OPSI's arguments would be far better considered in the more complete context of the PJM Board's proposed market monitoring structure, following its comprehensive review of RTO/ISO best practices in this area. Given that PJM expects to complete its review within 60 days, it would be highly inappropriate for the Commission to prematurely step in and direct results before that Board review has been completed. In short, the Commission should not allow the preemptive filing by OPSI to override and marginalize the Board's own careful review of market monitoring structure.

By deferring this issue, the Commission also can avoid addressing the very substantial legal obstacles to the unusual relief that Complainants seek.

First, Complainants have not provided the Commission substantial evidence on which it could find that PJM's current tariff is unjust and unreasonable – a prerequisite to any change.[6] Substantial evidence has not yet been presented to support a finding that PJM has in fact compromised the independence of the MMU or impeded its functioning. As with the rest of the Complaint's allegations and requested relief, OPSI relies only on the brief, non-specific, and unsubstantiated comments of the Market Monitor at the April 5 technical conference, adding only innuendo and speculation to those comments. The Commission cannot take any action without knowing the facts underlying these comments, and a thorough investigation of those facts already is underway in order to elucidate those facts. The Commission should await the outcome of the report to inform

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6 See 16 U.S.C. §824e(a); ANR Pipeline Co. v. FERC, 771 F.2d 507, 513 (D.C. Cir. 1985) (construing comparable provision of Natural Gas Act). Nor does the OPSI Complaint provide any evidence to back its summary assertion (at 31) that service PJM provides is "inadequate" in contravention of FPA §207, 16 U.S.C. §824f, or any support for the proposition that section 207 could be applicable to an RTO's monitoring the competitiveness of wholesale markets, as opposed to the provision of physical service.

its views on the need for any PJM tariff changes. The PJM Board appropriately has advised the Commission that its review of market monitoring structure will be informed by the results of the independent investigation.[7]

Complainants' proposed tariff changes also suffer a critical statutory shortcoming. The Commission has no authority under the Federal Power Act to dictate PJM's internal corporate reporting relationships, internal corporate budgeting process, or personnel policies. The only FPA provision allowing the Commission to address internal corporate structure, section 305 of the FPA, has no applicability here. Section 305 addresses only corporate officers' or directors' dealings in securities, and individuals that serve as both an officer or director of one public utility, and an officer or director of another public utility or of another company that does business with the utility.[8]

As the court of appeals for the District of Columbia Circuit has held, the Commission has no authority beyond this to address internal utility corporate structure.[9] PJM's internal corporate organization, reporting relationships, and personnel policies are not "practice[s] . . . affecting [a] rate" within the meaning of FPA section 206. Such "practices" are limited to "those methods or ways of doing things on the part of the utility that directly affect the rate or are closely related to the rate, not all those remote things beyond the rate structure that might in some sense indirectly or ultimately do so." Id. at

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7 See April 17, 2007 Letter to the Commission from the PJM Board of Managers, filed April 18, 2007 in Docket No. EL07-56-000.

8 See 16 U.S.C. § 825d.

9 Calif. Indep. Sys. Operator v. FERC, 372 F.3d 395, 401 (D.C. Cir. 2004) ("CalISO") ("Congress's specific and limited enumeration of FERC's power over corporate governance in section 305 is strong evidence that section 206(a) confers no such authority on FERC").

403. The CalISO Court held that "[n]one of the words surrounding the word 'practice' in the statutory section suggest a congressional concern with corporate governance or structure," id. at 400, and firmly rejected the Commission's "claimed authority to regulate all actions or activities of public utilities including the personnel and structure of its corporate governance under the rubric of 'practices.'" Id. at 403. Addressing the implications of the authority the Commission claimed in that case, the court observed:

> If FERC can remove a board of directors and dictate the method of choosing a new one because the method of selecting the old one might have made it appear discriminatory, or have even given cause to fear future discrimination, then it would seem that FERC could also dictate the choice of CEO, COO, and the method of contracting for services, labor, office space, or whatever one might imagine, assuming FERC made the appropriate finding. However, we really need no such parade of horribles. The very act attempted by FERC in this case is quite enough to reveal the drastic implications of its overreaching.

Id. at 403-04.[10]

Consistent with these precedents, the Commission cannot dictate PJM's administrative management of its employees, i.e., order that certain PJM employees may

[10] See also NAACP v. FPC, 425 U.S. 662, 664-5 (1976) (affirming decision that FERC is "without power to prescribe personnel practices in detail and to receive complaints, adjudicate them, and punish directly infractions of those practices") (see also id. at 673, Burger, C.J., concurring, and stating that Commission properly rejected "far-reaching proposal" that would put it "into the business of regulating the everyday employment practices of regulated industries"); Missouri-Pacific Railroad Co. v. Norwood, 283 U.S. 249, 256-7 (1931) (comparable provision of Interstate Commerce Act empowering Interstate Commerce Commission to regulate "practice" of carriers did not authorize ICC to regulate the number of men to be employed in crews). Notably, even when the Commission established rules of conduct for the functional separation of transmission and wholesale merchant function employees, it did not go so far as to remove employees from standard corporate reporting relationships, instead recognizing "the need for the company to have officers and directors who are accountable, can exercise their fiduciary responsibilities and can engage in corporate governance functions"). Standards of Conduct for Transmission Providers, Order No. 2004-B, 108 FERC ¶ 61,118, P 57 (2004).

not be supervised by other PJM employees. Nor can the Commission require that PJM internal corporate budgets or personnel actions must be submitted to the Commission for its review and approval. Complainants' request that the PJM internal MMU report only to the PJM Board, with no oversight or supervision by any other PJM employee, and with Commission review of the Board's "budget, retention, or discipline" of any MMU employee, not only seeks relief far beyond any regulation that the Commission has ever imposed on the internal workings of a public utility, it also is outside the Commission's authority to grant.

By the same token, although OPSI requests withdrawal of PJM's RTO status unless its proposed changes to the current internal market monitoring structure are adopted, there is no requirement in Order No. 2000 that the market monitoring function be internal. In fact, Order No. 2000 expressly declined to adopt a particular structure[11] and the Commission has allowed a multitude of structures, as described at the recent technical conference. There is no basis to condition one entity's continuing RTO status on adoption of market monitoring structures not required of any other RTO.

Complainants' alternative demand that the Commission preserve the current MMU comprised of PJM employees, but place it under the supervision and control of some newly-constituted non-PJM board of government agency representatives, similarly goes far beyond anything the Commission may order. The Commission can and does employ its own market monitoring staff, but it cannot direct PJM to provide it with PJM

[11] Regional Transmission Organizations, Order No. 2000, 1996-2000 FERC Stats. & Regs., Regs. Preambles ¶ 31,089, at 31,155-56 (1999), order on reh'g, Order No. 2000-A, 1996-2000 FERC Stats & Regs., Regs. Preambles ¶ 31,092 (2000), petitions for review dismissed sub nom. Public Util. Dist. No. 1 v. FERC, 272 F.3d 607 (D.C. Cir. 2001).

employees to perform that function on behalf of, and under the supervision and control of, the Commission or some other governmental board established by the Commission. The employer-employee relationship necessarily presumes supervision; an employer bears the cost of its employees and is responsible for their performance. How the novel construct proposed by Complainants could be consistent with these fundamental features of an employment relationship are never explained. Certainly, Complainants provide no precedent or authority for their proposal.

FPA section 209, cited by Complainants, does not provide authority to the Commission to act as Complainants propose. That section only authorizes the Commission to "refer any matter arising in the administration" of the Federal Power Act to a board comprised of one or more representatives from each state affected by such matter.[12] On its face, this procedural vehicle does not enlarge the Commission's substantive authority under the other provisions of the FPA, and certainly does not describe any Commission or state role in supervision of utility employees. Moreover, it is not at all clear how such a supervisory arrangement could assure the confidentiality of market-sensitive information given that at least some states have indicated that they have no ability, under their state laws, to keep data free of public records requests.

The Commission need not confront these obstacles, however. Instead, it should await the outcome of PJM's review of alternative market monitoring structures, which may produce an external monitoring structure that could well eliminate the need to address dramatic changes to the current internal MMU structure.

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12 See 16 U.S.C. 824h(a).

CONCLUSION

The Commission should dismiss the Complaint as unsupported, or hold it in abeyance pending the completion of the PJM Board of Managers' announced independent investigation and consideration of market monitoring alternatives.

Respectfully submitted,

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May 3, 2007

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ATTACHMENT

Answer of PJM Interconnection, L.L.C. Filed April 30, 2007
To Complaint in Docket No. EL07-56-000

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Allegheny Electric Cooperative, Inc., Borough of Chambersburg, Pennsylvania; City and Towns of Hagerstown, Thurmont, and Williamsport, Maryland; District of Columbia Office of the People's Counsel; Illinois Citizens Utility Board; Indiana Office of Utility Consumer Counsel; Maryland Office of People's Counsel; New Jersey Division of Rate Counsel; Office of the Attorney General of Virginia, Division of Consumer Counsel; Office of the Ohio Consumer's Counsel; Old Dominion Electric Cooperative; Pennsylvania Office of Consumer Advocate; PJM Industrial Customer Coalition; Southern Maryland Electric Cooperative, Inc.; and State of Delaware, Division of the Public Advocate	)	
v.	)	Docket No. EL07-56-000
PJM Interconnection, L.L.C.	)	

ANSWER OF
PJM INTERCONNECTION, L.L.C.
TO COMPLAINT FOR A SHOW-CAUSE ORDER

PJM Interconnection, L.L.C. ("PJM"), pursuant to the Commission's rules, hereby answers the "Complaint for a Show-Cause Order on a Fast Track Basis," filed on April 17, 2007 ("Complaint") by certain PJM members ("Complainants") regarding the PJM Market Monitoring Unit ("MMU"). The Commission should dismiss the Complaint as entirely unsupported, or hold it in abeyance pending the completion of the PJM Board of Managers' announced independent investigation. As discussed below, there is no need for any "interim" relief. Contrary to the Complainant's unsubstantiated fears, unless and until the Board and the Commission approve a change in PJM's market monitoring structure, PJM has no intention to decrease the MMU's budget, staffing, or access to all of the databases it always has used to monitor the markets. PJM will not take any such action unless and until the Board and the Commission approve a change in PJM's market monitoring structure. Accordingly, there is no basis for the Commission to intervene.

SUMMARY

The Complaint is entirely devoid of support for its claim that PJM has "actively attempted to undermine the ability of the PJM Market Monitor to effectively monitor the PJM markets."[1] The only evidence the Complainants submit for this confrontational assertion is the market monitor, Mr. Bowring's, cursory and unsubstantiated comments at the Commission's April 5, 2007 technical conference in Docket No. AD07-8-000, briefly referencing three instances in which he felt that PJM management compromised his independence by affecting the timing and manner in which he presented certain information to stakeholders and others.

Because PJM does not take lightly allegations of this nature by its market monitor, the PJM Board has commenced a thorough independent investigation into the market monitor's allegations. The Board has committed to provide to the Commission "expeditiously, without sacrificing thoroughness," the results of that investigation. Rather than prematurely attempting to draw conclusions about the MMU's independence or any changes in the performance of this function, based on the market monitor's brief and unsubstantiated comments, simply repeated in the Complaint, the Commission should permit the PJM Board to investigate the facts and report to the Commission regarding its findings.

Nor is there any basis for interim relief of any kind. The Complaint lacks any support for its suggestion that PJM should "be found to be in violation of Attachment M

[1] Complaint at 4.

to its Tariff requiring that it provide the Market Monitor adequate resources and access to data necessary to effectively monitor PJM's markets."[2] The sole basis for this claim is the brief, non-specific unsubstantiated assertions of the market monitor that he felt that MMU personnel and their access to data somehow may be compromised in the future. There is no basis for this fear. PJM management provides the MMU with staff and resources to perform its assigned functions, has not reduced funding or staffing for the important market monitoring duties assigned to the MMU by the PJM Tariff, and has not diminished the MMU's access to data in any manner whatsoever. Pending any change to PJM's market monitoring structure, PJM has every intention of continuing to fund the MMU, as the Complainants seek, at no less than 2006 levels, and has always and will continue to provide the MMU with complete access to the same data it always has used to monitor the markets.

The Complaint also attempts to make much of whether PJM has already decided to seek to adopt an external MMU structure. There is no question that PJM management is recommending that its Board study and evaluate the risks and benefits of a new MMU structure, such as those used by other regional transmission organizations ("RTOs") that rely on an external market monitor. Such a "best practices" review is an entirely proper management function. Indeed, the Commission itself is investigating similar questions. It is also no secret that PJM management believes that its current structure, which represents the only entirely internal market monitoring in the country, very likely is not the best practice for this function.

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2 Complaint at 4.

In the aftermath of Mr. Bowring's highly-charged comments to the Commission, it has become even clearer that the current internal structure is highly strained and constitutes a distraction to both market monitoring staff and PJM staff. Without prejudging the Board's ultimate determination, and to resolve uncertainty as soon as possible, PJM expects to complete its review of the MMU structure within the next 60 days and, subject to Board determination, submit any required tariff filings to implement any changes to PJM's market monitoring structure promptly thereafter. Any decision the Board may make to change the present structure of the MMU will be informed by the results of the pending independent investigation. The Commission should be assured, however, that until the Commission approves any such changes, there will be no reduction in existing MMU funding, resources, or data access. And, if there is any change in structure, the Commission should be assured that such change will not lead to any diminution in efficacy of the MMU function.

PJM, of course, also expects the market monitor and his staff to continue to devote their full time and attention to their duties, and PJM, as the Commission-regulated utility responsible for ensuring proper monitoring of the PJM markets, will continue its assigned role of making sure that market monitoring continues unimpaired in the meantime. PJM's obligation, first and foremost, is to ensure the continued operation of robust and competitive wholesale electricity markets, and it will assure such markets are maintained and monitored.

ANSWER

I. Complainants' Allegations of Interference Present Nothing That Warrants Preempting the PJM Board's Pending Investigation.

Complainants ask the Commission to direct PJM to "show cause why it should not be found to have actively attempted to undermine the ability of the PJM Market Monitor to effectively monitor the PJM markets" (Complaint at 4) and ask that the Commission verify that the MMU has sufficient independence and is not unduly influenced by PJM management. Id. at 24.

The sole basis for these claims is the assertions of Mr. Bowring at the April 5 technical conference. There, Mr. Bowring asserted, without any actual evidence or other substantiation, that PJM had taken actions that he believed "are inconsistent with independence and with the objectives of the MMU" and cited three alleged instances of interference.[3]

However, as the Chairman has recognized, those statements do not provide "the whole story." As Chairman Kelliher observed:

> Mr. Bowring has raised certain allegations. I saw them for the first time this morning. I think he might have given them to us late last night or this morning at some point. I like Mr. Bowring. I respect him. But I don't feel comfortable assuming that his version is the complete story, it's the whole story. I think one thing we have to do here, and I think as State Commissions, you do this, I believe, is listen to more than one perspective before you

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3 Written Statement of Joseph E. Bowring, filed April 5, 2007 in Docket No. AD07-8-000 (reproduced as "Attachment A" to the Complaint). Mr. Bowring listed these as "ordering me to modify the State of the Market Report, preventing me from making a presentation to a membership committee on the exemption of certain interfaces from mitigation when PJM disagreed with my analysis and delaying the release of an MMU report regarding the regulation market based on management disagreements with our conclusions." Id., at ¶ 10.

> make a decision. I have reviewed his comments and I think we'll listen to more than one version of events though.[4]

Without more (which Complainants do not provide), Mr. Bowring's assertions do not provide grounds for a conclusion that PJM has violated its tariff. Complainants apparently recognize this, as they style their complaint as a request for an order to show cause. Rather than present grounds for a claim, as required by the Commission's rules,[5] that PJM has violated its tariff or any Commission statute, order, or rule, they ask the Commission to presume that PJM has acted improperly and impermissibly seek to turn the section 206 complaint process on its head by shifting the burden to PJM "to demonstrate its current compliance with tariff provisions." Complaint at 2.

Mr. Bowring's short one-sided recitation of actions that, viewed solely from his perspective, intruded on his prerogatives, is not a sufficient record basis for an immediate Commission order directing PJM to take, or refrain from taking, any actions. A remedy can be neither required nor effective unless it addresses some identified actual or imminent violation or error. Here, Mr. Bowring's brief and non-specific statements,[6] made at a technical conference where a large number of witnesses were provided only a few minutes to make presentations and answer the Commission's policy questions,

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4 April 5, 2007 Tech. Conf. in Docket No. AD07-8-000, at 193.

5 See 18 C.F.R. § 385.206 (b)(1), (2) which requires that a Complainant "clearly identify the action or inaction which is alleged to violate applicable statutory standards or regulatory requirements" and "explain how the action or inaction violates applicable statutory standards or regulatory requirements" (emphasis added).

6 For example, although Mr. Bowring's comments were taken by many as calling into question the conclusions in the recently released 2006 State of the Market Report, he subsequently assured the PJM Board that he stands by all of the conclusions in that report.

simply do not rise to the level of record evidence sufficient to support a complaint. Looking at those brief statements without more, one could equally infer that the facts show compliance with the tariff requirement that the MMU report to the PJM President, rather than conclude that the facts make out a tariff violation. This is precisely why the Board has sought further independent investigation.

Rather than engage in a breathless rush to judgment, the PJM Board has ordered a thorough investigation by independent counsel to identify and communicate all facts associated with Mr. Bowring's assertions. The Board has promised to do so "expeditiously, without sacrificing thoroughness," and has assured the Commission that the resulting comprehensive report will be provided to the Commission.[7] Indeed, as a practical matter, the PJM Board has already volunteered to do exactly what Complainants seek. The Board will "show" the Commission the actual facts regarding PJM's compliance with its tariff, as determined by independent counsel free from any influence of PJM management.

Complainants apparently would have PJM respond to Mr. Bowring's non-specific allegations before the Board even investigates the facts. To the contrary, it would be irresponsible for PJM to respond without the Board's completing its investigation into the precise nature of the accusations and the facts surrounding them. Accordingly, the Commission should only determine what action, if any, to take concerning Mr. Bowring's allegations after it has been provided the PJM Board report. It should not rely

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7 See Letter to the Commission from the PJM Board, filed April 18, 2007 in this proceeding.

on innuendo.[8] As the Complaint does nothing more than repeat Mr. Bowring's unsubstantiated factual allegations, adding only innuendo and suggestion, it does not support its requested findings or remedies. The Commission should therefore dismiss the Complaint[9] or, at the very least, hold it in abeyance until the Commission receives the PJM Board's report.[10]

II. PJM Has Consistently Provided, and Will Continue to Provide, the Resources and Access to Data That Support the MMU's Activities.

The Complaint asks the Commission to direct PJM "to verify that it has not taken or will not take steps to dismantle its market monitoring unit" (Complaint at 2) and to show cause "why it should not be found to be in violation of Attachment M to its Tariff requiring that it provide the Market Monitor adequate resources and access to data necessary to effectively monitor PJM's markets." Id. at 4. Similarly, the Complaint asks

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8 Moreover, to take all the actions Complainants demand solely on the basis of Mr. Bowring's brief comments at the technical conference could jeopardize the Commission's reliance on such conferences as forums for the Commission to exchange policy ideas with witnesses, transforming them instead into trial-type proceedings where attorneys would have to object to questions and statements for fear that the statement may form the basis for a complaint on matters unrelated to the announced purpose of the technical conference.

9 See, e.g., CAlifornians for Renewable Energy, Inc. v. California Public Utilities Commission, 119 FERC ¶ 61,058, at PP 41-44 (2007); Nat'l Ass'n of Gas Consumers v. All Sellers of Natural Gas, 106 FERC ¶ 61,072, at P 13 (2004); Chevron Products Co. v. SFPP, L.P., 99 FERC ¶ 61,196, at P 26 (2002).

10 C.f. Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards, 114 FERC ¶ 61,104, at P 485 (2006) ("The Commission agrees that the ERO, Regional Entities, and the Commission should generally avoid multiple investigations involving the same violation. There may be situations in which it would be appropriate to have concurrent investigations but we expect any such occasion to be rare. In those situations we would coordinate efforts with the ERO or any relevant Regional Entity.")

the Commission to require PJM to "provide the Market Monitor with full access to all data the Market Monitor determines is necessary to effectively monitor the markets;" and to "fully staff the Market Monitoring unit at least at the 2006 staff level." Id.

Contrary to the conclusory assertions of Complainants, PJM has not in any way "preemptively and prematurely initiated the dismantling of the present MMU structure" (Complaint at 22), and will in no respect diminish the critical function of market monitoring in the PJM region. Rather, PJM has provided, and continues to provide, the resources and access to data needed to support all of the market monitoring activities assigned to the MMU by the PJM Tariff.

Indeed, far from "dismantling" the MMU, PJM has substantially expanded the MMU in the past several years, at a pace faster than the growth of PJM's other departments. For example, in 2004, PJM budgeted $1.862 million for the MMU's operating expenses, with an authorized headcount of 16 full-time equivalent staff positions.[11] By 2006, PJM had increased the MMU operating expense budget by over 70 percent, to $3.181 million, with 19 full-time equivalent staff positions, augmented with contract employees budgeted to add another one to two full-time positions.[12] 2007 has seen no decrease in those budgets; to the contrary, the MMU operating expense budget has increased in just one year by another 11 percent, to $3.543 million, and the authorized

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11 The 2004, 2006, and 2007 staff headcount figures reported here include three full-time equivalent positions for student/co-op employees, which generally have been fully staffed throughout this period, often with individuals working for the MMU for extended periods.

12 Full-time equivalence for contract employees is based on dividing the dollars budgeted for the contract employees by their average hourly rate, and then dividing the resulting budgeted work-hours by an annual standard of 2080 hours for a full-time employee.

resources for personnel were increased to 19 full-time equivalent staff positions augmented by contract employees providing over three full-time equivalent positions. Notably, the amount PJM budgets for the MMU has in every year significantly exceeded the amount actually spent by the MMU in the prior year.

Moreover, the MMU's growth has outpaced the growth of the rest of PJM. In 2004, the operating expense budget for the MMU was 1.43% of the operating expense budget for all of PJM.[13] The proportion of PJM operating resources devoted to the MMU has increased every year since, and in 2007 PJM has budgeted 2.07% of all its operating expenses to the MMU.[14]

Again, all that the Complainants offer to support their assertions that the MMU is being "dismantled" (at 2) or has been "marginalized" by denial of resources (at 23) is the sparse, non-specific, and unsubstantiated technical conference comments of Mr. Bowring. There he briefly related his perceptions of a meeting between PJM management and MMU staff in advance of the release of the 2007 PJM Strategic Report, his perception of two PJM job postings, and a claim that PJM would be "removing the MMU's database" and transferring it elsewhere in PJM.[15]

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13 The MMU's 2004 operating expense budget was $1.862 million, as noted above, versus PJM's total 2004 operating expense budget of $129.830 million, or 1.43% of the total. (PJM operating expenses exclude capital project costs, depreciation, interest income, interest expense, and taxes, which generally are not attributable to specific PJM departments.)

14 The MMU's 2007 operating expense budget is $3.543 million, as noted above, versus PJM's total 2007 operating expense budget of $170.955 million, or 2.07% of the total.

15 <u>See</u> Attachment A to the Complaint, at page 3, paragraph 12.

While each of Mr. Bowring's comments on these points undoubtedly will be addressed in detail by the independent counsel investigation,[16] PJM's strong and continuing support of the existing MMU structure is amply evidenced by the facts detailed above showing PJM's commitment of resources to the MMU. The cursory allegations, which are addressed below, do not withstand scrutiny, and do not negate PJM's continued strong support of its existing market monitoring.

As to the referenced meeting between PJM management and the MMU, in the view of PJM management the underlying facts demonstrate only that PJM management properly visited MMU staff before the 2007 PJM Strategic Report was released, to advise them in advance of the report's recommendation to consider use of an external market monitor, and to send two messages: first, they should remain focused on their important duties; and second, PJM values them as employees and hopes to retain them regardless of the outcome of that review. This action hardly can be considered a tariff violation—to the contrary, it simply reflects good management practice and common courtesy.[17]

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16 PJM is compelled to address these issues now, without the benefit of the Board's investigation, as a result of Complainants' demand for immediate relief based on their false assertions that PJM is "dismantling" the MMU and denying it access to data. The discussion in the following text is PJM management's response.

17 The Complaint (at 23-24) suggests, unpersuasively, that there is some type of conflict on this topic between PJM's April 13, 2007 press release and its Chief Operating Officer's April 5, 2007 Technical Conference statement. However, both statements are consistent with the description of that meeting and its purpose, as described above. PJM's press release recognized "that this type of organizational examination creates concerns among the affected employees," prompting PJM management's meeting to advise the MMU staff of the impending review and express support for their valued work. Similarly, PJM's Chief Operating Officer explained to the Commission that PJM followed prudent business practice in such circumstances, i.e., "[w]hat we're intending to do is tell the employees it's under consideration, which we've told our employees."

Nor is PJM's consideration of the use of an external monitor a violation of its tariff or Order 2000. Indeed, every other RTO approved by the Commission relies in whole or in part on an external market monitor, and all have been found to comply with Order 2000.[18] A "best practices" review by the PJM Board, as management recommended, should be praised, not indicted. Indeed, the Commission's technical conference on the subject itself was the start of the Commission's own best practices review. Accordingly, the 2007 Strategic Report's recommendation to study and consider the risks and benefits of using an external market monitor raises no legitimate concerns about the viability or independence of the market monitor, or PJM's compliance with its tariff.

As to the MMU's concern about the impact of two PJM job postings, the underlying facts do not support the allegations made in the Complaint, or justify the relief it seeks. As with any PJM division, the MMU's actual employee headcount can vary from time to time based on individual employee actions. Among other reasons for job movements, PJM allows all PJM employees to bid on any PJM job postings, and PJM does not believe it would be appropriate to deny this opportunity to an employee solely because he or she works in the MMU.[19] One MMU employee successfully bid on a PJM

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18 See Southwest. Power Pool, Inc., 114 FERC ¶ 61,289, at P 134 (2006); Midwest Indep. Transmission Sys. Operator, Inc., 101 FERC ¶ 61,228, at P 1 (2002); N.Y. Indep. Sys. Operator, Inc.; 99 FERC ¶ 61,059, at 61,199 (2002); Prepared Remarks of Hung-Po Chao submitted in Docket No. AD07-8-000, at 1-2 (filed April 19, 2007) (describing ISO-New England dual internal/external market monitoring structure); Remarks of Karen Edson, submitted in Docket No. AD07-8-000, at 1 (filed April 11, 2007) (describing California ISO dual internal/external market monitoring structure).

19 Indeed, job postings result in movement of employees both to and from the MMU. When the MMU posts openings, all PJM employees may bid on those

(Cont'd . . .)

position and transferred earlier this year (prior to the announcement of PJM's recommended review of alternate market monitoring structures). Two more MMU employees successfully bid on PJM positions, and are scheduled to transfer in May. However, PJM is developing transition plans so that both employees continue to devote a significant portion of their time to the MMU until replacements can be found.[20] Moreover, PJM has now implemented a retention plan for MMU employees to encourage them to remain with the MMU. Every MMU employee that remains with the MMU through the completion of the consideration of any alternative market monitor structure, and through Commission approval of any such change, will receive a substantial project completion bonus. These facts hardly constitute a "dismantling" of the MMU.

Mr. Bowring's alleged concern about PJM "removing the MMU's database" at best appears to reflect a misunderstanding.[21] To be clear, the MMU retains completely unfettered access to all of the databases that it has used in the past, and continues to use, to monitor the PJM markets, as well as any and all other PJM data that it requires. The only potential change regarding data that PJM is considering is changing the designated security "stewardship" of certain databases used by the MMU from Mr. Bowring to Mr.

(. . . cont'd)

postings, and, in the past, at least one employee has moved from elsewhere within the PJM organization to the MMU.

20 Such replacements could be through new hires or on a contract basis, consistent with past practice for the MMU, and considering the resources needed by the MMU at that time.

21 As with all of the allegations by the market monitor, the lack of specifics leaves PJM without the ability to respond to concretely expressed concerns. This underscores the wisdom of the Commission avoiding a rush to judgment and allowing the PJM Board to complete an orderly investigation of the allegations at issue.

Ott, PJM's Vice President of Market Services. This change would have no bearing on access to any data. All PJM databases are maintained on secure servers in the physical custody of PJM's Information and Technology Services Division, which supports all of PJM's databases for use by the entire organization, including the MMU. No distinction is (or should be) made between "PJM" and "MMU" data. Each database has a designated "steward" with administrative responsibilities for security of PJM data and, as part of this responsibility, authorizing changes to access to the database by PJM personnel. Any change in "stewardship" of the subject database from Mr. Bowring to Mr. Ott would be intended solely to facilitate access by the Market Services Department to the data relating to the historical operation of PJM's markets, not to "remove" or diminish access by the MMU to that data in any manner whatsoever. Even if this change occurred, the MMU would retain exactly the same access to that data, including to all datasets developed by the MMU from historic data for analytical and other purposes. Finally, even if this change occurred, the MMU would retain the same opportunity to analyze, organize, categorize, test and examine this data both during and after any change in security "stewardship."

There is no requirement that the market monitor have the "stewardship" responsibility for PJM data that he uses to monitor the markets. In fact, the tariff anticipates the very information-sharing that PJM management proposed. The PJM Tariff provides that the market monitor is to "rely primarily upon data and information that is customarily gathered in the normal course of business of PJM," and the President's obligation is simply to assure that the MMU has "access to required information."[22] That

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[22] PJM Tariff, Attachment M, §§ VI.A, V.D.

is being done, and there is no claim by anyone, the MMU included, that this is not taking place.

Nonetheless, although PJM clearly is allowed to make this change, and it would have no effect on the MMU's access to data, the change has not yet been implemented,[23] and therefore PJM will defer any change, pending submission of the results of the Board's investigation to the Commission.

Finally, there is no basis for a requirement that the MMU report to the Commission every two weeks "about the status of its functionality." Complaint at 2. Complainants have not supported their assertions that PJM has not supplied the MMU with adequate resources or that PJM has denied the MMU access to any database. Accordingly, there is no basis for the reports demanded by Complainants, and such reports would likely become an additional distraction and source of friction within an already highly-charged atmosphere in PJM. They also potentially could impact adversely the orderly progression and prompt completion of the Board's investigation. Nonetheless, if the Commission directs the MMU to provide such reports, it should also order concurrent reports from PJM management on the status of the MMU's functioning.

III. PJM Will Complete its Recommended Review of the Appropriate Market Monitor Structure Without Delay.

The Complaint (at 20-21) implies that PJM's consideration of possible new structures for the market monitoring function is somehow impermissible. However, there is nothing improper in PJM's review of the market monitoring structures used by other RTOs to assess whether some version of those structures would be suitable for the PJM

23 Mr. Bowring remains listed as the "steward" of the subject databases.

region. Notably, Complainants themselves appear to object to the current structure, codified in the PJM Tariff, under which the MMU is internal to PJM and reports to the President as well as the Board.[24] Indeed, Mr. Bowring made clear to the Commission at the April 5 technical conference his view that the current reporting structure is incompatible with market monitor independence.

PJM agrees that something must change, particularly now in the wake of Mr. Bowring's April 5 comments. It has become clear that the current internal structure is now highly strained and constitutes a distraction to both market monitoring and PJM staff. Accordingly, PJM understands the need to complete its review of market monitoring structure as soon as possible. Therefore, PJM expects to complete its review of the MMU structure within the next 60 days and, subject to Board determination, submit any required tariff filings to implement the outcome of that review promptly thereafter.

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24 See Tariff Attachment M, §§ V.A and V.C.

CONCLUSION

The Commission should dismiss the Complaint as entirely unsupported, or hold it in abeyance pending the completion of the PJM Board of Managers' announced independent investigation.

Respectfully submitted,

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April 30, 2007

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C., this 30th day of April, 2007.

Paul Flynn

Paul M. Flynn

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C., this 3rd day of May, 2007.

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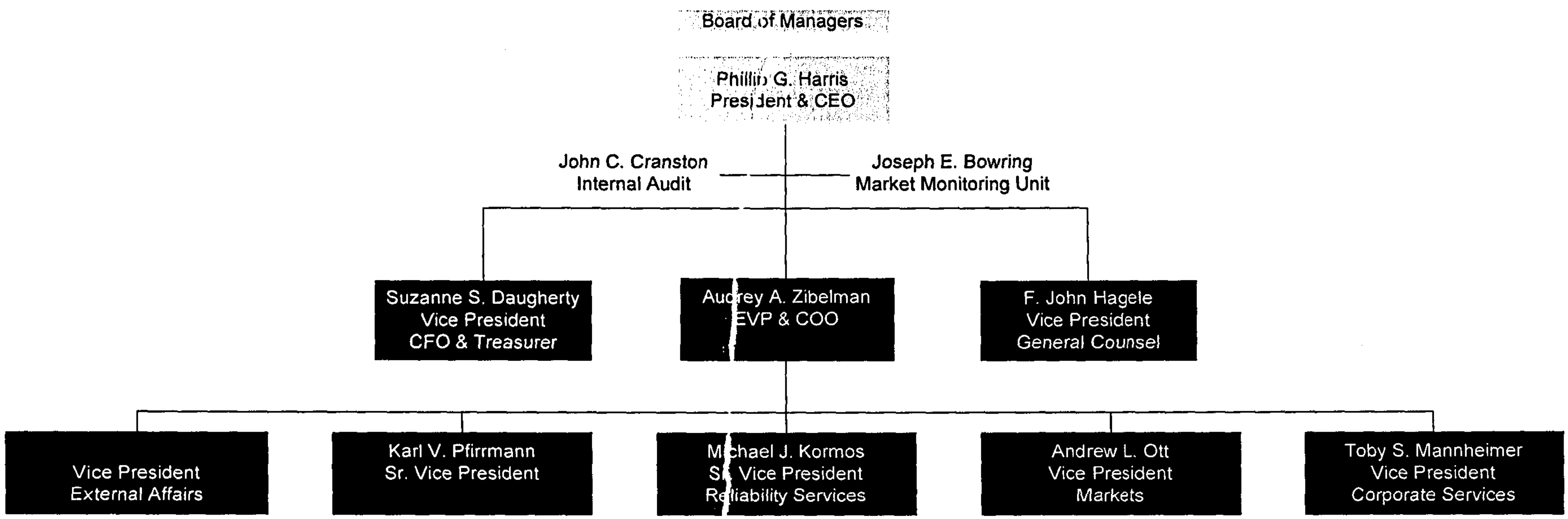
PJM Interconnection – December 2006



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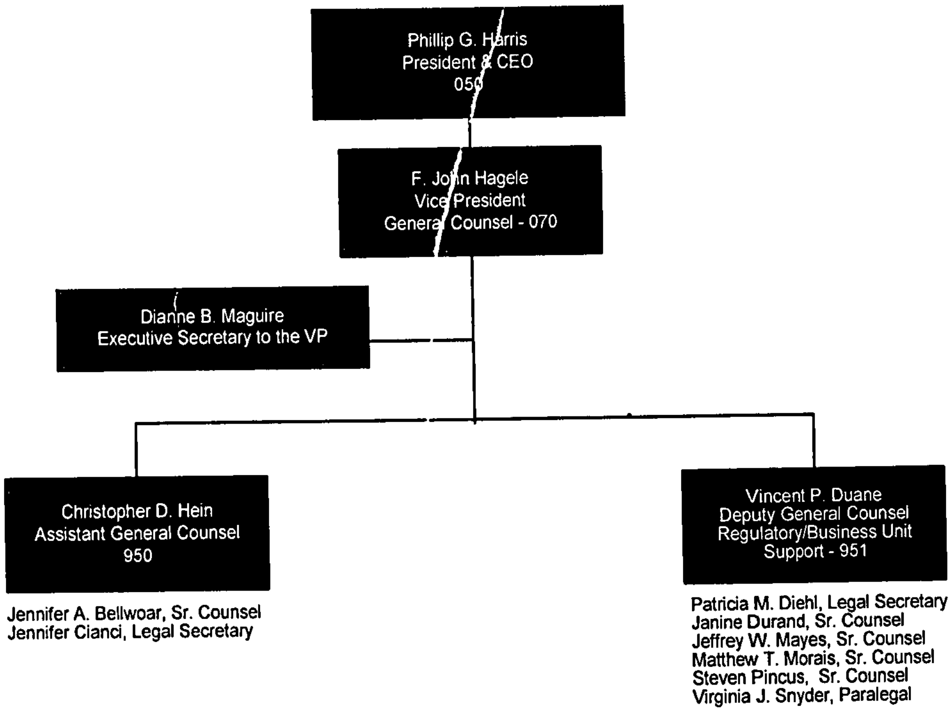
Phillip G. Harris
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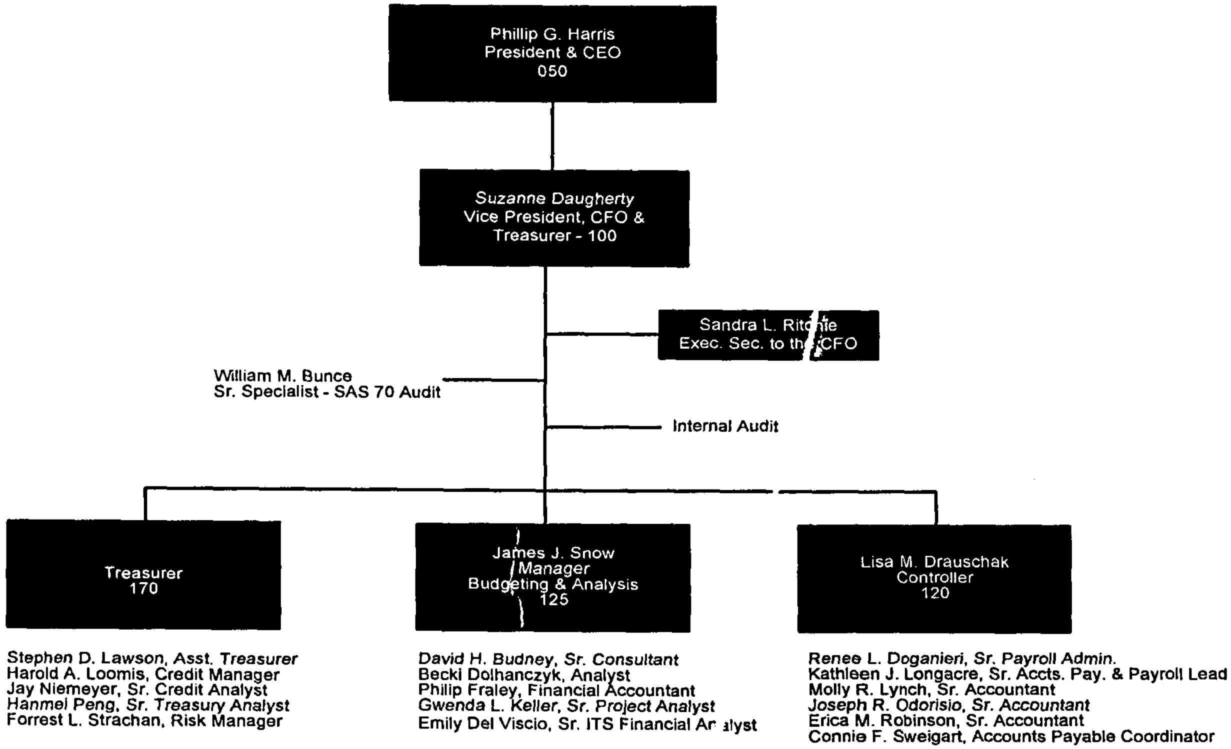

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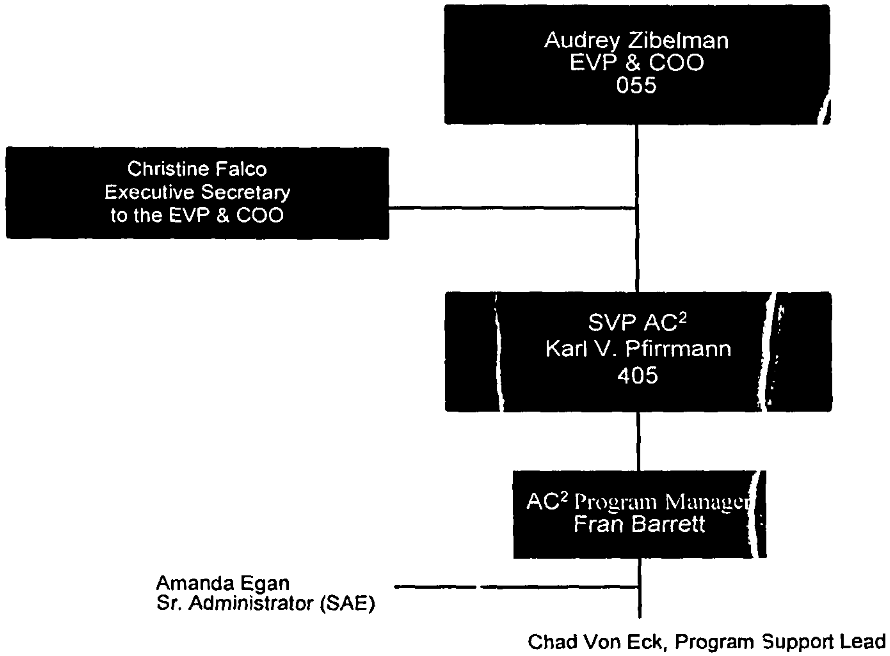
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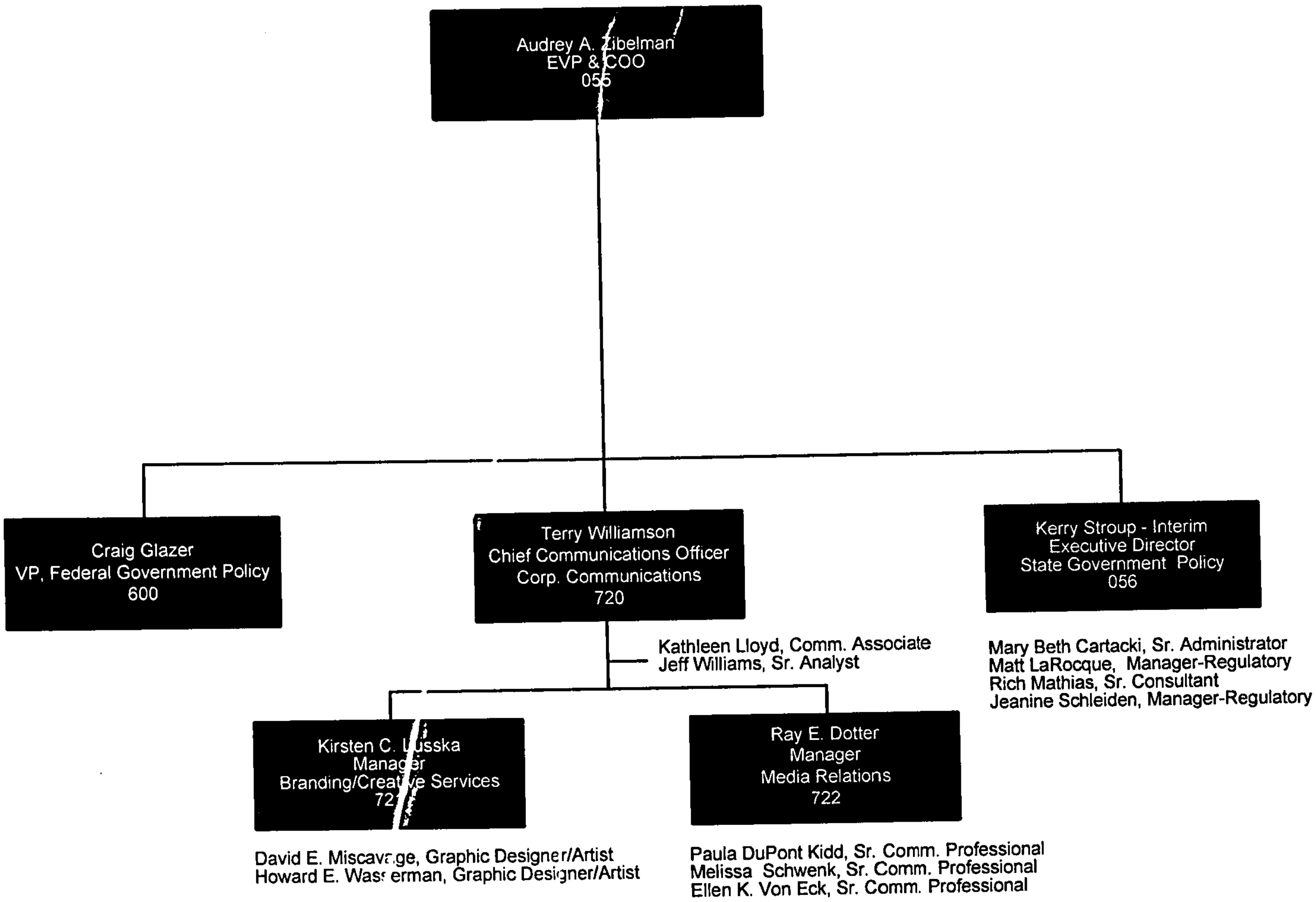
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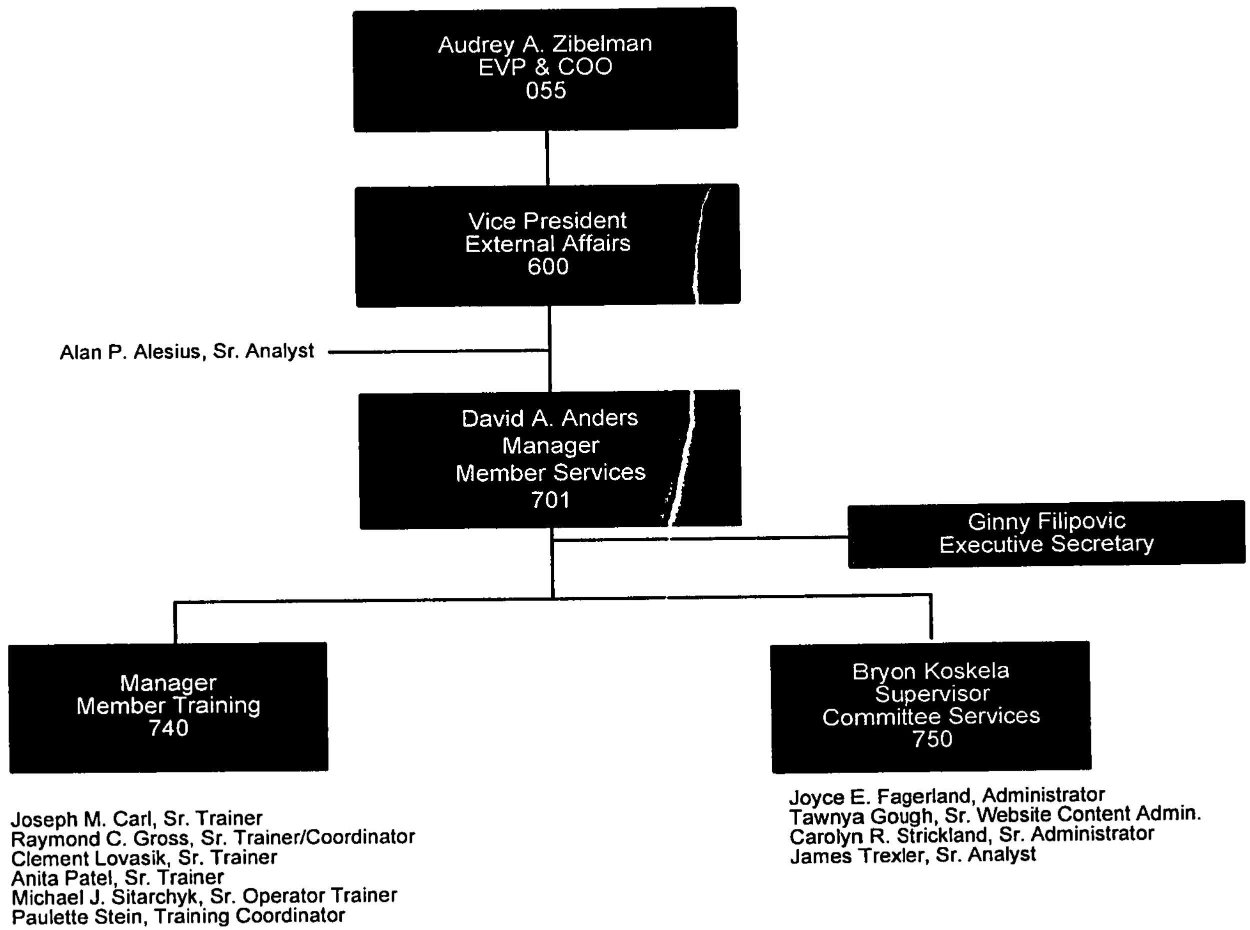

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Claudette Shellman-Peters
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SMM - 01386

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- Edmund Franks, Engineer
- Michael J. Herman, Engineer
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- Ganesh K.Velummylum, Engineer
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- Mark L. Sims, Sr. Engineer
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- Enzio D. Colodonato, Graph Des./ CAD Support
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Carl E. Schiavoni, Web Developer
Debra A. Taraschi, Sr. Business Analyst
Richa Tiwari, Sr. SAP Programmer
Timothy S. Watts, Sr. SAP Administrator
Laura Wolkowitz, Sr. Web Developer

Christopher Smart
Manager
Operations Applications
222

Walter C. Appleton, Sr. Application Developer
Wendy Casterline, Sr. Business Analyst
Srinivas Karra, Sr. Application Developer
Edward Kovler, Sr. Business Analyst
Wei Li, Sr. Application Developer
Aleksandrs Lubimovs, Sr. Application Developer
James L. McDonald, Business Analyst
Lana Meres, Sr. DBA
David S. Rohland, Sr. DBA
David G. Wolfe, Sr. Business Analyst
Jing Yang, Sr. Application Developer

SMM - 01388

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Information and Technology
Services
201

John I. Dyer
General Manager
IT Operations
230

Robert J. Wagner
Manager
Windows Infrastructure
214

- Larry S. Austin, Sr. Windows Support Analyst
- Terrence J. Curry, Sr. Windows Support Analyst
- Nicholas Della Pelle, Windows Support Analyst
- Michael J. Delviscio, Sr. Windows Support Analyst
- George M. Fazio, Windows Support Analyst
- Michael Fortunato, Windows Support Analyst
- Christopher Hagan, Sr. Windows Support Analyst
- Timothy Herman, Sr. Windows Support Analyst
- Ross A. Kendall, Windows Support Analyst
- Frank E. Kramer, Windows Support Analyst
- Jin Hyung Lee, Windows Support Analyst
- Ian M. Mundell, Sr. Windows Support Analyst
- Greg Rozinsky, Sr. Windows Support Analyst
- Jessica M. Staley, Windows Support Analyst
- Justin Weddington, Sr. Windows Security Analyst
- Clarence Whitaker, Windows Support Analyst

John N. Ippolito
Manager
AIX Infrastructure
211

- Mouhcine Bengelloun-Zahr, AIX Security Analyst
- Bryan Chain, AIX Infrastructure
- Paul Disciascio, AIX/Linux Support Analyst
- Lawrence E. Nicholas, Sr. Infrastructure Suport Analyst
- Charles A. Patterson, Sr. AIX/Linux Support Analyst
- Timothy M. Peek, Sr. AIX/Linux Support Analyst
- Neil Rosenberg, Infrastructure Suport Analyst
- Raymond G. Snyder, Sr. AIX/Linux Support Analyst
- James P. Smith, AIX Analyst
- David M. Zinn, Sr. Infrastructure Suport Analyst

Colin M. Brisson
Manager
Network Infrastructure
241

Network Infrastructure (241)
- Joseph Callis, Sr. Network Security Analyst
- Daniel R. Cunningham, Network Analyst
- David C. Frasch, Network Analyst
- Richard H. Glaum, Sr. Network Analyst
- Raymond M. Groff, Sr. Network Analyst
- Ronald R. Moore, Sr. Network Analyst
- Charles J. Nixon, Sr. Network Analyst
- Samuel T. Pomponi, Sr. Network Analyst
- Lee J. Triplicata, Sr Network Analyst

Telecommunications Infrastructure (242)
- John T. Hadrick, Sr. Telecom. Analyst
- Frank J. Nitchie, Sr. Telecom. Analyst

Sean McNamara
Manager
IT Operations Center
230

- Pradip K. Agnihotri, Sr. Specialist
- Albert E. Barth, Sr. Specialist
- Steven Cartacki, Sr. Specialist
- Charles L. Conway, Sr. Specialist
- Jonathan Geremia, Analyst
- Kristerpher Henderson, Analyst
- William E. Hibbs, Sr. Specialist
- Richard Hopkins, Sr. Specialist
- Troy J. Houston, Sr. Specialist
- Peter Kohut, Monitoring & Perf. Analyst
- Francis M. Letterio, Sr. Specialist
- Philip Milazzo, Sr. Monitoring & Perf. Analyst
- Gregory Moyer, Sr. Specialist
- Shannon R. Oconnor, Sr. Monitoring & Perf. Analyst
- Daniel J. Ognissanti, Analyst
- Andrew J. Procaccini, Sr. Specialist
- Dipti V. Shah, Sr. Config. Mgmt. Admin.

