit Period. The Company has had an average under-recovery of 12.89 percent during the Audit Period for the combined fuel cost and emission allowance factors.

Table VII.10.-Total FPP Under-Recovery

	Q3 2006	Q4 2006	Q1 2007	Q2 2007
Total Under Recovery of Fuel and EA Costs	$17,105,033.25	$15,515,589.91	$9,807,994.63	$23,607,717.53
Percentage Variance	11.84%	13.70%	8.22%	17.80%

C. Conclusions

1. Liberty's examination of the Audit Period's FC Component of Rider FPP disclosed no exceptions or concerns.

Liberty noted no exceptions in its financial audit procedures for the FC Component of Rider FPP. In addition, Liberty determined that Company personnel are following reasonable procedures for the processing of fuel data and transactions. Liberty concludes that Duke Energy's projection methods for budgeted generation costs resulted in reasonable estimates that were appropriately implemented and complied with Commission guidelines.

2. Liberty's examination of the Audit Period's EA Component of Rider FPP disclosed no exceptions or concerns.

Liberty noted no exceptions in its financial audit procedures for the EA Component of Rider FPP. In addition, Liberty determined that Company personnel are following reasonable procedures for the processing of emission data and transactions. Liberty concludes that Duke Energy's overall projection methods for budgeted emission costs resulted in reasonable estimates that were appropriately implemented and complied with Commission guidelines.

3. Liberty's examination of the Audit Period's RA Component of Rider FPP disclosed no exceptions or concerns.

Liberty noted no exceptions in its financial audit procedures for the RA Component of Rider FPP. In addition, Liberty determined that Company personnel are following reasonable procedures for calculating and reconciling the FPP rate, including compliance with financial procedural aspects of former chapter 4901:1-11 of the Administrative Code. Liberty concludes that the Company's procedures and methods for the true up of projected costs to actual costs through the RA were correctly implemented and complied with Commission guidelines.

4. Liberty's examination of the Audit Period's SLA Component of Rider FPP disclosed no exceptions or concerns.

Liberty noted no exceptions in its financial audit procedures for the SLA Component of Rider FPP. Liberty concludes that the Company's overall projection methods for budgeted system losses resulted in reasonable estimates that were appropriately implemented and complied with Commission guidelines.

5. Liberty's examination of the Audit Period's Rider SRT disclosed no exceptions or concerns.

Liberty noted no exceptions in its financial audit procedures for Rider SRT. Liberty concludes that the Company's overall projection methods for budgeted system reliability costs resulted in reasonable estimates that were appropriately implemented.

6. The suspension of FAS 71 treatment causes earnings fluctuations on financial statements despite the Commission's intent to allow for reconciliation of FPP revenues to actual costs.

This last FAS 71 criterion listed in the Findings section requires consideration of anticipated changes in levels of demand or competition during the recovery period for any capitalized costs. The use of FAS 71 does not have any direct impact on charges to customers. It does, however, have the effect of recognizing no liability on the books of Duke Energy, despite the Commission's provisions for reconciling future cost recovery for any prior over- or under-collections.

Liberty has no recommendation on this issue, because the impact of FAS 71 does not affect the revenue amounts actually collected by Duke Energy Ohio. Liberty simply seeks to bring to the Commission's attention that what prove to be mis-forecasts of revenues and costs intended to be reconciled can have impacts on reported earnings. As with all forecasts, however well founded, such discrepancies are unavoidable.

7. The Company has under-collected on Fuel Costs by a significant amount each quarter of the Audit Period. *(Recommendation #1)*

The Company has had an average under-recovery on Fuel Costs of $21,854,980.29, or 17.93 percent of estimated Fuel Costs during the Audit Period. A persistent, large over- or under-collection of Fuel Costs can have impacts on customers. As described in Chapter VII.3 of this report, Duke Energy Ohio's position on FAS 71 defers reconciliation for six months, when the under-collection begins getting applied to customer bills. Thus, significant cost mismatches have implications for customer choice.