SMM - 01389

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Thomas F. O'Brien
General Manager
Reliability Services AC²
Program - 265

Lisa Brennan, Project Scheduler
Earl Lynch, AC² Program Office Lead

John Baranowski
Manager
Vendor Business/
Development Lead 407

Ronald T. Graff, Lead Architect
Daniel Moscovitz, Systems Engineer
Darryl G. Schrift, Sr. Lead Engineer
John P. Smith, Sr. Network Analyst

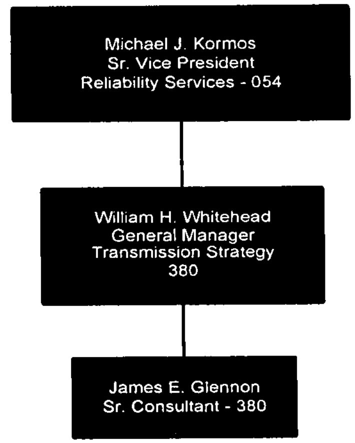
David J. Vicini
Manager
Operations Lead AC²
406

Richard Brenton, Sr. Technical Architect
John E. Collier, Sr. Lead Architect
John Dadourian, Sr, Lead Engineer
Trevor R. Loose, Sr. Lead Engineer
Stephanie Monzon, Sr. Analyst
Andrew J. Rodriquez, Sr. Consultant

Joshua Binstead
Manager
Information Systems AC²
244

Amanda Chambers, Project Lead
Lisa Hoover, Sr. Data Architect
Richard Knebel, Sr. Network Analyst
Michael R. Luna, Sr. Technical Architect
Kathleen O'Brien, Sr. Business Analyst
Tahir Saeed, Sr. Lead Analyst
Sammie Stahlback, Sr. Technical Architect
Dave Ulmer, Sr. Technical Architect

SMM - 01390



SMM - 01391

326692

Michael J. Kormos
Sr. Vice President
Reliability Services
054

Reliability Council Coordination
800

Leanne M. Harrison, Sr. Engineer
Stephanie Monzon, Sr. Engineer

Manager
Interregional Coord. &
Compliance (730)

Albert M. DiCaprio, Sr. Strategist
Mark J. Kuras, Sr. Engineer

Thomas T. Bowe
Chief Security Officer
181

Francine A Martin, Sec. Administrator

Physical Security (181)
R. Scott Heffentrager, Physical Sec. Mgr.
Timothy Foley, Security Analyst

Business Continuity (183)
Ronald G. Hedges, Sr. Consultant Business Recovery
Leroy Bunyon, Sr. Coord.-Business Recovery

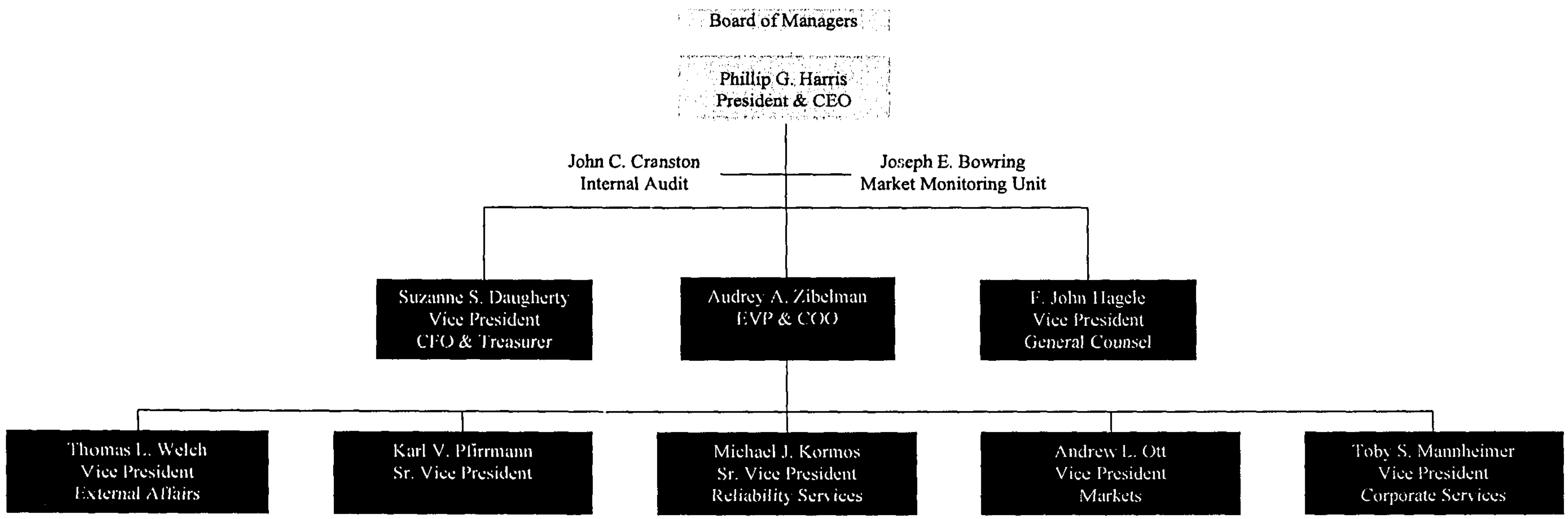
Security Compliance (184)
Todd N. Thompson, Sr. Security Leader
Duy K. Tran, Sr. Security Analyst

Mark L. Holman
Manager
IT Security
205

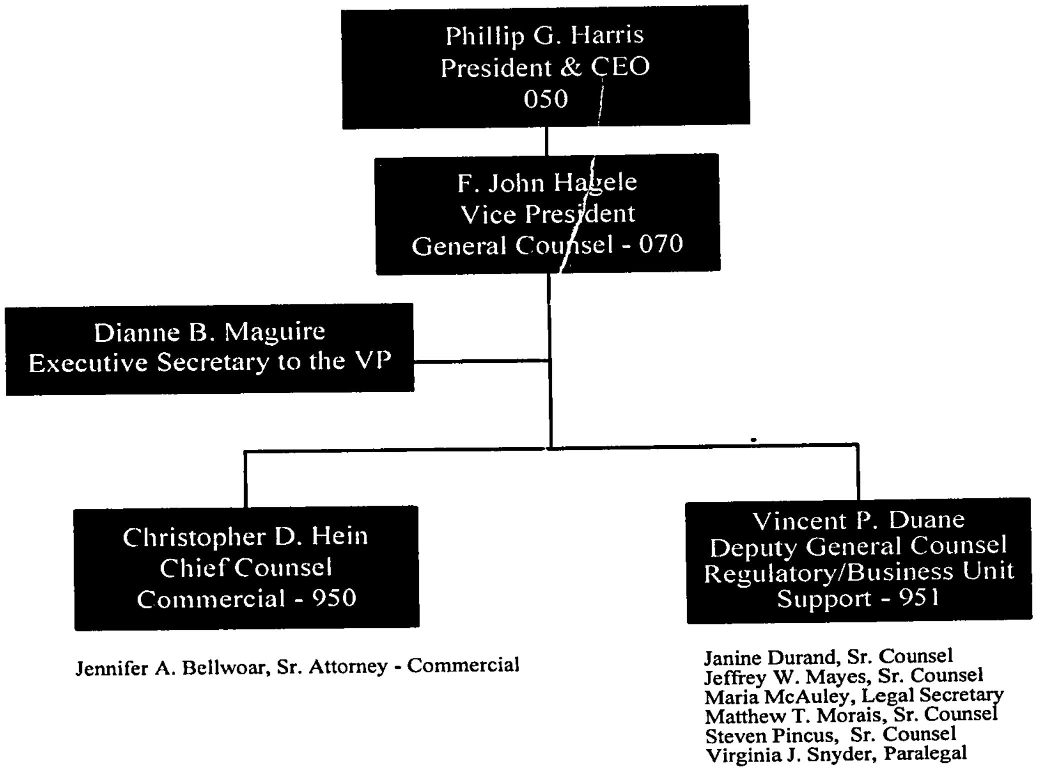
Helen M. Burnley, Security Analyst
Lorraine I. Coulston, Security Analyst
Francine Miller, Security Analyst
Sherwood R. Probeck, Sr. Security Analyst
Kristyn M. Roessler, Security Analyst
William Souza, Sr. Security Analyst

SMM - 01392

PJM Interconnection – December 1, 2005

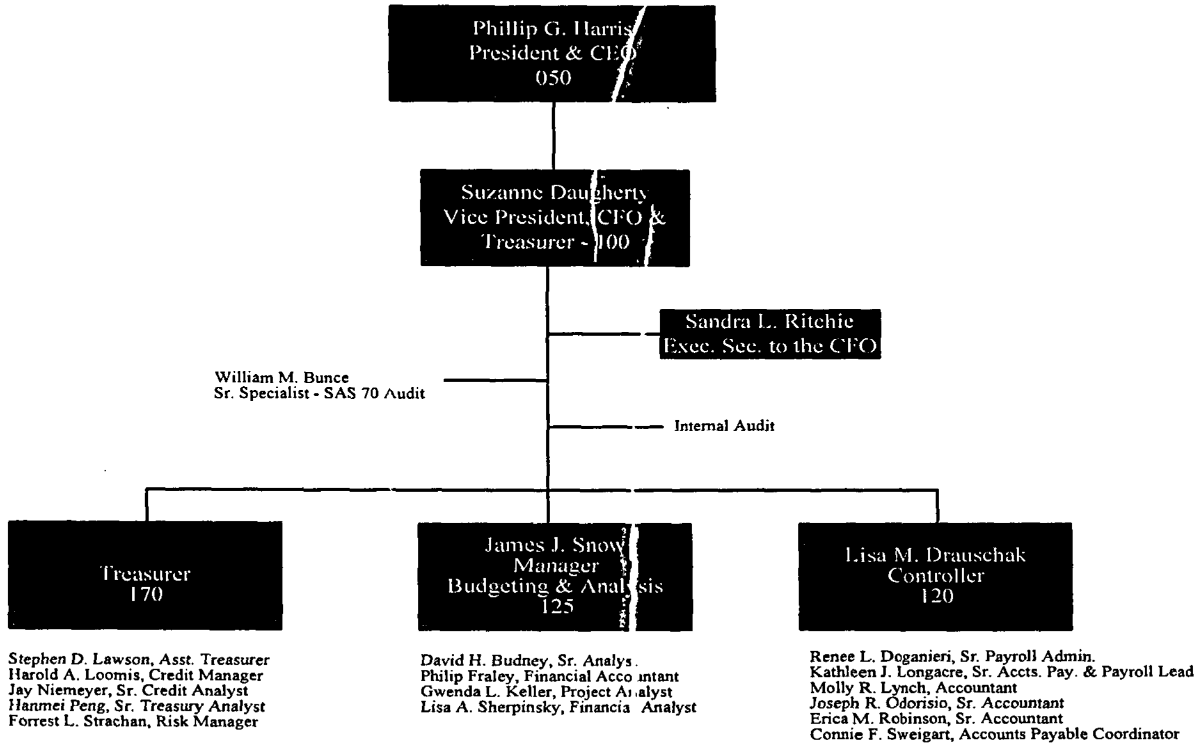


SMM - 01393



Phillip G. Harris
President & CEO
050
F. John Hagele
Vice President
General Counsel - 070
Dianne B. Maguire
Executive Secretary to the VP
Christopher D. Hein
Chief Counsel
Commercial - 950
Jennifer A. Bellwoar, Sr. Attorney - Commercial
Vincent P. Duane
Deputy General Counsel
Regulatory/Business Unit
Support - 951
Janine Durand, Sr. Counsel
Jeffrey W. Mayes, Sr. Counsel
Maria McAuley, Legal Secretary
Matthew T. Morais, Sr. Counsel
Steven Pincus, Sr. Counsel
Virginia J. Snyder, Paralegal

SMM - 01394


Phillip G. Harris
President & CEO
050
Suzanne Daugherty
Vice President, CFO &
Treasurer - 100
Sandra L. Ritchie
Exec. Sec. to the CFO
William M. Bunce
Sr. Specialist - SAS 70 Audit
Internal Audit
Treasurer
170
Stephen D. Lawson, Asst. Treasurer
Harold A. Loomis, Credit Manager
Jay Niemeyer, Sr. Credit Analyst
Hanmei Peng, Sr. Treasury Analyst
Forrest L. Strachan, Risk Manager
James J. Snow
Manager
Budgeting & Analysis
125
David H. Budney, Sr. Analys
Philip Fraley, Financial Acco ıntant
Gwenda L. Keller, Project A ıalyst
Lisa A. Sherpinsky, Financia Analyst
Lisa M. Drauschak
Controller
120
Renee L. Doganieri, Sr. Payroll Admin.
Kathleen J. Longacre, Sr. Accts. Pay. & Payroll Lead
Molly R. Lynch, Accountant
Joseph R. Odorisio, Sr. Accountant
Erica M. Robinson, Sr. Accountant
Connie F. Sweigart, Accounts Payable Coordinator

SMM - 01395

Phillip G. Harris
President & CEO
050

- Geraldine K. Kook
  Exec. Sec. to the President

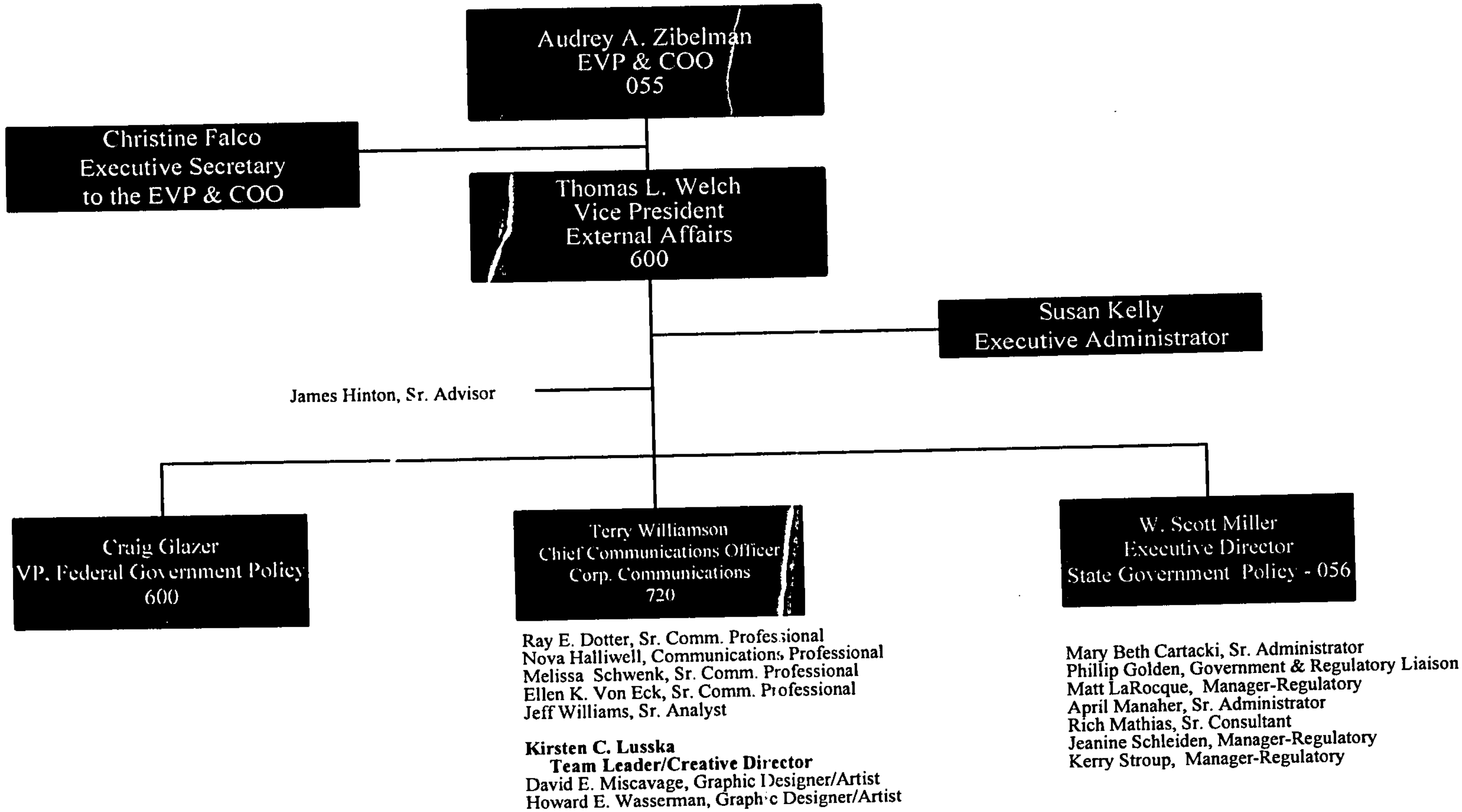
- Joseph E. Bowring
  General Manager
  Market Monitoring Unit - 520

  Francis J. Bell, Sr. Engineer
  Thomas A. Blair, Sr. Database Analyst
  Susan Cawley, Sr. Administrator
  Bridgid M. Cummings, Analyst
  Andrew Engle, Analyst
  Beatrice Gockley, Analyst
  Howard Haas, Sr. Economist
  Ellen C. Krawiec, Sr. Database Analyst
  Donald E. Kujawski, Sr. Analyst
  Yan Lin, Sr. Engineer
  Mark Million, Sr. Analyst
  John P. O'Neill, Sr. Engineer
  Frank J. Racioppi, Sr. Engineer
  Paul G. Scheidecker, Sr. Engineer
  Thomas F. Zadlo, Sr. Analyst

- John C. Cranston
  Manager
  Internal Audit
  080

  Steven A. Abramowicz, Sr. Financial/Operations Auditor
  William I. Bixler, Sr. IT Auditor
  Lisa M. Hurchik, Sr. Fin. Auditor
  Sandra Johansen, Sr. IT Auditor

SMM - 01396


Audrey A. Zibelman
EVP & COO
055
Christine Falco
Executive Secretary
to the EVP & COO
Thomas L. Welch
Vice President
External Affairs
600
Susan Kelly
Executive Administrator
James Hinton, Sr. Advisor
Craig Glazer
VP, Federal Government Policy
600
Terry Williamson
Chief Communications Officer
Corp. Communications
720
Ray E. Dotter, Sr. Comm. Professional
Nova Halliwell, Communications Professional
Melissa Schwenk, Sr. Comm. Professional
Ellen K. Von Eck, Sr. Comm. Professional
Jeff Williams, Sr. Analyst
Kirsten C. Lusska
Team Leader/Creative Director
David E. Miscavage, Graphic Designer/Artist
Howard E. Wasserman, Graphic Designer/Artist
W. Scott Miller
Executive Director
State Government Policy - 056
Mary Beth Cartacki, Sr. Administrator
Phillip Golden, Government & Regulatory Liaison
Matt LaRocque, Manager-Regulatory
April Manaher, Sr. Administrator
Rich Mathias, Sr. Consultant
Jeanine Schleiden, Manager-Regulatory
Kerry Stroup, Manager-Regulatory

SMM - 01397

Audrey A. Zibelman
EVP & COO
055

Thomas L. Welch
Vice President
External Affairs
600

David A. Anders
Manager
Member Services
701

Ginny Filipovic
Executive Secretary

Manager
Member Training
740

Glen D. Boyle, Training Lead
Joseph M. Carl, Sr. Trainer
Raymond C. Gross, Sr. Trainer/Coordinator
Clement Lovasik, Sr. Trainer
Anita Patel, Sr. Trainer
Michael J. Sitarchyk, Sr. Operator Trainer
Paulette Stein, Training Coordinator

Alicia Daugherty
Manager
Member Relations
440

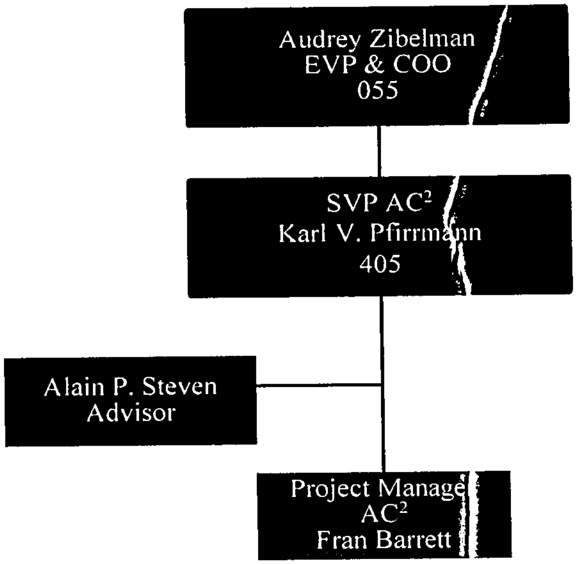
Lauren K. Andersen, Client Manager
Priscilla Chandler, Sr. Customer Liaison
Tracy A. Domin, Analyst
John W. Gdowik, Client Manager
Esrick McCartha, Client Manager
Dennis Regan, Client Manager
Glenn C. Weiss, Client Manager

Sheila Foley, Sr. Customer Support Analyst (Hotline/Reception Team Lead)
Ingrid U. Bohn, Customer Support Admin./Rec.
Suzanne Clyman, Receptionist - Tech. Center
April Mays-Parks, Sr. Customer Support Admin.
Carol McMenamin, Sr. Receptionist
Michelle M Souder, Sr. Customer Support Admin.
Leslie A. Yeager, Customer Support Admin./Rec.

Bryon Koskela
Supervisor
Committee Services
750

Patricia Cory, Sr. Analyst
Joyce E. Fagerland, Administrator
Tawnya Gough, Sr. Website Content Admin.
Carolyn R. Strickland, Customer Sppt. Admin./Rec.

SMM - 01398



Jeffrey P. Hagerty, Sr. Consultant

SMM - 01399

Audrey Zibelman
EVP & COO
055

Andrew L. Ott
Vice President
Markets
500

Arlene G. Noonan
Executive Secretary to a VP

Stu Bresler
General Manager
Market Operations
501

Wai M. Jew, Database Analyst

Raymond J. Fernandez
Manager
Market Development
510

- R. Matthew Edwards, Engineer
- Steven J. Fedena, Sr. Engineer
- Jaclynn Geist, Engineer
- Lynn M. Horning, Sr. Training Coor.
- Chih-Chieh Huang, Engineer
- Amanda Libengood, Engineer
- Hui Ni, Sr. Engineer
- Matthew P. Pennell, Sr. Engineer

Dean Hartung
Manager
Real Time Market
Operations - 535

- Rebecca Andrews, Sr. Engineer
- Mark F. Gilrain, Sr. Lead Engineer
- Adam J. Keech, Sr. Engineer
- Angelo N. Marcino, Sr. Engineer
- Ritwik Mishra, Engineer
- Michael Olaleye, Engineer
- Simon K. Tam, Sr. Lead Engineer

Mark H. Gravener
Manager
Forward Market
Operations - 530

- Aaron Baizman, Analyst
- Theresa A. Esterly, Sr. Lead Engineer
- Jason Keech, Sr. Engineer
- Keshavamurthy, Bhavana G., Engineer
- Gerard D. McNamee, Sr. Analyst
- Steven Schickram, Associate Engineer
- Cam D. Tran, Sr. Engineer
- Michael J. Ward, Sr. Lead Engineer

Jeffrey D. Bastian
Manager
Market Simulation
540

- Timothy J. Horger, Sr. Engineer
- Erich A. Mauroschadt, Sr. Engineer
- David M. Picarelli, Sr. Engineer

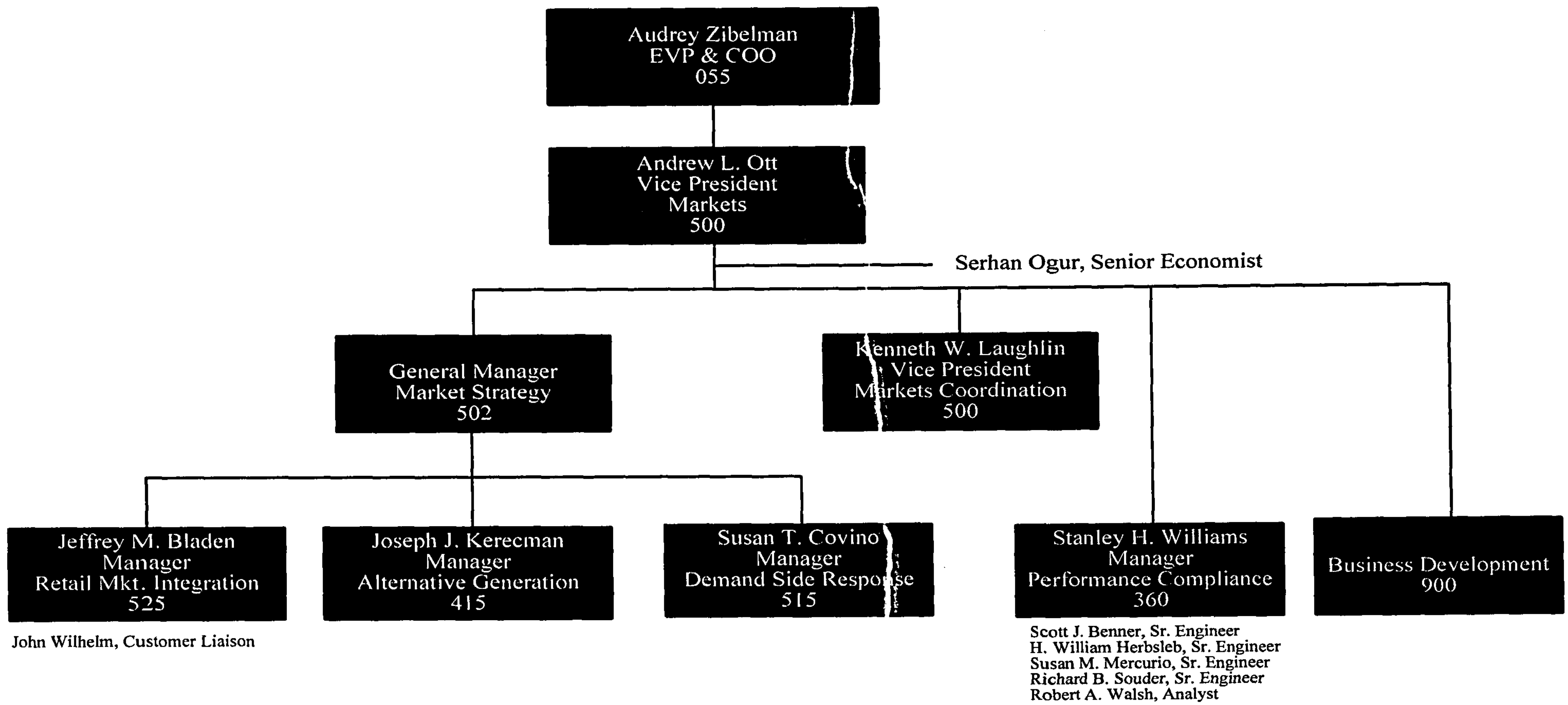
James G. Powick
Manager
Market Settlement
Operations - 135

- Jessica L. Buffoni, Analyst
- Robert H. Carr, Sr. Engineer
- Cheryl L. Cloud, Sr. Engineer
- Yvette Dreisbach, DB Admin.
- Denise Gajdowski, Analyst
- John C. McComb, Sr. Analyst
- Cathleen A. Robinson, Analyst
- Rick Rowland, Analyst
- Michael Stellabotte, Sr. Engineer

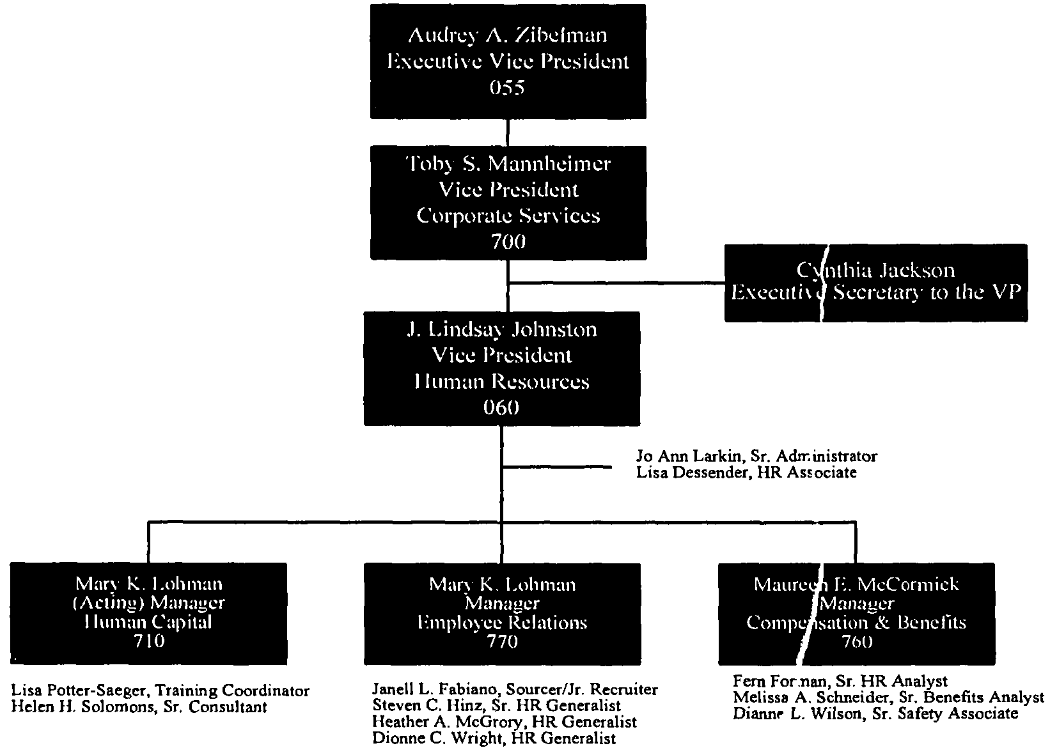
Harry E. Dessender
Manager
Market Settlement
Services - 130

- Michael Bean, Analyst
- Timothy Burdis, Analyst
- Suzanne R. Coyne, Sr. Lead Eng.
- Eric Hsia, Sr. Analyst
- Lisa Knauer, Analyst
- Edward Rich, Analyst
- Brian C. Weathers, Sr. Analyst

SMM - 01400


Audrey Zibelman
EVP & COO
055
Andrew L. Ott
Vice President
Markets
500
Serhan Ogur, Senior Economist
General Manager
Market Strategy
502
Kenneth W. Laughlin
Vice President
Markets Coordination
500
Jeffrey M. Bladen
Manager
Retail Mkt. Integration
525
John Wilhelm, Customer Liaison
Joseph J. Kerecman
Manager
Alternative Generation
415
Susan T. Covino
Manager
Demand Side Response
515
Stanley H. Williams
Manager
Performance Compliance
360
Scott J. Benner, Sr. Engineer
H. William Herbsleb, Sr. Engineer
Susan M. Mercurio, Sr. Engineer
Richard B. Souder, Sr. Engineer
Robert A. Walsh, Analyst
Business Development
900

SMM - 01401



Audrey A. Zibelman
Executive Vice President
055
Toby S. Mannheimer
Vice President
Corporate Services
700
Cynthia Jackson
Executive Secretary to the VP
J. Lindsay Johnston
Vice President
Human Resources
060
Jo Ann Larkin, Sr. Administrator
Lisa Dessender, HR Associate
Mary K. Lohman
(Acting) Manager
Human Capital
710
Lisa Potter-Saeger, Training Coordinator
Helen H. Solomons, Sr. Consultant
Mary K. Lohman
Manager
Employee Relations
770
Janell L. Fabiano, Sourcer/Jr. Recruiter
Steven C. Hinz, Sr. HR Generalist
Heather A. McGrory, HR Generalist
Dionne C. Wright, HR Generalist
Maureen E. McCormick
Manager
Compensation & Benefits
760
Fern Forman, Sr. HR Analyst
Melissa A. Schneider, Sr. Benefits Analyst
Dianne L. Wilson, Sr. Safety Associate

SMM - 01402

Audrey A. Zibelman
EVP & COO
055

Toby S. Mannheimer
Vice President
Corporate Services
710

Joseph E. Davis
General Manager
Corporate Services
700

Nora C. Swimm
Executive Director
Governance/Board Services/
Planning - 702

Karen A. Lewis
BOM Liaison

Gloria P. Holt
Manager
702

David B. Spangler
Manager
Facilities
110

William J. Bryson, Sr. Fac. Consultant

Steven G. Walker, Building Mechanic Foreman
William L. Franks, Sr. Building Mechanic
Benjamin R. Pritt, Sr. Building Mechanic
Michael P. Haag, Intermediate Building Mechanic
Stan A. Koncoski, Building Mechanic
Charles D. Kramer, Building Mechanic
John D. McCann, Building Mechanic
Barry L. Powell, Building Mechanic
Mark Robinson, Intermediate Building Mechanic
Virgil Robinson, Building Support Specialist
Edward E. Smith, Intermediate Building Mechanic
Carl T. Davis, Building Mechanic Consult- SAE

David P. Rudolph, Sr. Facilities Project Leader

Robert H. Hood, Supervising Engineering Tech
James R. Lancaster, Sr. Engineering Technician
William J. Lebus, Sr. Engineering Technician
Jay C. Stauffer, Sr. Engineering Technician

Ronald Lake, Shipping/Receiving Clerk

Paul J. McLaverty
Manager
Procurement
630

Albert G. Bramley, Sr. Category Administrator
Thomas C. Geremski, Category Lead
Donna Morgis, Category Lead
Deborah H. Papillon, Sr. Category Administrator
James P. Phelan, Category Lead
Janet L. Powidzki, Sr. Category Specialist
Pamela J. Quittner, Category Lead

Business Process Advisory (182)
William B. Baugh, Internal Control Consultant
Alex G. Habre, Internal Control Consultant-IT

Organizational Compliance (610)
James T. Cella, Sr. Quality Assurance Consultant
Becki D. Dolhanczyk, Analyst, Pol. & Proc.
Theresa M. Schofield, Sr. Records Mgmt. Analyst

SMM - 01403

Michael J. Kormos
Sr. VP
Reliability Services - 054

Ann Marie Blackwell
Executive Administrator

Frank J. Koza
Executive Director
System Operations
400

Gerald W. Mellinger
Manager
Strategic Support - 400

Stephen S. Crutchfield
Robert Thomas

Linda A. Foulke
Executive Secretary

Karen Kenney
Sr. Travel Coordinator

Chantal N. Hendrzak
Manager
Operations Development
420

Pasma Apehaya, Engineer
Kevin M. Bonner, Analyst
James M. Burlew, Analyst
Ronald W. DeLoach, Engineer
Qun Gu, Engineer
Kevin J. Komara, Sr. Engineer
Stephanie Monzon, Sr. Analyst
Wayne B. Moodie, Sr. Analyst
Chris M. Pacella, Analyst
Andrew J. Rodriquez, Sr. Analyst
Jianzhong Tong, Sr. Strategist
Jerry Whooley, Sr. Engineer-SAE

Robert E. Reed
Manager
System Operator Training
435

Jessica J. Bian, Sr. Lead Engineer
Paul Daugherty, Sr. Operator Trainer
Allen M. Fickman, Sr. Engineer
Peter J. Lawrence, Sr. Operator Trainer
William J. Powell, Sr. Operator Trainer
Daniel M. Restucci, Sr. Operator Trainer

Jonathan Z. Ponder
Manager
Engineering Support
460

Charlotte El, Analyst
Suzie M. Fahr, Analyst
Daniel Moscovitz, Engineer
Michael A. Nazarek, Sr. Engineer
James M. Ortlieb, Sr. Analyst
Jennifer Reed, Analyst
Brian T. Schneider, Sr. Engineer
Sammie W. Stahlback, Sr. Analyst

Michael E. Bryson
Manager
Transmission
480

Christopher J. Advena, Sr. Consultant
Patrick Dolan, Engineer
Aniss Fradi, Sr. Strategist
William L. Harm, Sr. Consultant
Ryan Mattocks, Analyst
Mona Megeed, Engineer
Robert Morasco, Engineer
Heather L. Reiter, Engineer
Kimberly A. Sauerwine, Sr. Engineer
Yuri Smolanitsky, Engineer
Donald E. Williams, Sr. Engineer

John Dadourian, Supervisor
Steven W. Campbell, Transaction Coordinator
Walker Dugan, Transaction Coordinator
Shane E. Gorichky, Transaction Coordinator
Matthew McGrath, Transaction Coordinator
Susan L. O'Connell, Transaction Coordinator
Hope I. Pesner, Transaction Coordinator
Julius A. Rigo, Transaction Coordinator
George T. Smith, Transaction Coordinator

John R. Baranowski
Manager
Generation
490

Augustine C. Caven, Engineer
Elliot H. Hoffman, Sr. Analyst
Jeffrey A. Hoffman, Sr. Engineer
Trevor R. Loose, Sr. Lead Engineer
Ruston J. Ogburn, Engineer
John A. Richardson, Sr. Hydro Analyst-SAE
Darryl G. Schrift, Sr. Lead Engineer
Kenneth A. Schuyler, Sr. Consultant

SMM - 01404

Michael J. Kormos
Sr. VP
Reliability Services - 054

Frank J. Koza
Executive Director
System Operations
400

Robert O. Hinkel
General Manager
Regional Operations
410

David W. Souder, Chief System Operator

Supervisor, System Operations
Thomas R. Burns
Joseph Ciabattoni
Philip J. D'Antonio
James McLaughlin
William J. Powell
Nicholas J. Winter

System Operator - Generation
Brian S. Fry
Michael D. Hardie
Joseph A. Lebel
Eric P. Morris
Kenneth W. Thompson

System Operator - Scheduling
Arthur T. Baker
Matthew A. Cresta
Edward P. Hoey
Anthony F. LaCorte
John A. Libertz
Phillip A. McGrath
William S. Patton
Claudette Shellman-Peters
Kristina Peterson
Richard Potts

System Operator - Power
Alfonso C. Alicea
T. Randolph Boroughs
Patrick A. Brown
John G. Clark
Peter Diaz
William L. Fox
Michael L. Francis
Thomas Keyser
Gregory G. Miscavage
Brian Oakes
Reginald J. Palaypay
Curtis D. Peterson
Michael R. Shipe
Thomas D. Voghel
Donald Wallin

Reliability Engineers
David Mabry, Team Lead
Nicole M. Fagnani
Edward Franks
Liem Hoang
Joseph Jackson
Christopher Pilong
David Turtle
Donald Urban

West Dispatch (470)

David J. Vicini, Chief System Operator

System Operator - Power
Roger E. Cummins
Allen T. Halliwell
Frederick J. Hirt
Christopher A. Smyth
Frank P. Squires
Henry J. Thomas
Edward I. Zyvith

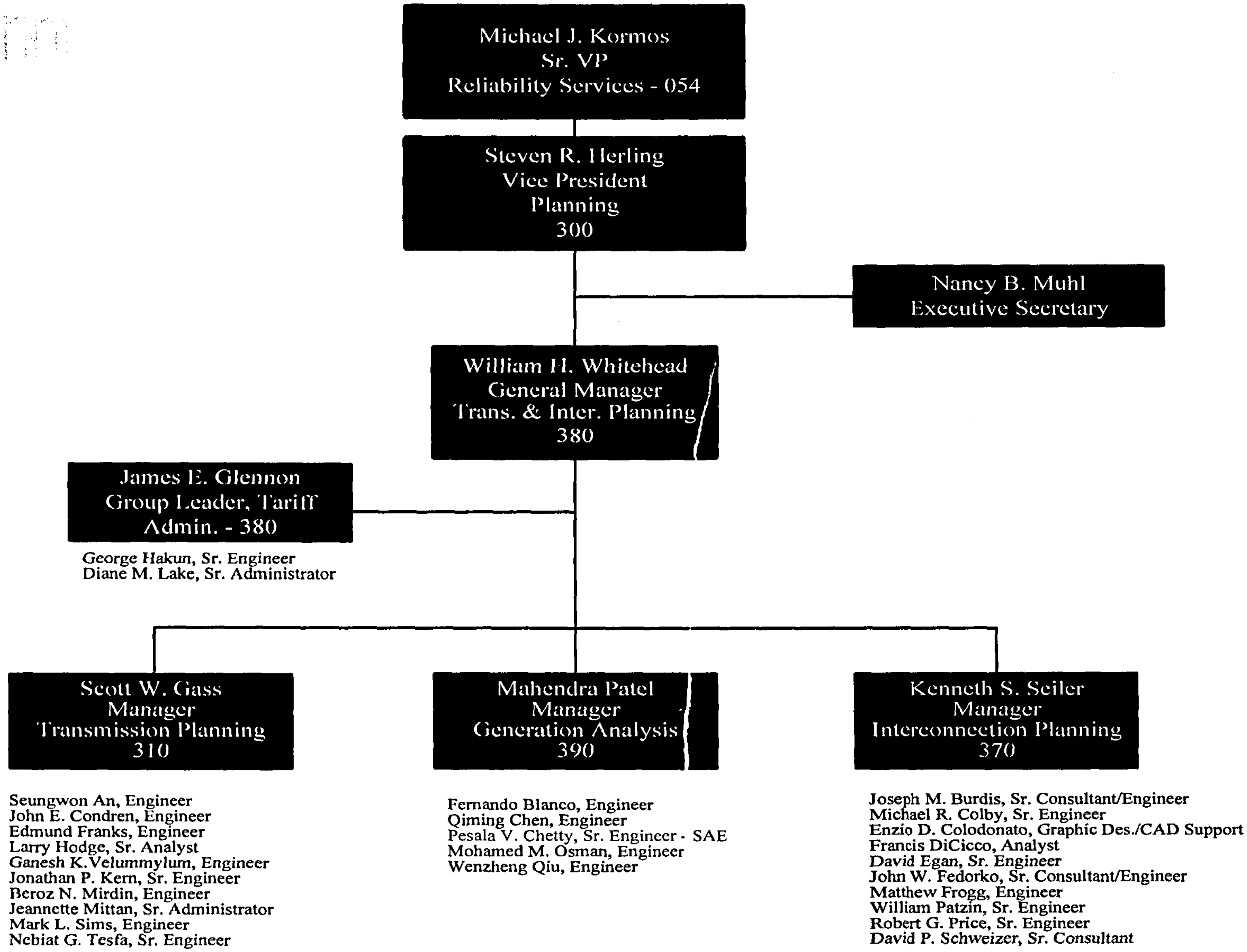
System Operator - Generation
Paul Daugherty
David B. Hislop
Lawrence M. Kokos
Gregory D. McBee
Dean S. Miskovich
Robert Olinger
Kenneth A. Ruffing
Martin A. Sas
Todd Seanor
Deidre Vottero

James A. Uhrin
Manager
PJM West
475

Amy S. Stanley, Executive Secretary

Dirk Baker, Engineer
Derek Kassimer, Engineer

SMM - 01405



Michael J. Kormos
Sr. VP
Reliability Services - 054
Steven R. Herling
Vice President
Planning
300
Nancy B. Muhl
Executive Secretary
William H. Whitehead
General Manager
Trans. & Inter. Planning
380
James E. Glennon
Group Leader, Tariff
Admin. - 380
George Hakun, Sr. Engineer
Diane M. Lake, Sr. Administrator
Scott W. Gass
Manager
Transmission Planning
310
Seungwon An, Engineer
John E. Condren, Engineer
Edmund Franks, Engineer
Larry Hodge, Sr. Analyst
Ganesh K.Velummylum, Engineer
Jonathan P. Kern, Sr. Engineer
Beroz N. Mirdin, Engineer
Jeannette Mittan, Sr. Administrator
Mark L. Sims, Engineer
Nebiat G. Tesfa, Sr. Engineer
Mahendra Patel
Manager
Generation Analysis
390
Fernando Blanco, Engineer
Qiming Chen, Engineer
Pesala V. Chetty, Sr. Engineer - SAE
Mohamed M. Osman, Engineer
Wenzheng Qiu, Engineer
Kenneth S. Seiler
Manager
Interconnection Planning
370
Joseph M. Burdis, Sr. Consultant/Engineer
Michael R. Colby, Sr. Engineer
Enzio D. Colodonato, Graphic Des./CAD Support
Francis DiCicco, Analyst
David Egan, Sr. Engineer
John W. Fedorko, Sr. Consultant/Engineer
Matthew Frogg, Engineer
William Patzin, Sr. Engineer
Robert G. Price, Sr. Engineer
David P. Schweizer, Sr. Consultant

SMM - 01406

Michael J. Kormos
Sr. VP
Reliability Services - 054

Steven R. Herling
Vice President
Planning
300

Thomas A. Falin
Manager
Capacity Adequacy Plan.
350

- Murty P. Bhavaraju, Sr. Consultant - SAE
- Molly Brazill, Analyst
- James J. Dolan, Sr. Analyst
- Andrew P. Ford, Sr. Engineer
- Peter Kohut, Analyst
- James W. Kirby, Sr. Engineer
- Kenneth B. Mancini, Sr. Engineer
- Thomas M. Moleski, Sr. Analyst
- David J. Pomian, Sr. Analyst
- John M. Reynolds, Sr. Engineer
- Gary A. Schuck, Sr. Engineer
- John J. Slivka, Sr. Analyst - SAE
- Randy W. Zwitch, Analyst

Alan Elmy
Manager
Generation Integration
300

SMM - 01407

Michael J. Kormos
Sr. Vice President
Reliability Services -054

Thomas F. O'Brien
General Manager
Portfolio Management
& Enterprise Architecture
265

George M. Dateno
Manager
Portfolio Management
Office - 620

Dean B. Workman, Section Leader
Alan P. Alesius, Sr. Project Analyst
Lisa A. Brennan, Project Scheduler
Pai-Yen Chou, Sr. Analyst
Douglas A. Fabish, Sr. Analyst
James J. Lange, Sr. Analyst
Earl Lynch, Program Office Leader
Jeffrey R. Schmitt, Sr. Engineer
Diane L. Smith, Sr. Analyst
Chad Von Eck, Sr. Analyst

Joshua Binstead
Manager
Enterprise Architecture
244

Richard Brenton, Sr. Technical Architect
John T. Carminati, Lead Architect, Data
John E. Collier, Sr. Lead Architect
Ronald T. Graff, Lead Architect
Richard E. Hann, Sr. Technical Architect
Edward Kovler, Sr. Technical Architect
Wei Li, Sr. Technical Architect
Michael R. Luna, Sr. Technical Architect
Leonard J. Maahs, Lead Arch. Power Sys Eng.