D. Recommendations

1. Examine the cause of the Company's under-collection on Fuel Costs. ***(Conclusion #7)***

Liberty proposes to examine forecasting results in the next Audit Period, and, should they prove consistently high or lower compared with ultimate experience, assess the reasons for any such pattern.

[1] Response to Liberty Data Request #13.
[2] Response to Liberty Data Request #13.
[3] Response to Liberty Data Request #41.
[4] Energy Information Administration Website.
[5] Response to Liberty Data Request #18.
[6] Response to Liberty Data Request #18.
[7] Response to Liberty Data Request #20.

[8] Response to Liberty Data Request #46.
[9] Response to Liberty Data Request #27.
[10] Response to Liberty Data Request #47
[11] Response to Liberty Data Request #179.
[12] Response to Liberty Data Request #180.
[13] Interview with Charles Whitlock on September 12, 2007.
[14] Response to Liberty Data Request #185.
[15] Liberty interview with David Jackson on 9/11/07.
[16] Response to Liberty Data Request #61.
[17] Response to Liberty Data Request #106.
[18] Response to Liberty Data Request #106
[19] Response to Liberty Data Request #67.
[20] Response to Liberty Data Request #67 and Liberty Data Request #121.
[21] Interview of September 11, 2007.
[22] Liberty also reviewed the complete list of outages contained in the response to Liberty Data Request # 65.
[23] Response to Liberty Data Request #68.
[24] Response to Liberty Data Request #68 and Liberty Data Request #65.
[25] Response to Liberty Data Request #65.
[26] Interview of September 12, 2007.
[27] Response to Liberty Data Request #167.
[28] Interview of September 11, 2007.
[29] Response to Liberty Data Request #68.
[30] Response to Liberty Data Request #140.
[31] Response to Data Request #63.
[32] Plant Interview of September 12, 2007.
[33] Response to Liberty Data Request #64 and Liberty Data Request #67.
[34] Interview of September 11, 2007.
[35] Response to Liberty Data Request #64
[36] Response to Liberty Data Request #167.
[37] Response to Liberty Data Request #120.
[38] Interview of September 11, 2007.
[39] Response to Liberty Data Request #66 and Liberty Data Request #167.
[40] Response to Liberty Data Request #66 and Liberty data Request #167.
[41] Interview of September 12, 2007.
[42] Plant tour of September 12, 2007.
[43] Interview of September 12, 2007.
[44] Plant tour of September 12, 2007.
[45] Interview of September 12, 2007.
[46] Plant tour of September 12, 2007.
[47] Response to Liberty Data Request #169.
[48] Interview of September 12, 2007 and response to Liberty Data Request #167.
[49] Plant walk down of September 12, 2007.
[50] Response to Liberty Data Request #165.
[51] Response to Liberty Data Request #73.
[52] Response to Liberty Data Request # 143.
[53] Interview of September 11, 2007.
[54] Interview of September 11, 2007.
[55] Liberty did not request a listing of economic analyses conducted to reduce planned outage times.
[56] Response to Liberty Data Request #72.
[57] Response to Liberty Data Request #169.
[58] Interview of September 12, 2007 and response to Liberty Data Request #167.
[59] Response to Liberty Data Request #74.
[60] Response to Liberty Data Request #75.
[61] Response to Liberty Data Request #141.

[62] Response to Liberty Data Request #141.
[63] Response to Liberty Data Request #141.
[64] Response to Liberty Data Request #141.
[65] December 20, 2006 Order of the Public Utilities Commission of Ohio, Case No. 03-93-EL-ATA et al., Paragraph #22.
[66] Only available to customers taking service at 69 kV or greater.
[67] Case No. 99-103-EL-EFC
[68] Case No. 99-103-EL-EFC
[69] Only available to customers taking service at 69 kV or greater.
[70] Only available to customers taking service at 69 kV or greater.
[71] Response to Liberty Data Request #174.
[72] Response to Liberty Data Request #174.