Manager
Enterprise Portfolio Mgmt.
267

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Michael J. Kormos
Sr. Vice President
Reliability Services-054

Mike Cleary
Chief of Staff

Information and
Technology Services 201

Marsha Staub
Executive Secretary

Lee H. Levant,
Manager
Application Development
& Support - 225

Thomas B. Woollam
Manager
Application Dev. &
Integration Services - 280

T. Shane Watts, Sr. Analyst (280)

Heather M. Forsythe, Section Leader, Data Mgmt. Sys. (215)
Pradip Agnihotri, Sr. Production DBA
Lisa M.Hoover, Sr. Production DBA
William E. Hibbs, Sr. Production DBA
Christopher J. Fazio, Sr. App. DBA
Donald Landis, Sr. App. DBA
Lana Meres, Sr. Production DBA
Raj K. Rohilla, Sr. Application DBA
David Rohland, Sr. Production DBA
Jianxiong Zhang, Sr. Production DBA

Sean P. McNamara, Section Leader, Center for Operational Excellence (282)
James J. Gentile, Sr. QA Analyst
Richard Hopkins, Sr. App. Dev. Analyst
Dipti V. Shah, Sr. Config. Mgmt. Analyst

Amanda E. Chambers, Section Leader, Testing (284)
Donna Hungarter, Sr. Test Integrator
James L. McDonald, QA Analyst

John M. Conboy
Manager
Infor. Tech. Svcs.,
Markets & Operations -225

Open, Section Leader, I&TS, System Ops. (222)
Walter C. Appleton, Sr. App. Dev. Analyst
Daryn J. Aucoin, Application Dev. Analyst
Srinivas Karra, Sr. App. Dev. Analyst
Aleksandrs Lubimovs, Application Dev. Analyst
Raymond B. Monroe, Sr. App. Dev. Analyst
Kathleen O'Brien, Sr. Business Analyst
Andrew J. Procaccini, Sr. App. Dev. Analyst
Michael J. Sembello, Sr. App. Dev. Analyst

Kevin E. Morelock, Section Leader, I&TS, Markets (227)
Neil W. Hornbeck, Sr. App. Dev. Analyst
Alexander Rubinshteyn, Analyst
David W. Ulmer, Sr. Application Dev. Analyst
David G. Wolfe, Sr. Business Analyst

Beth J. Miller, Section Leader, I&TS, Market Settlements (274)
Wendy Casterline, Sr. Business Analyst
Congmei Ding, Sr. App. Dev. Analyst
Todd Hiser, Sr. Business Analyst
Cathy A. McGowan, Sr. App. Dev. Analyst
Patrick Neary, Sr. Analyst
Debra A. Taraschi, Sr. Business Analyst
Medha Pai, Sr. App. Dev. Analyst
James Reynolds, Sr. App. Dev. Analyst
Laura Wolkowitz, Sr. App. Dev. Analyst
Jing Yang, Sr. Application Dev. Analyst

Richard D. Lanning
Manager - Infor. Tech.
Svcs.. System Planning &
Corporate Services - 270

Michael C. Radel, Section Leader, Decision Support Systems (271)
Deirdre R. Cusack, Sr. Datawarehouse Admin.
Patricia J. Finegan, Sr. Bus. Analyst
Robert J. Griffin, Decision Support Analyst
Matt Heere, Sr. Decision Support Analyst
Robert L. Jones, Sr. Decision Support Analyst
Alla Lakhtman, Decision Support Analyst
Paul Y. Meshkovsky, Decision Support Analylst
Marc Mundell, Sr. Decision Support Developer
Fabian P. Robinson, Sr. Decision Support Developer
Srinivasan, Shiva, Decision Support Developer

Thomas A. Csongradi, Section Leader, Enterprise Bus. Apps. (150)
Dion A. Alveranga, Sr. Analyst
John Davis, Sr. Analyst
Jeffrey M. Falciani, Sr. Technical Analsyt
Monica Feniak, Technical Analyst
Janice A. Fullmer, Sr. Business Analyst
Glenn E. Long, Technical Analyst
Christopher G. Pasik, Sr. SAP Integ. Analyst
Carl E. Schiavoni, Technical Analyst
Richa Tiwari, Sr. SAP Analyst

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Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Information and Technology Services 201

John I. Dyer
Manager
IT Infrastructure Ops., Planning & Support - 281

Finance, Metrics and Procurement (281)
Stephen J. Feeley, Sr. ISD Financial Analyst
Susan R. Kohn, Sr. Administrator
Emily Miller, Sr. ISD Financial Analyst

Robert J. Wagner
Manager
Technology Infrastructure Services - 210

John N. Ippolito, Section Leader
AIX /Unix Operations, Planning & Support (211)
Albert E. Barth, Sr. Unix Support Analyst
Mouhcine Bengelloun-Zahr, UNIX Support Analyst
Cynthia M. Culbreath, Unix Support Analyst
Paul DiSciascio, Unix Support Analyst
Francis M. Letterio, Sr. Unix Support Analyst
Charles A. Patterson, Sr. Unix Support Analyst
Timothy M. Peek, Sr. Unix Support Analyst
Tahir Saeed, Sr. Lead Unix Support Analyst
Raymond G. Snyder, Sr. Unix Support Analyst
William Souza, Sr. Unix Security Analyst
Nikolas S. Tsamutalis, Sr. Unix Support Analyst

Christopher Smart, Section Leader, Client Technical Services & Support (214)
Larry S. Austin Sr. WE&S Analyst
Nicholas Della Pelle, WE&S Analyst
Ross A. Kendall, WE&S Analyst
Albert W. Krauss, Sr. WE&S Analyst
Terrence J. Curry, Sr. Help Desk Analyst
Jin Hyung Lee, WE&S Analyst
Duy K. Tran, WE&S Analyst
Clarence Whitaker, WE&S Analyst

Open , Section Leader, Windows Operations, Planning & Support (217)
Steven Cartacki, Sr. WE&S Analyst
George M. Fazio, WE&S Analyst
Christopher Hagan, Sr. WE&S Analyst
David D. Ham, Sr. Analyst - NT Security
Timothy Herman, Sr. WE&S Analyst
Frank E. Kramer, Analyst
Greg Moyer, Sr. WE&S Analyst
Ian M. Mundell, Sr. WE&S Analyst
Greg Rozinsky, Sr. WE&S Analyst
[illegible] Valdez, Sr. WE&S Analyst

Colin M. Brisson
Manager
Networks, Telecom and Asset Management -241

David Zinn, Section Leader, Storage Mgmt., Backup, Recovery & BCP (213)
Lawrence E. Nicholas, Rec. & Perf. Analyst
Stephen Pronchick, Sr. Rec. & Perf. Analyst
Neil Rosenberg, Rec. & Perf. Analyst

Lee J. Triplicata, Section Leader, Network Operations, Planning & Support (241)
Charles L. Conway, Sr. Network Analyst
Dan Cunningham, Network Analyst
David C. Frasch, Network Analyst
Richard H. Glaum, Sr. Network Analyst
Raymond M. Groff, Sr. Network Analyst
Troy Houston, Sr. Network Analyst
Richard Knebel, Sr. Network Analyst
Ronald R. Moore, Sr. Network Analyst
Charles J. Nixon, Sr. Network Analyst
Samuel T. Pomponi, Sr. Network Analyst
Mike Stamm, Sr. Network Analyst
John P. Smith, Sr. Network Analyst

Telecom Operations, Planning & Support (242)
John T. Hadrick, Sr. Telecom Analyst
Frank Nitchie, Sr. Telecom Analyst

Michael Del Viscio, Section Leader, Asset & Configuration Mgmt., Capacity Planning & Monitoring (247)
Shannon O'Connor, Rec. & Performance Analyst
Christopher F. Six, Sr. Rec. & Performance Analyst

SMM - 01410

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Information and Technology
Services 201

Kenneth M. Huber
Manager
Advanced Technology
1105

Thomas J. Kennedy, Lead Consultant

SMM - 01411

Michael J. Kormos
Sr. Vice President
Reliability Services
054

Bruce M. Balmat
Executive Director
Reliability Council
Coordination - 800

Joseph D. Willson
Manager
Interregional Coord. &
Compliance (730)

Albert M. DiCaprio, Sr. Strategist
John A. Horakh, Sr. Engineer-SAE
Mark J. Kuras, Sr. Engineer

Thomas T. Bowe
Chief Security Officer
181

Physical Security (181)
R. Scott Heffentrager, Physical Sec. Mgr.
Timothy Foley, Security Analyst

Business Continuity (181)
Ronald G. Hedges, Sr. Consultant Business Recpveru
Leroy Bunyon, Sr. Coord.-Business Recovery

Risk Management (181)
Todd N. Thompson, Sr. Security Leader
Anne L. Boyle, Technical Analyst
Jeff Whitehead, Sr. Security Analyst

Mark L. Holman
Manager
IT Security (205)

Joseph Brown, Sr. Security Analyst
Helen M. Burnley, Security Analyst
Lorraine I. Coulston, Security Analyst
Francine Miller, Security Analyst
Robert Perciaccante, Sr. Security Analyst
Sherwood R. Probeck, Sr. Security Analyst
Kristyn M. Roessler, Security Analyst
Paul F. Schuler, Sr. Analyst
Joseph J. Zaremski Jr., Sr. Security Analyst

SMM - 01412

PJM Interconnection – December 1, 2004

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Internal Audit

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Market Monitoring Unit

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RTO Integration, Steve Crutchfield

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VP, PJM & President, Southern Region (052M)

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Bruce M. Balmat

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Human Capital Strat. & Dev., Mark J. Felici
Office of Corp. Prac., Gloria P. Holt
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- Member Services, Open
- Member Training, Open
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- West Dispatch, Dave Vicini
- PJM West, Jim Uhrin

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- Real Time Market Ops., Dean Hartung

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  Alternative Generation, Joe Kerecman
  Demand Side Response, Susan Covino
  Performance Compliance, Stan Williams
  Retail Market Integration, Jeffrey Bladen

Vice President Market Coordination
Kenneth W. Laughlin

Thomas Bowe
Chief Security Officer

IT Security,
Mark Holman

Physical Security,
Scott Heffentrager

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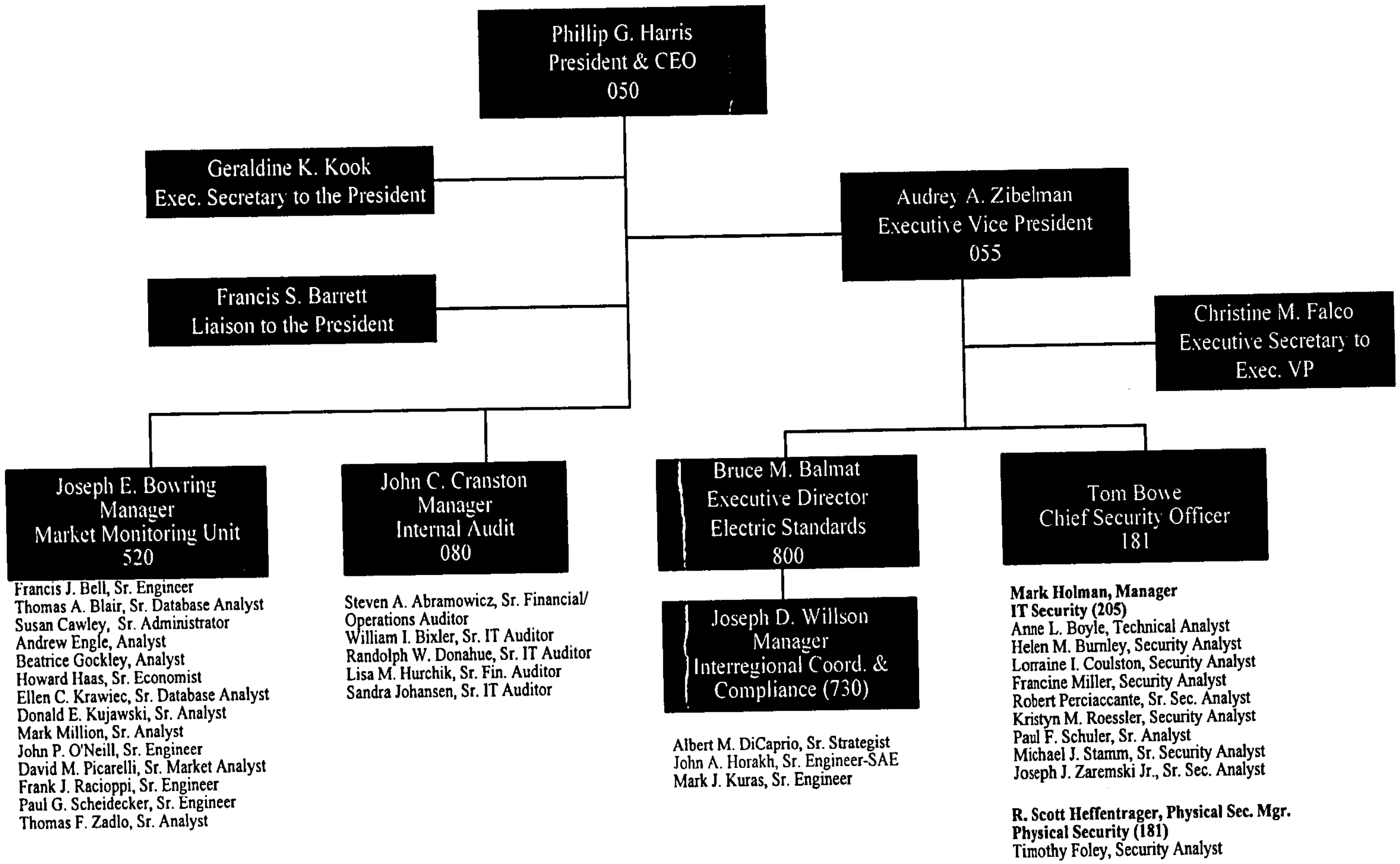
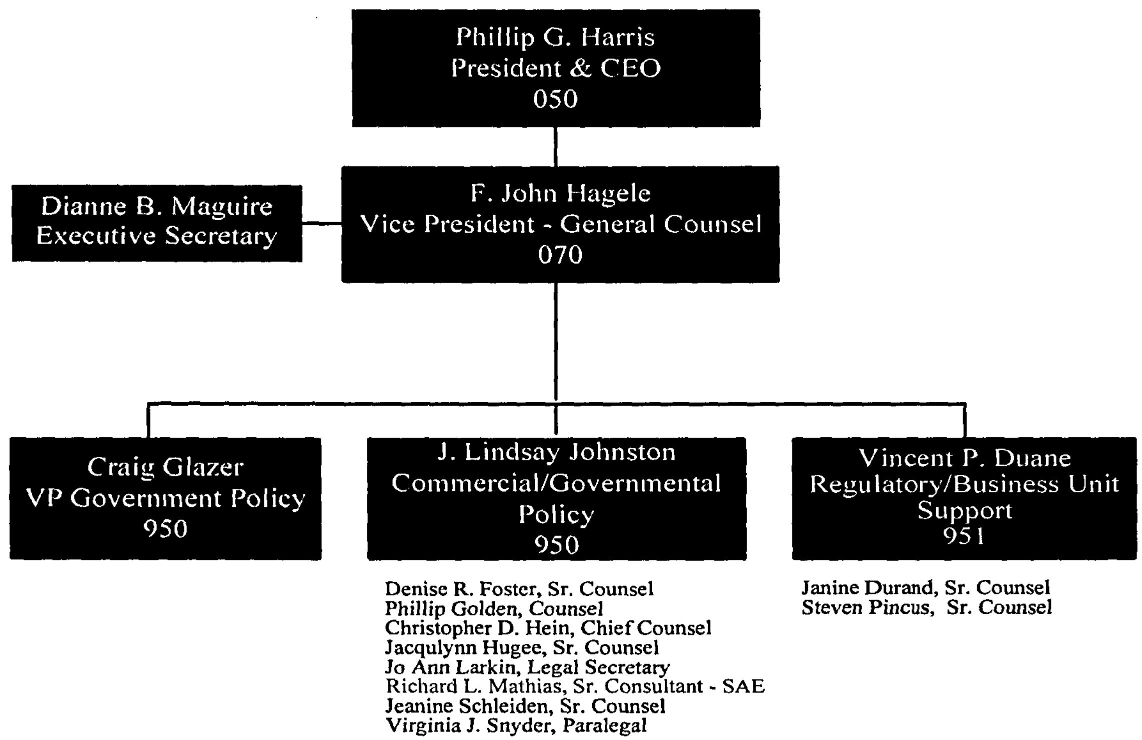


SAE
MI – Market
Integration Positions

SMM - 01414



SAE
MI – Market
Integration Positions

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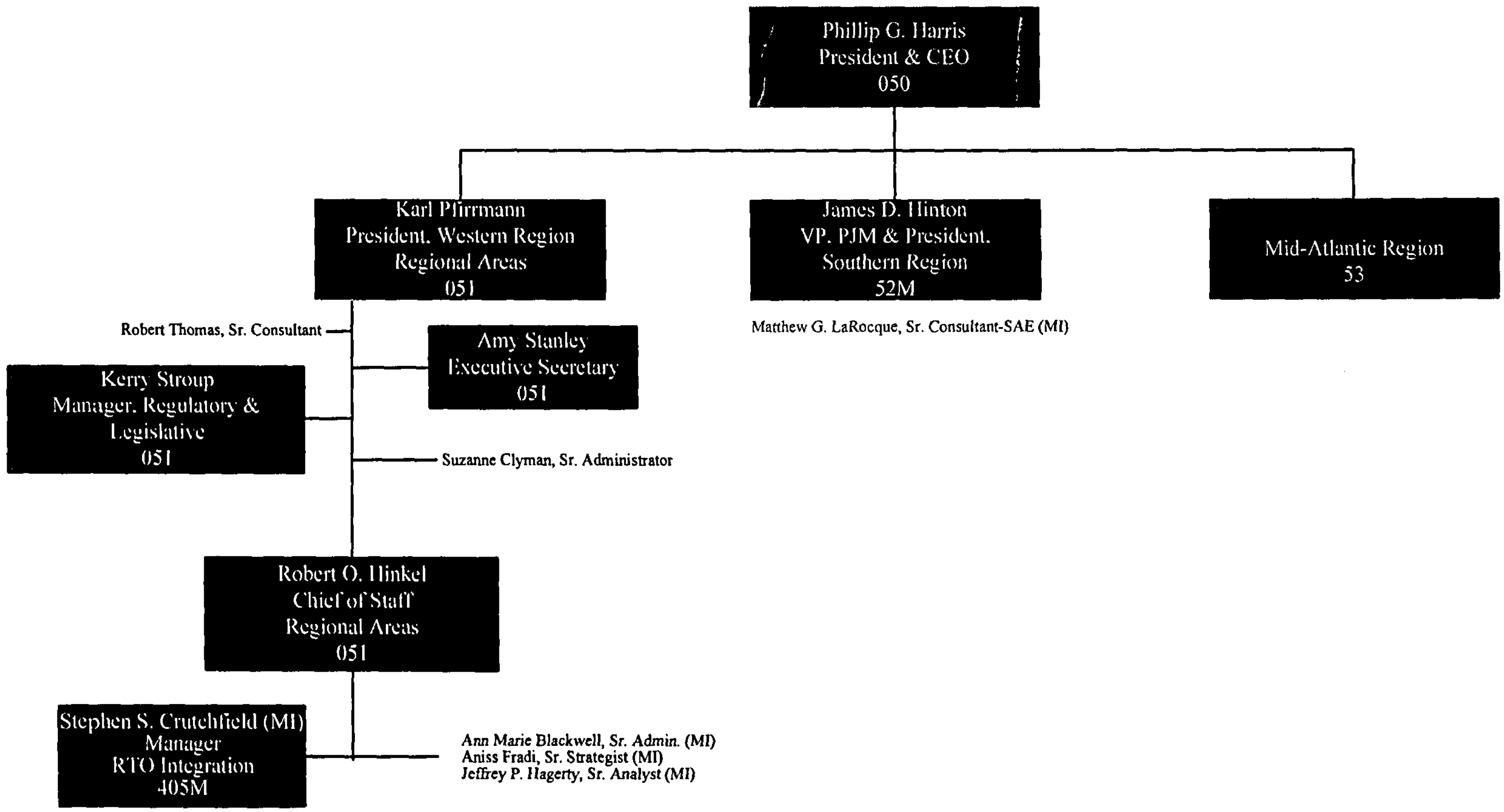
Phillip G. Harris
President & CEO
050
Karl Pfirrmann
President, Western Region
Regional Areas
051
James D. Hinton
VP, PJM & President,
Southern Region
52M
Mid-Atlantic Region
53
Matthew G. LaRocque, Sr. Consultant-SAE (MI)
Robert Thomas, Sr. Consultant
Amy Stanley
Executive Secretary
051
Kerry Stroup
Manager, Regulatory &
Legislative
051
Suzanne Clyman, Sr. Administrator
Robert O. Hinkel
Chief of Staff
Regional Areas
051
Stephen S. Crutchfield (MI)
Manager
RTO Integration
405M
Ann Marie Blackwell, Sr. Admin. (MI)
Aniss Fradi, Sr. Strategist (MI)
Jeffrey P. Hagerty, Sr. Analyst (MI)

SMM - 01416

Audrey A. Zibelman
Executive Vice President
055

Alain P. Steven
VP & CTO
Information Services
(201)

Nora C. Swimm
Executive Director
Information Services (201)

Nancy J. Keim
Executive Secretary

Lee H. Levan
Manager
Markets & Operations
222

John M. Conboy, Project Leader, Mkts. & Ops.
Daryn J. Aucoin, Application Dev. Analyst
Neil W. Hornbeck, Sr. App. Dev. Analyst
Srinivas Karra, Sr. App. Dev. Analyst
Aleksandrs Lubimovs, Application Dev. Analyst
Raymond B. Monroe, Sr. App. Dev. Analyst
David W. Ulmer, Application Dev. Analyst
David G. Wolfe, Sr. Business Analyst

Sean McNamara, Project Leader, Mkts. & Ops.
Walter C. Appleton, Sr. App. Dev. Analyst
Richard Hopkins, Sr. App. Dev. Analyst
Andrew J. Procaccini, Sr. App. Dev. Analyst
Michael J. Sembello, Sr. App. Dev. Analyst

Kevin E. Morelock, Project Leader, Mkts. & Ops.

Robert J. Wagner
Manager
Technology Services
210

John N. Ippolito, Project Leader, Unix Systems (211)
Albert E. Barth, Sr. Unix Support Analyst
Mouhcine Bengelloun-Zahr, Unix Support Analyst
Cynthia M. Culbreath, Unix Support Analyst
Paul DiSciascio, Unix Support Analyst
Francis M. Letterio, Sr. Unix Support Analyst
Charles A. Patterson, Sr. Unix Support Analyst
Timothy M. Peek, Sr. Unix Support Analyst
Tahir Saeed, Sr. Lead Unix Support Analyst
Raymond G. Snyder, Sr. Unix Support Analyst
William Souza, Sr. Unix Security Analyst
Nikolas S. Tsamutalis, Sr. Unix Support Analyst

Michael J. DelViscio, Project Leader, WE&S (214)
Larry S. Austin, Sr. WE&S Analyst
Steven Cartacki, Sr. WE&S Analyst
Nicholas Della Pelle, WE&S Analyst
George M. Fazio, WE&S Analyst
Christopher Hagan, Sr. WE&S Analyst
David D. Ham, Sr. Analyst - NT Security
Timothy Herman, Sr. WE&S Analyst
Ross A. Kendall, WE&S Analyst
Albert W. Krauss, Sr. WE&S Analyst
Stanley V. Krechner, Sr. WE&S Analyst
Jin Hyung Lee, WE&S Analyst
Glenn E. Long, WE&S Analyst
Greg Moyer, WE&S Analyst
Ian M. Mundell, Sr. WE&S Analyst
Greg Rozinsky, Sr. WE&S Analyst
Duy K. Tran, WE&S Analyst
Clarence Whitaker, WE&S Analyst

Heather M. Forsythe, Project Leader, Data Management Systems (215)
Pradip Agnihotri, Sr. Production DBA
Lisa M. Hoover, Sr. Production DBA
William E. Hibbs, Sr. Production DBA
Christopher J. Fazio, Sr. App. DBA
Donald Landis, Sr. App. DBA
Lana Meres, Sr. Production DBA
Raj K. Rohilla, Sr. Production DBA
David Rohland, Sr. Production DBA
Jianxiong Zhang, Sr. Production DBA

Thomas B. Woollam
Integ. & Enterprise
System Services
280

Christopher Smart, Project Leader, CM/HD/QA (282)
Terrence J. Curry, Sr. Help Desk Analyst
Amanda E. Chambers, Sr. QA Analyst
James J. Gentile, Sr. QA Analyst
Esrick O. McCartha, Config Mlmt Administrator
James L. McDonald, QA Analyst
Jo Anne Polish, Sr. Config. Mgmt. Analyst
Dipti V. Shah, Sr. Config. Mgmt. Analyst

David M. Zinn, Project Leader, Rec. & Perf. (213)
Lawrence E. Nicholas, Rec. & Perf. Analyst
Shannon R. O'Connor, Rec. & Perf. Analyst
Stephen Pronchick, Sr. Rec. & Perf. Analyst
Neil Rosenberg, Rec. & Perf. Analyst
F. Chris Six, Sr. Rec. & Perf. Analyst
Earl L. Williams, Rec. & Perf. Analyst

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Audrey A. Zibelman
Executive Vice President
055

Alain P. Steven
VP & CTO
Information Services
(201)

Nora Swimm
Executive Director
Information Services (201)

Richard D. Lanning
Manager
Settlements, Planning, and
Decision Support Systems- 270

Beth J. Miller, Project Leader-Settlements (274)
Wendy Casterline, Sr. Business Analyst
Congmei Ding, Sr. App. Dev. Analyst
Todd Hiser, Sr. Business Analyst
Cathy A. McGowan, Sr. App. Dev. Analyst
Debra A. Taraschi, Sr. Business Analyst
Medha Pai, Sr. App. Dev. Analyst
James Reynolds, Sr. App. Dev. Analyst
Laura Wolkowitz, Sr. App. Dev. Analyst
Jing Yang, Sr. Application Dev. Analyst

Michael C. Radel, Project Leader-
Planning and Decision Support Systems (271)
Deirdre R. Cusack, Sr. Datawarehouse Admin.
Patricia J. Finegan, Sr. Bus. Analyst
Robert J. Griffin, Decision Support Analyst
Matt Heere, Sr. Decision Support Analyst
Robert L. Jones, Sr. Decision Support Analyst
Alla Lakhtman, Decision Support Analyst
Paul Y. Meshkovsky, Decision Support Analylst
Marc Mundell, Sr. Decision Support Developer
Fabian P. Robinson, Sr. Decision Support Developer

Thomas F. O'Brien
(Acting) Manager
Architecture

Ronald T. Graff, Project Leader,
Tech. Arch. (244)
Richard Brenton, Sr. Technical Architect
Richard E. Hann, Sr. Technical Architect
Edward Kovler, Sr. Technical Architect
Michael R. Luna - Sr. Technical Architect
John T. Carminati, Lead Architect, Data
John E. Collier, Sr. Lead Architect
Leonard J. Maahs, Lead Arch. Power Sys Eng

Colin M. Brisson
Manager
Networks & Telec.
241

Networks (241)
Thomas J. Carrigan, Sr. Network Analyst
Charles L. Conway, Sr. Network Analyst
David C. Frasch, Network Analyst
Richard H. Glaum, Sr. Network Analyst
Raymond M. Groff, Sr. Network Analyst
Terrence J. Gumpper, Sr. Network Analyst
Richard Knebel, Sr. Network Analyst
Ronald R. Moore, Sr. Network Analyst
Charles J. Nixon, Network Analyst
Samuel T. Pomponi, Sr. Network Analyst
John P. Smith, Sr. Network Analyst
Lee J. Triplicata, Sr. Network Analyst**Media &**

Voice Networking (242)
John T. Hadrick, Sr. Telec. Analyst
Frank Nitchie, Sr. Telec. Analyst

John I. Dyer
Manager
Finance, Government &
Corporate Systems - 150

Thomas A. Csongradi, Project Leader,
Finance, Government & Corporate System
Dion A. Alveranga, Analyst
Ryan J. Davidson, Sr. Analyst
John Davis, Sr. Analyst
Janice A. Fullmer, Sr. Business Analyst
Christopher G. Pasik, Sr. SAP Integ. Analyst
Richa Tiwari, Sr. SAP Analyst
T. Shane Watts, Sr. Analyst

Finance & Asset Mgmt. (281)
Stephen J. Feeley, Sr. ISD Financial Analyst
Susan Kohn, Purchasing Assistant
Emily A. Miller, Sr. ISD Financial Analyst

Web Development & Support (273)
Jeffrey M. Falciani, Sr. Technical Analyst
Monica Feniak, Technical Analyst
Carl E. Schiavoni, Technical Analyst

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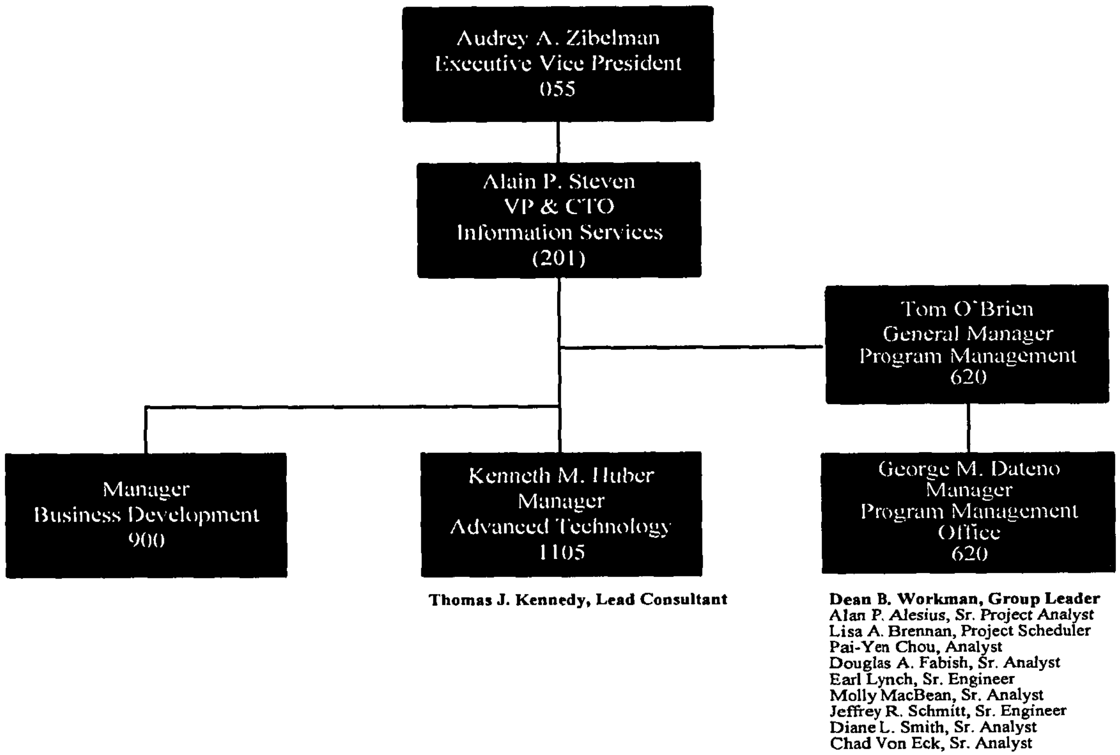
Audrey A. Zibelman
Executive Vice President
055
Alain P. Steven
VP & CTO
Information Services
(201)
Tom O'Brien
General Manager
Program Management
620
Manager
Business Development
900
Kenneth M. Huber
Manager
Advanced Technology
1105
George M. Dateno
Manager
Program Management
Office
620
Thomas J. Kennedy, Lead Consultant
Dean B. Workman, Group Leader
Alan P. Alesius, Sr. Project Analyst
Lisa A. Brennan, Project Scheduler
Pai-Yen Chou, Analyst
Douglas A. Fabish, Sr. Analyst
Earl Lynch, Sr. Engineer
Molly MacBean, Sr. Analyst
Jeffrey R. Schmitt, Sr. Engineer
Diane L. Smith, Sr. Analyst
Chad Von Eck, Sr. Analyst

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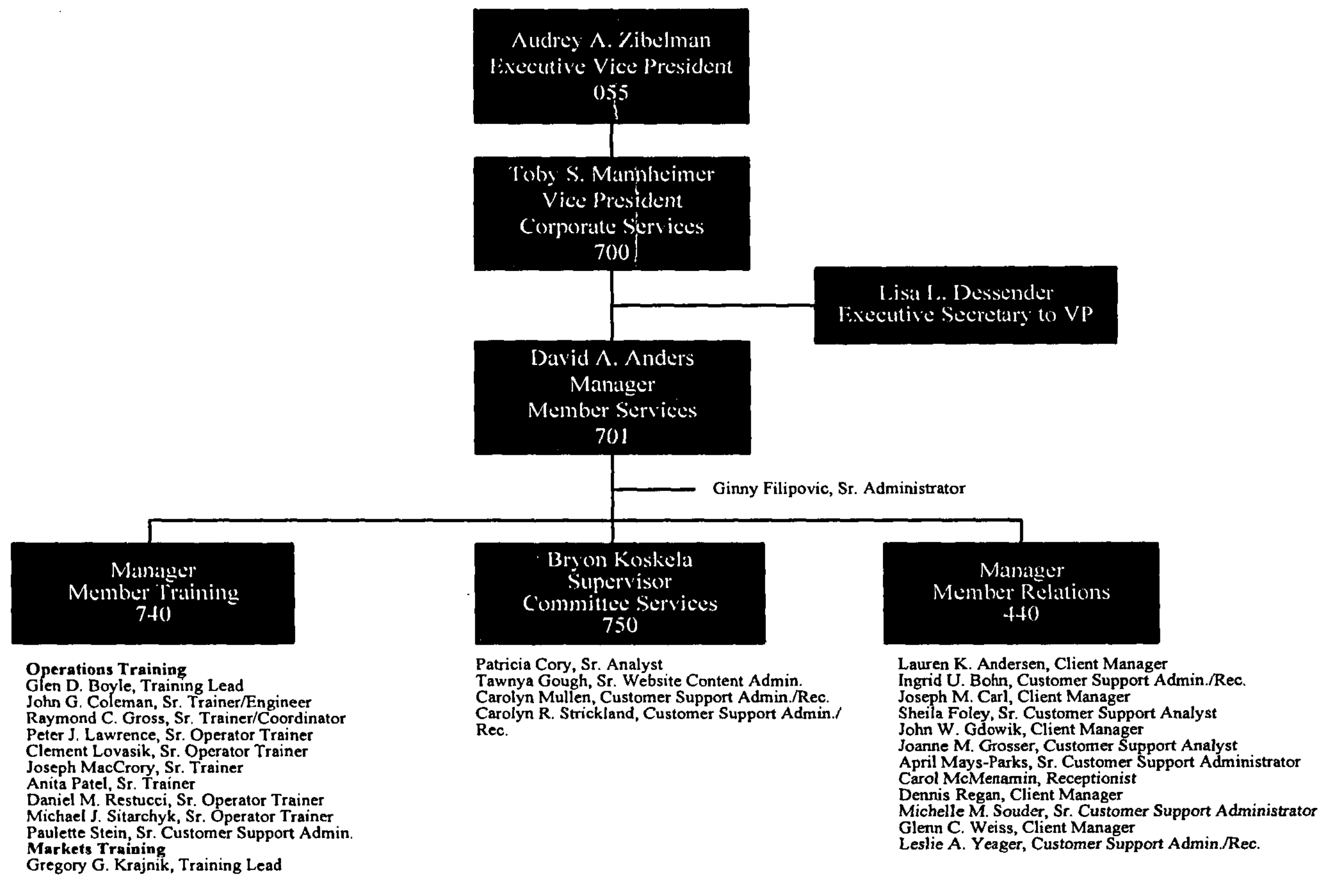
Audrey A. Zibelman
Executive Vice President
055
Toby S. Mannheimer
Vice President
Corporate Services
700
Lisa L. Dessender
Executive Secretary to VP
David A. Anders
Manager
Member Services
701
Ginny Filipovic, Sr. Administrator
Manager
Member Training
740
Operations Training
Glen D. Boyle, Training Lead
John G. Coleman, Sr. Trainer/Engineer
Raymond C. Gross, Sr. Trainer/Coordinator
Peter J. Lawrence, Sr. Operator Trainer
Clement Lovasik, Sr. Operator Trainer
Joseph MacCrory, Sr. Trainer
Anita Patel, Sr. Trainer
Daniel M. Restucci, Sr. Operator Trainer
Michael J. Sitarchyk, Sr. Operator Trainer
Paulette Stein, Sr. Customer Support Admin.
Markets Training
Gregory G. Krajnik, Training Lead
Bryon Koskela
Supervisor
Committee Services
750
Patricia Cory, Sr. Analyst
Tawnya Gough, Sr. Website Content Admin.
Carolyn Mullen, Customer Support Admin./Rec.
Carolyn R. Strickland, Customer Support Admin./Rec.
Manager
Member Relations
440
Lauren K. Andersen, Client Manager
Ingrid U. Bohn, Customer Support Admin./Rec.
Joseph M. Carl, Client Manager
Sheila Foley, Sr. Customer Support Analyst
John W. Gdowik, Client Manager
Joanne M. Grosser, Customer Support Analyst
April Mays-Parks, Sr. Customer Support Administrator
Carol McMenamin, Receptionist
Dennis Regan, Client Manager
Michelle M. Souder, Sr. Customer Support Administrator
Glenn C. Weiss, Client Manager
Leslie A. Yeager, Customer Support Admin./Rec.

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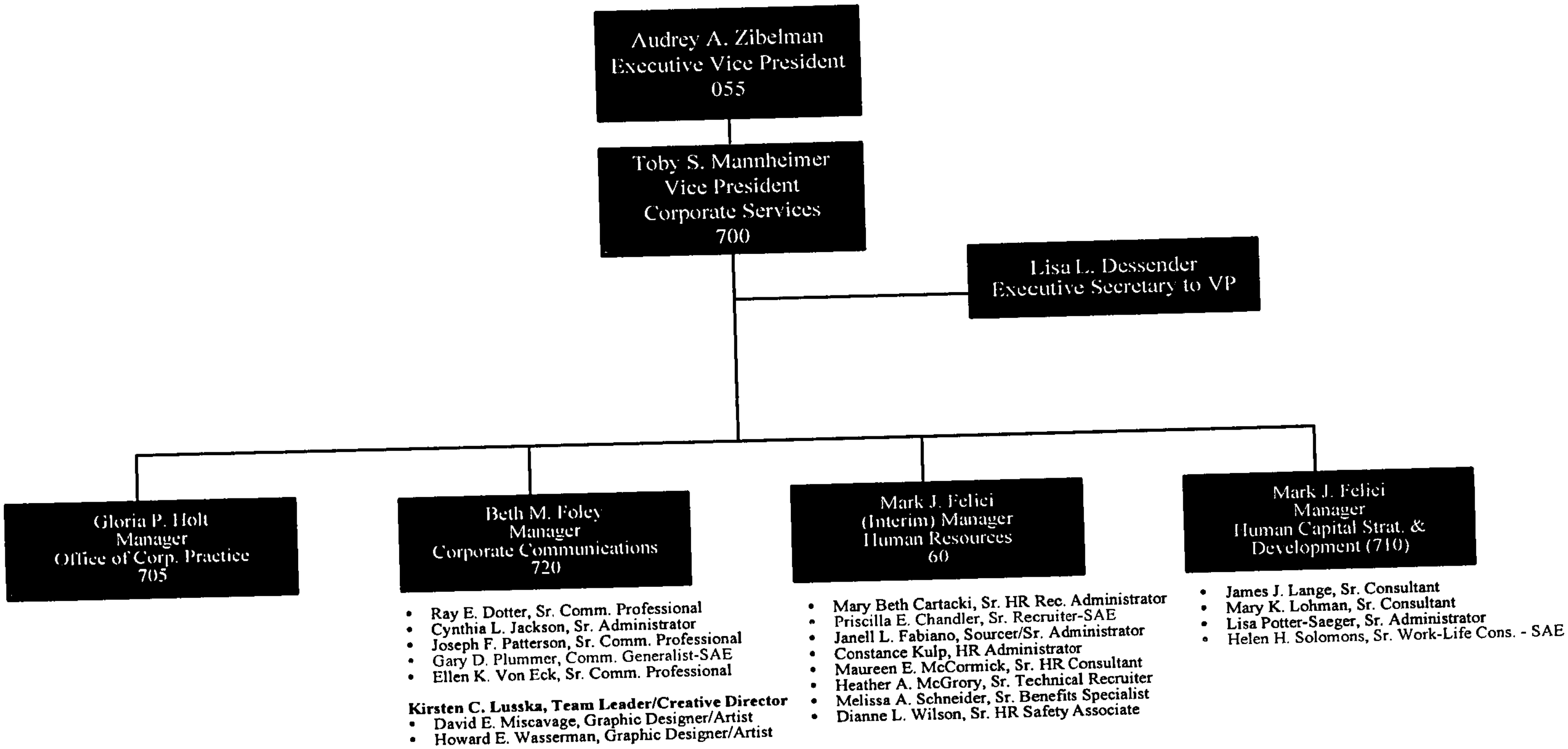

Audrey A. Zibelman
Executive Vice President
055
Toby S. Mannheimer
Vice President
Corporate Services
700
Lisa L. Dessender
Executive Secretary to VP
Gloria P. Holt
Manager
Office of Corp. Practice
705
Beth M. Foley
Manager
Corporate Communications
720
Mark J. Felici
(Interim) Manager
Human Resources
60
Mark J. Felici
Manager
Human Capital Strat. &
Development (710)
Ray E. Dotter, Sr. Comm. Professional
Cynthia L. Jackson, Sr. Administrator
Joseph F. Patterson, Sr. Comm. Professional
Gary D. Plummer, Comm. Generalist-SAE
Ellen K. Von Eck, Sr. Comm. Professional
Kirsten C. Lusska, Team Leader/Creative Director
David E. Miscavage, Graphic Designer/Artist
Howard E. Wasserman, Graphic Designer/Artist
Mary Beth Cartacki, Sr. HR Rec. Administrator
Priscilla E. Chandler, Sr. Recruiter-SAE
Janell L. Fabiano, Sourcer/Sr. Administrator
Constance Kulp, HR Administrator
Maureen E. McCormick, Sr. HR Consultant
Heather A. McGrory, Sr. Technical Recruiter
Melissa A. Schneider, Sr. Benefits Specialist
Dianne L. Wilson, Sr. HR Safety Associate
James J. Lange, Sr. Consultant
Mary K. Lohman, Sr. Consultant
Lisa Potter-Saeger, Sr. Administrator
Helen H. Solomons, Sr. Work-Life Cons. - SAE

SMM - 01421

Audrey A. Zibelman
Executive Vice President
055

Toby S. Mannheimer
VP, Corporate Services
700

Joseph E. Davis
General Manager
Business Services
700

James T. Cella
Manager
Quality Assurance
180

Business Process Advisory (182)
William B. Baugh, Internal Control Consultant
Alex G. Habre, Internal Control Consultant-IT

Organizational Compliance (610)
William M. Bunce, Sr. Specialist
Becki D. Dolhanczyk, Analyst, Pol. & Proc.
Theresa M. Schofield, Sr. Records Mgmt. Analyst

David B. Spangler
Manager
Facilities
110

William J. Bryson, Sr. Fac. Consultant

Steven G. Walker, Building Mechanic Foreman
William L. Franks, Sr. Building Mechanic
Benjamin R. Pritt, Sr. Building Mechanic
Michael P. Haag, Building Mechanic
Stan A. Koncoski, Building Mechanic
Charles D. Kramer, Building Mechanic
John D. McCann, Building Mechanic
Barry L. Powell, Building Mechanic
Mark Robinson, Building Mechanic
Virgil Robinson, Building Support Specialist
Edward E. Smith, Building Mechanic
Carl T. Davis, Building Mechanic Consult- SAE
Warren F. Werner, Building Mechanic Consult- SAE

David P. Rudolph, Sr. Facilities Project Leader

Robert H. Hood, Supervising Engineering Tech
James R. Lancaster, Sr. Engineering Technician
William J. Lebus, Sr. Engineering Technician
Jay C. Stauffer, Sr. Engineering Technician

Ronald Lake, Shipping/Receiving Clerk

Paul J. McLaverty
Manager
Procurement
630

Albert G. Bramley, Sr. Category Administrator
Thomas C. Geremski, Category Lead
Jason Guistwhite, Category Lead
Leon McRae, Category Lead
Donna Morgis, Category Lead
Deborah H. Papillon, Procurement Assistant
Pamela J. Quittner, Sr. Category Specialist

SMM - 01422

Suzanne Daugherty (acting)
Vice President & CFO
100

Sandra L. Ritchie
Executive Secretary to CFO

Open
Manager
Treasurer
170

Leroy T. Bunyon, Sr. Coord.-BCP
Ronald G. Hedges, Strategist
Stephen D. Lawson, Asst. Treasurer
Harold A. Loomis, Credit Manager
Jay Niemeyer, Sr. Credit Analyst
Hanmei Peng, Sr. Treasury Analyst
Forrest L. Strachan, Risk Manager

Open
Manager
Controller
120

James J. Snow, Supervisor, Budgeting & Anal.
David H. Budney, Sr. Analyst
Philip Fraley, Financial Accountant
Gwenda L. Keller, Accountant
Lisa A. Sherpinsky, Financial Analyst

Lisa M. Drauschak, Assistant Controller
Andrea G. Daly, Administrator
Renee L. Doganieri, Sr. Payroll Admin.
Kathleen J. Longacre, Sr. Accts. Pay. & Payroll Lead
Molly R. Lynch, Accountant
Joseph R. Odorisio, Sr. Accountant
Erica M. Robinson, Sr. Accountant
Connie F. Sweigart, Sr. BOM Administrator

SMM - 01423

Audrey A. Zibelman
Executive Vice President
050

Steven R. Herling
Vice President
Planning
300

Nancy B. Muhl
Executive Secretary

Thomas A. Falin
Manager
Capacity Adequacy Plan.
350

Murty P. Bhavaraju, Sr. Consultant - SAE
Molly Brazill, Analyst
James J. Dolan, Sr. Analyst
Andrew P. Ford, Sr. Engineer
James W. Kirby, Sr. Engineer
Kenneth B. Mancini, Sr. Engineer
Eric W. Mayhew, Sr. Lead Engineer - SAE
Thomas M. Moleski, Sr. Analyst
David J. Pomian, Sr. Analyst
John M. Reynolds, Sr. Engineer
Gary A. Schuck, Sr. Engineer
John J. Slivka, Sr. Analyst - SAE
Randy W. Zwitch, Analyst

Open
Manager
Generation

SMM - 01424

Audrey A. Zibelman
Executive Vice President
050

Steven R. Herling
Vice President
Planning
300

Nancy B. Muhl
Executive Secretary

William H. Whitehead
General Manager
Trans. & Inter. Planning
380

James E. Glennon
Group Leader. Tariff Admin.
380

George Hakun, Sr. Engineer
Diane M. Lake, Sr. Administrator

Scott W. Gass
Manager
Transmission Planning
310

Seungwon An, Engineer
Fernando Blanco, Engineer
Qiming Chen, Engineer
Pesala V. Chetty, Sr. Engineer - SAE
John E. Condren, Engineer
Larry Hodge, Sr. Analyst
Ganesh K.Velummylum, Engineer
Jonathan P. Kern, Sr. Engineer
Beroz N. Mirdin, Engineer
Jeannette Mittan, Sr. Administrator
Mohamed M. Osman, Engineer
Mahendra Patel, Sr. Consultant
Wenzheng Qiu, Engineer
Mark L. Sims, Engineer
Nebiat G. Tesfa, Engineer

Kenneth S. Seiler
Manager
Interconnection Planning
370

Joseph M. Burdis, Sr. Consultant/Engineer
Michael R. Colby, Sr. Engineer
Enzio D. Colodonato, Graphic Des./CAD Support
David Egan, Sr. Engineer
John W. Fedorko, Sr. Consultant/Engineer
William Patzin, Sr. Engineer
David P. Schweizer, Sr. Consultant
Terry V. Spencer, Sr. Engineer
Jacob M. Terkanian, Engineer

SMM - 01425

Audrey A. Zibelman
Executive Vice President
050

Michael J. Kormos
Vice President
System Operations
400

Gerald W. Mellinger
Manager
Strategic Support
400

Linda A. Foulke
Executive Secretary to VP

Karen Kenney
Sr. Travel Coordinator

Chantal N. Hendrzak
Manager
Operations Development
420

Richard L. Bishop, Analyst
James M. Burlew, Analyst
Ronald W. DeLoach, Engineer
Qun Gu, Engineer
Kevin J. Komara, Sr. Engineer
Heather G. Leung, Analyst
Stephanie Monzon, Sr. Analyst
Wayne B. Moodie, Sr. Analyst
Chris M. Pacella, Analyst
Andrew J. Rodriquez, Sr. Analyst
Jianzhong Tong, Sr. Strategist
Jeffrey Whitehead, Analyst
Jerry Whooley, Sr. Engineer-SAE

Robert E. Reed
Manager
Operations Simulator
435

Jessica J. Bian, Sr. Lead Engineer

Jonathan Z. Ponder
Manager
Engineering Support
460

Charlotte El, Analyst
Suzie M. Fahr, Analyst
Daniel Moscovitz, Engineer
Michael A. Nazarek, Sr. Engineer
James M. Ortlieb, Sr. Analyst
Jennifer Reed, Analyst
Brian T. Schneider, Sr. Engineer
Sammie W. Stahlback, Sr. Analyst

Michael E. Bryson
Manager
Transmission
480

Christopher J. Advena, Sr. Consultant
Aaron Baizman, Analyst
Stephen M. Griffin, Engineer
Nathaniel O. Halladay, Sr. Engineer
William L. Harm, Sr. Consultant
Ryan Mattocks, Analyst
Mona Megeed, Engineer
Robert Morasco, Engineer
Heather L. Reiter, Engineer
Kimberly A. Sauerwine, Sr. Engineer
Kenneth R. Thomas, Sr. Engineer
Donald E. Williams, Sr. Engineer

John Dadourian, Supervisor
Walker Dugan, Transaction Coordinator
Matthew McGrath, Transaction Coordinator
Susan L. O'Connell, Transaction Coordinator
Hope I. Pesner, Transaction Coordinator
Julius A. Rigo, Transaction Coordinator
George T. Smith, Transaction Coordinator

John R. Baranowski
Manager
Generation
490

Augustine C. Caven, Engineer
Elliot H. Hoffman, Sr. Analyst
Jeffrey A. Hoffman, Sr. Engineer
Trevor R. Loose, Sr. Lead Engineer
Ruston J. Ogburn, Engineer
John A. Richardson, Sr. Hydro Analyst-SAE
Darryl G. Schrift, Sr. Lead Engineer
Kenneth A. Schuyler, Sr. Consultant

SMM - 01426

Audrey A. Zibelman
Executive Vice President
050

Mike J. Kormos
Vice President
System Operations
400

Frank J. Koza
General Manager
Regional Operations
410

David W. Souder, Chief System Operator

Supervisor, System Operations
Thomas R. Burns
Joseph Ciabattoni
Philip J. D'Antonio
James McLaughlin
William J. Powell
Nicholas J. Winter

System Operator - Generation
Brian S. Fry
Michael D. Hardie
Eric P. Morris
Michael R. Shipe

System Operator - Scheduling
Matthew A. Cresta
Edward P. Hoey
Joseph A. Lebel
Nathan Marr
Phillip A. McGrath
Claudette Shellman-Peters
Kristina Peterson
Richard Potts

System Operator - Power
Alfonso C. Alicea
T. Randolph Boroughs
Patrick A. Brown
Joan G. Clark
Peter Diaz
William L. Fox
Michael L. Francis
Thomas Keyser
Gregory G. Miscavage
Brian Oakes
Reginald J. Palaypay
Curtis D. Peterson
David M. Turtle
Thomas D. Voghel
Donald Wallin

Reliability Engineers
David Mabry, Team Lead
Nicole M. Fagnani
Edward Franks
Liem Hoang
Joseph Jackson
Sharon Micklos
Christopher Pilong

West Dispatch (470)

David J. Vicini, Chief System Operator

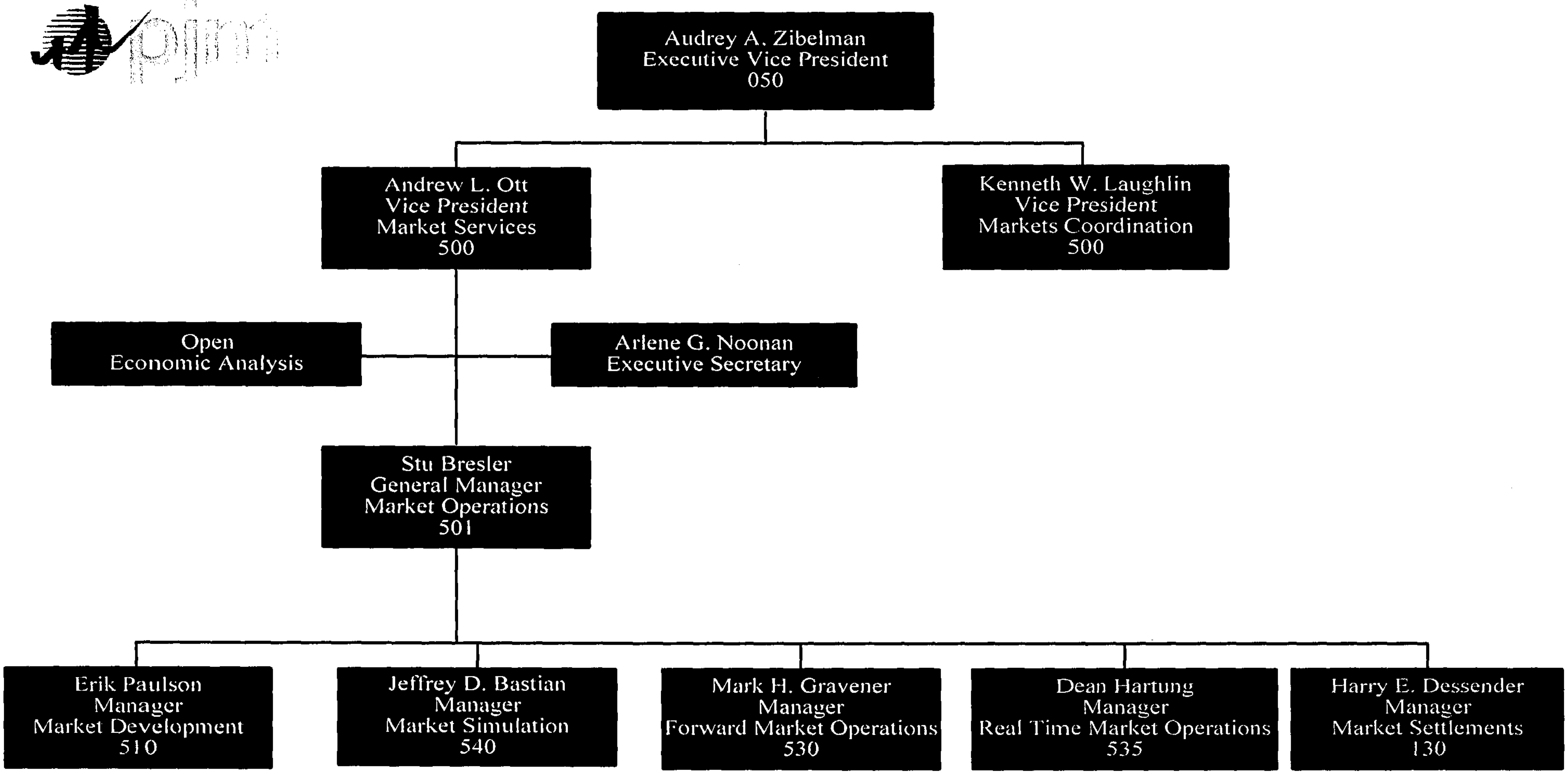
System Operator - Power
Roger E. Cummins
Allen T. Halliwell
Frederick J. Hirt
Christopher A. Smyth
Frank P. Squires
Donald Urban
Edward I. Zyvith

System Operator - Generation
Jason Clay
Paul Daugherty
David B. Hislop
Dean S. Miskovich
Robert Olinger
Kenneth A. Ruffing
Martin A. Sas
Henry J. Thomas

James A. Uhrin
Manager
PJM West
475

Dirk Baker, Engineer
Russell De Salvo, Sr. Engineer-SAE
Derek Kassimer, Engineer
Kelly Reott, Administrator-SAE

SMM - 01427



R. Matthew Edwards, Engineer
Steven J. Fedena, Sr. Engineer
Raymond Fernandez, Sr. Lead Engineer
Jaclynn Geist, Engineer
Lynn M. Horning, Sr. Training Coor.
Hui Ni, Sr. Engineer
Matthew P. Pennell, Sr. Engineer
Michael J. Ward, Sr. Engineer

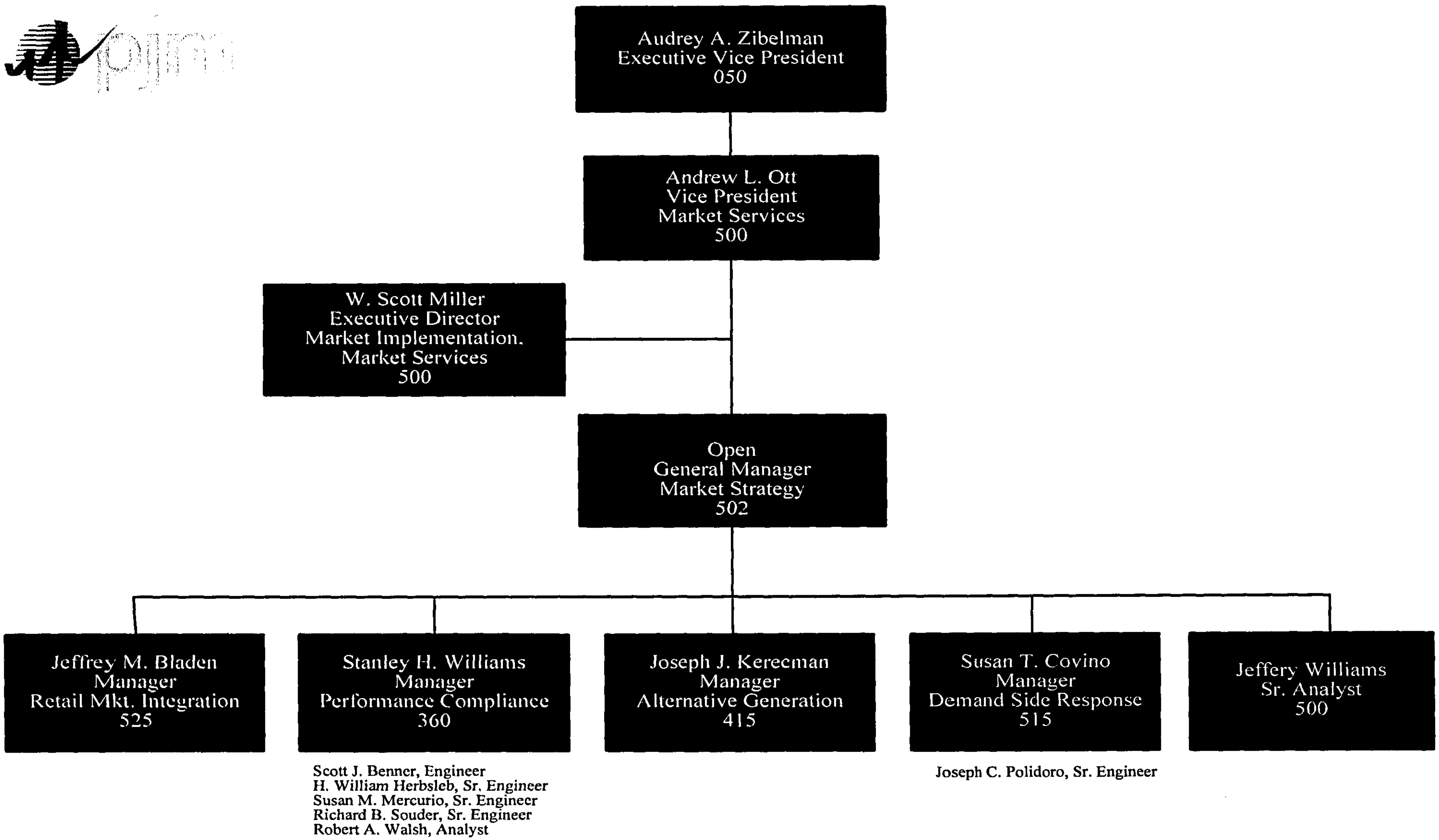
Timothy J. Horger, Sr. Engineer
Erich A. Mauroschadt, Sr. Engineer

Theresa A. Esterly, Sr. Lead Engineer
Jason Keech, Engineer
Gerard D. McNamee, Sr. Analyst
Steven Schickram, Associate Engineer
Cam D. Tran, Engineer

Rebecca Andrews, Sr. Engineer
Mark F. Gilrain, Sr. Lead Engineer
Adam J. Keech, Engineer
Angelo N. Marcino, Sr. Engineer
Ritwik Mishra, Engineer
Simon K. Tam, Sr. Lead Engineer

Michael Bean, Analyst
Jessica L. Buffoni, Analyst
Robert H. Carr, Sr. Engineer
Cheryl L. Cloud, Sr. Engineer
Suzanne R. Coyne, Sr. Lead Engineer
Yvette Dreisbach, Database Admin.
Denise Gajdowski, Analyst
Eric Hsia, Analyst
Wai M. Jew, Database Analyst
Lisa Knauer, Analyst
John C. McComb, Sr. Analyst
Cathleen A. Robinson, Analyst
Stephanie Rowe, Analyst
Rick Rowland, Analyst
Michael Stellabotte, Sr. Engineer
Brian C. Weathers, Sr. Analyst

SMM - 01428


Audrey A. Zibelman
Executive Vice President
050
Andrew L. Ott
Vice President
Market Services
500
W. Scott Miller
Executive Director
Market Implementation.
Market Services
500
Open
General Manager
Market Strategy
502
Jeffrey M. Bladen
Manager
Retail Mkt. Integration
525
Stanley H. Williams
Manager
Performance Compliance
360
Scott J. Benner, Engineer
H. William Herbsleb, Sr. Engineer
Susan M. Mercurio, Sr. Engineer
Richard B. Souder, Sr. Engineer
Robert A. Walsh, Analyst
Joseph J. Kerecman
Manager
Alternative Generation
415
Susan T. Covino
Manager
Demand Side Response
515
Joseph C. Polidoro, Sr. Engineer
Jeffery Williams
Sr. Analyst
500

SMM - 01429

INTEROFFICE MEMORANDUM

Date: 4/26/07

To: Frank Racioppi

From: Lindsay Johnston

Cc: Dionne Wright, Andy Ott, Joe Bowring, Stan Williams

Subject: Transition to Markets

Frank,

Congratulations on your new position in the Performance Compliance department. It has been agreed by Joe Bowring, Andy Ott and Human Resources that you will transition into your new role on **May 1, 2007**.

In the interest of ensuring continuity of MMU operations we will need you to provide assistance to the MMU for the July RPM auction and other MMU work until your duties can be transitioned to other MMU staff. Our hope is that your RPM assistance can be transitioned prior to the December 2007 RPM auction, however should that not have occurred you will need to provide assistance in the December RPM auction as well. In addition should your assistance be necessary for the 2007 State of the Market report, the MMU, HR and Markets will discuss how best to accommodate that additional work in the fall.

Keeping in mind that it may take some time to transition your duties to other MMU staff, I am suggesting that no more than 30% of your time is allocated to the MMU but flexibility will be required there as well. Additionally, I am requesting that you maintain a record of all your MMU work related activities in the SAP system so we can ascertain how many hours are required to complete the analyses.

Frank, let me know if you have any questions or concerns.

INTEROFFICE MEMORANDUM

Date: 4/26/07

To: Bridgid Cummings

From: Lindsay Johnston

Cc: Dionne Wright, Andy Ott, Joe Bowring, Stan Williams

Subject: Transition to Markets

Bridgid,

Congratulations on your new position in the Performance Compliance department. It has been agreed by Joe Bowring, Andy Ott and Human Resources that you will transition into your new role on **May 23, 2007**.

In the interest of ensuring continuity of MMU operations we will need you to continue to provide assistance with the MMU as we transition the work and until the MMU has transitioned your duties to another analyst. in addition should your assistance be necessary for the 2007 State of the Market report, the MMU, HR and markets will discuss how best to accommodate that additional work in the fall.

Keeping in mind that this may take some time, I am suggesting that no more than 30% of your time is allocated to the MMU. Additionally, I am requesting that you maintain a record of all your MMU work related activities in the SAP system so we can ascertain how many hours are required to complete the analyses.

Bridgid, let me know if you have any questions or concerns.

GENERAL POSITION SUMMARY:

The Co-op, Market Monitoring supports analysts in the monitoring and reporting of issues related to all PJM market operations and the potential to exercise market power. The student will gain valuable insight on topics such as electric system operations, applied microeconomics, public policy, computer programming, data analysis and statistics.

CHARACTERISTICS AND QUALIFICATIONS:

To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. The requirements listed below are representative of the knowledge, skill, and/or ability required. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

Required:

- Sophomore, Pre-Junior, Junior, or Senior Status
- Pursuing degree in Mathematics, Information Systems, Computer Science, Engineering (preferably Electrical), Business, or Economics
- Demonstrated ability to communicate effectively.
- Demonstrated ability to visualize and solve complex problems.
- Strong analytical skills.
- Ability to work closely with analysts in a teamwork environment.
- Good written and verbal communications.

Preferred:

- Experience with SQL, SAS, or other programming languages.
- Knowledge of Macro or Micro economics.
- Demonstrated ability to use Microsoft Excel for graphing and other data analysis.
- Demonstrated ability to use Microsoft PowerPoint for creating presentations.
- Experience with relational databases (preferably Oracle).
- Knowledge of power system engineering concepts, principles, standards and reliability concepts.
- Experience using PSS/e or other power system analysis programs.
- Knowledge of linear programming.

Essential Skills:
ESSENTIAL DUTIES AND RESPONSIBILITIES:

The Co-op, Market Monitoring responsibilities will include, but are not limited to, the following:

- The ability to create, execute, and support SAS/SQL programming code.
- The ability to create monthly reports that adhere to departmental standards.
- The ability to analyze data and support the MMU staff in conducting detailed analysis.
- The ability to use data analysis tools to draw conclusions and solve problems.
- The ability to perform internet research.

CORPORATE POLICY

DIVISION:	Corporate Services	**Version Number:**	3
DEPARTMENT:	Human Resources	**Version Issue Date:**	2/15/05
SECTION:		**Original Issue Date:**	4/6/04

Time Off

Policy Statement

It is the policy of PJM Interconnection to accommodate employees who wish to take time off to observe religious holidays or for other personal reasons.

The policy intent is to recognize that employees may occasionally need time off from work for vacation, personal business, illness or death in the family.

Audience

This policy applies to all exempt and non-exempt employees of PJM.

Revision Reference

Ctrl Click here to view the Revision Reference.

Policy

This policy shall be implemented by establishing and maintaining the following rules:

- PJM provides employees with the following types of time off:
  - Vacation
  - Standard Holidays
  - Floating Holidays
  - Paid Time Off (PTO)
  - Bereavement (Funeral) Leave
- Number of vacation days granted annually to employees is based on years of service and career band placement. (See Attachment A: Vacation Benefit Schedules on page 8)
- Number of days granted annually to employees for standard holidays, floating holidays and PTO is based on date of hire. (See Attachment B: Standard Holiday, Floating Holiday and Paid Time Off (PTO) Benefit Schedules Page 10.)
- The minimum time that may be charged for time off is one half-day (4 hours).
- Operating and other business needs permitting, time off will be scheduled to accommodate employees' requests.

  Note: Consideration is given to length of service with the company where conflicts arise. Management may develop business needs-based rules governing time off scheduling.

ATTACHMENT B: STANDARD HOLIDAY, FLOATING HOLIDAY AND PAID TIME OFF (PTO) BENEFIT SCHEDULES

New Employees – Full-time			
HIRE DATE	**Amount of SH**	**Amount of FH**	**Amount of PTO**
If hired January 1st through June 30th	paid for holidays that occur after date of hire	24 hours (3 days)	56 hours (7 days)
If hired July 1st through September 30th	paid for holidays that occur after date of hire	16 hours (2 days)	32 hours (4 days)
If hired October 1st through November 30th	paid for holidays that occur after date of hire	8 hours (1 day)	16 hours (2 days)
If hired December 1st - 31st	paid for holidays that occur after date of hire	0 hours	0 hours

New Employees – Shift Workers			
HIRE DATE	**Amount of SH**	**Amount of FH**	**Amount of PTO**
If hired January 1st through June 30th	See SH section of policy	40 hours (5 days)	56 hours (7 days)
If hired July 1st through September 30th	See SH section of policy	20 hours (2 ½ days)	32 hours (4 days)
If hired October 1st through November 30th	See SH section of policy	8 hours (1 day)	16 hours (2 days)
If hired December 1st - 31st	See SH section of policy	0 hours	0 hours

Co-Op Students (hired for 6 month duration)			
HIRE DATE	**Amount of SH**	**Amount of FH**	**Amount of PTO**
For entire 6 month duration	If holiday falls on scheduled work day, will be paid for hours normally worked.	0 hours	40 hours (5 days) **Will not be "paid out" at end of duration**
Co-ops whose school schedule precludes them from completing six months in succession are eligible for a pro-rated amount of Paid Time Off. 4 month duration	If holiday falls on scheduled work day, will be paid for hours normally worked.	0 hours	24 hours (3 days) **Will not be "paid out" at end of duration**
3 months or less	If holiday falls on scheduled work day, will be paid for hours normally worked.	0 hours	0 hours

Intermittent Employees			
HIRE DATE	**Amount of SH**	**Amount of FH**	**Amount of PTO**
If hired January 1st through December 31st	0 hours	0 hours	20 hours (2 ½ days)

COMMISSIONER WELLINGHOFF: Getting down to the structural issue a little bit. Related to the question I asked Mr. Bowring this morning, assuming that we do get to the point where we develop some definitions and we decide ultimately that we also need to restructure some of the functions of the market monitors and some of the RTOs and ISOs.

How would you propose that we do the transition. In other words, I want to make sure that we don't lose anything in the period going from the existing structure to what would be a new and different structure.

MS. ZIBELMAN: It's a very, very difficult management issue. All of us, as you know, companies face this all the time when they make outsourcing decisions or merger decisions. How do you retain people in the light of uncertainty?

The processes that they've used are really the best I think we can do. What we're intending to do is to tell the employees it's under consideration, which we've told our employees. You assure them that the normal processes, in terms of if in fact a decision is made to outsource and they wish to stay with the RTO and there are jobs available, they should be there, and you put in retention plans.

So to the extent that you are worried about people migrating away, there's an economic reason for them to stay till the end of the program so they understand there may be a bonus if they stayed until the end, and just deal with it as a management issue.

The challenge, of course, always is if somebody feels that their job is uncertain and we have people who are engineers, economists, etcetera, who are very attractive to a lot of people these days. How do you retain them? That's really the management challenge, but the best way you can do it is to effectively ensure them that they will at least be compensated for the risks they're taking of not looking for another job while you're trying to make a decision.

MR. HARVEY: Half a minute left.

COMMISSIONER WELLINGHOFF: My final comment on the half minute is, it's more than a difficult management challenge, it's a critical issue, given that you have to make sure that you've attained that functionality through the transmission because --

MS. ZIBELMAN: Right. In the past when I've confronted these issues and mergers where people were told their departments were going to be moved to different cities, it was the same issue. The best you can do is to provide the right types of retention plan and assurances and continue to work with staff.

COMMISSIONER WELLINGHOFF: Thank you very much. Thank you Chairman.

PJM Interference

1.) 2005 SOM Introduction and conclusions
    a. Soften results generally
    b. Discussion of the merits market power mitigation gutted
    c. Regulation market analysis conclusion

2.) Ford Mill analysis delayed: huge operating reserve pay outs (change in offers and min run times, etc)

3.) Regulation Market report: disagreed with conclusion. Got hung up for some time.

    a. They believed that large amounts of excess supply, etc

4.) TPS Implementation

    a. We participated in early design docs, but were cut out subsequently

        i. Testing, getting the right data.

    b. DA Probe implementation: had to find out details from the Vendor.

5.) MIC APS South TPS Discussion

    a.

    b. 1/25/2007 In the afternoon

        i. Around 2pm. AO came into Engle's cube where Engle and PS's were talking: AO: "Your analysis is wrong" to PS. AO was indicating that the proportion of failures metric produced by PS was incorrect. I walked over and said, "It was not wrong." I was directing the analysis and I was putting it together a response to AO's MIC slides for Joe. I indicated that the analysis/slides were still being put together, but I'd be willing to discuss the issue of ratios, etc with him.

        ii. He demanded the slides/report as is. I indicated that the analysis was not complete, and Joe had not had a chance to review it. I told AO that Joe was clear he was to review it before we released it. I indicated he would have to talk to Joe to get it. Joe had not had a chance to read it yet. I suggested he call Joe. At that time, Joe called on AO's cell phone (Susan had called Joe to let him know what was going on). Andy looked at the phone and did not pick it up.

        iii. AO said to me: "I want the slides. Send me the slides."

        iv. I asked him to talk to Joe. "I'm not talking to Joe. I want the slides."

        v. I got Andy out of the cubes...I went to my desk: AO: "I want the slides". HH: I will need to talk to Joe. AO: "Don't talk to Joe, send the slides."

        vi. I went to my cube, called Joe. Andy came down while I was on the phone. Did not say anything, as he stood at the entrance to my cube (I was turned away from Andy at my computer, but saw him in the reflections). I clued Joe in to Andy's presence and indicated to Joe, "Too late, we are running out of time." Andy left. HH: Joe wanted to discuss the individual pieces of the analysis that made up the slides at that point in time so we could get a draft out to AO. I set up a meeting in Joe K's office. (Tom Z and Paul S. and Me) Office around 2:45. Telephone call in to Joe.

vii. Andy burst into Joe K's office. "Where are those slides?" HH: "We are meeting with Joe to review the slides right now. Joe's on the phone." AO: "I want those slides. Do you want me to get HR involved in this?"

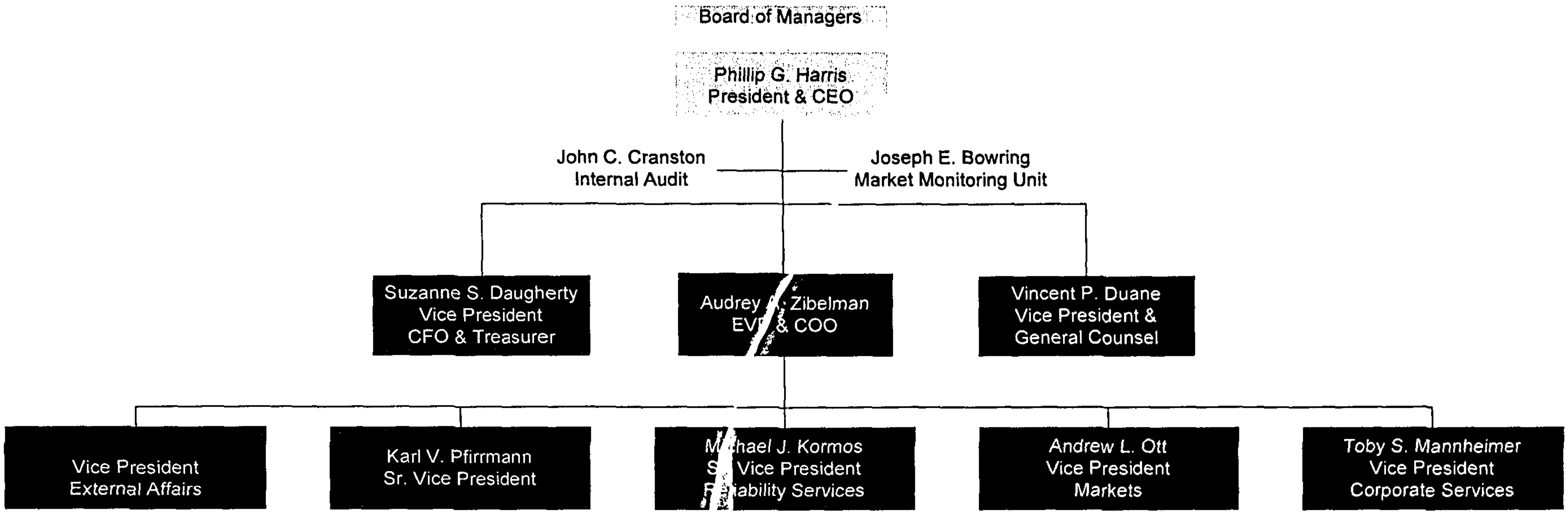
viii. I asked Joe for a response. Andy said: "Joe, make him give me the slides." Joe: Ok Andy

ix. I left Joe K's office to send the slides to AO, and then returned to Joe K's office to finish the meeting.

x. There was a meeting later that afternoon with Paul S, AO, Stu Breslar (SB), Dean Hartung (DH), Joe (on the phone) and myself. I brought a couple of hard copies of the slides. I indicated issues I had with their approach to the re-dispatch, there calculation of "failed interval ratio" etc. They indicated they had issues with our UPF based approach. Both parties agreed to re-examine methodology on price impact of not capping. It was indicated they did not want to see the total dollar impacts. Andy did not want the MMU criticizing Market's analysis. Willing to argue about the philosophy, but not the analysis in public. Both parties agreed to do more work and exchange slides again. AO apologized for putting me in the circumstance earlier.

6.) More recently RPM TPS: The design doc we developed for markets was not made part of the spec sent to AREVA.

PJM Interconnection – June 2007



SMM - 01441

Phillip G. Harris
President & CEO
050

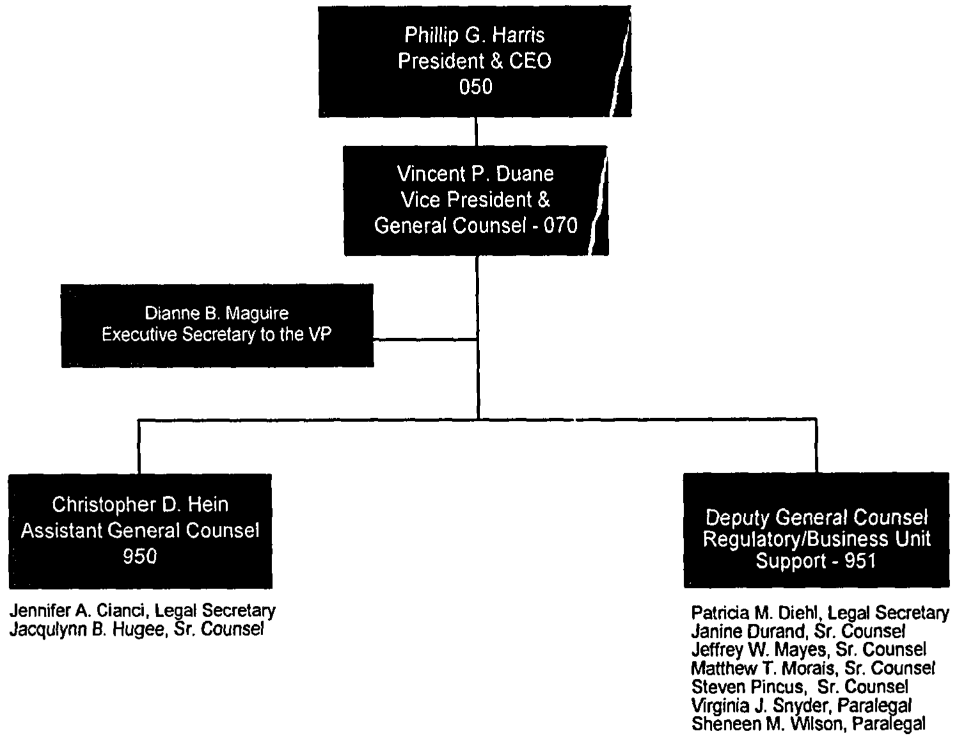
Geraldine K. Kook
Exec. Sec. to the President

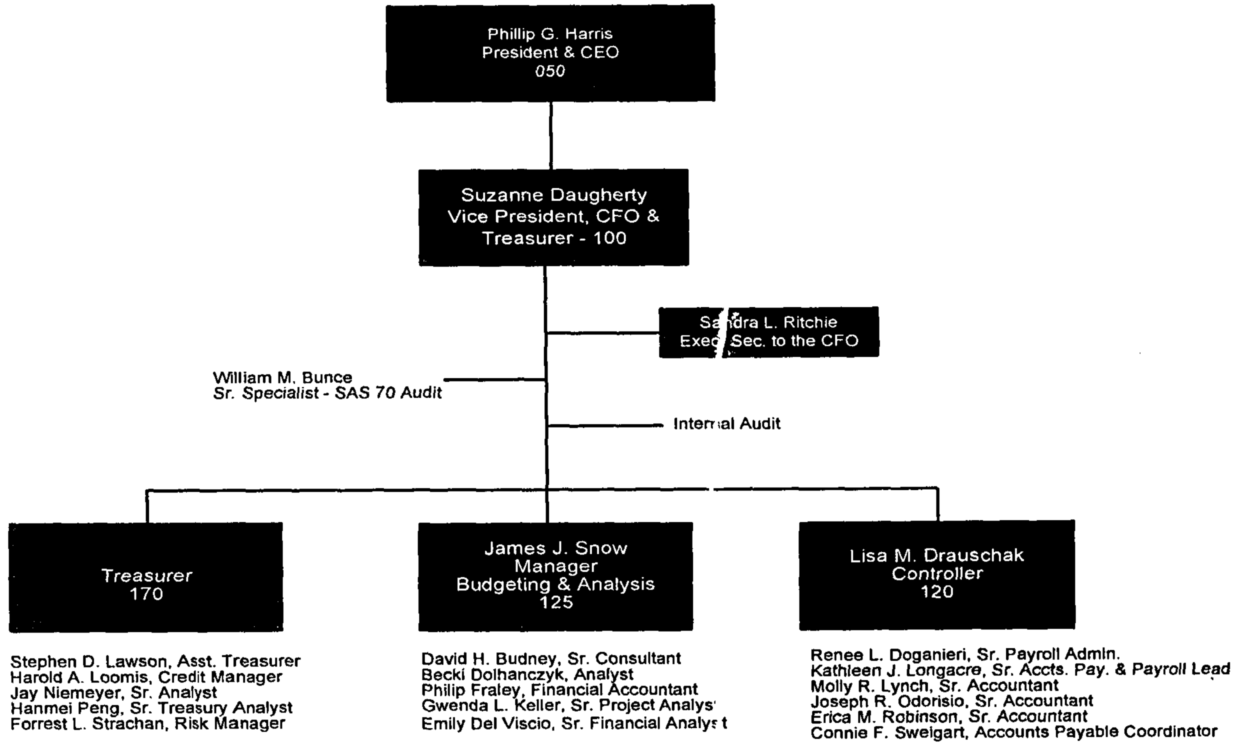
Joseph E. Bowring
General Manager
Market Monitoring Unit - 520

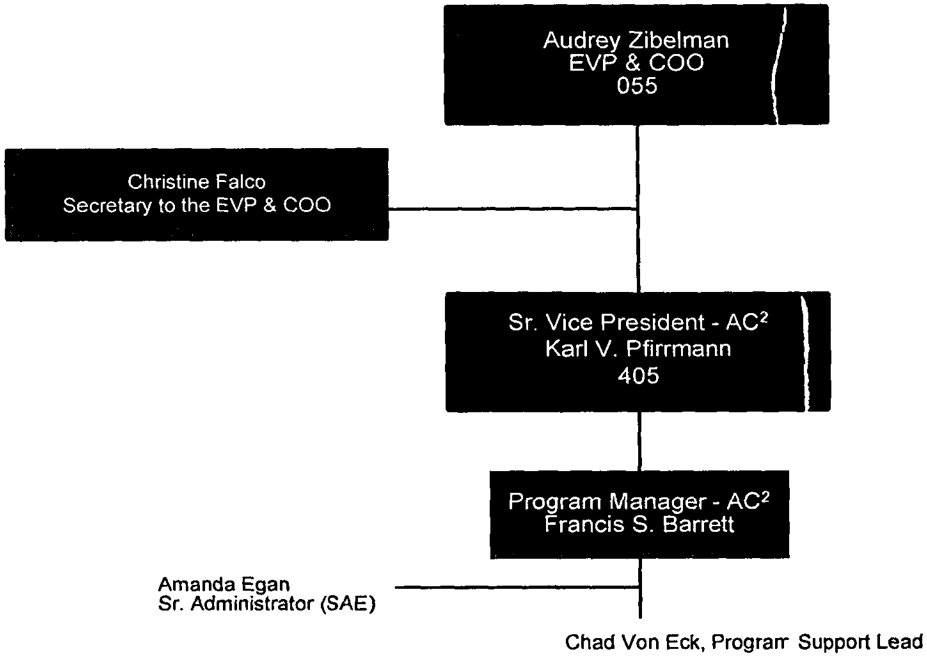
Kevin D. Bazar, Analyst
Francis J. Bell, Sr. Engineer
Thomas A. Blair, Sr. Database Analyst
Susan Cawley, Sr. Administrator
Andrew Engle, Sr. Analyst
Beatrice Gockley, Analyst
Howard J. Haas, Deputy Market Monitorr
Ellen C. Krawiec, Supervisor, Data Mgmt. & Reporting
Mark Million, Sr. Analyst
Hui Niu, Sr. Analyst
John P. O'Neill, Sr. Engineer
Paul G. Scheidecker, Supervisor, Market Performance

John C. Cranston
Manager
Internal Audit
080

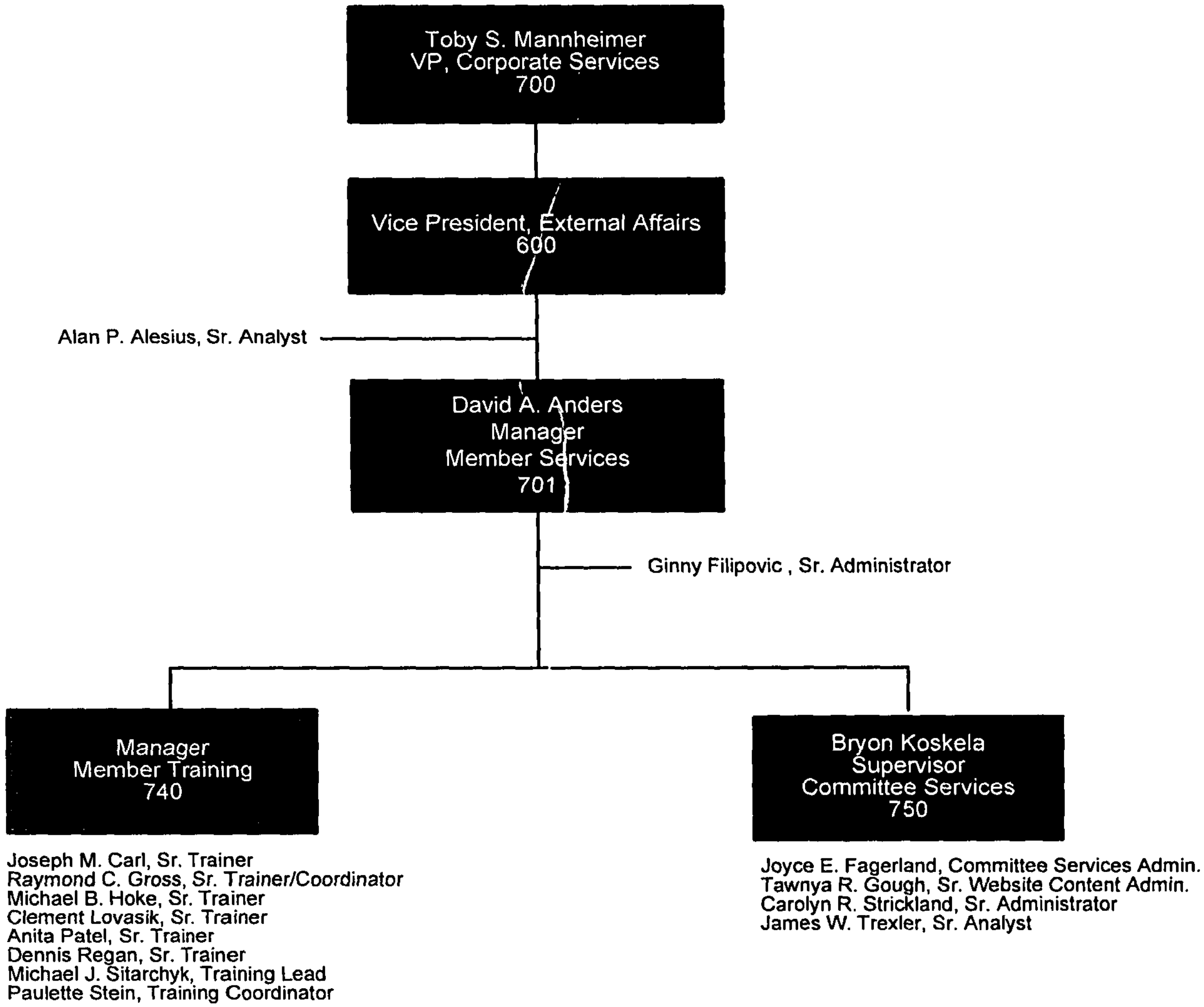
William I. Bixler, Sr. IT Auditor
Randolph W. Donahue, Sr. IT Auditor
Lisa M. Hurchik, Sr. Financial Auditor
Sandra A. Johansen, Sr. IT Auditor


Phillip G. Harris
President & CEO
050
Vincent P. Duane
Vice President &
General Counsel - 070
Dianne B. Maguire
Executive Secretary to the VP
Christopher D. Hein
Assistant General Counsel
950
Jennifer A. Cianci, Legal Secretary
Jacqulynn B. Hugee, Sr. Counsel
Deputy General Counsel
Regulatory/Business Unit
Support - 951
Patricia M. Diehl, Legal Secretary
Janine Durand, Sr. Counsel
Jeffrey W. Mayes, Sr. Counsel
Matthew T. Morais, Sr. Counsel
Steven Pincus, Sr. Counsel
Virginia J. Snyder, Paralegal
Sheneen M. Wilson, Paralegal


Phillip G. Harris
President & CEO
050
Suzanne Daugherty
Vice President, CFO &
Treasurer - 100
Sandra L. Ritchie
Exec. Sec. to the CFO
William M. Bunce
Sr. Specialist - SAS 70 Audit
Internal Audit
Treasurer
170
James J. Snow
Manager
Budgeting & Analysis
125
Lisa M. Drauschak
Controller
120
Stephen D. Lawson, Asst. Treasurer
Harold A. Loomis, Credit Manager
Jay Niemeyer, Sr. Analyst
Hanmei Peng, Sr. Treasury Analyst
Forrest L. Strachan, Risk Manager
David H. Budney, Sr. Consultant
Becki Dolhanczyk, Analyst
Philip Fraley, Financial Accountant
Gwenda L. Keller, Sr. Project Analyst
Emily Del Viscio, Sr. Financial Analyst
Renee L. Doganieri, Sr. Payroll Admin.
Kathleen J. Longacre, Sr. Accts. Pay. & Payroll Lead
Molly R. Lynch, Sr. Accountant
Joseph R. Odorisio, Sr. Accountant
Erica M. Robinson, Sr. Accountant
Connie F. Swelgart, Accounts Payable Coordinator


Audrey Zibelman
EVP & COO
055
Christine Falco
Secretary to the EVP & COO
Sr. Vice President - AC²
Karl V. Pfirrmann
405
Program Manager - AC²
Francis S. Barrett
Amanda Egan
Sr. Administrator (SAE)
Chad Von Eck, Prograrr Support Lead

- **Toby Mannheimer**, VP, Corporate Services, 700
  - **Vice President, External Affairs**, 600
    - **Craig A. Glazer**, VP, Federal Government Policy, 600
    - **Terry A. Williamson**, Chief Communications Officer, Corp. Communications, 720
      - Kathleen E. Lloyd, Comm. Associate
      - Jeffrey A. Williams, Sr. Analyst
      - **Kirsten C. Lusska**, Manager, Branding/Creative Services, 721
        - David E. Miscavage, Graphic Designer/Artist
        - Howard E. Wasserman, Graphic Designer/Artist
      - **Ray E. Dotter**, Manager, Media Relations, 722
        - Paula DuPont Kidd, Sr. Comm. Professional
        - Helene Giansante, Comm. Professional
        - Melissa Schwenk, Sr. Comm. Professional
    - **William H. Whitehead**, Exec. Director, State Gov't Policy, 056
      - Stephen Boyle, Manager, Regulatory/Legislative Affairs
      - Mary Beth Cartacki, Sr. Administrator
      - Matthew G. LaRocque, Manager-Regulatory
      - Richard L. Mathias, Sr. Consultant - SAE
      - Evelyn R. Robinson, State Regulatory Liaison
      - Kerry M. Stroup, Manager, Regulatory/Legislative


Toby S. Mannheimer
VP, Corporate Services
700
Vice President, External Affairs
600
Alan P. Alesius, Sr. Analyst
David A. Anders
Manager
Member Services
701
Ginny Filipovic , Sr. Administrator
Manager
Member Training
740
Joseph M. Carl, Sr. Trainer
Raymond C. Gross, Sr. Trainer/Coordinator
Michael B. Hoke, Sr. Trainer
Clement Lovasik, Sr. Trainer
Anita Patel, Sr. Trainer
Dennis Regan, Sr. Trainer
Michael J. Sitarchyk, Training Lead
Paulette Stein, Training Coordinator
Bryon Koskela
Supervisor
Committee Services
750
Joyce E. Fagerland, Committee Services Admin.
Tawnya R. Gough, Sr. Website Content Admin.
Carolyn R. Strickland, Sr. Administrator
James W. Trexler, Sr. Analyst

Audrey Zibelman
EVP & COO
055

Andrew L. Ott
Vice President
Market Services
500

Arlene G. Noonan
Executive Secretary

Susan M. Kelly
Executive Secretary

F. Stu Bresler
Executive Director
Market Operations
501

Wai M. Jew, Database Analyst
Alex G. Habre, Internal Control Consultant
Jeffrey R. Schmitt, Sr. Engineer

Raymond J. Fernandez
Manager
Market Development
510

Steven J. Fedena, Sr. Engineer
Jaclynn Lukach, Engineer
Lynn M. Horning, Sr. Training Coor.
Amanda M. Libengood, Sr. Analyst
Susan E. Martinoli, Sr. Analyst
Kimberly A. Miller, Div. Portfolio Analyst
Hui Ni, Sr. Engineer
Matthew P. Pennell, Sr. Engineer

Dean Hartung
Manager
Real Time Market
Operations
535

Matthew E. Baim, Sr. Engineer
Rebecca Carroll, Sr. Engineer
Adam J. Keech, Sr. Engineer
Alex W. Ma, Engineer
Angelo N. Marcino, Sr. Engineer
Michael B. Olaleye, Engineer
Simon K. Tam, Sr. Lead Engineer

Mark H. Gravener
Manager
Forward Market Operations
530

Aaron Baizman, Engineer
James J. Dolan, Sr. Engineer
Theresa A. Esterly, Sr. Lead Engineer
Qun Gu, Sr. Engineer
Jason M. Keech, Sr. Engineer
James W. Kirby, Sr. Engineer
Bhavana G. Keshavamurthy, Engineer
Rebecca L. Lawrence, Sr. Analyst
Cam D. Tran, Sr. Engineer
Michael J. Ward, Sr. Lead Engineer

James G. Powick
Manager
Market Settlement
Operations
135

Jessica L. Buffoni, Analyst
Robert H. Carr, Sr. Engineer
Cheryl L. Cloud, Sr. Engineer
Yvette Dreisbach, DB Admin.
Denise Gajdowski, Sr. Analyst
C. John McComb, Sr. Consultant
W. Rick Rowland, Analyst
Michael Stellabotte, Sr. Engineer

Jeffrey D. Bastian
Manager
Market Simulation
540

Zhenyu Fan, Engineer
Timothy J. Horger, Sr. Engineer
Erich A. Mauroschadt, Sr. Engineer
David M. Picarelli, Sr. Engineer
Yan Lin, Sr. Engineer

Harry E. Dessender
Manager
Market Settlement
Services
130

Michael J. Bean, Sr. Analyst
Sarah C. Burlew, Analyst
Timothy C. Burdis, Analyst
Suzanne R. Coyne, Sr. Lead Eng.
Eric Hsia, Sr. Analyst
Lisa K. Knauer, Sr. Analyst
Edward Rich, Analyst
Cathleen A. Robinson, Analyst
Brian C. Weathers, Sr. Analyst

SMM - 01448

326692

- **Audrey Zibelman**, EVP & COO, 055
  - **Andrew L. Ott**, Vice President, Markets, 500
    - **Jeffrey M. Bladen**, General Manager, Market Strategy, 502
      - Susan T. Covino, Senior Consultant
      - Serhan Ogur, Senior Economist
      - **Manager**, Retail Mkt. Integration, 525
      - **Joseph J. Kerecman**, Manager, Alternative Generation, 415
        - John D. Wilhelm, Sr. Engineer
      - **Peter L. Langbein**, Manager, Retail Demand Response Integration, 515
        - Donald E. Kujawski, Sr. Analyst
    - **Amanda E. Chambers**, Manager, Member Relations, 440
      - Helen M. Burnley, Customer Consultant
      - Tracy A. Domin, Analyst
      - Marie P. Furey, Client Manager
      - Risa J. Holland, Client Manager
      - Gregory G. Krajnik, Client Manager
      - Esrick O. McCartha, Client Manager
      - Glenn C. Weiss, Client Manager
      - **Sheila Foley, Supervisor, Customer Service**
        - Cynthia L. Jackson, Sr. Customer Support Administrator
        - April Mays-Parks, Sr. Customer Support Admin.
        - Carol McMenamin, Sr. Receptionist
        - Michelle M. Souder, Customer Consultant
        - Leslie A. Yeager, Customer Support Admin./Rec.
    - **Stanley H. Williams**, Manager, Performance Compliance, 360
      - Scott J. Benner, Sr. Engineer
      - Brigid M. Cummings, Analyst
      - H. William Herbsleb, Sr. Engineer
      - Susan M. Mercurio, Sr. Engineer
      - Frank J. Racioppi, Sr. Lead Engineer
      - Robert A. Walsh, Analyst
      - Xu Xu, Engineer
      - Thomas F. Zadlo, Sr. Analyst
    - **Business Development**, 900

SMM - 01449

Audrey A. Zibelman
Executive Vice President
055

Toby S. Mannheimer
Vice President
Corporate Services
700

Vice President
Human Resources
060

Mary K. Lohman
Manager
Human Capital
710

Steven C. Hinz, Sr. HR Business Partner
Lisa Potter-Saeger, Training Coordinator
Andrew Rinaldi, Sr. HR Business Partner
Linda L. Sechrist, Executive Administrator
Dionne C. Wright, HR Business Partner

Maureen E. McCormick
Manager
Compensation & Benefits
760

Janell L. Fabiano, Recruiter
Heather A. McGrory, HR Business Partner
Melissa A. Schneider, Sr. HR Analyst
Carol A. Smith, HR Coordinator
Dianne L. Wilson, Sr. Safety Associate

SMM - 01450

pjm

Audrey A. Zibelman
EVP & COO
055

Toby S. Mannheimer
Vice President
Corporate Services
700

Douglas A. Fabish, Sr. Analyst

David B. Spangler
Manager
Facilities
110

William J. Bryson, Sr. Fac. Consultant
Carl T. Davis, Building Mechanic Consult- SAE
William L. Franks, Sr. Building Mechanic
Michael P. Haag, Intermediate Building Mechanic
Robert H. Hood, Supervising Engineering Tech
Joel A. Hysore, Building Mechanic
Stan A. Koncoski, Building Mechanic
Charles D. Kramer, Building Mechanic
Ronald Lake, Shipping/Receiving Clerk
James R. Lancaster, Sr. Engineering Technician
William J. Lebus, Sr. Engineering Technician
John D. McCann, Building Mechanic
Barry L. Powell, Building Mechanic
Benjamin R. Pritt, Sr. Building Mechanic
Mark Robinson, Intermediate Building Mechanic
Virgil Robinson, Building Support Specialist
David P. Rudolph, Sr. Facilities Project Leader
Edward E. Smith, Intermediate Building Mechanic
Jay C. Stauffer, Sr. Engineering Technician
Steven G. Walker, Building Mechanic Foreman

Paul J. McLaverty
Manager
Procurement / Contracts
630

Albert G. Bramley, Sr. Category Administrator
Thomas C. Geremski, Category Lead
Donna Morgis, Category Lead
Deborah H. Papillon, Sr. Category Administrator
Pamela J. Quittner, Category Lead

Priscilla E. Chandler
Manager
Office of Diversity & Inclusion
700

Jennifer A. Bellwoar
GM,
Governance & Business Planning
702

Patricia A. Cory, Sr. Consultant
Lisa L. Dessender, Analyst
Kevin T. Hilyard, Analyst
Karen A. Lewis, BOM Liaison

SMM - 01451

Michael J. Kormos
Sr. VP
Reliability Services - 054

Ann Marie Blackwell
Executive Administrator

Frank J. Koza
Executive Director
System Operations
400

Linda A. Foulke, Executive Secretary
Karen T. Kenney, Sr. Travel Coord.

Diane L. Smith, Div. Portfolio Analyst

Manager
Strategic Support - 400

Mark L. Holman
Manager
Operations Development
420

Kevin M. Bonner, Analyst
Ronald W. DeLoach, Sr. Engineer
Kevin J. Komara, Sr. Engineer
Wayne B. Moodie, Sr. Analyst
Christopher M. Pacella, Analyst
Jerry Whooley, Sr. Engineer

Glen D. Boyle
Manager
System Operator Training
435

Jessica J. Bian, Sr. Lead Engineer
Allen M. Fickman, Sr. Engineer
Peter J. Lawrence, Sr. Operator Trainer
William J. Powell, Sr. Operator Trainer
Daniel M. Restucci, Sr. Operator Trainer
Kimberly A. Sauerwine, Sr. Operator Trainer

Jonathan Z. Ponder
Manager
Engineering Support
460

Donald S. Bielak, Engineer
Charlotte El, Analyst
Suzie M. Fahr, Analyst
Jing Liu, Engineer
Michael A. Nazarek, Sr. Engineer
James M. Ortlieb, Sr. Analyst

David W. Souder
Manager
Operations Planning
490

Dirk A. Baker, Sr. Engineer
Augustine C. Caven, Reliability Engineer
Nicole M. Fagnani, Reliability Engineer
Liem S. Hoang, Reliability Engineer
Elliot H. Hoffman, Sr. Analyst
Jeffrey A. Hoffman, Sr. Engineer
Joseph E. Jackson, Reliability Engineer
Ronald K. Lavan, Engineer
Ruston J. Ogburn, Reliability Engineer
Sanjay Patil, Engineer
Christopher Pilong, Sr. Reliability Eng. (Team Leader)
John A. Richardson, Sr. Hydro Analyst-SAE
David M. Turtle, Reliability Engineer
Donald Urban, Reliability Engineer

SMM - 01452

Michael J. Kormos
Sr. VP
Reliability Services - 0 4

Frank J. Koza
Executive Director
System Operations
400

General Manager
Regional Operations
410

Michael E. Bryson
Manager, Dispatch
410

Amy S. Stanley, Executive Secretary

Supervisor, System Operations
Alfonso C. Alicea
Patrick A. Brown
Thomas R. Burns
Joseph Ciabattoni
Philip J. D'Antonio
Nicholas J. Winter

System Operator - Generation
Arthur T. Baker
Dale T. Irwin
Gerald S. Keefer
Lawrence M. Kokos
Anthony F. LaCorte
John A. Libertz
Nathan A. Marr
Greagory D. McBee
Robert J. Olinger
Kristina M. Peterson
William L. Willis

System Operator - Scheduling
Matthew A. Cresta
Edward P. Hoey
Ernest J. Owens
Carol Ann Rice
Claudette Shellman-Peters

System Operato - Power
Roger E. Cummir s
Joan G. D'Antoni
Peter Diaz
William L. Fox
Michael L. Franc s
Brian S. Fry
Allen T. Halliwell
Michael D. Hardi
Frederick J. Hirt
David B. Hislop
Thomas Keyser
Joseph A. Lebel
Eric P. Morris
Brian Oakes
Reginald J. Pa aypay
Curtis D. Peter son
Kenneth A. Ru fing
Christopher A. Smyth
Frank P. Squir es
Henry J. Thom as
Thomas D. Vo thel
Donald Wallin
Edward I. Zyvi n

Master Coordinator
Steven W. Campbell
Marc A. Farinas
Shane E. Gorichky
Victor J. Kurywczak
Matthew McGrath
Steven T. Piech
Julius A. Rigo
George T. Smith
John A. Starcheski

Transaction Coordinator
Hope I. Pesner

Reliability Engineers - from cc 490
Augustine C. Caven
Nicole M. Fagnani
Liem S. Hoang
Joseph Jackson
Ruston J. Ogburn
Christopher Pilong
David Turtle
Donald Urban

SMM - 01453

Michael J. Kormos
Sr. VP
Reliability Services - 054

Steven R. Herling
Vice President
Planning
300

Nancy B. Muhl
Executive Secretary

Paul McGlynn
Manager
Transmission Planning
310

- Seungwon An, Engineer
- Edmund J. Franks, Engineer
- Michael J. Herman, Engineer
- Larry Hodge, Sr. Analyst
- Ganesh K.Velummylum, Engineer
- Jonathan P. Kern, Sr. Engineer
- Mark L. Sims, Sr. Engineer
- Nebiat G. Tesfa, Sr. Engineer
- Jonathan Thompson, Engineer

Alan J. Elmy
Manager
Interconnection &
Generation Planning
370

- Aaron T. Berner, Sr. Engineer
- Joseph M. Burdis, Sr. Consultant/Engineer
- Qiming Chen, Sr. Engineer
- Pesala V. Chetty, Sr. Engineer
- Michael R. Colby, Sr. Engineer
- Enzio D. Colodonato, Graph Des./CAD Support
- Francis DiCicco, Analyst
- David Egan, Sr. Engineer
- John W. Fedorko, Sr. Consultant/Engineer
- George Hakun, Sr. Engineer
- Brindavani Malladi, Engineer
- Kennth B. Mancini, Sr. Engineer
- Jeffrey M. McLaughlin, Engineer
- Jeannette C. Mittan, S. Administrator
- Moamed M. Osman, Sr. Engineer
- Wenzheng Qiu, Engineer

Thomas A. Falin
Manager
Capacity Adequacy Plan.
350

- Murty P. Bhavaraju, Sr. Consultant - SAE
- Andrew P. Ford, Sr. Engineer
- Molly A. Mooney, Analyst
- David J. Pomian, Sr. Analyst
- Jason Quevada, Analyst
- John M. Reynolds, Sr. Engineer
- Gary A. Schuck, Sr. Engineer
- John J. Slivka, Sr. Analyst - SAE
- Jennifer Warner-Freeman, Analyst
- Sree Rama Kumar Yeddanapudi, Engineer

SMM - 01454

Michael J. Kormos
Sr. Vice President
Reliability Services-054

Chantal Aimee N. Hendrzak
General Manager
Applied Solutions
290

- Pasma Apehaya, Business Solution Engineer
- Kenneth M. Huber, Manager, Advanced Technology
- Thomas J. Kennedy, Business Solution Engineer
- Edward Kovler, Technical Engineer
- Ritwik Mishra, Business Solution Engineer
- Mahendra Patel, Technical Engineer
- Jianzhong Tong, Business Solution Engineer

Nora C. Swimm
Exec. Director, ITS
President, EIS
201

Marsha L. Staub, Executive Secretary

Lee H. Levan
General Manager
IT Integration
222

Steven A. Abramowicz, SAP Functional Lead

Heather M. Forsythe
Manager
Decision Support Systems
271

- Deirdre R. Cusack, Sr. Data Warehouse Admin.
- Christopher J. Fazio, Sr. DBA
- Patricia J. Finegan, Sr. Business Analyst
- Robert J. Griffin, Application Developer
- Todd L. Hiser, Sr. Business Analyst
- Robert L. Jones, Sr. Application Developer
- Julie-Anne M. Marshall, Analyst
- Marc B. Mundell, Sr. Application Developer
- Fabian P. Robinson, Sr. Application Developer
- Shiva Srinivasan, Application Developer
- Jianxiong Zhang, Sr. Production DBA
- Alla Ziring, Application Developer

John M. Conboy
Manager
Markets Applications
227

- Daryn J. Aucoin, Application Developer
- Pai-Yen Chou, Sr. Business Analyst
- Congmei Ding, Sr. Application Developer
- Jeffrey M. Falciani, Sr. Application Developer
- Neil W. Hornbeck, Sr. Application Developer
- Chih-Chieh Huang, Application Developer
- Donna M. Hungarter, Sr. Business Analyst
- Donald K. Landis, Sr. DBA
- Glenn E. Long, Application Developer
- Gerard McNamee, Sr. Business Analyst
- Patrick J. Neary, Sr. Business Analyst
- Medha Pai, Sr. Application Developer
- James Reynolds, Sr. Application Developer
- Raj K. Rohilla, Sr. DBA
- Alexander Rubinshteyn, Application Developer

Manager
Corporate Applications
250

- Dion A. Alveranga, Sr. SAP Programmer
- Thomas A. Csongradi, Sr. SAP Developer
- Monica I. Feniak, Web Developer
- Carl E. Schiavoni, Web Developer
- Debra A. Taraschi, Sr. Business Analyst
- Richa Tiwari, Sr. SAP Programmer
- Timothy S. Watts, Sr. SAP Administrator
- Laura Wolkowitz, Sr. Web Developer

Christopher Smart
Manager
Operations Applications
222

- Walter C. Appleton, Sr. Application Developer
- Wendy Casterline, Sr. Business Analyst
- Srinivas Karra, Sr. Application Developer
- Sung Hee Lee, Application Developer
- Wei Li, Sr. Application Developer
- Aleksandrs Lubimovs, Sr. Application Developer
- James L. McDonald, Business Analyst
- Lana Meres, Sr. DBA
- Paul Y. Meshkovsky, Application Developer
- David S. Rohland, Sr. DBA
- David G. Wolfe, Sr. Business Analyst
- Jing Yang, Sr. Application Developer

SMM - 01455

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Nora C. Swimm
Exec. Director, ITS
President, EIS
201

John I. Dyer
General Manager
IT Operations
230

ITS Administration & Support (281)
Stephen J. Feeley, Sr. ITS Financial Analyst
Susan R. Kohn, Procurement Administrator
James L. Lange, Sr. Analyst
Richard D. Lanning, Sr. Consultant

Robert J. Wagner
Manager
Windows Infrastructure
214

Larry S. Austin, Sr. Windows Support Analyst
Terrence J. Curry, Sr. Windows Support Analyst
Nicholas Della Pelle, Windows Support Analyst
Michael J. DelViscio, Sr. Windows Support Analyst
James E. Dwyer, Windows Support Analyst
George M. Fazio, Windows Support Analyst
Michael Fortunato, Windows Support Analyst
Christopher Hagan, Sr. Windows Support Analyst
Timothy Herman, Sr. Windows Support Analyst
Ross A. Kendall, Windows Support Analyst
Frank E. Kramer, Windows Support Analyst
Jin Hyung Lee, Windows Support Analyst
Ian M. Mundell, Sr. Windows Support Analyst
Greg Rozinsky, Sr. Windows Support Analyst
Jessica M. Staley, Windows Support Analyst
Justin Weddington, Sr. Windows Security Analyst
Clarence Whitaker, Windows Support Analyst

John N. Ippolito
Manager
AIX Infrastructure
211

Mouhcine Bengelloun-Zahr, AIX Security Analyst
Bryan Chain, AIX Infrastructure
Paul DiSciascio, Sr. AIX Analyst
Lawrence E. Nicholas, Sr. Infrastructure Suport Analyst
Charles A. Patterson, Sr. AIX/Linux Support Analyst
Timothy M. Peek, Sr. AIX/Linux Support Analyst
Neil Rosenberg, Infrastructure Suport Analyst
Raymond G. Snyder, Sr. AIX/Linux Support Analyst
James P. Smith, AIX Analyst
David M. Zinn, Sr. Infrastructure Suport Analyst

Colin M. Brisson
Manager
Network Infrastructure
241

Network Infrastructure (241)
Joseph Callis, Sr. Network Security Analyst
Daniel R. Cunningham, Network Analyst
Richard H. Glaum, Sr. Network Analyst
Raymond M. Groff, Sr. Network Analyst
Ronald R. Moore, Sr. Network Analyst
Charles J. Nixon, Sr. Network Analyst
Brian L. Orme, Corporate Network Analyst
Samuel T. Pomponi, Sr. Network Analyst
Lee J. Triplicata, Sr Network Analyst

Telecommunications Infrastructure (242)
John T. Hadrick, Sr. Telecom. Analyst
Frank J. Nitchie, Sr. Telecom. Analyst

Sean McNamara
Manager
IT Operations Center
230

Pradip K. Agnihotri, Sr. Specialist
Albert E. Barth, Sr. Specialist
Arnold V. Candelaria, Analyst
Steven Cartacki, Sr. Specialist
Charles L. Conway, Sr. Specialist
Jonathan A. Geremia, Analyst
Terrence J. Gumpper, Sr. Specialist
Kristerpher Henderson, Analyst
William E. Hibbs, Sr. Specialist
Richard Hopkins, Sr. Specialist
Troy J. Houston, Sr. Specialist
Peter M. Kohut, Monitoring & Perf. Analyst
Francis M. Letterio, Sr. Specialist
Philip Milazzo, Sr. Monitoring & Perf. Analyst
Gregory Moyer, Sr. Specialist
Shannon R. O'Connor, Monitoring & Perf. Analyst
Daniel J. Ognissanti, Analyst
Andrew J. Procaccini, Sr. Specialist
Dipti V. Shah, Sr. Config. Mgmt. Admin.

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

Thomas F. O'Brien
General Manager
Reliability Services AC² Program
265

Lisa A. Brennan, Project Scheduler
Earl Lynch, AC² Program Office Lead
Sherwood R. Probeck, Sr. Security Analyst AC²

John Baranowski
Manager
Operations Lead AC²
407

Ronald T. Graff, Lead Architect
Daniel J. Moscovitz, Engineer
Darryl G. Schrift, Sr. Lead Engineer
John P. Smith, Sr. Network Analyst

David J. Vicini
Manager
Operations Lead AC²
406

Richard Brenton, Sr. Technical Architect
John E. Collier, Sr. Lead Architect
John Dadourian, Sr, Lead Engineer
Trevor R. Loose, Sr. Lead Engineer
Scott Martello, Engineer
Charles J. Schultz, Engineer

Joshua Binstead
Manager
Enterprise Architecture
244

Lisa M. Hoover, Sr. Data Architect
Richard Knebel, Sr. Network Analyst
Michael R. Luna, Sr. Technical Architect
Ashwini J. Paranjape, Engineer
Gautam R. Punjabi, AC² Engineer
Tahir Saeed, Sr. Lead Unix Support Analyst
Sammie W. Stahlback, Sr. Technical Architect
Dave W. Ulmer, Sr. Technical Architect

Michael J. Kormos
Sr. Vice President
Reliability Services - 054

General Manager
Transmission Strategy
380

James E. Glennon
Sr. Consultant - 380

Michael J. Kormos
Sr. Vice President
Reliability Services
054

Thomas T. Bowe
Executive Director
Reliability Integration
800

Alicia E. Daugherty
Manager
NERC & Regional Coordination
800

- Albert M. DiCaprio, Sr. Strategist
- William L. Harm, Sr. Consultant
- Leanne M. Harrison, Sr. Engineer
- Mark J. Kuras, Sr. Engineer
- Susan L. McGill, Engineer
- Thomas M. Moleski, Sr. Analyst
- Stephanie Monzon, Sr. Engineer

Kenneth S. Seiler
Manager
Power System Coordination
810 / 820

Interconnection Coordination - 810

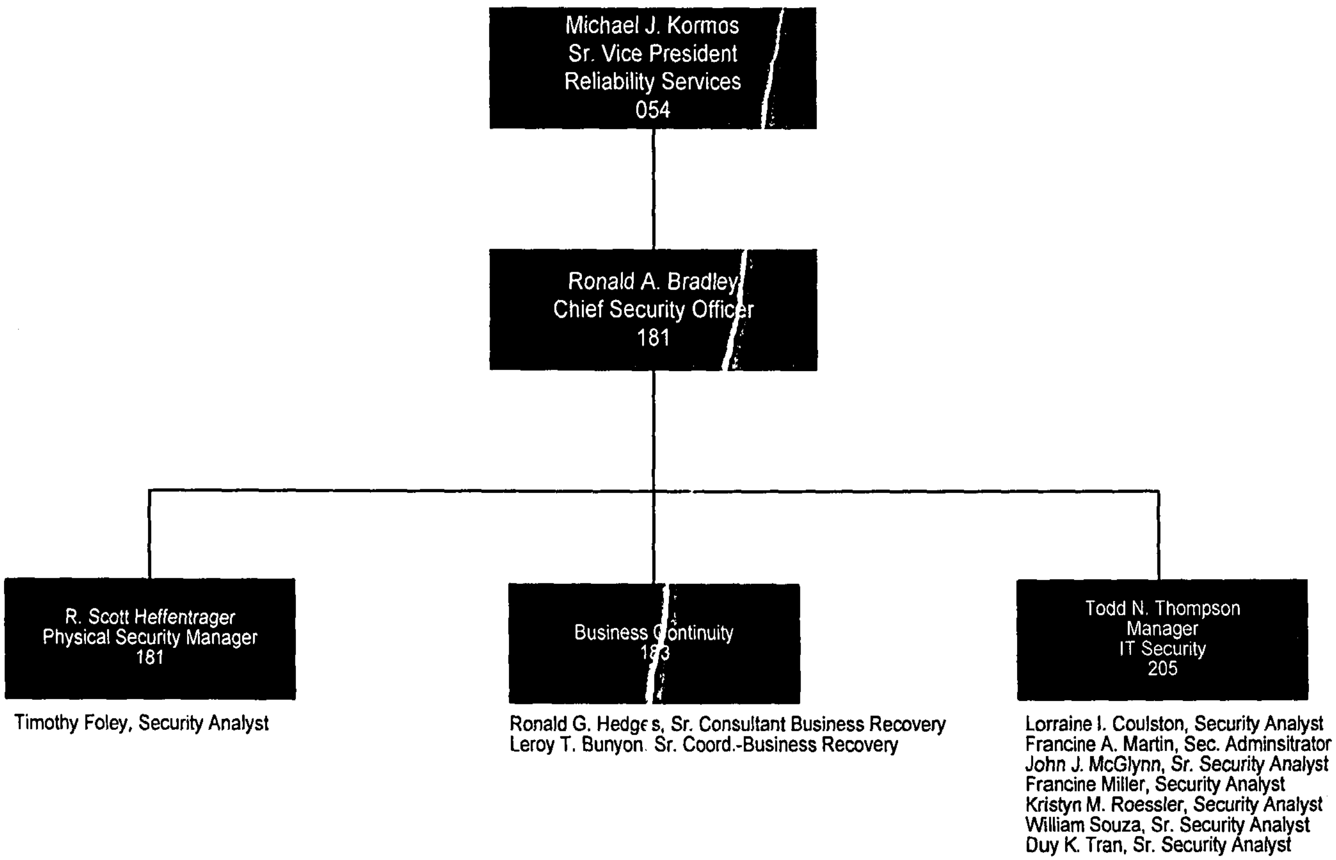
- Diane Lake, Sr. Administrator
- William M. Patzin, Sr. Engineer
- Robert G. Price, Sr. Engineer
- Kenneth A. Schuyler, Sr. Consultant
- David P. Schweizer, Sr. Consultant

Mid-Term Operations Planning - 820

- Aniss Fradi, Sr. Engineer
- Matthew D. Frogg, Engineer
- Robert J. Morasco, Engineer
- Heather L. Reiter, Engineer
- Yuri Smolanitsky, Engineer
- Mona A. Soliman, Engineer
- Richard B. Souder, Sr. Engineer
- Kennth R. Thomas, Sr. Engineer

Christopher J. Advena
Manager
Tariff Integration
830

- James M. Burlew, Analyst
- John W. Gdowik, Sr. Analyst
- Susan L. O'Connell, OASIS Administrator
- Biagio R. Pinto, Analyst
- Bao Tran, Engineer
- Donald E. Williams, Sr. Engineer



Michael J. Kormos
Sr. Vice President
Reliability Services
054
Ronald A. Bradley
Chief Security Officer
181
R. Scott Heffentrager
Physical Security Manager
181
Timothy Foley, Security Analyst
Business Continuity
183
Ronald G. Hedges, Sr. Consultant Business Recovery
Leroy T. Bunyon. Sr. Coord.-Business Recovery
Todd N. Thompson
Manager
IT Security
205
Lorraine I. Coulston, Security Analyst
Francine A. Martin, Sec. Adminsitrator
John J. McGlynn, Sr. Security Analyst
Francine Miller, Security Analyst
Kristyn M. Roessler, Security Analyst
William Souza, Sr. Security Analyst
Duy K. Tran, Sr. Security Analyst

SMM - 01460

-----Original Message-----
From: Zibelman, Audrey A.
Sent: Wednesday, March 01, 2006 11:00 AM
To: Ott, Andy; Bowring, Joseph
Cc: Harris, P.G.; Kormos, M.J.
Subject: Re: SOM

Thanks

-----Original Message-----
From: Ott, Andy
To: Zibelman, Audrey A.; Bowring, Joseph
CC: Harris, P.G.; Kormos, M.J.
Sent: Wed Mar 01 09:43:36 2006
Subject: RE: SOM

Joe and I met this morning and the immediate issue has been resolved by changing the conclusions section of the SOM.
Joe, Mike and myself will meet in the near future to discuss the regulation market analysis in greater detail and to develop a plan for resolving the regulation market mitigation structure.

-----Original Message-----
From: Zibelman, Audrey A.
Sent: Tuesday, February 28, 2006 6:08 PM
To: Bowring, Joseph
Cc: Harris, P.G.; Ott, Andy; Kormos, M.J.
Subject: RE: SOM

Joe - let me be clear. As you are aware both Andy and Mike have concerns about the validity of your analytic approach to the regulation market and the conclusions you are drawing as a consequence. They are both concerned that the information presented to the Board is different then the information in the current version of the state of the market report. Under our processes we were to have a staff opportunity to review the SOM before it is presented to the Board. By changing the underlying analysis and conclusions after the fact your are not adhering to the process we outlined. The reason we have it that way is to provide the Board the opportunity to hear about concerns others may have. Your approach deprives PJM and the Board of that opportunity.

I am not sure what changes you are now proposing to make. Certainly what you are suggesting is an improvement others may conclude is reduction in the quality of analysis. I suggest that you work with Mike and Andy to make sure that they do not see wholes in your analysis that were not there in the earlier versions.

Audrey

-----Original Message-----
From: Bowring, Joseph
Sent: Tuesday, February 28, 2006 5:30 PM
To: Zibelman, Audrey A.
Subject: SOM

Audrey,
I wanted you to be aware that it is not possible to literally go back to the draft version of the regulation market write up as the underlying analysis and write-up has been updated and improved here as elsewhere in the SOM. I am assuming that you want me to change the conclusion regarding the competitiveness of the combined markets rather than change the analysis. Please let me know if that is not correct.
- Joe

-----Original Message-----
From: Bowring, Joseph
Sent: Wednesday, March 01, 2006 5:54 AM
To: Smith, Carl W.
Subject: RE: Ancillary

Sorry - wrong version. Correct version now posted.

-----Original Message-----
From: Smith, Carl W.
Sent: Tuesday, February 28, 2006 9:26 PM
To: Bowring, Joseph
Subject: RE: Ancillary

Joe-
I looked at the Ancillary version on the J drive, and there are no changes tracked in the document, except for refreshes of figure numbers. Are you sure you put the updated version out there? The time stamp says it was last saved at 6:22 PM tonight.

Thanks,
Carl

-----Original Message-----
From: Bowring, Joseph
Sent: Tuesday, February 28, 2006 9:02 PM
To: Smith, Carl W.
Subject: RE: Ancillary

It is now the version out on the J drive. Can you take it from there?
I will let you know if there are more changes.

-----Original Message-----
From: Smith, Carl W.
Sent: Tuesday, February 28, 2006 8:21 PM
To: Bowring, Joseph
Subject: RE: Ancillary

Joe-
I would send them. Creative Services has blasted through all of the issues that I have logged, so any progress they could make would be added value. Even if they have to change it again.

Major stuff, or minor?

Carl

-----Original Message-----
From: Bowring, Joseph
Sent: Tuesday, February 28, 2006 8:18 PM
To: Smith, Carl W.
Subject: RE: Ancillary

I am dealing with interventions from up the ladder - have made changes but not sure they are yet final. Should I send along anyway?

> -----Original Message-----
> **From:** Smith, Carl W.
> **Sent:** Tuesday, February 28, 2006 8:06 PM
> **To:** Bowring, Joseph
> **Subject:** Ancillary
>
> Joe-
> Tonight, I'm working on verifying that all found defects have been implemented into Word documents (at least the overviews) so Linda can proceed with the Intro.
>
> I'm also planning on doing my own review of Ancillary, but you mentioned to me today that you were going to be making changes to Ancillary. What's the scoop?
>
> Thanks,
> Carl

-----Original Message-----
From: Bowring, Joseph
Sent: Tuesday, February 28, 2006 1:21 PM
To: Smith, Carl W.
Subject: Ancillary

Carl,
I am going to have to modify the Ancillary section. Will try to complete by COB.
- Joe

Evolution of the 2005 State of the Market Report

- Dr. Bowring's original draft
- Red-lined edits, showing the changes on pp. 7 and 22 that PJM Management ordered Dr. Bowring to make to the report
- The final draft, incorporating the red-lined edits

Ancillary Service Markets

The United States Federal Energy Regulatory Commission (FERC) defined six ancillary services in Order 888: 1) scheduling, system control and dispatch; 2) reactive supply and voltage control from generation services; 3) regulation and frequency response services; 4) energy imbalance service; 5) operating reserve – spinning reserve services; and 6) operating reserve – supplemental reserve services.[1] Of these, PJM currently provides regulation, energy imbalance and spinning reserve services through market-based mechanisms. PJM provides energy imbalance service through the Real-Time Energy Market. PJM provides the remaining ancillary services on a cost basis.

Regulation matches generation with very short-term changes in load by moving the output of selected generators up and down via an automatic control signal.[2] Regulation is provided, independent of economic signal, by generators with a short-term response capability (less than five minutes). Longer term deviations between system load and generation are met via primary and secondary reserves and generation responses to economic signals. Spinning reserve is a form of primary reserve. To provide spinning a generator must be synchronized to the system and capable of providing output within 10 minutes.

Both the Regulation and Spinning Reserve Markets are cleared on a real-time basis. A unit can be selected for either spinning reserve or regulation or neither, but it cannot be selected for both. The Regulation and Spinning Reserve Markets are cleared simultaneously and cooptimized with the Energy Market and operating reserve requirements to minimize the cost of the combined products.

PJM does not provide a market for reactive power, but does ensure its adequacy through member requirements and scheduling.[3] Generation owners are paid according to the FERC-approved reactive revenue requirements. Charges are allocated to network customers based on their percentage of load, as well as to point-to-point customers based on their monthly peak usage.

During the last two calendar years, PJM has integrated five control zones. In the *2004 State of the Market Report* the calendar year was divided into three phases, corresponding

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1 75 FERC ¶ 61,080 (1996).

2 Regulation is used to help control the area control error (ACE). See Appendix F, "Ancillary Service Markets," for a full definition and discussion of ACE.

3 See "PJM Manual for Scheduling Operations, M-11," Revision 25 (August 19, 2005), p. 71.

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to market integration dates. In the *2005 State of the Market Report* the calendar year is divided into two phases, also corresponding to market integration dates:[4]

- **Phase 1 (2004).** The four-month period from January 1 through April 30, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones,[5] and the Allegheny Power Company (AP) Control Zone.[6]

- **Phase 2 (2004).** The five-month period from May 1 through September 30, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP Control Zone and the Commonwealth Edison Company Control Area (ComEd).[7]

- **Phase 3 (2004).** The three-month period from October 1 through December 31, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP Control Zone and the ComEd Control Zone plus the American Electric Power Control Zone (AEP) and The Dayton Power & Light Company Control Zone (DAY). The ComEd Control Area became the ComEd Control Zone on October 1.

- **Phase 4 (2005).** The four-month period from January 1 through April 30, 2005, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP, ComEd, AEP and DAY Control Zones plus the Duquesne Light Company (DLCO) Control Zone which was integrated into PJM on January 1, 2005.

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4 See the *2004 State of the Market Report* for more detailed descriptions of Phases 1, 2 and 3.

5 The Mid-Atlantic Region is comprised of the Atlantic Electric Company Control Zone (AECO), the Baltimore Gas & Electric Control Zone (BGE), the Delmarva Power & Light Control Zone (DPL), the Jersey Central Power & Light Company Control Zone (JCPL), the Metropolitan Edison Company Control Zone (Met-Ed), the PECO Energy Company Control Zone (PECO), the Pennsylvania Electric Company Control Zone (PENELEC), the Pepco Control Zone (PEPCO), the PPL Electric Utilities Corporation Control Zone (PPL), the Public Service Electric and Gas Company Control Zone (PSEG) and the Rockland Electric Company Control Zone (RECO).

6 Zones, control zones and control areas are geographic areas that customarily bear the name of a large utility service provider operating within their boundaries. Names apply to the geographic area, not to any single company. The geographic areas did not change with the formalization of the control zone and control area concepts during PJM's Phase 3 integrations. For simplicity, zones are referred to as control zones for all three phases. The only exception is ComEd which is called the ComEd Control Area for Phase 2 only.

7 During the five-month period May 1, 2004, through September 30, 2004, the ComEd Control Zone (ComEd) was called the Northern Illinois Control Area (NICA).

- **Phase 5 (2005).** The eight-month period from May 1 through December 31, 2005, during which PJM was comprised of the Phase 4 elements plus the Dominion Control Zone which was integrated into PJM on May 1, 2005.

In both Phase 4 and Phase 5, PJM operated two Regulation Markets: one for the Mid-Atlantic Region and a second for the Western Region. On August 1 of Phase 5, PJM combined both into a single PJM Combined Regulation Market for a six-month trial period. After the trial period, based on analysis of market results and a report by the PJM Market Monitoring Unit (MMU), PJM stakeholders will vote on whether to keep the combined market.

During Phase 4, PJM operated three Spinning Reserve Markets: one for the Mid-Atlantic Region, one for the Western Region and one for the ComEd Control Zone. During Phase 5, PJM operated a fourth Spinning Reserve Market for Dominion.

The analysis treats each of the two Regulation Markets and each of the three Spinning Reserve Markets separately during Phase 4. The market analysis treats each of the two Regulation Markets separately during the May 1 through July 31 component of Phase 5 (Phase 5-a), and as a single Regulation Market during the August 1 through December 31 component of Phase 5 (Phase 5-b). Each of the four Spinning Reserve Markets is treated separately for the entire Phase 5 period.

Overview – Regulation and Spinning Reserve Markets

The MMU has reviewed structure, conduct and performance indicators for the identified Regulation Markets. The MMU concludes that the Regulation Markets functioned effectively, except for some minor problems of insufficient regulation supply shortly after the start of Phase 5 and during times of minimum generation. The Regulation Markets produced competitive results throughout calendar year 2005 based on the regulation market-clearing price. The Regulation Market prices reflected the fact that offers in the Western Region were capped during Phase 4 and that the offers of two large participants, AEP and Dominion, were capped at cost plus a margin throughout Phase 5, in both cases because the Western Region Regulation market was determined to be not structurally competitive.

The MMU has reviewed structure, conduct and performance indicators for the identified Spinning Reserve Markets. The MMU concludes that the Spinning Reserve Markets functioned effectively. The Spinning Reserve Markets produced competitive results throughout calendar year 2005 based on the spinning market-clearing price. The Spinning Reserve Market prices reflected the fact that all offers were capped at cost plus a margin because the markets have been determined to be not structurally competitive.

The Regulation Markets

The structure of the Mid-Atlantic Region and Western Region Regulation Markets was evaluated and the MMU concluded that these markets are not structurally competitive as they are characterized by a combination of one or more structural elements including high levels of supplier concentration, high individual company market shares, significant hours with pivotal suppliers and inelastic demand. The structure of the Combined Regulation Market was also evaluated based on the five months of available data and the MMU concluded that this market is characterized by lower levels of concentration, smaller market shares but a small number of dominant, pivotal suppliers and inelastic demand. The conduct of market participants within these market structures has been consistent with competition consistent with existing offer capping, and the market performance results have been competitive.

- **Mid-Atlantic Region.** The Regulation Market in the PJM Mid-Atlantic Region was cleared based on participants' price offers during Phases 4 and 5-a. All suppliers were paid the market-clearing price, which is a function of the supply curve and PJM-defined demand. The supply curve consists of offered and eligible MW and the associated offer prices which are a combination of unit-specific offers plus opportunity cost (OC) as calculated by PJM.[8]

- **Western Region.** The Regulation Market in the Western Region during Phase 4 was cleared based on participants' cost-based offers. The cost-based regulation offers are defined to be the unit-specific incremental cost of providing regulation plus a margin of $7.50 per MWh plus opportunity cost calculated by PJM. During Phase 5-a, the market was cleared using a combination of price-based offers and cost-based offers. In Phase 5, Dominion and AEP were required to make cost-based offers based on their dominant position in the market while other participants made price offers.

- **PJM Combined Regulation Market.** During the trial period for the PJM Combined Regulation Market, the market was cleared using a combination of price-based offers and cost-based offers. Dominion and AEP were required to make cost-based offers based on their dominant position in the market while other participants made price offers.

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8 As used here, the term, "opportunity cost" (OC), refers to the estimated lost opportunity cost (LOC) that PJM uses to create a supply curve on an hour-ahead basis. The term, "lost opportunity cost," refers to opportunity costs included in payments to generation owners.

Market Structure

- **Demand.** Demand for regulation is determined by PJM based on an evaluation of the regulation required in order to meet reliability objectives. Required regulation remained constant for each control region throughout 2005 except for two periods during which a temporary adder was implemented at the direction of PJM.

- **Supply.** The supply of offered and eligible regulation in the PJM Mid-Atlantic Region was generally both stable and adequate, with an average 1.92 ratio of regulation supply offered and eligible to the hourly regulation requirement during Phases 4 and 5-a. While the average ratio of hourly regulation supply offered and eligible to regulation required was 1.64 for the Western Region during Phases 4 and 5-a, at times an inadequate supply of regulation was offered and eligible to participate in the market on an hourly basis in the Western Region. The average ratio of hourly regulation supply offered and eligible to regulation required was 1.88 for the PJM Combined Regulation Market during Phase 5-b.

Concentration of Ownership

- **Mid-Atlantic Region.** During Phase 4 and Phase 5-a, the PJM Mid-Atlantic Region Regulation Market for eligible regulation had an average Herfindahl-Hirschman Index (HHI)[9], of 1751 which is classified as "moderately concentrated."[10] Less than 1 percent of the hours had an eligible regulation HHI above 2500. There were two suppliers with market shares greater than, or equal to, 20 percent. Seven percent of the hours had a single pivotal supplier, 48 percent of the hours had two pivotal suppliers and 88 percent of the hours had three pivotal suppliers.

- **Western Region.** During Phase 4 and Phase 5-a, the Western Region Regulation Market for eligible regulation had an average HHI of 2802 which is classified as "highly concentrated" and 58 percent of the hours had an HHI above 2500. There was a single pivotal supplier in 62 percent of the hours. One hundred percent of the hours had two pivotal suppliers.

- **PJM Combined Regulation Market.** During Phase 5-b, the PJM Combined Regulation Market had an average HHI of 1079 which is classified as

9 See Section 2, "Energy Market, Part I," at "Market Concentration" for a more complete discussion of concentration ratios and the Herfindahl-Hirschman Index (HHI).

10 The market structure metrics reported in this summary are based on regulation capacity that is both offered to the market and is eligible to provide regulation.

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"moderately concentrated." No suppliers had market shares greater than, or equal to, 20 percent. During 1 percent of hours, there was a single pivotal supplier. During 6 percent of hours, there were two pivotal suppliers. During 29 percent of the hours, there were three pivotal suppliers. For all units except CTs, during 5 percent of hours, there was a single pivotal supplier, during 23 percent of hours, there were two pivotal suppliers and during 68 percent of the hours, there were three pivotal suppliers.

Market Conduct

- **Offers.** The offer price is the only component of the total regulation offer price provided by the unit owner and is applicable for the entire operating day. The regulation offer price is subject to a $100 per MWh offer cap in the Mid-Atlantic Region, was subject to offer capping in Phase4 in the Western Region and was subject only to a $100 per MWh offer cap in Phase 5 in the Western Region, with the exception of the dominant suppliers, Dominion and AEP, whose offers were capped at marginal cost plus $7.50 per MWh plus opportunity cost. The average MW-weighted offer price for regulation in the PJM Mid-Atlantic region during Phases 4 and 5-a was $15.63. The average MW-weighted offer price for regulation in the Western Region Regulation Market during Phases 4 and 5-a was $7.73. For the PJM Combined Regulation Market during Phase 5-b, the average MW-weighted offer price for regulation was $16.29.

Market Performance

- **Price.** For the entire PJM regional transmission organization (RTO) from January 1, 2005, to December 31, 2005, the average price per MWh (regulation market-clearing price) associated with meeting PJM's demand for regulation was $49.73. For the PJM region during Phases 4 and 5-a, the average price per MWh for regulation was $36.39. For the Western Region Regulation Market during Phases 4 and 5-a, the average price per MWh for regulation was $42.64. For the PJM Combined Regulation Market during Phase 5-b, the average price per MWh was $64.03.

The Spinning Reserve Markets

The structure of each of the Spinning Reserve Markets has been evaluated and the MMU has concluded that these markets are not structurally competitive as they are characterized by high levels of supplier concentration and inelastic demand. As a result, these markets are operated as markets with market-clearing prices and with offers based on the marginal cost of producing the service plus a margin and opportunity cost. The conduct of market participants within these market structures has been consistent with competition, and the market performance results have been competitive. Prices for spinning in the PJM Mid-Atlantic Region, the ComEd Control Zone, the Western Region and Dominion are market-clearing prices determined by the supply curve and PJM-defined demand. The cost-based spinning offers are defined to be the unit-specific incremental cost of providing spinning reserve plus a margin of $7.50 per MWh plus opportunity cost calculated by PJM.

Market Structure

- **Demand.** Computed in accordance with the specific spinning reserve requirements, the average MW spinning requirement was: 1,091 MW, for the PJM Mid-Atlantic Region; 217 MW for the ComEd Spinning Zone; 437 MW for the Western Region; and 5 MW for the Southern Spinning Reserve Zone (May – December only).

- **Supply.** For the PJM Mid-Atlantic Region, the offered and eligible excess supply ratio was 1.15. For the Western and Southern Regions, the ratio was 1.76. For the ComEd Control Zone, the ratio was 1.21.

- **Concentration of Ownership.** In 2005, market concentration was high in the Tier 2 Spinning Reserve Market. The average offered and eligible Spinning Reserve Market HHI for the PJM Mid-Atlantic Region throughout 2005 was 2940. The average Spinning Reserve Market HHI for the Western Region was 4593. The average Spinning Reserve Market HHI for ComEd Control Zone was 8844. The average Spinning Reserve Market HHI for Dominion was 10000.

Market Performance

- **Price.** Load-weighted, average price associated with meeting the PJM system demand for Tier 2 spinning reserve throughout 2005 was $14.41 per MW, a $0.45 per MW decrease from 2004. The load-weighted, average price in the PJM Mid-Atlantic Region for Phases 4 and 5 was $15.44 per MW. The load-weighted, average price for spinning reserve in the ComEd Control Zone during Phases 4 and 5 was $12.73. The load-weighted, average price for spinning in the Western Control Zone during Phases 4 and 5 was $13.23. The load-weighted, average price for spinning in Dominion during Phase 5 was $13.08.

Conclusion

PJM consolidated its Regulation Markets into a single Combined Regulation Market effective, on a trial basis, effective August 1, 2005. PJM's consolidation of its regulation markets clearly resulted in improved performance and in increased competition. However, the improvement in HHI and maximum market share metrics was not enough to overcome the fact that there are still dominant suppliers in the Combined Regulation Market that are frequently pivotal and that therefore have the ability to exercise market power, aggravated by the presence of inelastic demand. Consistent with the FERC's order affecting the offer capping of dominant suppliers in the Western Region

Regulation Market, an effective means of reducing the probability of the exercise of market power would be to offer cap the dominant suppliers in the Combined Regulation Market. There is little downside to this approach in the presence of dominant suppliers. The market continues to be based on price offers for most sellers and all sellers are paid a market clearing price based on offers plus opportunity costs. The result of this design would be a competitive outcome and consistent with competitive offers from all participants whether offer capped or not. The marginal costs of providing regulation have been clearly defined and are consistent with the offers that would be made if the suppliers were behaving competitively.

PJM's Spinning Reserve Markets have worked effectively with offers based on marginal costs plus a margin and with all participants paid a market clearing price based on the marginal offer including opportunity costs, despite the fact that these markets are characterized by high levels of seller concentration and inelastic demand.

The benefits of markets are realized under this approach to ancillary services markets. Even in the presence of structurally non-competitive markets, there are transparent, market clearing prices based on competitive offers that account explicitly and accurately for opportunity costs. PJM should continue to consider whether additional ancillary services markets need to be defined in order to ensure that the market is compensating suppliers for services when appropriate.

Regulation Markets

Regulation Market Structure

Two major changes affected the structure of the Regulation Market in 2005. The first was the integration of Dominion into the Western Region Regulation Market on May 1, 2005. The second was the implementation of the PJM Combined Regulation Market on August 1, 2005.

Demand

Demand for regulation does not change with price (is price inelastic). The demand for regulation is set administratively based on reliability objectives and forecast load. Regulation demand will be referred to in this report as required regulation.

The PJM Mid-Atlantic Region has different regulation requirements for on-peak hours and off-peak hours. The regulation requirement for the peak period is 1.1 percent of the peak-load forecast; for the off-peak period, it is 1.1 percent of the valley-load forecast.[11] During Phases 4 and 5-a, PJM Mid-Atlantic Region regulation requirements ranged from

11 See "PJM Manual for Scheduling Operations, M-11," Revision 25 (August 19, 2005), p. 51.

226 MW of regulation capability for off-peak periods to 649 MW for on-peak periods. The average required regulation was 434 MW.

In the Western Region, the regulation requirement was 1.0 percent of the peak forecast load and did not vary between on-peak and off-peak periods. During Phases 4 and 5-a, the requirement ranged from 320 MW to 771 MW, averaging 517 MW.

During Phase 5-b, the PJM Mid-Atlantic Region and the Western Region Regulation Markets were combined into the PJM Combined Regulation Market. The regulation requirement for this combined market was defined to equal the sum of the separate regulation requirements for each region. During Phase 5-b, the regulation requirement ranged from 662 MW to 1,404 MW, averaging 978 MW.

Although the required regulation specification remained constant for each control region throughout 2005, a temporary adder was implemented at the direction of PJM for two periods. As a result, regulation was purchased in addition to the full regulation requirement. On October 23, 2004, in response to problems after the integration of the ComEd Control Zone into the Western Region, required regulation was increased by 75 MW for each regulation zone. This regulation adder was subsequently reduced until regulation was returned to its base requirement on February 11, 2005.

On April 15, 2005, in response to a persistent problem with frequency excursions, a 100 MW increment was added to the regulation demand for both the Mid-Atlantic and Western Regions. It was phased out and then eliminated on May 14, 2005. Table 0-1 contains a list of regulation adder amounts by date.

Table 0-1 Temporary regulation adder: October 23, 2004 to May 15, 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\regulation adder table.xls (tab:regulation adder)>>

Regulation Adder Date	Change in Regulation MW per Control Zone	Total Regulation Adder (MW) per Control Zone
23-Oct-04	75	75
29-Oct-04	(75)	0
1-Nov-04	75	75
11-Nov-04	100	175
17-Dec-04	(50)	125
7-Jan-05	(25)	100
14-Jan-05	(25)	75
26-Jan-05	(25)	50
4-Feb-05	(25)	25
11-Feb-05	(25)	0
15-Apr-05	100	100
6-May-05	(25)	75
8-May-05	(75)	0
12-May-05	50	50
14-May-05	(50)	0

The temporary additional regulation requirements between mid-April and mid-May reflected an effort by PJM to solve simultaneous problems of insufficient regulation in the Western Region Regulation Market, particularly during off-peak hours, and frequency excursions that impacted PJM's compliance requirement for CPS2.[12]

Regulation obligation is determined hourly for each load-serving entity (LSE) by applying the real-time load ratio share (adjusted for scheduled load responsibility) to the actual amount of regulation assigned for that hour adjusted for any bilaterals and self-supply. The hourly regulation charge for each LSE is equal to the hourly regulation market-clearing price (RMCP) multiplied by the MW of regulation purchased from the market, plus the LSE's percentage share of any opportunity cost incurred by generation owners over and above the RMCP, plus the LSE's percentage share of any unrecovered costs incurred by those units called on by PJM for the sole purpose of providing regulation.

12 See Appendix F, "Ancillary Service Markets," for additional information on area control error (ACE) control and control performance standard (CPS).

Supply

The supply of regulation can be measured as regulation capability, regulation offered, or regulation offered and eligible. For purposes of evaluating the Regulation Market, the relevant regulation supply is the level of supply that is both offered to the market on an hourly basis and is eligible to participate in the market on an hourly basis. This is the only supply that is actually considered in the determination of market prices. The level of supply that clears in the market on an hourly basis is called assigned regulation. Assigned regulation is selected from regulation that is both offered and eligible.

Regulation capability represents the total volume of regulation capability reported by resource owners based on unit characteristics.

Regulation offered represents the level of regulation capability actually offered to the PJM Regulation Market. Resource owners may offer those units with approved regulation capability into the PJM Regulation Market. PJM does not require a resource capable of providing regulation service to offer its capability to the market. Regulation offers may be submitted on a daily basis and these daily offers may be modified on an hourly basis.

Regulation offered and eligible represents the level of regulation capability actually offered to the PJM Regulation Market and actually eligible to provide regulation in an hour. Some regulation offered to the market is not eligible to participate in the Regulation Market as a result of identifiable offer parameters specified by the supplier. As an example, the regulation capability of a unit will be included in regulation offered based on the daily offer and availability status, but that regulation capability will not be eligible in one or more hours because the supplier sets the availability status to unavailable for one or more hours of that same day. (The availability status of a unit may be set in both a daily offer and an hourly update table in the PJM market software.) As another example, the regulation capability of a unit will be included in regulation offered if the owner of a unit offers regulation, but that regulation capability will not be eligible if the owner sets the unit's economic maximum generation level equal to its economic minimum generation level. In that case, the unit cannot provide regulation and is not eligible to provide regulation. As another example, the regulation capability of a unit will be included in regulation offered but that regulation capability will not be eligible if the unit is not operating, unless the unit is a combustion turbine that meets specific operating parameter requirements.

Only those offers which are eligible to provide regulation in an hour are part of supply for that hour, and only those offers are considered for purposes of clearing the market. Regulation assigned represents those regulation resources selected through the regulation market-clearing mechanism to provide regulation service for a given hour.

While the average regulation supply-to-requirement ratio of offered regulation in the Western Region Regulation Market during Phase 5-a was generally adequate at 1.70, the situation was more complicated than the supply-to-requirement ratio indicates. Regulation capacity was always adequate in the sense that the total reported capability was adequate.[13] Occasionally, however, PJM dispatchers had to redispatch generation uneconomically to satisfy reliability requirements. PJM encountered some difficulty with insufficient regulation supply in the Western Regulation Zone during Phase 5-a. Shortly after the Dominion integration on May 1, 2005, there was at times an inadequate supply of regulation that was offered and eligible to participate in the market on an hourly basis. This situation was most acute in the Western Region Regulation Market in May 2005 during off-peak periods when market solutions resulted in deficits 13.6 percent of the time and occasional off-peak hourly price spikes. (See Figure 0-1.) These higher than normal deficits generally occurred during off-peak hours when regulation-capable units were unavailable to regulate because they were not operating. In May, PJM frequently operated under minimum generation conditions, especially during off-peak hours. The combination of a regulation deficit and minimum generation conditions required dispatchers to balance the need for more regulation with the need for less generation. Dispatchers at times chose to operate with regulation deficits. This situation improved during June (deficits in 5.3 percent of all periods) and was resolved in July when the deficit percentage returned to its overall Phases 4 and 5-a average.

Figure 0-1 compares the percentage of regulation deficit hours across several Regulation Market periods, including all of 2005, Phase 5 only, off-peak and on-peak hours and off-peak hours in May. The abnormally high deficits that occurred in the Western Region particularly during off-peak hours in early May are clearly indicated.

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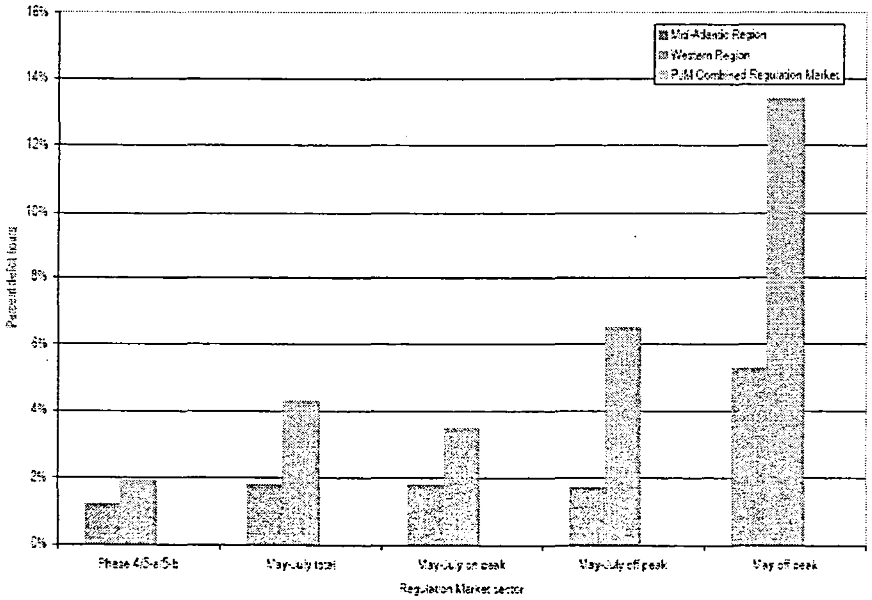
13 See "Regulation Capacity, Daily Availability, Hourly Supply and Price," in Appendix F, "Ancillary Service Markets," for a definition of capacity, availability and supply.

Figure 0-1 Regulation deficit analysis: Calendar year 2005 **<<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\deficit study.xls (tab:graph)>>**



Regulation deficits in the west were reduced during June and returned to normal in July. Also indicated in Figure 0-1 is the extent to which regulation deficits were all but eliminated after the PJM Combined Regulation Market. There was only one period of regulation deficit in the PJM Combined Regulation Market during Phase 5-b. This deficit does not show up in Figure 0-1 because the percentage of regulation deficit hours rounds to zero percent.

Concentration of Ownership

Market Structure Definitions

The market structure analysis follows the Commission logic specified in the AEP Order.[14] The logic of the delivered price test is followed by calculating market share, HHI and pivotal supplier metrics for each market configuration.[15] The analysis presented here differs in two ways from the Commission's delivered price test. The delivered price test would start with the universe of regulation offered and eligible and

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14 AEP Power Mktg. Inc., 107 FERC ¶ 61,018 ("AEP Order"), order on reh'g, 108 FERC ¶ 61,026 (2004).

15 AEP Order at 105 et seq.

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then limit the analysis to those offered and eligible units that could provide regulation at less than or equal to 1.05 times the clearing price. The analysis here uses a proxy for the 1.05 times the clearing price definition used to define the relevant market. In PJM, the supply of regulation is bifurcated into an all units except combustion turbine (CT) segment (consisting of steam and hydro units) and a CT segment. While steam, hydro and CT units can and do provide regulation, the steam/hydro segment is significantly lower cost and is relatively homogeneous while the CT segment is significantly higher cost and similarly internally homogeneous. Rather than directly applying the 1.05 times the clearing price market definition, the analysis here focuses separately on the steam/hydro and the CT portions of the market. Focusing on the steam/hydro segment of the market is functionally equivalent to including only sellers that offer for a price equal to the clearing price times 1.05 when a steam/hydro unit is marginal, although the segment approach probably results in a larger market definition. Focusing on the CT segment is similarly equivalent to including only sellers that offer for a price equal to the clearing price times 1.05 when a CT unit is marginal, although again the segment approach probably results in a larger market definition. The data is presented including all units, all units except CTs (steam and hydro) and CTs. In addition, the analysis here includes the results of the one, two and three pivotal supplier tests.

The analysis here includes all regulation provided by each supplier and made offered and eligible. While the market structure results are reported for regulation offered, this is not directly relevant to a determination of whether a market structure is competitive. Regulation must be both offered and eligible in an hour in order for it to be part of the market. This is termed economic capacity under the delivered price test.

The delivered price test may also be applied using available economic capacity, or gross supply by participant net of their load obligation. The fact that suppliers have load obligations may affect their incentives to exercise market power although not unambiguously. However, as the amount of load that will be served by the integrated utilities in the future is unknown given the unknown extent of retail competition, a reasonable approach is to evaluate the entire regulation supply, or economic capacity, as is done here.

The Commission's AEP Order indicates that failure of any one of the specified tests is adequate for a showing of market power including tests based on market concentration, market share and pivotal supplier analyses. The analysis presented here goes further in order to analyze the significance of excess supply. The PJM Market Monitor applies the pivotal supplier test using one, two and three pivotal suppliers. In addition, when there are hours with one, two or three pivotal suppliers, the analysis also examines the frequency with which individual generation owners are in the pivotal group. If the hours that fail a pivotal supplier test have the same pivotal supplier for a significant proportion of the hours, that information can be used to identify dominant suppliers.

The pivotal supplier tests represent an analytical approach to the issue of excess supply. Excess supply, by itself, is not necessarily adequate to ensure a competitive outcome. A monopolist could have substantial excess supply but the monopolist would not be expected to change its market behavior as a result. The same logic applies to a small group of dominant suppliers. However, if there is adequate supply without the three dominant suppliers to meet the demand, then the market can reasonably be deemed competitive.

PJM Mid-Atlantic Regulation Market – Phases 4 through 5-a

During Phases 4 through 5-a, in the Regulation Market in the Mid-Atlantic Region, the offer capability was 2,408 MW.[16] The level of regulation resources offered on an hourly level and the level of regulation resources both offered and eligible to participate on an hourly level in the market were lower than the total regulation capability. In 2005 the average hourly offer level was 1,128 MW or 47 percent of offer capability while the average hourly eligible offer level was 835 MW or 35 percent of offer capability.

The ratio of the hourly regulation supply offered to the hourly regulation requirement, averaged 2.60 for the PJM Mid-Atlantic Region during Phases 4 and 5-a. When this ratio equals 1.0, it indicates that offered supply exactly equals demand for the referenced time period. Based upon regulation offered and eligible, this ratio averaged 1.92. The average regulation requirement for the PJM Mid-Atlantic Region during 2005 was 434 MW.

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible, and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 2064 to a minimum of 1088 with an average value of 1510. Based upon regulation offered and eligible, HHI values ranged from a maximum of 2787 to a minimum HHI of 1190, with an average value of 1751. Less than 1 percent of hours had an eligible regulation HHI above 2500. Based upon regulation assigned, HHI values ranged from a maximum of 9690 to a minimum HHI of 1118. The average HHI value for regulation assigned was 2260. Thirty-one percent of hours had an assigned regulation HHI above 2500. Table 0-2 summarizes the January 2005 through July 2005 PJM Mid-Atlantic Region Regulation Market HHIs.

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16 Offer capability is defined as the maximum daily offer volume for each offering unit during the period without regard to the actual availability of the resource.

Table 0-2 **PJM Mid-Atlantic Regulation Market hourly HHI: Phases 4 and 5-a< 14_Graphs_Tables\HHI_Tables.xls (Tab PJM HHIs) >**

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1088	1510	2064	0%
Eligible	1190	1751	2787	0%
Assigned	1118	2260	9690	31%

As noted above, regulation supply in PJM is bifurcated into the combustion turbine (CT) segment and the all units except CTs segment because, while some CTs provide regulation, they are very expensive to operate solely to provide regulation. In order to approximate the delivered price test approach, the Regulation Market HHI is reported with and without CTs. (See Table 3.) In the PJM Mid-Atlantic Region, HHIs are slightly lower without CTs because the CTs are disproportionately owned by the company with the largest market share.

Table 3 PJM Mid-Atlantic Regulation Market hourly HHI (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\PJMHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1078	1475	2354	0%
Eligible	1183	1718	2941	0%
Assigned	1118	2266	9690	31%

During Phases 4 and 5-a, two suppliers had market shares greater than, or equal to, 20 percent based on regulation offered and eligible. For the market segment excluding CTs, two suppliers had market shares greater than, or equal to, 20 percent based on regulation offered and eligible.

During Phases 4 and 5-a, 7 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the PJM Mid-Atlantic Market.[17] This means that, during the seven-month period, for 7 percent of the hours the total regulation requirement could not be met in the absence of the largest supplier. Forty-eight percent of the hours failed the two pivotal supplier test. This means that, during 48 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. Eighty-eight percent of the hours failed the three pivotal supplier test. This means that,

[17] The pivotal supplier results are provided for all offered regulation as additional information although these results are not directly relevant to the market structure analysis.

during 88 percent of the hours, the total regulation the regulation requirement could not be met in the absence of the three largest suppliers.

For the market segment excluding CTs, the percentage of one pivotal supplier hours in the eligible Regulation Market increases from 7 percent to 10 percent, the percentage of two pivotal supplier hours increases from 48 percent to 52 percent and the percentage of three pivotal supplier hours increases from 88 percent to 89 percent. Table 0-4 summarizes the PJM Mid-Atlantic Regulation Market pivotal supplier statistics for Phases 4 and 5-a. The pivotal supplier statistics are also presented for all regulating units except CTs. (See Table 5.) Three companies are pivotal more than 75 percent of the three pivotal supplier intervals for all units, and for the all units except CTs segment.

Table 0-4 PJM Mid-Atlantic Region Regulation Market pivotal supplier statistics: Phases 4 and 5-a< 14_Graphs_Tables\Piv Sup Tables.xls (Tab PJM PivSup) >

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	7%
2 pivotal	3%	48%
3 pivotal	35%	88%

Table 5 PJM Mid-Atlantic Region Regulation Market pivotal supplier statistics (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\PJMPivSupResultsxls.xls (Tab NonCTPivSupHours) >

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	10%
2 pivotal	9%	52%
3 pivotal	52%	89%

Based on these market structure results, the MMU concludes that the market structure of the PJM Mid-Atlantic Region's Regulation Market during Phases 4 and 5-a can no longer be considered to be consistent with a competitive outcome. The combination of two market participants with market shares greater than, or equal to, 20 percent and the pivotal supplier results are not consistent with a competitive structure. The market in the PJM Mid-Atlantic Region was operated by PJM as a competitive market prior to the Combined Regulation Market.

Western Region Regulation Market – Phases 4 and 5-a

During Phases 4 and 5-a, in the Western Region Regulation Market, the submitted offer capability was 2,267 MW. The level of resources offered on an hourly level and the level of regulation resources both offered and eligible to participate on an hourly level in the Regulation Market were lower than the submitted regulation offer capability. Between the beginning of Phase 4 and the end of Phase 5-a, the average hourly offer level was 938 MW or 41 percent of the submitted capability, while the average hourly eligible offer level was 847 MW or 37 percent of the submitted capability.

The ratio of the hourly regulation supply offered to the hourly regulation requirement, averaged 1.81 for the Phases 4 and 5-a Western Region Regulation Market. Based upon regulation offered and eligible, this ratio averaged 1.64. The average regulation requirement for the Phases 4 and 5-a Western Region Regulation Market was 517 MW.[18]

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 4357 to a minimum of 1748 with an average value of 2730. Fifty-eight percent of hours had an offered regulation HHI above 2500. Based upon regulation offered and eligible, HHI values ranged from a maximum of 4810 to a minimum HHI of 1757, with an average value of 2802. Fifty-eight percent of hours had an eligible regulation HHI above 2500. Based upon regulation assigned, HHI values ranged from a maximum of 7162 to a minimum HHI of 1698. The average HHI value for regulation assigned was 2973. Sixty-four percent of hours had an assigned regulation HHI above 2500. Table 0-6 summarizes the January 2005 through July Western Region Regulation Market HHIs.

Table 0-6 Western Region Regulation Market hourly HHI: Phases 4 and 5-a <14_Graphs_Tables\HHI Tables.xls (Tab WRM HHIs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1748	2730	4357	58%
Eligible	1757	2802	4810	58%
Assigned	1698	2973	7162	64%

For the market segment excluding CTs, HHIs in the Western Region Regulation Market are somewhat higher. (See Table 7.)

[18] See Appendix F, "Ancillary Service Markets," for additional detail on the regulation requirements.

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Table 7 Western Region Regulation Market hourly HHI (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\WRMHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1859	2960	4973	60%
Eligible	1856	3029	5249	62%
Assigned	1738	2984	7162	65%

During Phases 4 and 5-a, one supplier had a market share greater than, or equal to, 20 percent based on offered and eligible regulation. For the market segment excluding CTs, one supplier had a market share greater than, or equal to, 20 percent based on offered and eligible regulation.

During Phases 4 through 5-a, 62 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the Western Region Regulation Market. This means that, during the seven-month period, the total regulation requirement could not be met for 62 percent of the hours in the absence of the largest supplier. One-hundred percent of the hours failed the two pivotal supplier test. This means that, during 100 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. One-hundred percent of the hours failed the three pivotal supplier test. This means that, during 100 percent of the hours, the total regulation requirement could not be met in the absence of the three largest suppliers. Table 0-8 summarizes the Western Region Regulation Market pivotal supplier statistics for Phases 4 through 5-a..

Table 0-8 Western Region Regulation Market pivotal supplier statistics: Phases 4 and 5-a .<14_Graphs_Tables\RSI Tables.xls (Tab WRM PivSup)>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	30%	62%
2 pivotal	100%	100%
3 pivotal	100%	100%

Table 9 presents pivotal supplier statistics for the Western Region regulation pool for all units except CTs. Eighty-eight percent of hours fail the one pivotal supplier test. In both the all units and all units except CTs market segments the same company that was the one pivotal supplier was also pivotal for more than 95 percent of the hours in which two and three suppliers were pivotal.

Table 9 Western Region Regulation Market pivotal supplier statistics (All units except CTs:): Phases 4 and 5-a .<14_Graphs_Tables\WRMPivSupResultsxls.xls (Tab NonCTPivSupHours)>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	69%	88%
2 pivotal	100%	100%
3 pivotal	100%	100%

Based on these market structure results, the MMU concludes that the market structure of the Western Region Regulation Market was not consistent with a competitive outcome. The Regulation Market in the Western Region was operated by PJM, with the two dominant suppliers offer capped, as a market with market-clearing prices during Phases 4 and 5-a.

PJM Combined Regulation Market – Phase 5-b

The PJM Combined Regulation Market during Phase 5-b was comprised of the PJM Western Region (the ComEd, AEP, DAY, Dominion, DLCO and AP Control Zones) and the PJM Mid-Atlantic Region. For the Phase 5-b PJM Combined Regulation Market, the submitted capability was 5,491 MW. The average hourly offer level was 2,370 MW while the average hourly eligible offer level was 1,841 MW.

The ratio of the hourly regulation supply offered to the hourly regulation requirement averaged 2.42. Based upon regulation offered and eligible, this ratio averaged 1.88. The average regulation requirement for the Phase 5-b PJM Combined Regulation Market was 978 MW.

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 1331 to a minimum of 812 with an average value of 1001. Based upon regulation offered and eligible, HHI ranged from a maximum of 1562 to a minimum HHI of 866, with an average value of 1079. Based upon regulation assigned, HHI values ranged from a maximum of 2390 to a minimum of 878. The average HHI value for regulation assigned was 1299. Table 0-10 summarizes HHI results for the PJM Combined Regulation Market.

Table 0-10 PJM Combined Regulation Market HHI: Phase 5-b <<14_Graphs_Tables\HHI Tables.xls (Tab RTO HHIs)>>

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	812	1001	1331	0
Eligible	866	1079	1562	0
Assigned	878	1299	2390	0

For the market segment excluding CTs, HHIs are essentially the same (Table 11).

Table 11 PJM Combined Regulation Market HHI (All units except CTs): Phase 5-b< 14_Graphs_Tables\RTOHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	845	1016	1417	0
Eligible	891	1080	1659	0
Assigned	878	1301	2400	0

During Phase 5-b, in the PJM Combined Regulation Market, no suppliers had a market share greater than, or equal to, 20 percent for regulation offered and eligible. For the market segment excluding CTs, no suppliers had a market share greater than, or equal to, 20 percent for regulation offered and eligible. For the CT market segment, two suppliers had market shares in excess of 20 percent for regulation offered and eligible.

During Phase 5-b, 1 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the PJM Combined Regulation Market. This means that, during the five-month period, the total regulation requirement could not be met for 1 percent of the hours in the absence of the largest supplier. Six percent of the hours failed the two pivotal supplier test. This means that, during 6 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. Twenty-nine percent of the hours failed the three pivotal supplier test. This means that, during 29 percent of the hours, the total regulation requirement could not be met in the absence of the three largest suppliers. Table 0-12 summarizes the PJM Combined Regulation Market's pivotal supplier results for Phase 5-b. For all units including CTs the same company that was the one pivotal supplier for more than one third of the one pivotal supplier intervals was also pivotal for more than 75 percent of the two pivotal supplier intervals and more than 80 percent of the hours in which two and three suppliers were pivotal. A second company was pivotal during more than 25 percent of the two pivotal and approximately 50 percent of three pivotal hours.

Table 0-12 PJM Combined Regulation Market pivotal supplier statistics: Phase 5-b <<<14_Graphs_Tables\PivSup Tables.xls (Tab RTO PivSup)>>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	1%
2 pivotal	0%	6%
3 pivotal	1%	29%

Table 13 presents pivotal supplier statistics for the PJM Combined Regulation market segment for all units except CTs.

Table 13 PJM Combined Regulation Market pivotal supplier statistics (All units except CTs): Phase 5-b <<<14_Graphs_Tables\RTOPivSupResultsxls.xls (Tab NonCTPivSupHours)>>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	5%
2 pivotal	1%	23%
3 pivotal	14%	68%

For the market segment excluding CTs, the percentage of one pivotal supplier hours in the eligible Regulation Market increases from 1 percent to 5 percent, the percentage of two pivotal supplier hours increases from 6 percent to 23 percent and the percentage of three pivotal supplier hours increases from 29 percent to 68 percent. (Table 13) In the all units except CTs market segment the same company that was the one pivotal supplier for more than two thirds of the one pivotal supplier intervals was also pivotal for more than 80 percent of the two pivotal supplier intervals and more than 95 percent of the hours in which two and three suppliers were pivotal. A second company is pivotal during more than 60 percent of the two pivotal and three pivotal hours, while the third pivotal position is shared by three companies with an approximately equal frequency of occurrence.

Based on this analysis, the MMU recommends that PJM continue to operate the Regulation Market as a single Combined Regulation Market. This recommendation is based on improved operational results and on the increased competitiveness of the Combined Market. Nonetheless, based on these market structure results, the MMU concludes that the market structure of the PJM Combined Regulation Market was not consistent with a competitive outcome. For Phase 5-b, the PJM Combined Regulation Market was operated by PJM, with the two dominant suppliers offer capped, as a price-based market with market-clearing prices. It would be reasonable, consistent with the results of the analysis and with FERC's actions regarding the Western Region Regulation

Market, to offer cap only the two dominant market participants identified in the analysis of the Combined Regulation Market. These results are based on the first five months of operation of the combined market. The MMU will continue to analyze market outcomes and market structure for the Combined Regulation Market.

Regulation Market Conduct

Regulation Offers

Generators wishing to participate in any of the PJM Regulation Markets must submit regulation offers for specific units by hour 1800 EPT of the day before the operating day. The regulation offer price is subject to a $100 per MWh offer cap in PJM control zones with the exception of the dominant suppliers Dominion and AEP whose offers are capped at marginal cost plus $7.50 per MWh plus opportunity cost. In the PJM Western Region during Phase 4, all regulation offers were capped at $7.50 per MWh plus the cost of providing regulation service because that market was determined to be not structurally competitive. As in any competitive market, regulation offers at marginal cost are considered to be competitive. In PJM, a $7.50 per MWh adder is considered to be consistent with competitive offers based on an analysis of historical offer behavior.

The offer price is the only component of the regulation offer applicable for the entire operating day. The following information must be included in each offer, but can be entered or changed up to 60 minutes prior to the operating hour: regulating status (available, unavailable or self-scheduled); regulation capability; and high and low regulation limits. The Regulation Market is cleared on a real-time basis, and regulation prices are posted hourly throughout the operating day. The amount of self-scheduled regulation is confirmed 60 minutes before each operating hour, and regulation assignments are made 30 minutes before each operating hour.

PJM's Regulation Markets are cleared hourly, based upon both offers submitted by the units and the hourly opportunity cost of each unit.[19] The effective offer price is the sum of the unit-specific offer and the opportunity cost. In order to clear the market, PJM ranks units which offer and are eligible to regulate by effective offer price and selects the lowest offers in order until the amount of regulation required for the hour is satisfied at least cost. The price that results is the regulation market-clearing price (RMCP), and the unit that sets this price is the marginal unit.

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19 PJM estimates the opportunity cost for units providing regulation based on a forecast of locational marginal price (LMP) for the upcoming hour. Opportunity cost is included in the market-clearing price.

Regulation Market Performance

Regulation Prices

Figure 0-2 shows both the daily average regulation market-clearing price and the opportunity cost component for the marginal units in the PJM Mid-Atlantic Region during Phases 4 and 5-a. Figure 0-3 shows the same data for the Western Region Regulation Market during Phases 4 and 5-a. Figure 0-4 shows the same data for the PJM Combined Regulation Market during Phase 5-b. All units chosen to provide regulation during Phases 4 and 5 received as payment the higher of the clearing price multiplied by the unit's assigned regulating capability, or the unit's regulation bid multiplied by its assigned regulating capability plus the individual unit's real-time opportunity cost.[20]

Regulation credits are awarded to generation owners that have either self-scheduled regulation or sold regulation into the market. Regulation credits for units self-scheduled to provide regulation are equal to the RMCP times the unit's self-scheduled regulating capability. Regulation credits for units that offered regulation into the market and were selected to provide regulation are the higher of the RMCP times the unit's assigned regulating capability, or the unit's regulation bid times its assigned regulating capability plus the opportunity cost that unit incurred. Although most units are paid RMCP times their assigned regulation MW, the RMCP is itself strongly dependent on the lost opportunity cost based upon forecast LMP calculated for the marginal unit during market clearing. This means that the total cost of regulation is very strongly dependent upon lost opportunity cost, which is dependent upon forecast LMP. Figure 0-2, Figure 0-3 and Figure 0-4 graph the RMCP against the estimated lost opportunity cost of the marginal unit (calculated at market clearance, adjusted for real-time deviations in LMP, and averaged over the day). Most of the cost of regulation comes from the lost opportunity cost of the marginal unit. The rest of the RMCP is the unit's regulation offer. The average offer of the marginal unit for PJM Mid-Atlantic during Phases 4 and 5-a was $15.33. The average offer of the marginal unit for the Western Region Regulation Market during Phases 4 and 5-a was $8.66. The average offer of the marginal unit for the PJM Combined Regulation Market during Phase 5-b was $13.16. In the PJM Mid-Atlantic Regulation Market during Phases 4 and 5-a, marginal unit LOC averaged 57 percent of the RMCP. In the Western Region Regulation Market during Phases 4 and 5-a, marginal unit LOC averaged 76 percent of RMCP. In the PJM Combined Regulation Market during Phase 5-b, marginal unit LOC averaged 79 percent of RMCP.

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20 See "PJM Operating Agreement, Accounting, m28," Revision 27, Section 4, "Regulation Credits" (October 1, 2004), pp. 26-27. PJM uses estimated opportunity cost to clear the market and real-time opportunity cost to compensate generators that provide regulation and spinning. Real-time opportunity cost is calculated using real-time LMP.

Figure 0-2 PJM Mid-Atlantic Region daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phases 4 and 5-a << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_2_RMCP_LOC_graph_PJM_new.xls (tab: Graph)>>

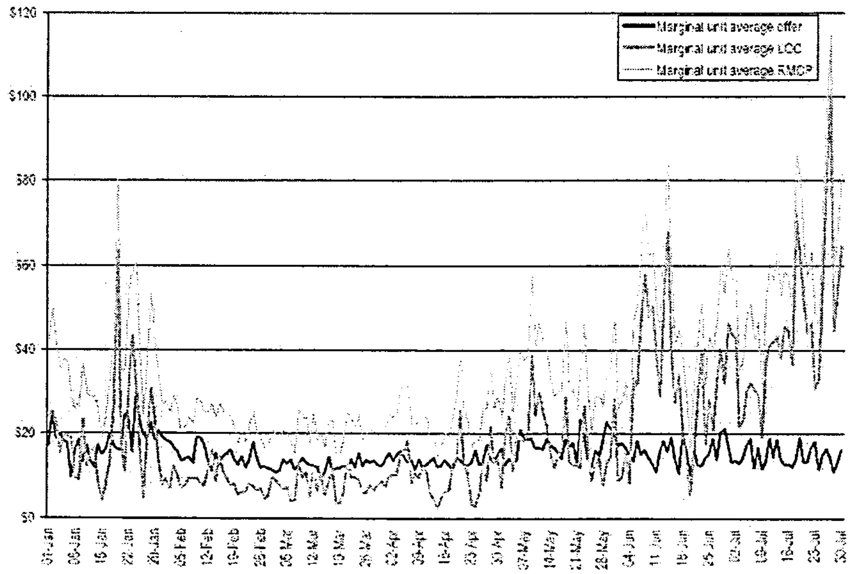

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Figure 0-3 Western Region daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phases 4 and 5-a **<< H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_3_RMCP_LOC_graph_WRM_new.xls (tab: Graph)>>**

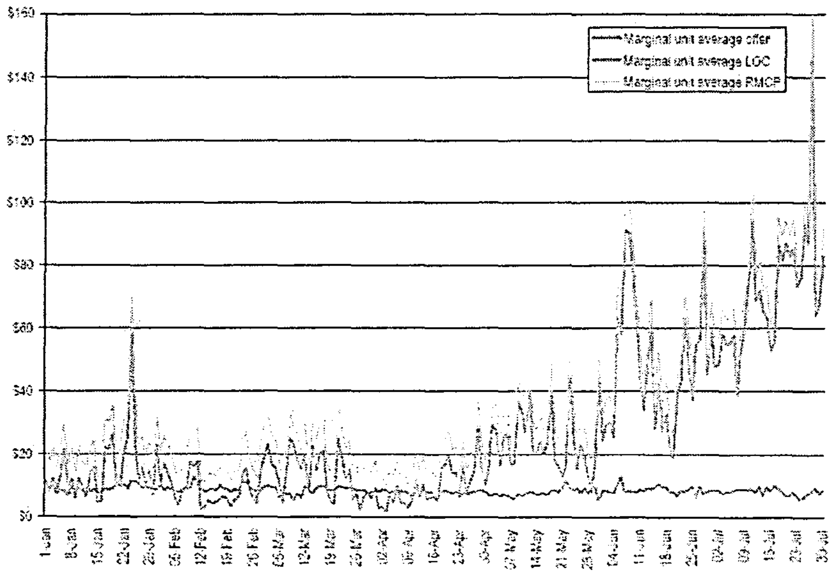


Figure 0-4 PJM Combined Regulation Market daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phase 5-b < H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_4_RMCP_LOC_graph_RTO_new.xls (tab: Graph)>

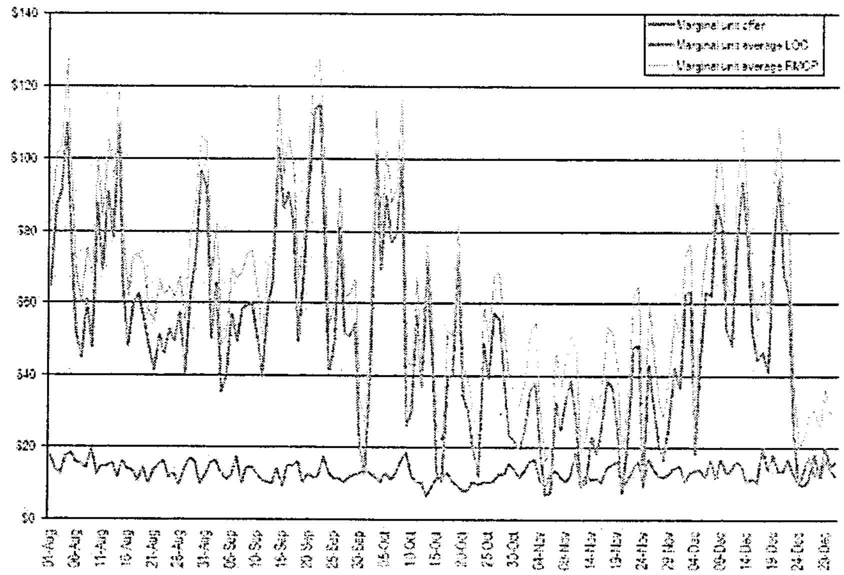


Figure 0-5, Figure 0-6 and Figure 0-7 compare the regulation price per MWh to the regulation MW purchased for each of the Regulation Markets. As the regulation requirement is a linear function of daily forecast peak load in all markets, all three graphs show that despite considerable daily variation, the price of regulation and the demand for regulation increase or decrease together on a seasonal scale. System LMP increases with load because higher priced units must be dispatched to meet demand and those increases in system LMP cause the opportunity cost to rise by increasing the spread between LMP and the energy offers of the regulating units.

Figure 0-5 PJM Mid-Atlantic Region daily regulation MW purchased vs. price per MW: Phases 4 and 5-a <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\RegMWPurch_vs_Price.xls (tab: PJMGraph)>>

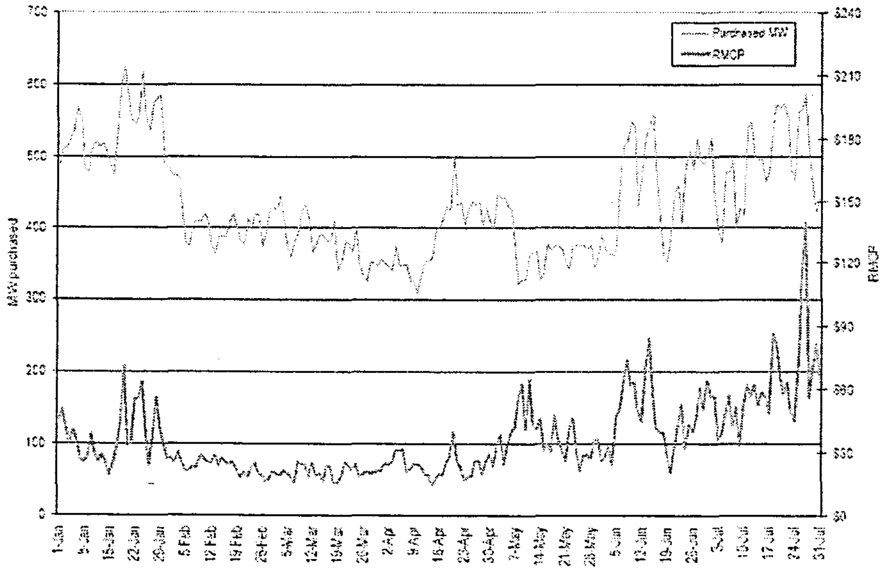


Figure 0-6 Western Region daily regulation MW purchased vs. price per MW: Phases 4 and 5-a <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\RegMWPurch_vs_Price.xls (tab: WRMGraph)>>

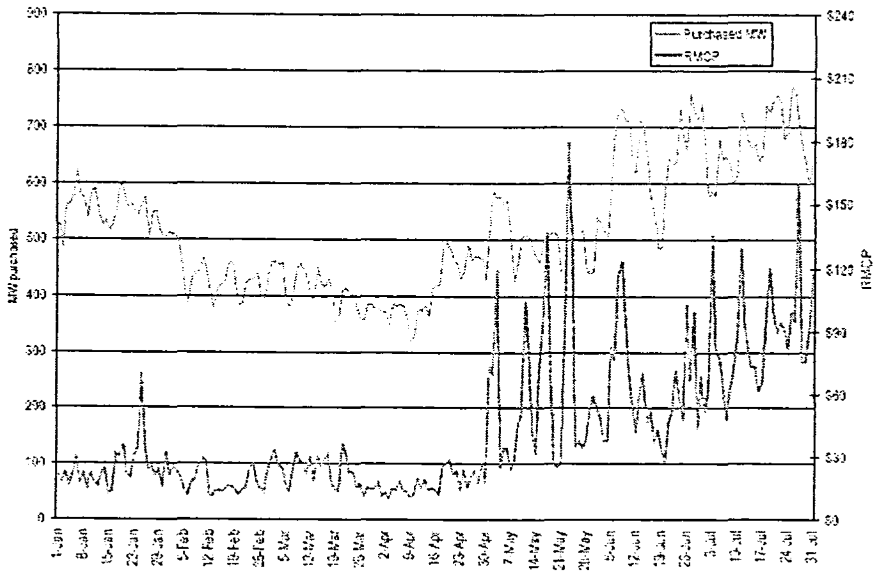
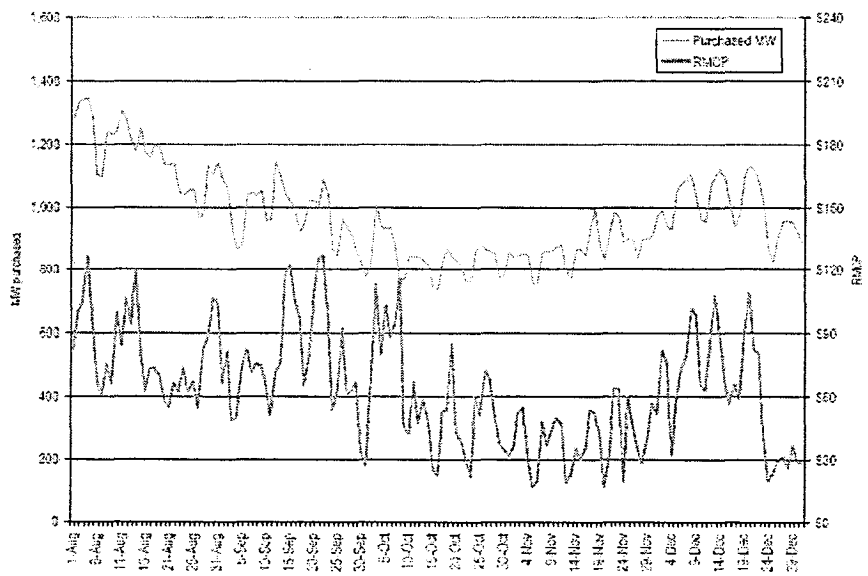


Figure 0-7 PJM Combined Regulation Market daily regulation MW purchased vs. price per MW: Phase 5-b <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ RegMWPurch_vs_Price.xls (tab: RTOgraph)>>



Important exceptions to this general pattern occurred periodically in the Western Region after the integration of Dominion on May 1, 2005. (See Figure 0-6.) An hourly analysis of regulation MW purchased versus the regulation price reveals some extreme exceptions that resulted from deficits during off-peak hours and/or times of minimum generation events. A shortage of regulation-capable units (as existed in the Western Region in early May) combined with a minimum generation event required expensive combustion turbine units to be started to satisfy regulation requirements resulting in high clearing prices. Minimum generation events can cause shortages of regulation in the PJM Mid-Atlantic Region as well, but since the regulation requirement in the PJM Mid-Atlantic Region is lower during off-peak hours it is less likely. Overall, the inflexibility of demand and the shortage of available regulating units caused relatively wide price swings in the Western Region during Phase 5-a.

As Figure 0-5, Figure 0-6 and Figure 0-7 also show, regulation prices during calendar year 2005 were seasonally higher in January, remained lower and relatively stable from February through April, then began to increase and show high daily variability into October before moderating at the end of the year. The higher average summer prices reflect higher LMPs in the lost opportunity cost (LOC) portion of the marginal unit's clearing price (RMCP) for regulation. (See Figure 0-2, Figure 0-3 and Figure 0-4.) During a period of low prices, March and April, the LOC/RMCP ratio was 42 percent for the PJM Mid-Atlantic Region and 58 percent for the Western Region. During a period of high prices, August and September, the LOC/RMCP ratio was 83 percent for the PJM Combined Regulation Market.

Figure 0-8 illustrates the level of demand for regulation by month in 2005 and the corresponding level of regulation cost.

Figure 0-8 Monthly regulation MW and regulation cost per MW: Calendar year 2005 <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostPerMW_Monthly.xls (tab: graph)>

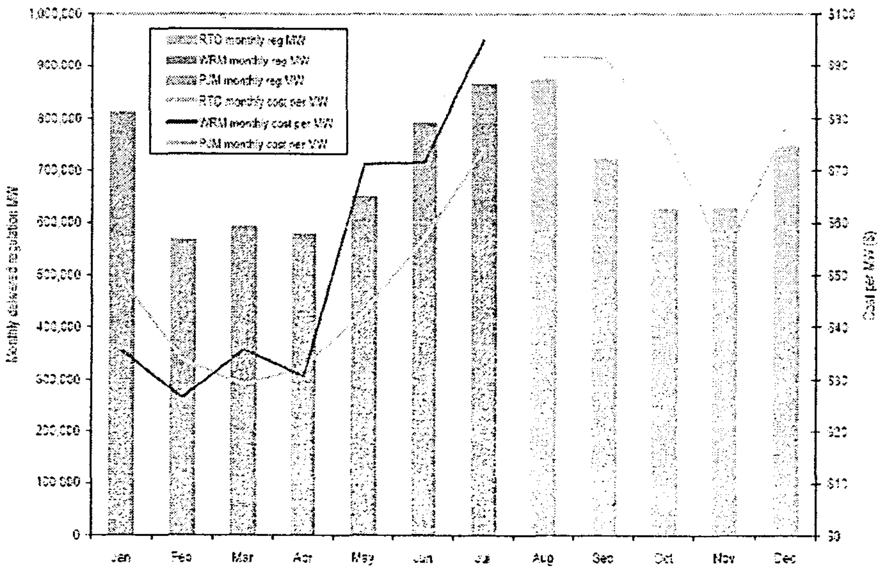


Figure 0-9 shows the average number of units per hour required to satisfy PJM's regulation requirement.

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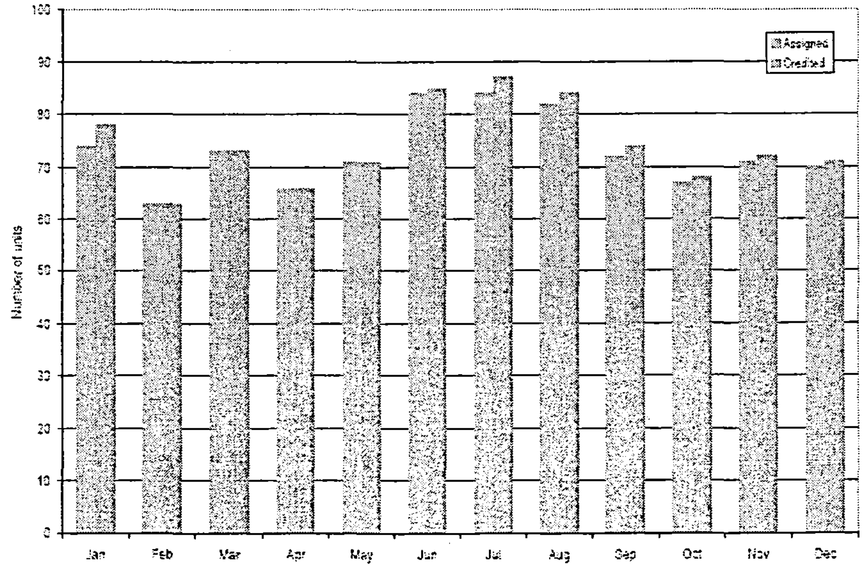
Figure 0-9 Average hourly count of distinct units required to satisfy regulation requirement: Calendar year 2005 < J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\UnitCount.xls (tab: UnitCountgraph)> >



Units which provide regulation are paid the higher of the RMCP or their offer plus their unit-specific opportunity cost. In a perfect market all units would be compensated at RMCP times output. Sometimes, however, circumstances require that units be paid their offer plus their unit-specific opportunity cost. Examples include units that must be redispatched because of constraints, unanticipated performance problems, or changes in the real-time LMP and, therefore, opportunity cost from the value estimated at regulation market-clearing 30 minutes prior to the operating hour. For these reasons some units are paid the value of their offer plus their unit-specific lost opportunity costs when that sum is higher than the RMCP. This means that PJM's regulation cost per MWh is somewhat higher than the RMCP. Figure 0-10 and Figure 0-11 compare the regulation cost per MWh with the regulation clearing price to show the difference between the price of regulation and the total cost of regulation.

Figure 0-10 PJM Western Region Regulation Market daily average RMCP vs. cost per MW for regulation: Phases 4 and 5-a <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostVsPrice.xls (tab: PJMWRMgraph)>

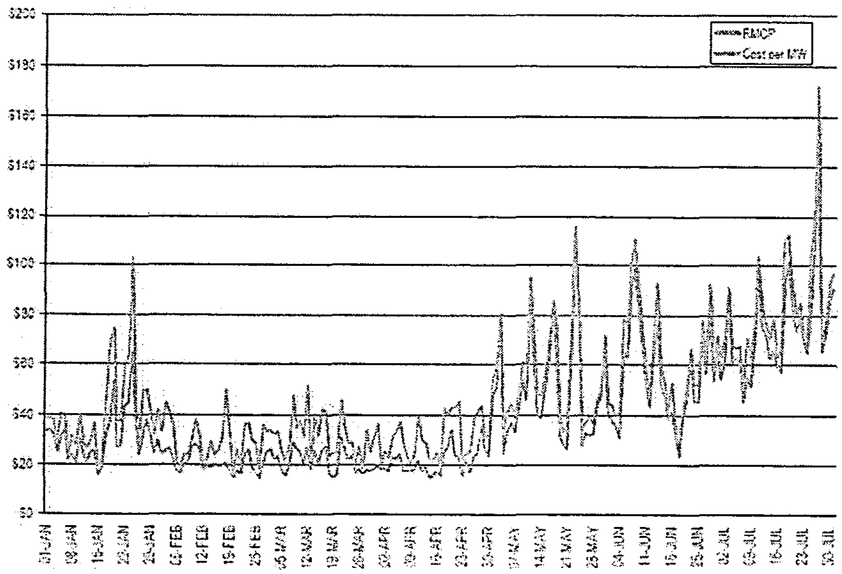
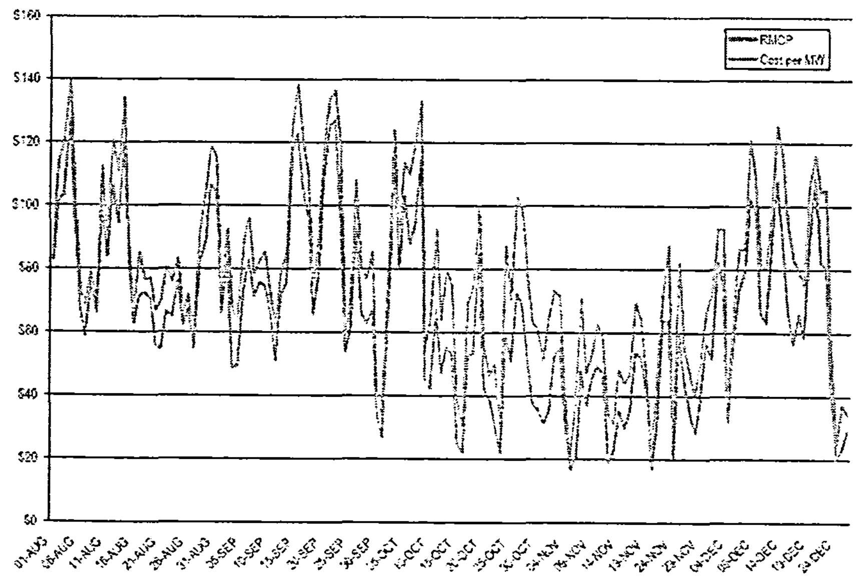


Figure 0-11 PJM Combined Regulation Market daily average RMCP vs. cost per MW for regulation: Phase 5-b <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostVsPrice.xls (tab: RTOgraph)>



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Spinning Reserve Markets

Spinning Reserve Market Structure

The integration of Dominion on May 1, 2005 resulted in the creation of a Southern Region Spinning Reserve Market. Thus the PJM Spinning Reserve Markets include the PJM Mid-Atlantic Spinning Reserve Market, the Western Region Spinning Reserve Market, the ComEd Region Spinning Reserve Market and the Southern Region Spinning Reserve Market.

Demand

Tier 2 spinning requirements are determined by subtracting the amount of forecast Tier 1 spinning reserve available from each spinning control area spinning reserve requirement for the period. The total spinning reserve requirement is different for each of the four regional Spinning Reserve Markets. For the Mid-Atlantic Region, the requirement is 75 percent of the largest contingency in the region, provided that 25 percent of the largest contingency is available as nonsynchronized, 10-minute reserve. For the ComEd Region, the requirement is 50 percent of the ComEd Control Zone's load ratio share of the largest contingency in NERC's Mid-America Interconnected Network, Inc. (MAIN) Region. From October 1 to December 3, 2004, this was 269 MW. After December 3, 2004, the ComEd Control Zone's spinning requirement was 216 MW. For the Western Region, the requirement is 1.5 percent of the daily peak-load forecast. For the Southern Spinning Reserve Zone, the requirement is the Dominion Control Zone's load ratio share of the largest system contingency within the Virginia and Carolinas Area (VACAR), minus the available 15-minute quick start capability within the Southern Spinning Reserve Zone.

Computed in accordance with the requirements above, the average MW spinning requirement was: 1091 MW, for the PJM Mid-Atlantic Region; 217 MW for the ComEd Spinning Zone; 437 MW for the Western Region; and 5 MW for the Southern Spinning Reserve Zone (May – December only).

Figure 0-12 PJM Mid-Atlantic Spinning Region average hourly required spinning vs. Tier 2 spinning purchased: Calendar year 2005 <<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Required vs Tier 2 Purchased.xls (tab: PJM)>>

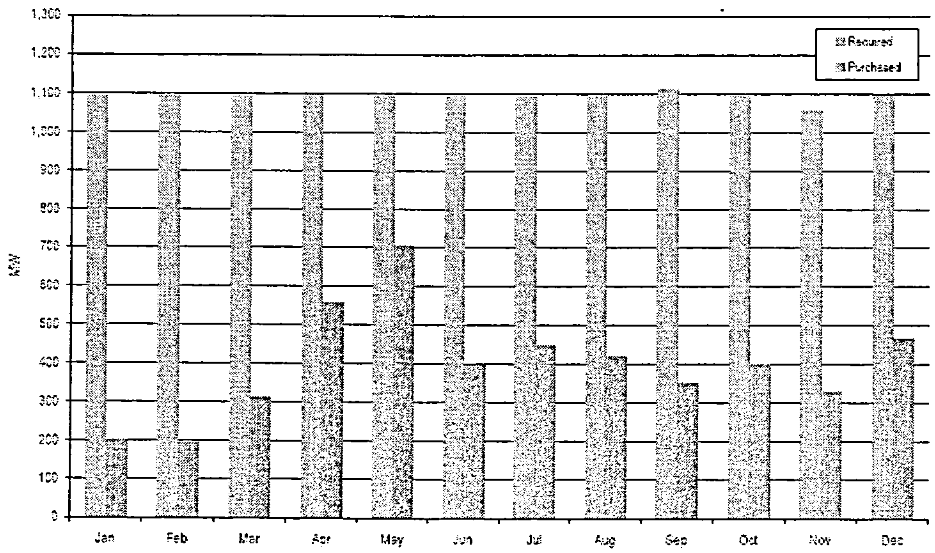

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Figure 0-13 ComEd Spinning Region average hourly required spinning vs. Tier 2 spinning purchased: Calendar year 2005 <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Required vs Tier 2 Purchased.xls (tab: ComEd)>

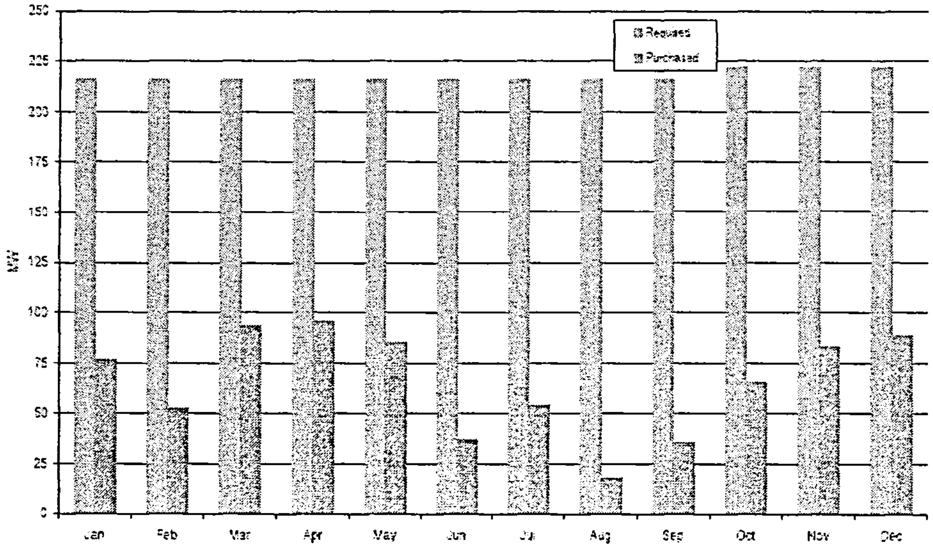
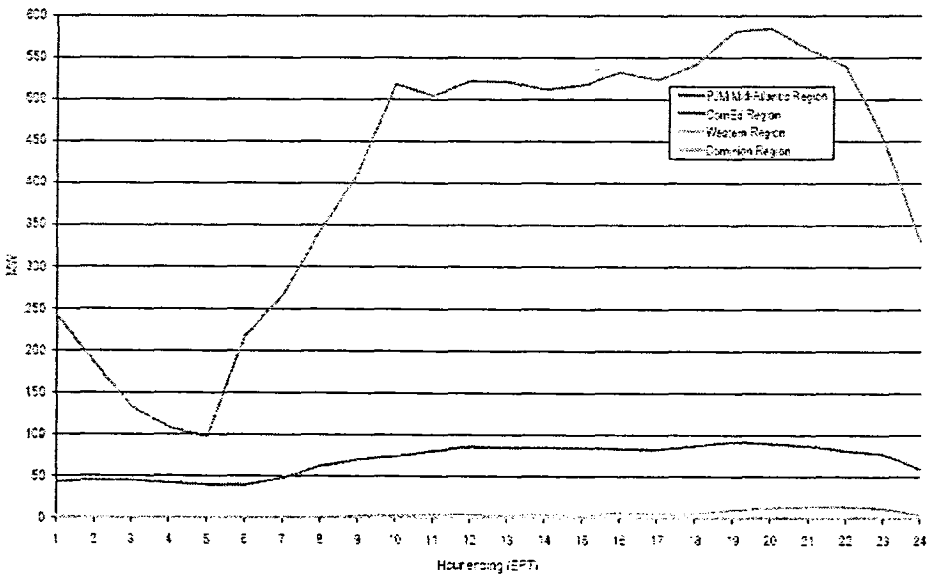


Figure 0-12 and Figure 0-13 show the average hourly spinning required and the average hourly Tier 2 spinning MW purchased during 2005 for the PJM Mid-Atlantic and ComEd Spinning Regions. Results for the Western Region Spinning Reserve Zone and the Southern Spinning Reserve Zone are not shown because Tier 2 spinning MW purchases were insignificant in those control areas during 2005. Spinning MW requirements are different for each of the four spinning regions in PJM. These differences are the result of specifications from local reliability councils, reserve-sharing arrangements with neighboring control areas and the types of generation available in the control area. The Southern Spinning Reserve Zone is a member of the VACAR subregion of SERC. VACAR specifies that available 15-minute quick start reserve can be subtracted from the largest contingency to determine spinning reserve requirements. The amount of 15-minute quick start reserve available in VACAR is sufficient to make Tier 2 spinning requirements zero for most hours. Similarly, in the Western Region Spinning Reserve Zone most of the required spinning reserve is available as Tier 1 from large, frequently running baseload units, reducing its Tier 2 spinning requirement to zero in most hours. In both the PJM Mid-Atlantic and ComEd Spinning Regions the spinning reserve requirement is a function of the largest contingency. For PJM Mid-Atlantic the hourly spinning requirement was usually 863 MW during off-peak hours and 1,150 MW during on-peak hours. Sometimes temporary grid conditions such as maintenance outages can cause double contingencies so there were times throughout the year when the on-peak spinning requirement was 1,380 MW. The average hourly Tier 2 spinning required for the PJM Mid-Atlantic Region was 1,091 MW. In the ComEd Region, the hourly requirement was 216 MW from January through September and 222 MW from October through December. Figure 0-12 and Figure 0-13 illustrate monthly average of the spinning reserve requirement and the amount of Tier 2 spinning actually purchased. The difference between the required spinning and Tier 2 spinning purchased is the amount of Tier 2 spinning available. Figure 0-14 illustrates the amount of Tier 2 spinning purchased by hour of the day. The hour variability reflects differing spinning reserve requirements for off-peak and on-peak hours as well as different amounts of Tier 1 spinning available.

Figure 0-14 Average hourly Tier 2 spinning MW purchased by hour of day: Calendar year 2005 <<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Tier 2 Credited Average MWs By Hour.xls (tab: graph)>>



Supply

Spinning reserve is an ancillary service defined as generation that is synchronized to the system and capable of producing output within 10 minutes. Spinning reserve can, at present, be provided by a number of sources, including steam units with available ramp, condensing hydroelectric units, condensing CTs and CTs running at minimum generation.

All of the units that participate in the Spinning Reserve Market are categorized as either Tier 1 or Tier 2 spinning. Tier 1 resources are those units that are online following economic dispatch and able to respond to a spinning event by ramping up from their present output. All units operating on the PJM system are considered potential Tier 1 resources, except for those explicitly assigned to Tier 2 spinning. Tier 2 resources include units that are backed down to provide spinning capability and condensing units synchronized to the system and available to increase output.

PJM introduced a market for spinning reserve on December 1, 2002. Before the Spinning Reserve Market, Tier 1 spinning reserve had not been compensated directly and Tier 2 spinning reserve had been compensated on a unit-specific, cost-based formula.

Under the Spinning Reserve Market rules, Tier 1 resources are paid when they respond to an identified spinning event as an incentive to respond when needed. Tier 1 spinning payments or credits are equal to the integrated increase in MW output above economic dispatch from each generator over the length of a spinning event, multiplied by the spinning energy premium less the hourly integrated LMP. The spinning energy premium is defined as the average of the five-minute LMPs calculated during the spinning event plus $50 per MWh.[21] All units called on to supply Tier 1 or Tier 2 spinning have their actual MW monitored. Tier 1 units are not penalized if their output fails to match their expected response as they are only compensated for their actual response. Tier 2 units assigned spinning by market operations are compensated whether or not they are actually called on to supply spinning so they are penalized if their MW output fails to meet their assignment.

There were significant changes to the geographic structure of PJM's Spinning Reserve Markets in 2005. In Phase 4, PJM had three Spinning Reserve Markets: the PJM Mid-Atlantic Spinning Reserve Zone, the Western Spinning Reserve Zone and the ComEd Spinning Reserve Zone. During Phase 4 the Western Spinning Reserve Zone was comprised of AP, AEP, DAY and DLCO Control Zones. In Phase 5, the Dominion Control Zone was integrated into PJM and became the Southern Spinning Reserve Zone. Dominion remained a separate Spinning Reserve Market because as a member of the Southeastern Electric Reliability Council (SERC) it has distinct spinning reserve requirements and reserve-sharing agreements.

Under the Spinning Reserve Market rules, Tier 2 spinning resources are paid to be available as spinning reserve, regardless of whether the units are called upon to generate in response to a spinning event and are subject to penalties if they do not provide spinning reserve when called. The price for Tier 2 spinning resources is determined in a market for Tier 2 spinning resources. Several steps are necessary before the hourly Tier 2 Spinning Reserve Market is cleared. Ninety minutes prior to the start of the hour, PJM

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21 See "PJM Manual 11: Scheduling Operations," Revision 23 (December 7, 2004), pp. 66-67.

estimates the amount of Tier 1 reserve available from every unit; 60 minutes prior to the start of the hour, self-scheduled Tier 2 units are identified. If spinning requirements are not met by Tier 1 and self-scheduled Tier 2 resources, then a Tier 2 clearing price is determined 30 minutes prior to the start of the hour. This Tier 2 price is equivalent to the merit-order price of the highest price, Tier 2 resource needed to fulfill spinning requirements, the marginal unit.[22]

The spinning offer price submitted for a unit can be no greater than the unit's operating and maintenance cost plus a $7.50 per MWh margin.[23, 24] The market-clearing price is comprised of the marginal unit's spinning offer price, the cost of energy use and the unit's opportunity cost. All units cleared in the Spinning Reserve Market are paid the higher of either the market-clearing price or the unit's spinning offer plus the unit-specific LOC and/or the cost of energy use incurred.

The Mid-Atlantic Region, the Western Region, the ComEd Region, and the Southern Region Spinning Reserve Zones all operate under similar business rules. The Tier 2 Spinning Reserve Market in each of PJM's spinning reserve zones is cleared on cost-based offers because the structural conditions for competition do not exist. The structural issue can be more severe when the Spinning Reserve Market becomes local because of transmission constraints.

Concentration of Ownership

The offered and eligible Tier 2 Spinning Reserve Markets for all four geographic markets are highly concentrated. (See Figure 0-15.) During calendar year 2005, in the Mid-Atlantic Region average HHI for offered Tier 2 spinning was 2167 and 2940 for eligible spinning. In the ComEd Region during 2005 the average HHI for offered spinning was 6305 and 8844 for eligible spinning. In the Western Region the average HHI for offered spinning was 4173 and 4593 for eligible spinning. In the Southern Region the HHI was 10000.

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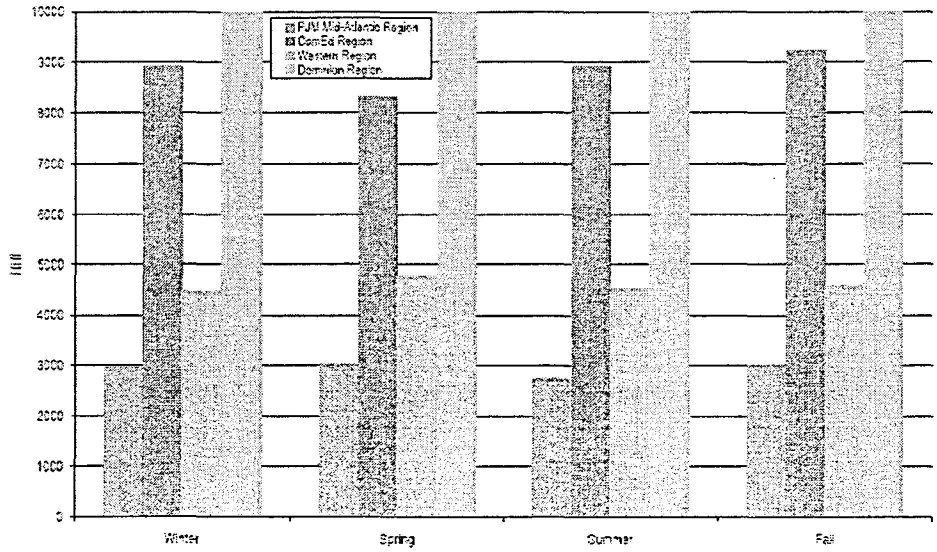
22 Although it is unusual, a PJM dispatcher can deselect units which have been committed after the clearing price is established. This only happens if real-time system conditions require dispatch of a spinning unit for constraint control, or problems with a generator or monitoring equipment are reported.

23 See "PJM Manual 11: Scheduling Operations," Revision 23 (December 7, 2004), p. 58.

24 See PJM Manual 15: Cost Development Guidelines, Rev. 4, (September 1, 2004), p. 31.

Figure 0-15 Eligible Spinning Reserve Market HHI: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Tier2 Eligible HHIs FCS.xls (tab:graph)>>



Spinning Reserve Market Performance

Spinning Reserve Offers

Figure 0-16 shows the daily average hourly offered Tier 2 spinning. Figure 0-17 shows the daily average hourly eligible Tier 2 spinning. Daily Tier 2 spinning offers are fairly stable reflecting the Tier 2 spinning capability of the units, other unit attributes and economic decisions by sellers. The level of eligible spinning displays considerable variability because it is calculated hourly and reflects current market and grid conditions, including LMP, unit dispatch and system constraints.

Figure 0-16 Tier 2 Spinning Offered MW: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Tier 2 Offered MWs and Offered $ per MWh Daily.xls (tab: Offered MW Graph>>

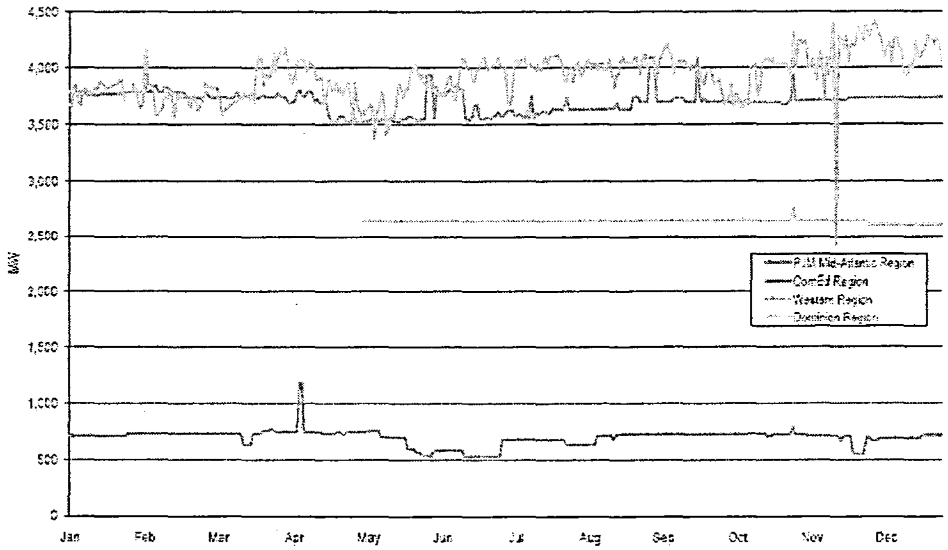


Figure 0-17 Tier 2 spinning eligible MW: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ Spinning Tier 2 Eligible MWs and Eligible $ per MWh Daily.xls>>

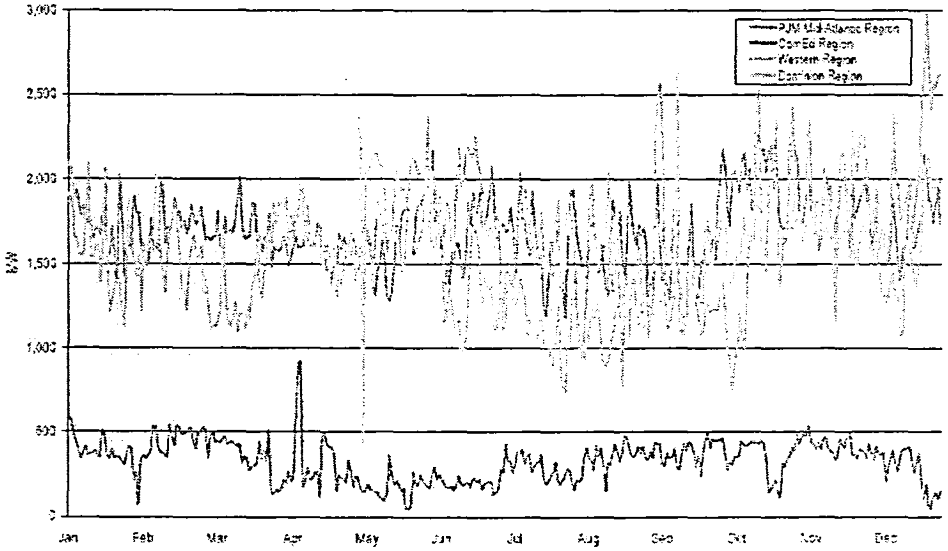


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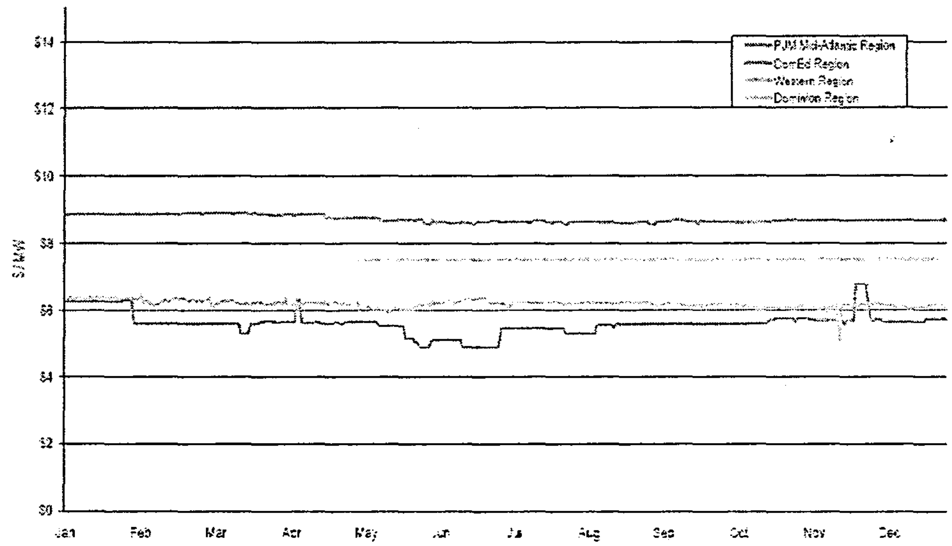
Figure 0-18 shows average offer price per MW by ancillary service area. Tier 2 spinning offers are capped at $7.50 plus costs. The clearing price for Tier 2 spinning includes lost opportunity costs based on LMP, energy use, and operating costs for units which are actually assigned Tier 2 spinning. (Figure 0-19)

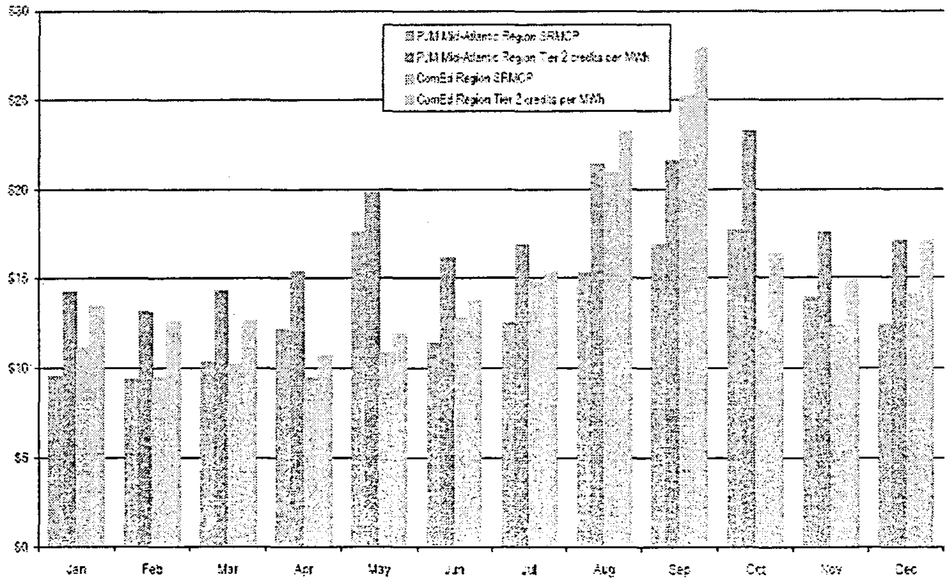
Figure 0-18 Tier 2 spinning average offer price per MW: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ Spinning Tier 2 Offered MWs and Offered $ per MWh Daily.xls (tab: Offered $ per MW graph>>



Spinning Reserve Prices

Figure 0-19 shows the average spinning reserve market-clearing price (SRMCP) and the cost per MW associated with meeting PJM demand for spinning reserve. The average PJM Mid-Atlantic Region SRMCP rose in 2005 to $13.29. The cost per MW of meeting the spinning reserve requirements also rose to approximately $17.59 per MWh. In the ComEd Region, the average SRMCP was $13.64 and the cost per MW for meeting the spinning reserve requirement was $15.85. No price data are presented for the Western Region Spinning Reserve Market because there was almost always adequate Tier 1 spinning reserve to meet the requirements for spinning reserve without clearing the Tier 2 market.

Figure 0-19 Tier 2 spinning market-clearing price and cost per MW: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ Spinning Tier 2 Credits Per MWh Daily Versus Average SRMCP.xls (tab: graph)>>



The Western Region's Spinning Reserve Market (not shown in Figure 0-19) during 2005 almost never had a clearing price because available Tier 1 spinning was always sufficient to cover the spinning requirement. For the 311 hours between June and December when a Spinning Reserve Market was cleared in the Western Region, the average clearing price was $12.27 and the cost of spinning was $66.75 per MWh. The Southern Region (not shown in Figure 0-19) was cleared only 18 hours between June 1 and December 31 with an average SRMCP of $11.34 and an average cost per MWh for Tier 2 spinning of $35.10.

Like Regulation Market prices, Tier 2 spinning reserve prices are more reflective of costs associated with the marginal unit than they are of offer prices. Unlike regulation, however, the costs in Tier 2 spinning are more than just opportunity costs; they are also energy costs for condensing MWh (which must be purchased from the Real-Time Energy Market when the unit is spinning), and startup costs if the assigned unit is not already running. Figure 0-20 and Figure 0-21 shows the relationship between the marginal unit's offer price and the SRMCP. For PJM Mid-Atlantic during all of 2005 the Tier 2 Spinning offer price averaged 67 percent of the SRMCP.

Figure 0-20 PJM Mid-Atlantic Tier 2 spinning reserve clearing prices and marginal unit offer price: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ SpinPriceLOC_final.xls (tab: PJMPriceLOCgraph)>>

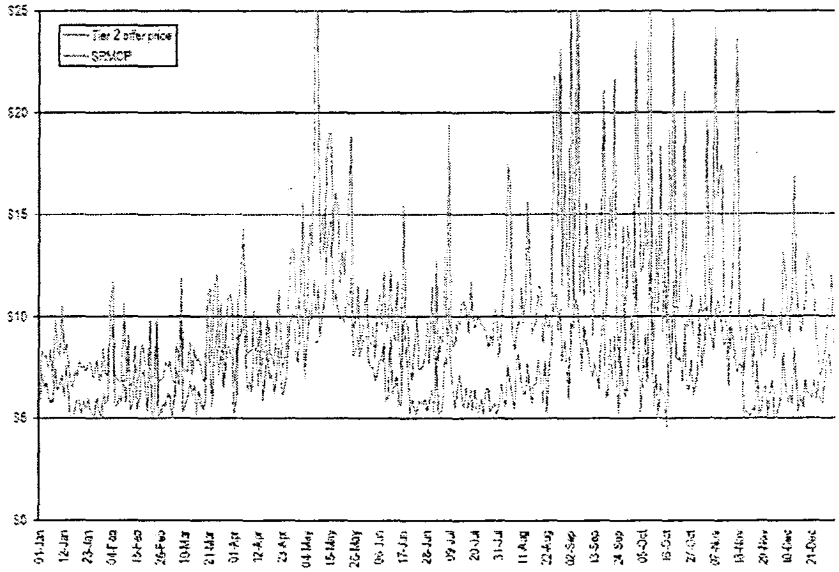


Figure 0-21 shows the relationship between the marginal units' offer price and the SRMCP for the ComEd Region. For the ComEd Region during all of 2005, the Tier 2 spinning offer price averaged 51 percent of the SRMCP.

Figure 0-21 ComEd Tier 2 spinning reserve clearing prices and marginal unit offer price: Calendar year 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ SpinPriceLOC_final.xls (tab: ComEDPriceLOCgraph)>>

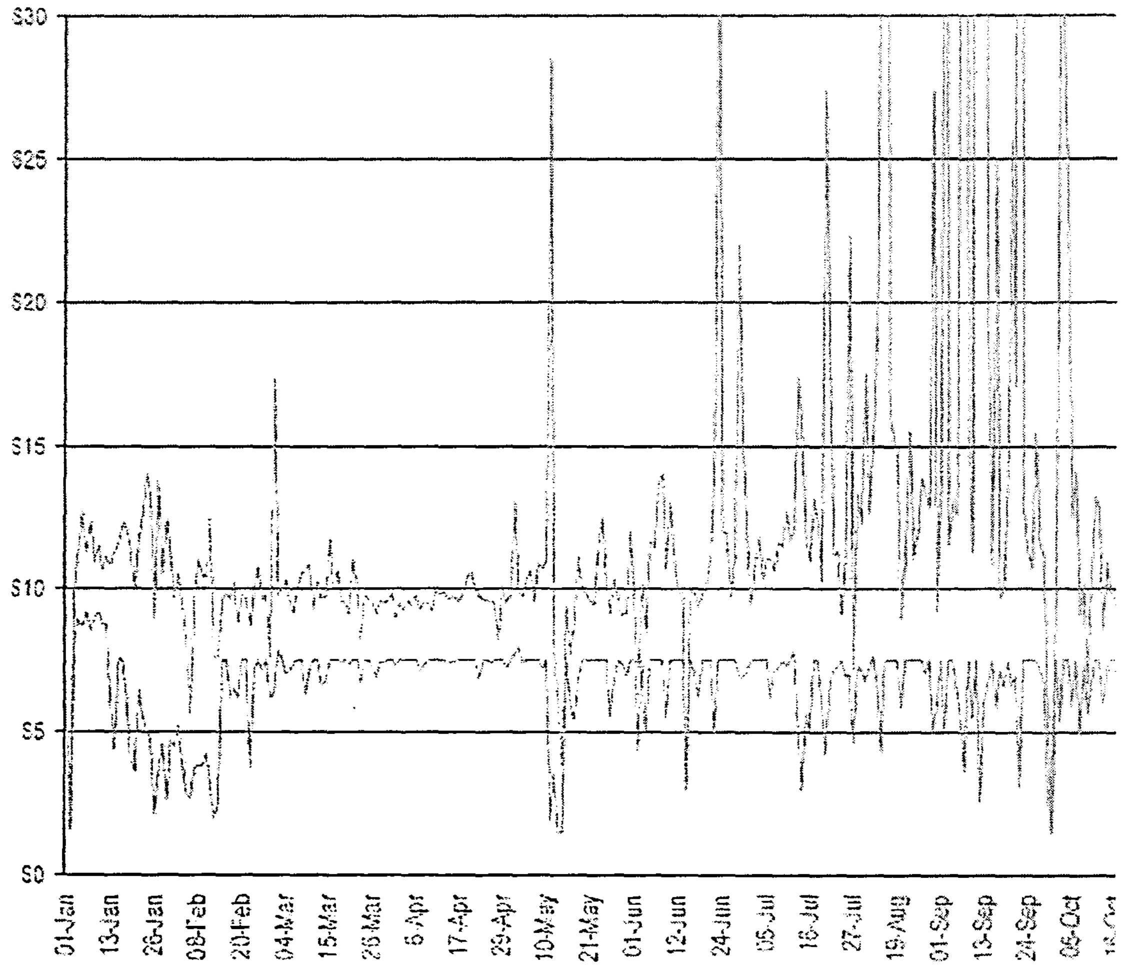
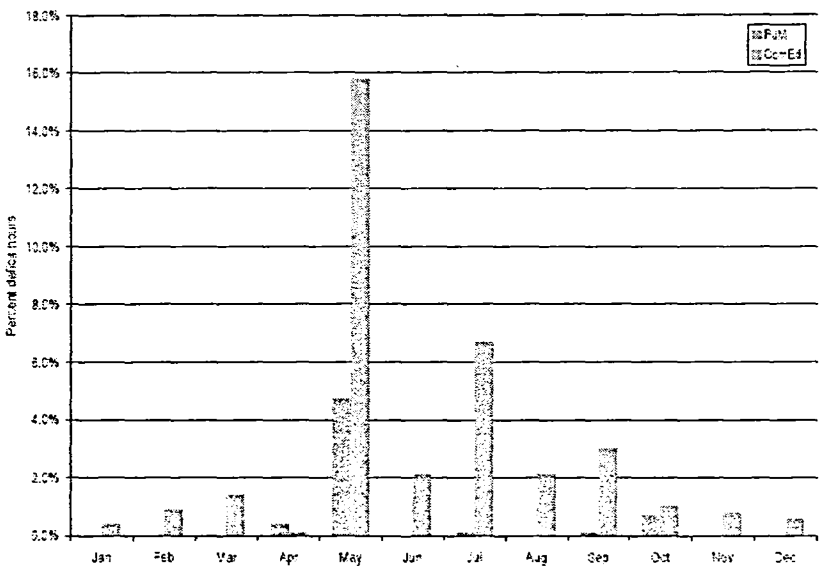


Figure 0-21 shows the level of Tier 1 and Tier 2 spinning reserve purchased from suppliers during calendar year 2005. Tier 1 resources are paid only if they respond during spinning events while Tier 2 resources are paid for providing hourly reserve. In general, more Tier 2 resources are purchased than Tier 1 resources, and Tier 2 payments are higher than Tier 1 payments. An important exception to this general rule was in the Western Region's Spinning Reserve Market where a large baseload of available operating reserves ensures that Tier 1 spinning reserve services were almost always sufficient to cover the spinning requirement so Tier 2 spinning reserve was rarely purchased.

Spinning Reserve Availability

A spinning reserve deficit occurs when the combination of Tier 1 and Tier 2 spinning is not adequate to meet the spinning reserve requirement. Except for a brief period in the ComEd Region during May (See Figure 0-22.), none of PJM's Spinning Reserve Markets had significant spinning reserve deficits during 2005.

Figure 0-22 Tier 2 Spinning Reserve Market deficits: Calendar year 2005 <<J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\DeficitResults.xls (tab: DeficitResultsGraph)>>



The Tier 2 spinning deficit peak during May in the ComEd Region was caused indirectly by a need for regulation and the assignment of several CTs, which otherwise provided spinning reserve to regulation. None of these Tier 2 spinning deficits created a serious problem because the ComEd Region's reserve requirement was satisfied by a reserve-sharing agreement with other members of MAIN.

Ancillary Service Markets

The United States Federal Energy Regulatory Commission (FERC) defined six ancillary services in Order 888: 1) scheduling, system control and dispatch; 2) reactive supply and voltage control from generation services; 3) regulation and frequency response services; 4) energy imbalance service; 5) operating reserve -- spinning reserve services; and 6) operating reserve -- supplemental reserve services.[1] Of these, PJM currently provides regulation, energy imbalance and spinning reserve services through market-based mechanisms. PJM provides energy imbalance service through the Real-Time Energy Market. PJM provides the remaining ancillary services on a cost basis.

Regulation matches generation with very short-term changes in load by moving the output of selected generators up and down via an automatic control signal.[2] Regulation is provided, independent of economic signal, by generators with a short-term response capability (less than five minutes). Longer term deviations between system load and generation are met via primary and secondary reserves and generation responses to economic signals. Spinning reserve is a form of primary reserve. To provide spinning a generator must be synchronized to the system and capable of providing output within 10 minutes.

Both the Regulation and Spinning Reserve Markets are cleared on a real-time basis. A unit can be selected for either spinning reserve or regulation or neither, but it cannot be selected for both. The Regulation and Spinning Reserve Markets are cleared simultaneously and cooptimized with the Energy Market and operating reserve requirements to minimize the cost of the combined products.

PJM does not provide a market for reactive power, but does ensure its adequacy through member requirements and scheduling.[3] Generation owners are paid according to the FERC-approved reactive revenue requirements. Charges are allocated to network customers based on their percentage of load, as well as to point-to-point customers based on their monthly peak usage.

During the last two calendar years, PJM has integrated five control zones. In the *2004 State of the Market Report* the calendar year was divided into three phases, corresponding

1 75 FERC ¶ 61,080 (1996).

2 Regulation is used to help control the area control error (ACE). See Appendix F, "Ancillary Service Markets," for a full definition and discussion of ACE.

3 See "PJM Manual for Scheduling Operations, M-11," Revision 25 (August 19, 2005), p. 71.

to market integration dates. In the *2005 State of the Market Report* the calendar year is divided into two phases, also corresponding to market integration dates:[4]

- **Phase 1 (2004).** The four-month period from January 1 through April 30, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones,[5] and the Allegheny Power Company (AP) Control Zone.[6]

- **Phase 2 (2004).** The five-month period from May 1 through September 30, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP Control Zone and the Commonwealth Edison Company Control Area (ComEd).[7]

- **Phase 3 (2004).** The three-month period from October 1 through December 31, 2004, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP Control Zone and the ComEd Control Zone plus the American Electric Power Control Zone (AEP) and The Dayton Power & Light Company Control Zone (DAY). The ComEd Control Area became the ComEd Control Zone on October 1.

- **Phase 4 (2005).** The four-month period from January 1 through April 30, 2005, during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP, ComEd, AEP and DAY Control Zones plus the Duquesne Light Company (DLCO) Control Zone which was integrated into PJM on January 1, 2005.

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4 See the *2004 State of the Market Report* for more detailed descriptions of Phases 1, 2 and 3.

5 The Mid-Atlantic Region is comprised of the Atlantic Electric Company Control Zone (AECO), the Baltimore Gas & Electric Control Zone (BGE), the Delmarva Power & Light Control Zone (DPL), the Jersey Central Power & Light Company Control Zone (JCPL), the Metropolitan Edison Company Control Zone (Met-Ed), the PECO Energy Company Control Zone (PECO), the Pennsylvania Electric Company Control Zone (PENELEC), the Pepco Control Zone (PEPCO), the PPL Electric Utilities Corporation Control Zone (PPL), the Public Service Electric and Gas Company Control Zone (PSEG) and the Rockland Electric Company Control Zone (RECO).

6 Zones, control zones and control areas are geographic areas that customarily bear the name of a large utility service provider operating within their boundaries. Names apply to the geographic area, not to any single company. The geographic areas did not change with the formalization of the control zone and control area concepts during PJM's Phase 3 integrations. For simplicity, zones are referred to as control zones for all three phases. The only exception is ComEd which is called the ComEd Control Area for Phase 2 only.

7 During the five-month period May 1, 2004, through September 30, 2004, the ComEd Control Zone (ComEd) was called the Northern Illinois Control Area (NICA).

- **Phase 5 (2005).** The eight-month period from May 1 through December 31, 2005, during which PJM was comprised of the Phase 4 elements plus the Dominion Control Zone which was integrated into PJM on May 1, 2005.

In both Phase 4 and Phase 5, PJM operated two Regulation Markets: one for the Mid-Atlantic Region and a second for the Western Region. On August 1 of Phase 5, PJM combined both into a single PJM Combined Regulation Market for a six-month trial period. After the trial period, based on analysis of market results and a report by the PJM Market Monitoring Unit (MMU), PJM stakeholders will vote on whether to keep the combined market.

During Phase 4, PJM operated three Spinning Reserve Markets: one for the Mid-Atlantic Region, one for the Western Region and one for the ComEd Control Zone. During Phase 5, PJM operated a fourth Spinning Reserve Market for Dominion.

The analysis treats each of the two Regulation Markets and each of the three Spinning Reserve Markets separately during Phase 4. The market analysis treats each of the two Regulation Markets separately during the May 1 through July 31 component of Phase 5 (Phase 5-a), and as a single Regulation Market during the August 1 through December 31 component of Phase 5 (Phase 5-b). Each of the four Spinning Reserve Markets is treated separately for the entire Phase 5 period.

Overview – Regulation and Spinning Reserve Markets

The MMU has reviewed structure, conduct and performance indicators for the identified Regulation Markets. The MMU concludes that the Regulation Markets functioned effectively, except for some minor problems of insufficient regulation supply shortly after the start of Phase 5 and during times of minimum generation. The Regulation Markets produced competitive results throughout calendar year 2005 based on the regulation market-clearing price. The Regulation Market prices reflected the fact that offers in the Western Region were capped during Phase 4 and that the offers of two large participants, AEP and Dominion, were capped at cost plus a margin throughout Phase 5, in both cases because the Western Region Regulation Market was determined to be not structurally competitive.

The MMU has reviewed structure, conduct and performance indicators for the identified Spinning Reserve Markets. The MMU concludes that the Spi nning Reserve Markets functioned effectively. The Spinning Reserve Markets produced competitive results throughout calendar year 2005 based on the spinning market-clearing price. The Spinning Reserve Market prices reflected the fact that all offers were capped at cost plus a margin because the markets have been determined to be not structurally competitive.

The Regulation Markets

The structure of the Mid-Atlantic Region and Western Region Regulation Markets was evaluated and the MMU concluded that these markets are not structurally competitive as they are characterized by a combination of one or more structural elements including high levels of supplier concentration, high individual company market shares, significant hours with pivotal suppliers and inelastic demand. The structure of the Combined Regulation Market was also evaluated based on the five months of available data and the MMU concluded that this market is characterized by lower levels of concentration, smaller market shares, a smaller number of hours with pivotal suppliers and inelastic demand. The conduct of market participants within these market structures has been consistent with competition consistent with existing offer capping, and the market performance results have been competitive.

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- **Mid-Atlantic Region.** The Regulation Market in the PJM Mid-Atlantic Region was cl eared based on participants' price offers during Phases 4 and 5-a. All suppliers were paid the market-clearing price, which is a function of the supply curve and PJM-defined demand. The supply curve consists of offered and eligible MW and the associated offer prices which are a combination of unit-specific offers plus opportunity cost (OC) as calculated by PJM.[8]

- **Western Region.** The Regulation Market in the Western Region during Phase 4 was cleared based on participants' cost-based offers. The cost-based regulation offers are defined to be the unit-specific incremental cost of providing regulation plus a margin of $7.50 per MWh plus opportunity cost calculated by PJM. During Phase 5-a, the market was cleared using a combination of price-based offers and cost-based offers. In Phase 5, Dominion and AEP were required to make cost-based offers based on their dominant position in the market while other participants made price offers.

- **PJM Combined Regulation Market.** During the trial period for the PJM Combined Regulation Market, the market was cleared using a combination of price-based offers and cost-based offers. Dominion and AEP were required to make cost-based offers based on their dominant position in the market while other participants made price offers.

8 As used here, the term, "opportunity cost" (OC), refers to the estimated lost opportunity cost (LOC) that PJM uses to create a supply curve on an hour-ahead basis. The term, "lost opportunity cost," refers to opportunity costs included in payments to generation owners.

Market Structure

- **Demand.** Demand for regulation is determined by PJM based on an evaluation of the regulation required in order to meet reliability objectives. Required regulation remained constant for each control region throughout 2005 except for two periods during which a temporary adder was implemented at the direction of PJM.

- **Supply.** The supply of offered and eligible regulation in the PJM Mid-Atlantic Region was generally both stable and adequate, with an average 1.92 ratio of regulation supply offered and eligible to the hourly regulation requirement during Phases 4 and 5-a. While the average ratio of hourly regulation supply offered and eligible to regulation required was 1.64 for the Western Region during Phases 4 and 5-a, at times an inadequate supply of regulation was offered and eligible to participate in the market on an hourly basis in the Western Region. The average ratio of hourly regulation supply offered and eligible to regulation required was 1.88 for the PJM Combined Regulation Market during Phase 5-b.

Concentration of Ownership

- **Mid-Atlantic Region.** During Phase 4 and Phase 5-a, the PJM Mid-Atlantic Region Regulation Market for eligible regulation had an average Herfindahl-Hirschman Index (HHI)[9] of 1751 which is classified as "moderately concentrated."[10] Less than 1 percent of the hours had an eligible regulation HHI above 2500. There were two suppliers with market shares greater than, or equal to, 20 percent. Seven percent of the hours had a single pivotal supplier, 48 percent of the hours had two pivotal suppliers and 88 percent of the hours had three pivotal suppliers.

- **Western Region.** During Phase 4 and Phase 5-a, the Western Region Regulation Market for eligible regulation had an average HHI of 2802 which is classified as "highly concentrated" and 58 percent of the hours had an HHI above 2500. There was a single pivotal supplier in 62 percent of the hours. One hundred percent of the hours had two pivotal suppliers.

- **PJM Combined Regulation Market.** During Phase 5-b, the PJM Combined Regulation Market had an average HHI of 1079 which is classified as

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9 See Section 2, "E nergy Market, Part I," at "Market Concentration" for a more complete discussion of concentration ratios and the Herfindahl-Hirschman Index (HHI).

10 The market structure metrics reported in this summary are based on regulation capacity that is both offered to the market and is eligible to provide regulation.

"moderately concentrated." No suppliers had market shares greater than, or equal to, 20 percent. During 1 percent of hours, there was a single pivotal supplier. During 6 percent of hours, there were two pivotal suppliers. During 29 percent of the hours, there were three pivotal suppliers. For all units except CTs, during 5 percent of hours, there was a single pivotal supplier, during 23 percent of hours, there were two pivotal suppliers and during 68 percent of the hours, there were three pivotal suppliers.

Market Conduct

- **Offers.** The offer price is the only component of the total regulation offer price provided by the unit owner and is applicable for the entire operating day. The regulation offer price is subject to a $100 per MWh offer cap in the Mid-Atlantic Region, was subject to offer capping in Phase 4 in the Western Region and was subject only to a $100 per MWh offer cap in Phase 5 in the Western Region, with the exception of the dominant suppliers, Dominion and AEP, whose offers were capped at marginal cost plus $7.50 per MWh plus opportunity cost. The average MW-weighted offer price for regulation in the PJM Mid-Atlantic Region during Phases 4 and 5-a was $15.63. The average MW-weighted offer price for regulation in the Western Region Regulation Market during Phases 4 and 5-a was $7.73. For the PJM Combined Regulation Market during Phase 5-b, the average MW-weighted offer price for regulation was $16.29.

Market Performance

- **Price.** For the entire PJM regional transmission organization (RTO) from January 1, 2005, to December 31, 2005, the average price per MWh (regulation market-clearing price) associated with meeting PJM's demand for regulation was $49.73. For the PJM region during Phases 4 and 5-a, the average price per MWh for regulation was $36.39. For the Western Region Regulation Market during Phases 4 and 5-a, the average price per MWh for regulation was $42.64. For the PJM Combined Regulation Market during Phase 5-b, the average price per MWh was $64.03.

The Spinning Reserve Markets

The structure of each of the Spinning Reserve Markets has been evaluated and the MMU has concluded that these markets are not structurally competitive as they are characterized by high levels of supplier concentration and inelastic demand. As a result, these markets are operated as markets with market-clearing prices and with offers based on the marginal cost of producing the service plus a margin and opportunity cost. The conduct of market participants within these market structures has been consistent with competition, and the market performance results have been competitive. Prices for spinning in the PJM Mid-Atlantic Region, the ComEd Control Zone, the Western Region

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and Dominion are market-clearing prices determined by the supply curve and PJM-defined demand. The cost-based spinning offers are defined to be the unit-specific incremental cost of providing spinning reserve plus a margin of $7.50 per MWh plus opportunity cost calculated by PJM.

Market Structure

- **Demand.** Computed in accordance with the specific spinning reserve requirements, the average MW spinning requirement was: 1,091 MW, for the PJM Mid-Atlantic Region; 217 MW for the ComEd Spinning Zone; 437 MW for the Western Region; and 5 MW for the Southern Spinning Reserve Zone (May to December only).

- **Supply.** For the PJM Mid-Atlantic Region, the offered and eligible excess supply ratio was 1.15. For the Western and Southern Regions, the ratio was 1.76. For the ComEd Control Zone, the ratio was 1.21.

- **Concentration of Ownership.** In 2005, market concentration was high in the Tier 2 Spinning Reserve Market. The average offered and eligible Spinning Reserve Market HHI for the PJM Mid-Atlantic Region throughout 2005 was 2940. The average Spinning Reserve Market HHI for the Western Region was 4593. The average Spinning Reserve Market HHI for ComEd Control Zone was 8844. The average Spinning Reserve Market HHI for Dominion was 10000.

Market Performance

- **Price.** Load-weighted, average price associated with meeting the PJM system demand for Tier 2 spinning reserve throughout 2005 was $14.41 per MW, a $0.45 per MW decrease from 2004. The load-weighted, average price in the PJM Mid-Atlantic Region for Phases 4 and 5 was $15.44 per MW. The load-weighted, average price for spinning reserve in the ComEd Control Zone during Phases 4 and 5 was $12.73. The load-weighted, average price for spinning in the Western Control Zone during Phases 4 and 5 was $13.23. The load-weighted, average price for spinning in Dominion during Phase 5 was $13.08.

Conclusion

PJM consolidated its Regulation Markets into a single Combined Regulation Market, on a trial basis, effective August 1, 2005. PJM's consolidation of its Regulation Markets resulted in improved performance and increased competition. The MMU will make a recommendation in the near future as to whether the consolidation has resulted in a market that is structurally competitive. The market continues to be based on price offers for most sellers and all sellers are paid a market-clearing price based on offers plus opportunity costs. The result of this design has been a competitive outcome and consistent with competitive offers from all participants whether offer-capped or not. The

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marginal costs of providing regulation have been clearly defined and are consistent with the offers that would be made if the suppliers were behaving competitively.

PJM's Spinning Reserve Markets have worked effectively with offers based on marginal costs plus a margin and with all participants paid a market-clearing price based on the marginal offer including opportunity costs, despite the fact that these markets are characterized by high levels of seller concentration and inelastic demand.

The benefits of markets are realized under this approach to ancillary service markets. Even in the presence of structurally non-competitive markets, there are transparent, market-clearing prices based on competitive offers that account explicitly and accurately for opportunity costs. PJM should continue to consider whether additional ancillary service markets need to be defined in order to ensure that the market is compensating suppliers for services when appropriate.

Regulation Markets

Regulation Market Structure

Two major changes affected the structure of the Regulation Market in 2005. The first was the integration of Dominion into the Western Region Regulation Market on May 1, 2005. The second was the implementation of the PJM Combined Regulation Market on August 1, 2005.

Demand

Demand for regulation does not change with price (is price inelastic). The demand for regulation is set administratively based on reliability objectives and forecast load. Regulation demand will be referred to in this report as required regulation.

The PJM Mid-Atlantic Region has different regulation requirements for on-peak hours and off-peak hours. The regulation requirement for the peak period is 1.1 percent of the peak-load forecast; for the off-peak period, it is 1.1 percent of the valley-load forecast.[11] During Phases 4 and 5-a, PJM Mid-Atlantic Region regulation requirements ranged from 226 MW of regulation capability for off-peak periods to 649 MW for on-peak periods. The average required regulation was 434 MW.

In the Western Region, the regulation requirement was 1.0 percent of the peak forecast load and did not vary between on-peak and off-peak periods. During Phases 4 and 5-a, the requirement ranged from 320 MW to 771 MW, averaging 517 MW.

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11 See "PJM Manual for Scheduling Operations, M-11," Revision 25 (August 19, 2005), p. 51.

During Phase 5-b, the PJM Mid-Atlantic Region and the Western Region Regulation Markets were combined into the PJM Combined Regulation Market. The regulation requirement for this combined market was defined to equal the sum of the separate regulation requirements for each region. During Phase 5-b, the regulation requirement ranged from 662 MW to 1,404 MW, averaging 978 MW.

Although the required regulation specification remained constant for each control region throughout 2005, a temporary adder was implemented at the direction of PJM for two periods. As a result, regulation was purchased in addition to the full regulation requirement. On October 23, 2004, in response to problems after the integration of the ComEd Control Zone into the Western Region, required regulation was increased by 75 MW for each regulation zone. This regulation adder was subsequently reduced until regulation was returned to its base requirement on February 11, 2005.

On April 15, 2005, in response to a persistent problem with frequency excursions, a 100 MW increment was added to the regulation demand for both the Mid-Atlantic and Western Regions. It was phased out and then eliminated on May 14, 2005. Table 0-1 contains a list of regulation adder amounts by date.

Table 0-1 Temporary regulation adder: October 23, 2004, to May 15, 2005 << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\regulation adder table.xls (tab:regulation adder)>>

Regulation Adder Date	Change in Regulation MW per Control Zone	Total Regulation Adder (MW) per Control Zone
23-Oct-04	75	75
29-Oct-04	(75)	0
1-Nov-04	75	75
11-Nov-04	100	175
17-Dec-04	(50)	125
7-Jan-05	(25)	100
14-Jan-05	(25)	75
26-Jan-05	(25)	50
4-Feb-05	(25)	25
11-Feb-05	(25)	0
15-Apr-05	100	100
6-May-05	(25)	75
8-May-05	(75)	0
12-May-05	50	50
14-May-05	(50)	0

The temporary additional regulation requirements between mid-April and mid-May reflected an effort by PJM to solve simultaneous problems of insufficient regulation in the Western Region Regulation Market, particularly during off-peak hours, and frequency excursions that impacted PJM's compliance requirement for CPS2.[12]

Regulation obligation is determined hourly for each load-serving entity (LSE) by applying the real-time load ratio share (adjusted for scheduled load responsibility) to the actual amount of regulation assigned for that hour adjusted for any bilaterals and self-supply. The hourly regulation charge for each LSE is equal to the hourly regulation market-clearing price (RMCP) multiplied by the MW of regulation purchased from the market, plus the LSE's percentage share of any opportunity cost incurred by generation owners over and above the RMCP, plus the LSE's percentage share of any unrecovered costs incurred by those units called on by PJM for the sole purpose of providing regulation.

Supply

The supply of regulation can be measured as regulation capability, regulation offered, or regulation offered and eligible. For purposes of evaluating the Regulation Market, the relevant regulation supply is the level of supply that is both offered to the market on an hourly basis and is eligible to participate in the market on an hourly basis. This is the only supply that is actually considered in the determination of market prices. The level of supply that clears in the market on an hourly basis is called assigned regulation. Assigned regulation is selected from regulation that is both offered and eligible.

Regulation capability represents the total volume of regulation capability reported by resource owners based on unit characteristics.

Regulation offered represents the level of regulation capability actually offered to the PJM Regulation Market. Resource owners may offer those units with approved regulation capability into the PJM Regulation Market. PJM does not require a resource capable of providing regulation service to offer its capability to the market. Regulation offers may be submitted on a daily basis and these daily offers may be modified on an hourly basis.

Regulation offered and eligible represents the level of regulation capability actually offered to the PJM Regulation Market and actually eligible to provide regulation in an hour. Some regulation offered to the market is not eligible to participate in the Regulation Market as a result of identifiable offer parameters specified by the supplier. As an example, the regulation capability of a unit will be included in regulation offered

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12 See Appendix F, "Ancillary Service Markets," for additional information on area control error (ACE) control and control performance standard (CPS).

based on the daily offer and availability status, but that regulation capability will not be eligible in one or more hours because the supplier sets the availability status to unavailable for one or more hours of that same day. (The availability status of a unit may be set in both a daily offer and an hourly update table in the PJM market software.) As another example, the regulation capability of a unit will be included in regulation offered if the owner of a unit offers regulation, but that regulation capability will not be eligible if the owner sets the unit's economic maximum generation level equal to its economic minimum generation level. In that case, the unit cannot provide regulation and is not eligible to provide regulation. As another example, the regulation capability of a unit will be included in regulation offered but that regulation capability will not be eligible if the unit is not operating, unless the unit is a combustion turbine that meets specific operating parameter requirements.

Only those offers which are eligible to provide regulation in an hour are part of supply for that hour, and only those offers are considered for purposes of clearing the market. Regulation assigned represents those regulation resources selected through the regulation market-clearing mechanism to provide regulation service for a given hour.

While the average regulation supply-to-requirement ratio of offered regulation in the Western Region Regulation Market during Phase 5-a was generally adequate at 1.70, the situation was more complicated than the supply-to-requirement ratio indicates. Regulation capacity was always adequate in the sense that the total reported capability was adequate.[13] Occasionally, however, PJM dispatchers had to redispatch generation uneconomically to satisfy reliability requirements. PJM encountered some difficulty with insufficient regulation supply in the Western Regulation Zone during Phase 5-a. Shortly after the Dominion integration on May 1, 2005, there was at times an inadequate supply of regulation that was offered and eligible to participate in the market on an hourly basis. This situation was most acute in the Western Region Regulation Market in May 2005 during off-peak periods when market solutions resulted in deficits 13.6 percent of the time and occasional off-peak hourly price spikes. (See Figure 0-1.) These higher than normal deficits generally occurred during off-peak hours when regulation-capable units were unavailable to regulate because they were not operating. In May, PJM frequently operated under minimum generation conditions, especially during off-peak hours. The combination of a regulation deficit and minimum generation conditions required dispatchers to balance the need for more regulation with the need for less generation. Dispatchers at times chose to operate with regulation deficits. This situation improved during June (deficits in 5.3 percent of all periods) and was resolved in July when the deficit percentage returned to its overall Phases 4 and 5-a average.

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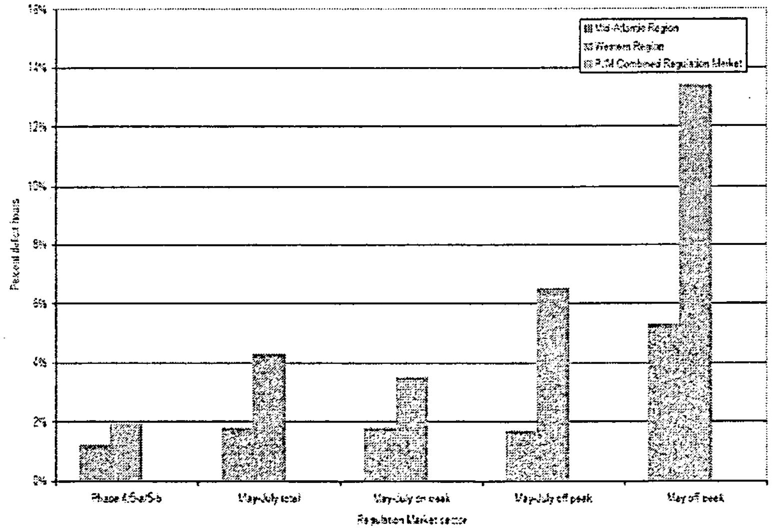
13 See "Regulation Capacity, Daily Availability, Hourly Supply and Price," in Appendix F, "Ancillary Service Markets," for a definition of capacity, availability and supply.

Figure 0-1 compares the percentage of regulation deficit hours across several Regulation Market periods, including all of 2005, Phase 5 only, off-peak and on-peak hours and off-peak hours in May. The abnormally high deficits that occurred in the Western Region particularly during off-peak hours in early May are clearly indicated.

Figure 0-1 Regulation deficit analysis: Calendar year 2005 <<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\deficit study.xls (tab:graph)>>



Regulation deficits in the west were reduced during June and returned to normal in July. Also indicated in Figure 0-1 is the extent to which regulation deficits were all but eliminated after the PJM Combined Regulation Market. There was only one period of regulation deficit in the PJM Combined Regulation Market during Phase 5-b. This deficit does not show up in Figure 0-1 because the percentage of regulation deficit hours rounds to zero percent.

Concentration of Ownership

Market Structure Definitions

The market structure analysis follows the Commission logic specified in the AEP order.[14] The logic of the delivered price test is followed by calculating market share, HHI and pivotal supplier metrics for each market configuration.[15] The analysis presented here differs in two ways from the Commission's delivered price test. The delivered price test would start with the universe of regulation offered and eligible and then limit the analysis to those offered and eligible units that could provide regulation at less than or equal to 1.05 times the clearing price. The analysis here uses a proxy for the 1.05 times the clearing price definition used to define the relevant market. In PJM, the supply of regulation generally consists of two relatively distinct segments: an all units except combustion turbine (CT) segment (consisting of steam and hydroelectric units) and a CT segment. While steam, hydroelectric and CT units can and do provide regulation, the steam/hydroelectric segment is generally lower cost and is relatively homogeneous while the CT segment is generally significantly higher cost and similarly relatively internally homogeneous. Rather than directly applying the 1.05 times the clearing price market definition, the analysis here focuses separately on the steam/hydroelectric and the CT portions of the market. The steam/hydroelectric segment of the market is used in place of including only sellers that offer for a price less than or equal to the clearing price times 1.05 when a steam/hydroelectric unit is marginal, although the segment approach results in a substantially larger market definition. The CT segment is similarly used in place of including only sellers that offer for a price less than or equal to the clearing price times 1.05 when a CT unit is marginal, although again the segment approach probably results in a larger market definition. The data are presented including all units, all units except CTs (steam and hydroelectric) and CTs. In addition, the analysis here includes the results of the one, two and three pivotal supplier tests.

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The analysis here includes all regulation provided by each supplier and made offered and eligible. While the market structure results are reported for regulation offered, this is not directly relevant to a determination of whether a market structure is competitive. Regulation must be both offered and eligible in an hour in order for it to be part of the market. This is termed economic capacity under the delivered price test.

The delivered price test may also be applied using available economic capacity, or gross supply by participant net of their load obligation. The fact that suppliers have load

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14 *AEP Power Mktg. Inc.*, 107 FERC ¶ 61,018 ("AEP Order"), order on reh'g, 108 FERC ¶ 61,026 (2004).

15 AEP Order at 105 *et seq*.

obligations may affect their incentives to exercise market power although not unambiguously. However, as the amount of load that will be served by the integrated utilities in the future is unknown given the unknown extent of retail competition, a reasonable approach is to evaluate the entire regulation supply, or economic capacity, as is done here.

The Commission's AEP order indicates that failure of any one of the specified tests is adequate for a showing of market power including tests based on market concentration, market share and pivotal supplier analyses. The analysis presented here goes further in order to analyze the significance of excess supply. The MMU applies the pivotal supplier test using one, two and three pivotal suppliers. In addition, when there are hours with one, two or three pivotal suppliers, the analysis also examines the frequency with which individual generation owners are in the pivotal group. If the hours that fail a pivotal supplier test have the same pivotal supplier(s) for a significant proportion of the hours, that information can be used to identify dominant suppliers.

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The pivotal supplier tests represent an analytical approach to the issue of excess supply. Excess supply, by itself, is not necessarily adequate to ensure a competitive outcome. A monopolist could have substantial excess supply but the monopolist would not be expected to change its market behavior as a result. The same logic applies to a small group of dominant suppliers. However, if there is adequate supply without the three dominant suppliers to meet the demand, then the market can reasonably be deemed competitive.

PJM Mid-Atlantic Regulation Market – Phases 4 through 5-a

During Phases 4 through 5-a, in the Regulation Market in the Mid-Atlantic Region, the offer capability was 2,408 MW.[16] The level of regulation resources offered on an hourly level and the level of regulation resources both offered and eligible to participate on an hourly level in the market were lower than the total regulation capability. In 2005 the average hourly offer level was 1,128 MW or 47 percent of offer capability while the average hourly eligible offer level was 835 MW or 35 percent of offer capability.

The ratio of the hourly regulation supply offered to the hourly regulation requirement, averaged 2.60 for the PJM Mid-Atlantic Region during Phases 4 and 5-a. When this ratio equals 1.0, it indicates that offered supply exactly equals demand for the referenced time period. Based upon regulation offered and eligible, this ratio averaged 1.92. The average regulation requirement for the PJM Mid-Atlantic Region during 2005 was 434 MW.

16 Offer capability is defined as the maximum daily offer volume for each offering unit during the period without regard to the actual availability of the resource.

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Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible, and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 2064 to a minimum of 1088 with an average value of 1510. Based upon regulation offered and eligible, HHI values ranged from a maximum of 2787 to a minimum HHI of 1190, with an average value of 1751. Less than 1 percent of hours had an eligible regulation HHI above 2500. Based upon regulation assigned, HHI values ranged from a maximum of 9690 to a minimum HHI of 1118. The average HHI value for regulation assigned was 2260. Thirty-one percent of hours had an assigned regulation HHI above 2500. Table 0-2 summarizes the January 2005 through July 2005 PJM Mid-Atlantic Region Regulation Market HHIs.

Table 0-2 PJM Mid-Atlantic Region Regulation Market hourly HHI: Phases 4 and 5-a< 14_Graphs_Tables\HHI_Tables.xls (Tab PJM HHIs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1088	1510	2064	0%
Eligible	1190	1751	2787	0%
Assigned	1118	2260	9690	31%

As noted above, regulation supply in PJM is bifurcated into the combustion turbine (CT) segment and the all units except CTs segment because, while some CTs provide regulation, they are very expensive to operate solely to provide regulation. In order to approximate the delivered price test approach, the Regulation Market HHI is reported with and without CTs. (See Table 3.) In the PJM Mid-Atlantic Region, HHIs are slightly lower without CTs because the CTs are disproportionately owned by the company with the largest market share.

Table 3 PJM Mid-Atlantic Region Regulation Market hourly HHI (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\PJMHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1078	1475	2354	0%
Eligible	1183	1718	2941	0%
Assigned	1118	2266	9690	31%

During Phases 4 and 5-a, two suppliers had market shares greater than, or equal to, 20 percent based on regulation offered and eligible. For the market segment excluding CTs, two suppliers had market shares greater than, or equal to, 20 percent based on regulation offered and eligible.

During Phases 4 and 5-a, 7 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the PJM Mid-Atlantic Region's market.[17] This means that, during the seven-month period, for 7 percent of the hours the total regulation requirement could not be met in the absence of the largest supplier. Forty-eight percent of the hours failed the two pivotal supplier test. This means that, during 48 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. Eighty-eight percent of the hours failed the three pivotal supplier test. This means that, during 88 percent of the hours, the total regulation the regulation requirement could not be met in the absence of the three largest suppliers.

For the market segment excluding CTs, the percentage of one pivotal supplier hours in the eligible Regulation Market increases from 7 percent to 10 percent, the percentage of two pivotal supplier hours increases from 48 percent to 52 percent and the percentage of three pivotal supplier hours increases from 88 percent to 89 percent. Table 0-4 summarizes the PJM Mid-Atlantic Region Regulation Market pivotal supplier statistics for Phases 4 and 5-a. The pivotal supplier statistics are also presented for all regulating units except CTs. (See Table 5.) Three companies are pivotal more than 75 percent of the three pivotal supplier intervals for all units, and for the all units except CTs segment.

Table 0-4 PJM Mid-Atlantic Region Regulation Market pivotal supplier statistics: Phases 4 and 5-a< 14_Graphs_Tables\Piv Sup Tables.xls (Tab PJM PivSup) >

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	7%
2 pivotal	3%	48%
3 pivotal	35%	88%

Table 5 PJM Mid-Atlantic Region Regulation Market pivotal supplier statistics (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\PJMPivSupResultsxls.xls (Tab NonCTPivSupHours) >

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	10%
2 pivotal	9%	52%
3 pivotal	52%	89%

17 The pivotal supplier results are provided for all offered regulation as additional information although these results are not directly relevant to the market structure analysis.

Based on these market structure results, the MMU concludes that the market structure of the PJM Mid-Atlantic Region Regulation Market during Phases 4 and 5-a can no longer be considered to be consistent with a competitive outcome. The combination of two market participants with market shares greater than, or equal to, 20 percent and the pivotal supplier results are not consistent with a competitive structure. The market in the PJM Mid-Atlantic Region was operated by PJM as a competitive market prior to the Combined Regulation Market.

Western Region Regulation Market – Phases 4 and 5-a

During Phases 4 and 5-a, in the Western Region Regulation Market, the submitted offer capability was 2,267 MW. The level of resources offered on an hourly level and the level of regulation resources both offered and eligible to participate on an hourly level in the Regulation Market were lower than the submitted regulation offer capability. Between the beginning of Phase 4 and the end of Phase 5-a, the average hourly offer level was 938 MW or 41 percent of the submitted capability, while the average hourly eligible offer level was 847 MW or 37 percent of the submitted capability.

The ratio of the hourly regulation supply offered to the hourly regulation requirement, averaged 1.81 for the Phases 4 and 5-a Western Region Regulation Market. Based upon regulation offered and eligible, this ratio averaged 1.64. The average regulation requirement for the Phases 4 and 5-a Western Region Regulation Market was 517 MW.[18]

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 4357 to a minimum of 1748 with an average value of 2730. Fifty-eight percent of hours had an offered regulation HHI above 2500. Based upon regulation offered and eligible, HHI values ranged from a maximum of 4810 to a minimum HHI of 1757, with an average value of 2802. Fifty-eight percent of hours had an eligible regulation HHI above 2500. Based upon regulation assigned, HHI values ranged from a maximum of 7162 to a minimum HHI of 1698. The average HHI value for regulation assigned was 2973. Sixty-four percent of hours had an assigned regulation HHI above 2500. Table 0-6 summarizes the January through July 2005 Western Region Regulation Market HHIs.

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18 See Appendix F, "Ancillary Service Markets," for additional detail on the regulation requirements.

Table 0-6 PJM Western Region Regulation Market hourly HHI: Phases 4 and 5-a <14_Graphs_Tables\HHI Tables.xls (Tab WRM HHIs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1748	2730	4357	58%
Eligible	1757	2802	4810	58%
Assigned	1698	2973	7162	64%

For the market segment excluding CTs, HHIs in the Western Region Regulation Market are somewhat higher. (See Table 7.)

Table 7 PJM Western Region Regulation Market hourly HHI (All units except CTs): Phases 4 and 5-a< 14_Graphs_Tables\WRMHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	1859	2960	4973	60%
Eligible	1856	3029	5249	62%
Assigned	1738	2984	7162	65%

During Phases 4 and 5-a, one supplier had a market share greater than, or equal to, 20 percent based on offered and eligible regulation. For the market segment excluding CTs, one supplier had a market share greater than, or equal to, 20 percent based on offered and eligible regulation.

During Phases 4 through 5-a, 62 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the Western Region Regulation Market. This means that, during the seven-month period, the total regulation requirement could not be met for 62 percent of the hours in the absence of the largest supplier. One hundred percent of the hours failed the two pivotal supplier test. This means that, during 100 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. One hundred percent of the hours failed the three pivotal supplier test. This means that, during 100 percent of the hours, the total regulation requirement could not be met in the absence of the three largest suppliers. Table 0-8 summarizes the Western Region Regulation Market pivotal supplier statistics for Phases 4 through 5-a.

Table 0-8 PJM Western Region Regulation Market pivotal supplier statistics: Phases 4 and 5-a .<14_Graphs_Tables\RSI Tables.xls (Tab WRM PivSup)>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	30%	62%
2 pivotal	100%	100%
3 pivotal	100%	100%

Table 9 presents pivotal supplier statistics for the Western Region regulation pool for all units except CTs. Eighty-eight percent of hours fail the one pivotal supplier test. In both the all units and all units except CTs market segments the same company that was the one pivotal supplier was also pivotal for more than 95 percent of the hours in which two and three suppliers were pivotal.

Table 9 PJM Western Region Regulation Market pivotal supplier statistics (All units except CTs:): Phases 4 and 5-a .<14_Graphs_Tables\WRMPivSupResultsxls.xls (Tab NonCTPivSupHours)>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	69%	88%
2 pivotal	100%	100%
3 pivotal	100%	100%

Based on these market structure results, the MMU concludes that the market structure of the Western Region Regulation Market was not consistent with a competitive outcome. The Regulation Market in the Western Region was operated by PJM, wi th the two dominant suppliers offer-capped, as a market with market-clearing prices during Phases 4 and 5-a.

PJM Combined Regulation Market – Phase 5-b

The PJM Combined Regulation Market during Phase 5-b was comprised of the PJM Western Region (the ComEd, AEP, DAY, Dominion, DLCO and AP Control Zones) and the PJM Mid-Atlantic Region. For the Phase 5-b PJM Combined Regulation Market, the submitted capability was 5,491 MW. The average hourly offer level was 2,370 MW while the average hourly eligible offer level was 1,841 MW.

The ratio of the hourly regulation supply offered to the hourly regulation requirement averaged 2.42. Based upon regulation offered and eligible, this ratio averaged 1.88. The average regulation requirement for the Phase 5-b PJM Combined Regulation Market was 978 MW.

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 1331 to a minimum of 812 with an average value of 1001. Based upon regulation offered and eligible, HHI ranged from a maximum of 1562 to a minimum HHI of 866, with an average value of 1079. Based upon regulation assigned, HHI values ranged from a maximum of 2390 to a minimum of 878. The average HHI value for regulation assigned was 1299. Table 0-10 summarizes HHI results for the PJM Combined Regulation Market.

Table 0-10 PJM Combined Regulation Market HHI: Phase 5-b
<<14_Graphs_Tables\HHI Tables.xls (Tab RTO HHIs)>>

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	812	1001	1331	0
Eligible	866	1079	1562	0
Assigned	878	1299	2390	0

For the market segment excluding CTs, HHIs are essentially the same. (See Table 11.)

Table 11 PJM Combined Regulation Market HHI (All units except CTs): Phase 5-b< 14_Graphs_Tables\RTOHHIResultsxls.xls (Tab NO_CTs) >

	Minimum	Average	Maximum	Percent Hours > 2500
Offered	845	1016	1417	0
Eligible	891	1080	1659	0
Assigned	878	1301	2400	0

During Phase 5-b, in the PJM Combined Regulation Market, no suppliers had a market share greater than, or equal to, 20 percent for regulation offered and eligible. For the market segment excluding CTs, no suppliers had a market share greater than, or equal to, 20 percent for regulation offered and eligible. For the CT market segment, two suppliers had market shares in excess of 20 percent for regulation offered and eligible.

During Phase 5-b, 1 percent of the hours failed the single pivotal supplier test for offered and eligible supply in the PJM Combined Regulation Market. This means that, during the five-month period, the total regulation requirement could not be met for 1 percent of the hours in the absence of the largest supplier. Six percent of the hours failed the two pivotal supplier test. This means that, during 6 percent of the hours, the total regulation requirement could not be met in the absence of the two largest suppliers. Twenty-nine percent of the hours failed the three pivotal supplier test. This means that, during 29 percent of the hours, the total regulation requirement could not be met in the absence of the three largest suppliers. Table 0-12 summarizes the PJM Combined Regulation Market's pivotal supplier results for Phase 5-b. For all units including CTs the same company that was the one pivotal supplier for more than one-third of the one pivotal supplier intervals was also pivotal for more than 75 percent of the two pivotal supplier intervals and more than 80 percent of the hours in which two and three suppliers were pivotal. A second company was pivotal during more than 25 percent of the two pivotal and approximately 50 percent of three pivotal hours.

Table 0-12 PJM Combined Regulation Market pivotal supplier statistics: Phase 5-b <<<14_Graphs_Tables\PivSup Tables.xls (Tab RTO PivSup)>>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	1%
2 pivotal	0%	6%
3 pivotal	1%	29%

Table 13 presents pivotal supplier statistics for the PJM Combined Regulation Market's segment for all units except CTs.

Table 13 PJM Combined Regulation Market pivotal supplier statistics (All units except CTs): Phase 5-b <<<14_Graphs_Tables\RTOPivSupResultsxls.xls (Tab NonCTPivSupHours)>>

	Hours Offered (Percent)	Hours Eligible (Percent)
1 pivotal	0%	5%
2 pivotal	1%	23%
3 pivotal	14%	68%

For the market segment excluding CTs, the percentage of one pivotal supplier hours in the eligible Regulation Market increases from 1 percent to 5 percent, the percentage of two pivotal supplier hours increases from 6 percent to 23 percent and the percentage of three pivotal supplier hours increases from 29 percent to 68 percent. (See Table 13.) In the all units except CTs market segment, the same company that was the one pivotal supplier for more than two-thirds of the one pivotal supplier intervals was also pivotal for more than 80 percent of the two pivotal supplier intervals and more than 95 percent of the hours in which two and three suppliers were pivotal. A second company is pivotal during more than 60 percent of the two pivotal and three pivotal hours, while the third pivotal position is shared by three companies with an approximately equal frequency of occurrence.

The MMU will make a recommendation to PJM members in the near future regarding the structural competitiveness of this market.

Deleted: Based on this analysis, the MMU recommends that PJM continue to operate the Regulation Market as a single Combined Regulation Market. This recommendation is based on improved operational results and on the increased competitiveness of the Combined Market. Nonetheless, based on these market structure results, the MMU concludes that the market structure of the PJM Combined Regulation Market was not consistent with a competitive outcome. For Phase 5-b, the PJM Combined Regulation Market was operated by PJM, with the two dominant suppliers offer-capped, as a price-based market with market-clearing prices. It would be reasonable, consistent with the results of the analysis and with FERC's actions regarding the Western Region Regulation Market, to offer cap only the two dominant market participants identified in the analysis of the Combined Regulation Market. These results are based on the first five months of operation of the combined market. The MMU will continue to analyze market outcomes and market structure for the Combined Regulation Market.¶

Regulation Market Conduct

Regulation Offers

Generators wishing to participate in any of the PJM Regulation Markets must submit regulation offers for specific units by hour 1800 EPT of the day before the operating day. The regulation offer price is subject to a $100 per MWh offer cap in PJM control zones with the exception of the dominant suppliers Dominion and AEP whose offers are capped at marginal cost plus $7.50 per MWh plus opportunity cost. In the PJM Western Region during Phase 4, all regulation offers were capped at $7.50 per MWh plus the cost of providing regulation service because that market was determined to be not structurally competitive. As in any competitive market, regulation offers at marginal cost are considered to be competitive. In PJM, a $7.50 per MWh adder is considered to be consistent with competitive offers based on an analysis of historical offer behavior.

The offer price is the only component of the regulation offer applicable for the entire operating day. The following information must be included in each offer, but can be entered or changed up to 60 minutes prior to the operating hour: regulating status (available, unavailable or self-scheduled); regulation capability; and high and low regulation limits. The Regulation Market is cleared on a real-time basis, and regulation prices are posted hourly throughout the operating day. The amount of self-scheduled regulation is confirmed 60 minutes before each operating hour, and regulation assignments are made 30 minutes before each operating hour.

PJM's Regulation Markets are cleared hourly, based upon both offers submitted by the units and the hourly opportunity cost of each unit.[19] The effective offer price is the sum of the unit-specific offer and the opportunity cost. In order to clear the market, PJM ranks units which offer and are eligible to regulate by effective offer price and selects the lowest offers in order until the amount of regulation required for the hour is satisfied at

19 PJM estimates the opportunity cost for units providing regulation based on a forecast of locational marginal price (LMP) for the upcoming hour. Opportunity cost is included in the market-clearing price.

least cost. The price that results is the RMCP, and the unit that sets this price is the marginal unit.

Regulation Market Performance

Regulation Prices

Figure 0-2 shows both the daily average regulation market-clearing price and the opportunity cost component for the marginal units in the PJM Mid-Atlantic Region during Phases 4 and 5-a. Figure 0-3 shows the same data for the Western Region Regulation Market during Phases 4 and 5-a. Figure 0-4 shows the same data for the PJM Combined Regulation Market during Phase 5-b. All units chosen to provide regulation during Phases 4 and 5 received as payment the higher of the clearing price multiplied by the unit's assigned regulating capability, or the unit's regulation bid multiplied by its assigned regulating capability plus the individual unit's real-time opportunity cost.[20]

Regulation credits are awarded to generation owners that have either self-scheduled regulation or sold regulation into the market. Regulation credits for units self-scheduled to provide regulation are equal to the RMCP times the unit's self-scheduled regulating capability. Regulation credits for units that offered regulation into the market and were selected to provide regulation are the higher of the RMCP times the unit's assigned regulating capability, or the unit's regulation bid times its assigned regulating capability plus the opportunity cost that unit incurred. Although most units are paid RMCP times their assigned regulation MW, the RMCP is itself strongly dependent on the lost opportunity cost based upon forecast LMP calculated for the marginal unit during market clearing. This means that the total cost of regulation is very strongly dependent upon lost opportunity cost, which is dependent upon forecast LMP. Figure 0-2, Figure 0-3 and Figure 0-4 graph the RMCP against the estimated lost opportunity cost of the marginal unit (calculated at market clearance, adjusted for real-time deviations in LMP and averaged over the day). Most of the cost of regulation comes from the lost opportunity cost of the marginal unit. The rest of the RMCP is the unit's regulation offer. The average offer of the marginal unit for the PJM Mid-Atlantic Region during Phases 4 and 5-a was $15.33. The average offer of the marginal unit for the Western Region Regulation Market during Phases 4 and 5-a was $8.66. The average offer of the marginal unit for the PJM Combined Regulation Market during Phase 5-b was $13.16. In the PJM Mid-Atlantic Region Regulation Market during Phases 4 and 5-a, marginal unit lost opportunity cost (LOC) averaged 57 percent of the RMCP. In the Western Region Regulation Market during Phases 4 and 5-a, marginal unit LOC averaged 76 percent of

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20 See "PJM Operating Agreement, Accounting, m28," Revision 27, Section 4, "Regulation Credits" (October 1, 2004), pp. 26-27. PJM uses estimated opportunity cost to clear the market and real-time opportunity cost to compensate generators that provide regulation and spinning. Real-time opportunity cost is calculated using real-time LMP.

RMCP. In the PJM Combined Regulation Market during Phase 5-b, marginal unit LOC averaged 79 percent of RMCP.

Figure 0-2 PJM Mid-Atlantic Region daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phases 4 and 5-a << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_2_RMCP_LOC_graph_PJM_new.xls (tab: Graph)>>

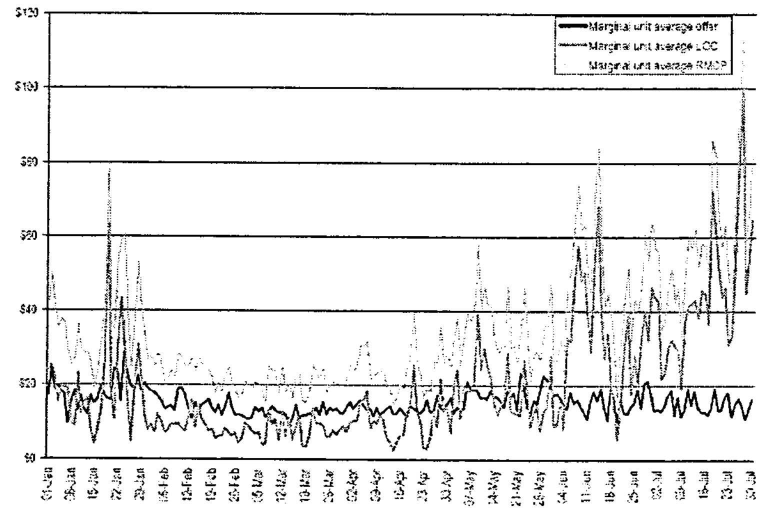

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Figure 0-3 PJM Western Region daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phases 4 and 5-a << H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_3_RMCP_LOC_graph_WRM_new.xls (tab: Graph)>>

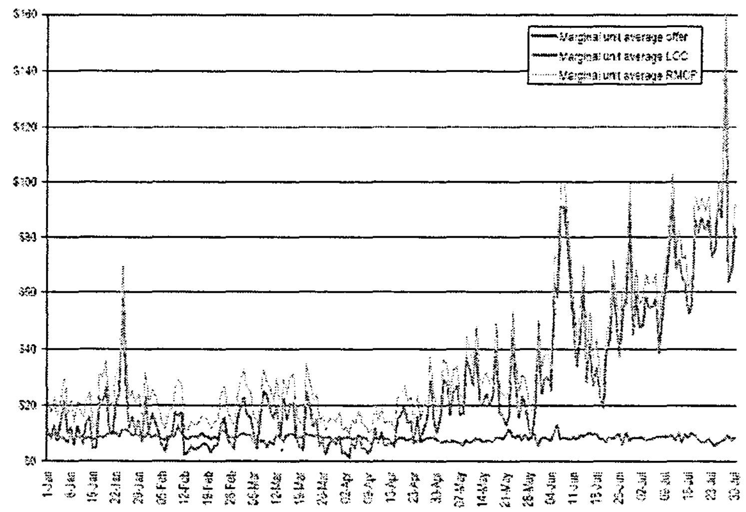

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Figure 0-4 PJM Combined Regulation Market daily average regulation clearing price and adjusted estimated marginal unit opportunity cost: Phase 5-b < H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Fig5_4_RMCP_LOC_graph_RTO_new.xls (tab: Graph)>

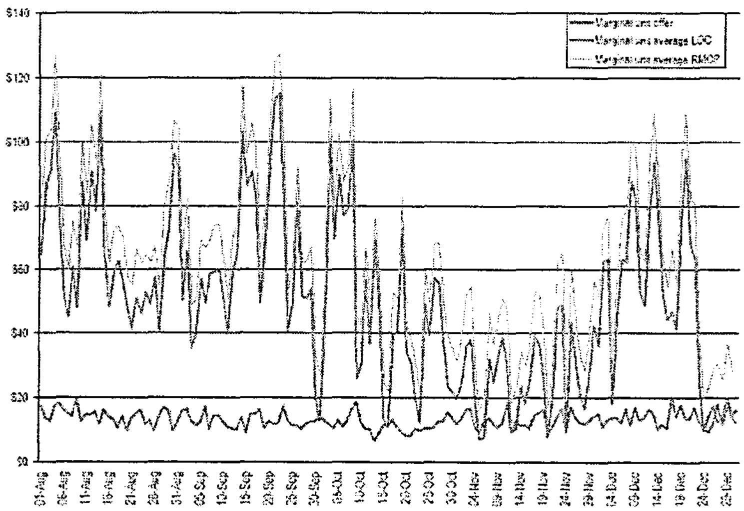

Figure 0-5, Figure 0-6 and Figure 0-7 compare the regulation price per MWh to the regulation MW purchased for each of the Regulation Markets. As the regulation requirement is a linear function of daily forecast peak load in all markets, all three graphs show that despite considerable daily variation, the price of regulation and the demand for regulation increase or decrease together on a seasonal scale. System LMP increases with load because higher priced units must be dispatched to meet demand and those increases in system LMP cause the opportunity cost to rise by increasing the spread between LMP and the energy offers of the regulating units.

Figure 0-5 PJM Mid-Atlantic Region daily regulation MW purchased vs. price per MW: Phases 4 and 5-a <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\RegMWPurch_vs_Price.xls (tab: PJMGraph)>>

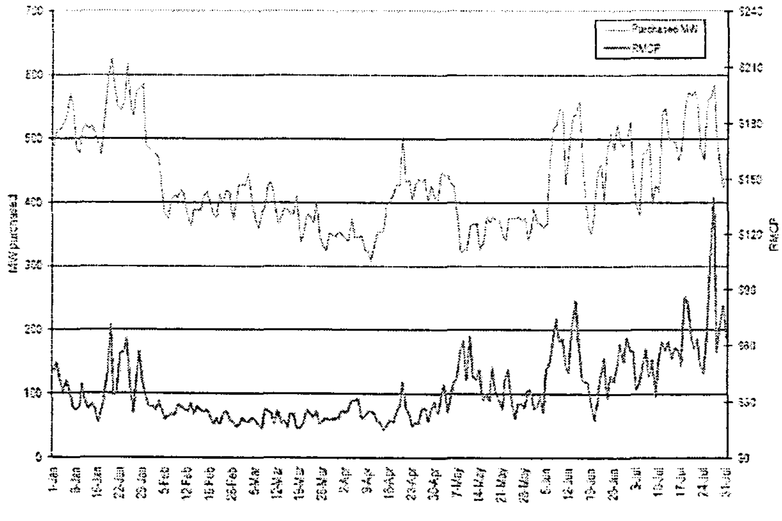

Figure 0-6 PJM Western Region daily regulation MW purchased vs. price per MW: Phases 4 and 5-a <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\RegMWPurch_vs_Price.xls (tab: WRMGraph)>>

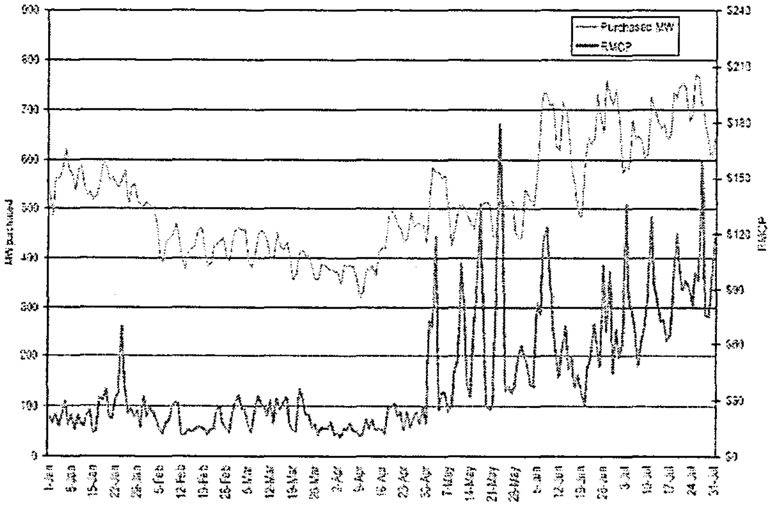

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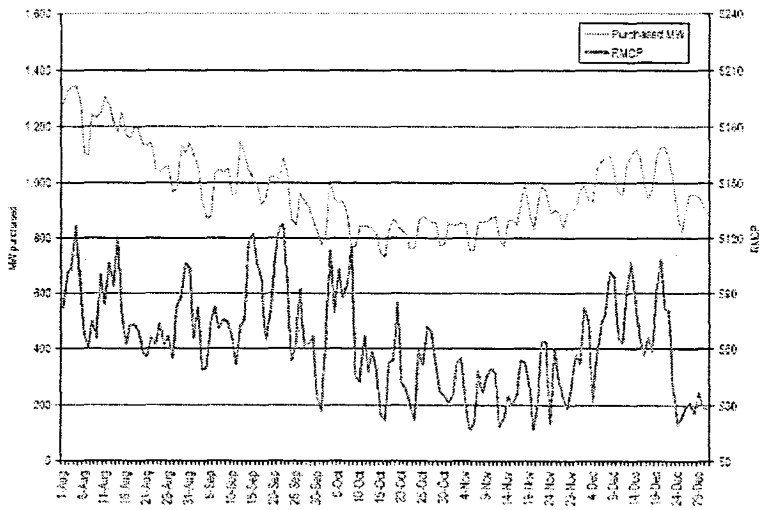
Figure 0-7 PJM Combined Regulation Market daily regulation MW purchased vs. price per MW: Phase 5-b <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\ RegMWPurch_vs_Price.xls (tab: RTOgraph)>>



Important exceptions to this general pattern occurred periodically in the Western Region after the integration of Dominion on May 1, 2005. (See Figure 0-6.) An hourly analysis of regulation MW purchased versus the regulation price reveals some extreme exceptions that resulted from deficits during off-peak hours and/or times of minimum generation events. A shortage of regulation-capable units (as existed in the Western Region in early May) combined with a minimum generation event required expensive combustion turbine units to be started to satisfy regulation requirements resulting in high clearing prices. Minimum generation events can cause shortages of regulation in the PJM Mid-Atlantic Region as well, but since the regulation requirement in the PJM Mid-Atlantic Region is lower during off-peak hours it is less likely. Overall, the inflexibility of demand and the shortage of available regulating units caused relatively wide price swings in the Western Region during Phase 5-a.

As Figure 0-5, Figure 0-6 and Figure 0-7 also show, regulation prices during calendar year 2005 were seasonally higher in January, remained lower and relatively stable from February through April, then began to increase and show high daily variability into October before moderating at the end of the year. The higher average summer prices reflect higher LMPs in the LOC portion of the marginal unit's RMCP for regulation. (See Figure 0-2, Figure 0-3 and Figure 0-4.) During a period of low prices, March and April, the LOC/RMCP ratio was 42 percent for the PJM Mid-Atlantic Region and 58 percent for the Western Region. During a period of high prices, August and September, the LOC/RMCP ratio was 83 percent for the PJM Combined Regulation Market.

Figure 0-8 illustrates the level of demand for regulation by month in 2005 and the corresponding level of regulation cost.

Figure 0-8 Monthly regulation MW and regulation cost per MW: Calendar year 2005 <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostPerMW_Monthly.xls (tab: graph)>

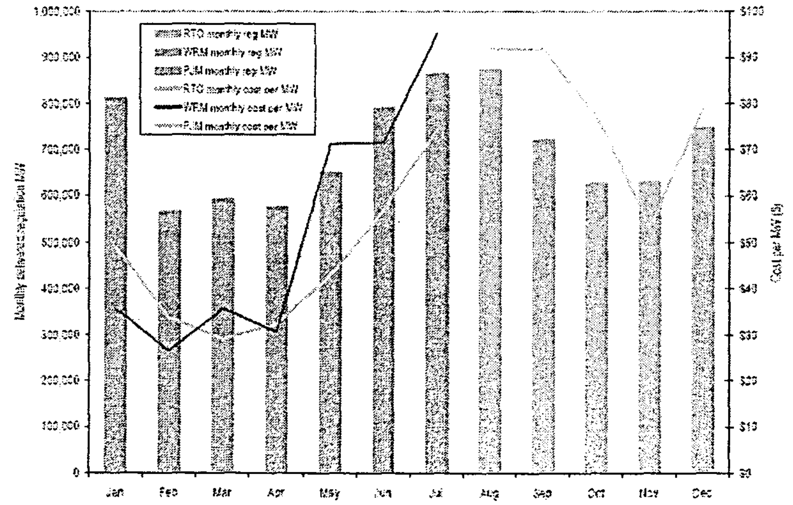
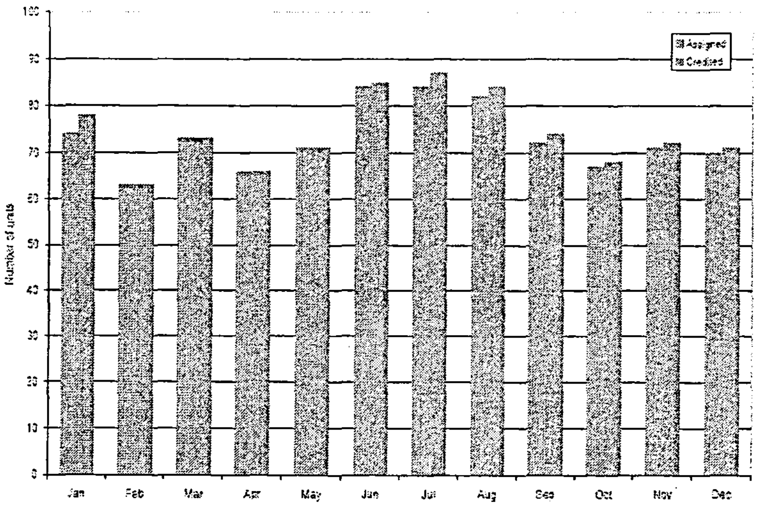


Figure 0-9 shows the average number of units per hour required to satisfy PJM's regulation requirement.

Figure 0-9 Average hourly count of distinct units required to satisfy regulation requirement: Calendar year 2005 < J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\UnitCount.xls (tab: UnitCountgraph)> >



Units which provide regulation are paid the higher of the RMCP or their offer plus their unit-specific opportunity cost. In a perfect market all units would be compensated at RMCP times output. Sometimes, however, circumstances require that units be paid their offer plus their unit-specific oppo rtunity cost. Examples include units that must be redispatched because of constraints, unanticipated performance problems, or changes in the real-time LMP and, therefore, opportunity cost from the value estimated at regulation market-clearing 30 minutes prior to the operating hour. For these reasons some units are paid the value of their offer plus their unit-specific lost opportunity costs when that sum is higher than the RMCP. This means that PJM's regulation cost per MWh is somewhat higher than the RMCP. Figure 0-10 and Figure 0-11 compare the regulation cost per MWh with the regulation clearing price to show the difference between the price of regulation and the total cost of regulation.

Figure 0-10 PJM Western Region Regulation Market daily average RMCP vs. cost per MW for regulation: Phases 4 and 5-a <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostVsPrice.xls (tab: PJMWRMgraph)>

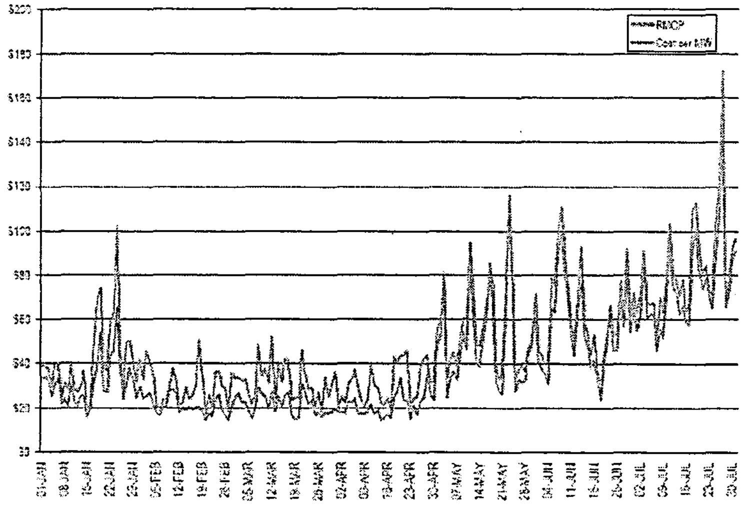
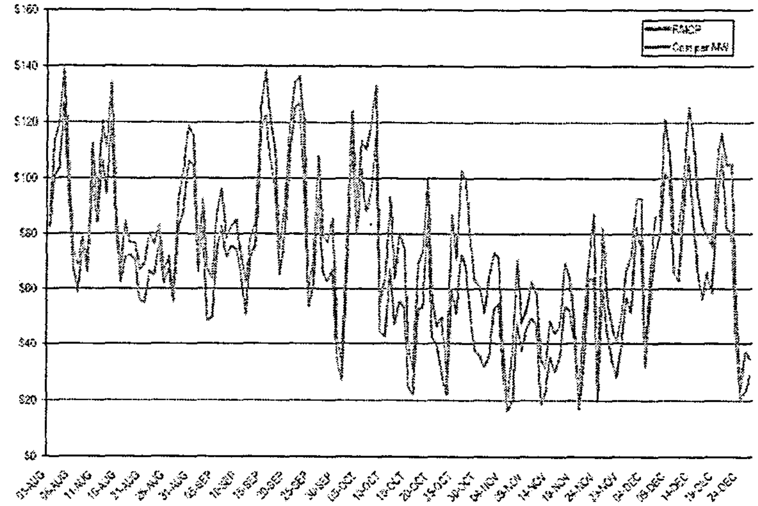


Figure 0-11 PJM Combined Regulation Market daily average RMCP vs. cost per MW for regulation: Phase 5-b <J:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\CostVsPrice.xls (tab: RTOgraph)>



Spinning Reserve Markets

Spinning Reserve Market Structure

The integration of Dominion on May 1, 2005, resulted in the creation of a Southern Region Spinning Reserve Market. Thus the PJM Spinning Reserve Markets include the PJM Mid-Atlantic Region Spinning Reserve Market, the Western Region Spinning Reserve Market, the ComEd Region Spinning Reserve Market and the Southern Region Spinning Reserve Market.

Demand

Tier 2 spinning requirements are determined by subtracting the amount of forecast Tier 1 spinning reserve available from each spinning control area spinning reserve requirement for the period. The total spinning reserve requirement is different for each of the four regional Spinning Reserve Markets. For the Mid-Atlantic Region, the requirement is 75 percent of the largest contingency in the region, provided that 25 percent of the largest contingency is available as nonsynchronized, 10-minute reserve. For the ComEd Region, the requirement is 50 percent of the ComEd Control Zone's load ratio share of the largest contingency in the North American Electric Reliability Council's (NER C) Mid-America Interconnected Network, Inc. (MAIN) Region. From October 1 to December 3, 2004, this was 269 MW. After December 3, 2004, the ComEd

Control Zone's spinning requirement was 216 MW. For the Western Region, the requirement is 1.5 percent of the daily peak-load forecast. For the Southern Spinning Reserve Zone, the requirement is the Dominion Control Zone's load ratio share of the largest system contingency within the Virginia and Carolinas Area (VACAR), minus the available 15-minute quick start capability within the Southern Spinning Reserve Zone.

Computed in accordance with the requirements above, the average MW spinning requirement was: 1091 MW, for the PJM Mid-Atlantic Region; 217 MW for the ComEd Spinning Zone; 437 MW for the Western Region; and 5 MW for the Southern Spinning Reserve Zone (May to December only).

Figure 0-12 PJM Mid-Atlantic Spinning Region average hourly required spinning vs. Tier 2 spinning purchased: Calendar year 2005 <<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Required vs Tier 2 Purchased.xls (tab: PJM)>>

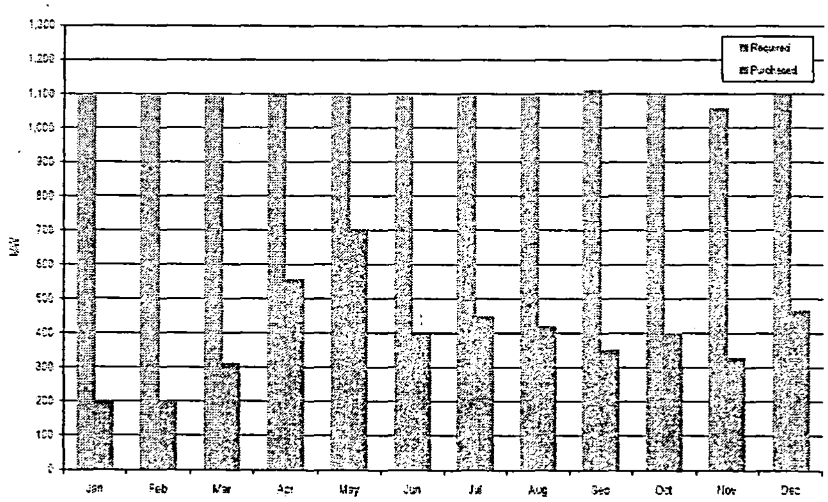


Figure 0-13 PJM ComEd Spinning Region average hourly required spinning vs. Tier 2 spinning purchased: Calendar year 2005 <H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Required vs Tier 2 Purchased.xls (tab: ComEd)>

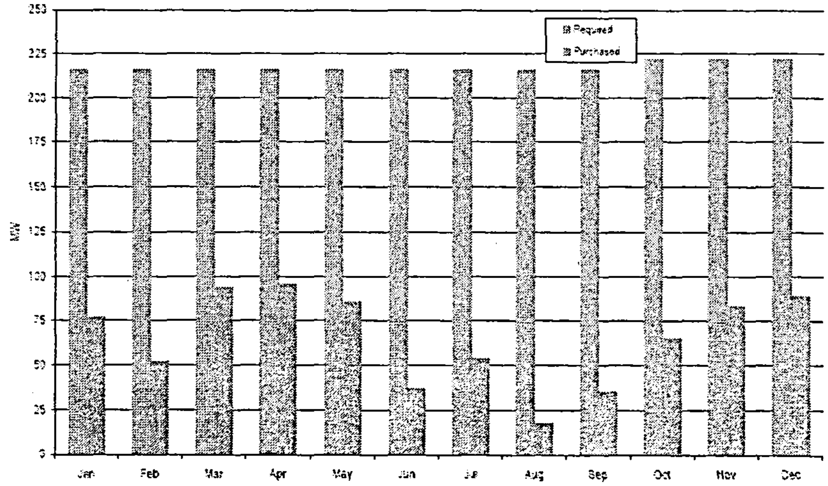
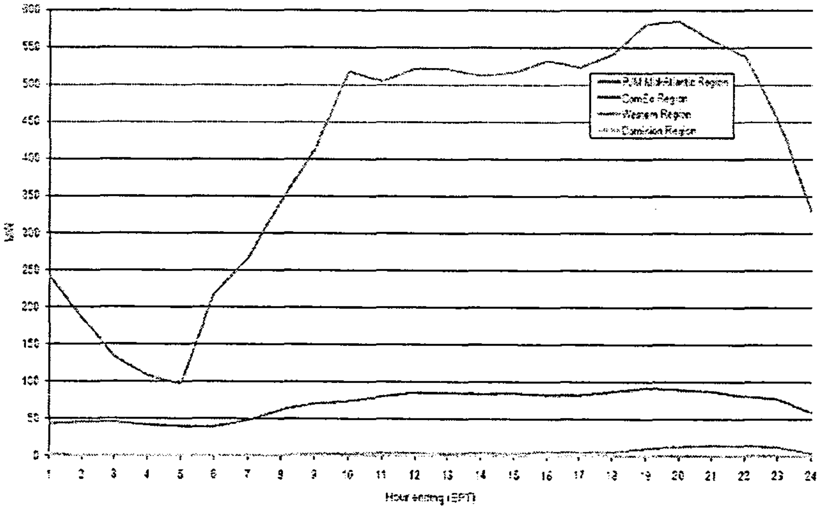


Figure 0-12 and Figure 0-13 show the average hourly spinning required and the average hourly Tier 2 spinning MW purchased during 2005 for the PJM Mid-Atlantic and ComEd Spinning Regions. Results for the Western Region Spinning Reserve Zone and the Southern Spinning Reserve Zone are not shown because Tier 2 spinning MW purchases were insignificant in those control areas during 2005. Spinning MW requirements are different for each of the four spinning regions in PJM. These differences are the result of specifications from local reliability councils, reserve-sharing arrangements with neighboring control areas and the types of generation available in the control area. The Southern Spinning Reserve Zone is a member of the VACAR subregion of NERC's Southeastern Electric Reliability Council (SERC). VACAR specifies that available 15-minute quick start reserve can be subtracted from the largest contingency to determine spinning reserve requirements. The amount of 15-minute quick start reserve available in VACAR is sufficient to make Tier 2 spinning requirements zero for most hours. Similarly, in the Western Region Spinning Reserve Zone most of the required spinning reserve is available as Tier 1 from large, frequently running baseload units, reducing its Tier 2 spinning requirement to zero in most hours. In both the PJM Mid-Atlantic and ComEd Spinning Regions the spinning reserve requirement is a function of the largest contingency. For the PJM Mid-Atlantic Region the hourly spinning requirement was usually 863 MW during off-peak hours and 1,150 MW during on-peak hours. Sometimes temporary grid conditions such as maintenance outages can cause double contingencies so there were times throughout the year when the on-peak spinning requirement was 1,380 MW. The average hourly Tier 2 spinning required for the PJM Mid-Atlantic Region was 1,091 MW. In the ComEd Region, the hourly requirement was 216 MW from January through September and 222 MW from October through December. Figure 0-12 and Figure 0-13 illustrate monthly average of the spinning reserve requirement and the amount of Tier 2 spinning actually purchased. The difference between the required spinning and Tier 2 spinning purchased is the amount of Tier 2 spinning available. Figure 0-14 illustrates the amount of Tier 2 spinning purchased by hour of the day. The hour variability reflects differing spinning reserve requirements for off-peak and on-peak hours as well as different amounts of Tier 1 spinning available.

Figure 0-14 Average hourly Tier 2 spinning MW purchased (By hour of day): Calendar year 2005 <<H:\Office of the President\Market Monitoring Unit\SOM_2005\14_Graphs_Tables\Spinning Tier 2 Credited Average MWs By Hour.xls (tab: graph)>>



Supply

Spinning reserve is an ancillary service defined as generation that is synchronized to the system and capable of producing output within 10 minutes. Spinning reserve can, at present, be provided by a number of sources, including steam units with available ramp, condensing hydroelectric units, condensing CTs and CTs running at minimum generation.

All of the units that participate in the Spinning Reserve Market are categorized as either Tier 1 or Tier 2 spinning. Tier 1 resources are those units that are online following economic dispatch and able to respond to a spinning event by ramping up from their present output. All units operating on the PJM system are considered potential Tier 1 resources, except for those explicitly assigned to Tier 2 spinning. Tier 2 resources include units that are backed down to provide spinning capability and condensing units synchronized to the system and available to increase output.

PJM introduced a market for spinning reserve on December 1, 2002. Before the Spinning Reserve Market, Tier 1 spinning reserve had not been compensated directly and Tier 2 spinning reserve had been compensated on a unit-specific, cost-based formula.

Under the Spinning Reserve Market rules, Tier 1 resources are paid when they respond to an identified spinning event as an incentive to respond when needed. Tier 1 spinning payments or credits are equal to the integrated increase in MW output above economic dispatch from each generator over the length of a spinning event, multiplied by the spinning energy premium less the hourly integrated LMP. The spinning energy premium is defined as the average of the five-minute LMPs calculated during the spinning event plus $50 per MWh.[21] All units called on to supply Tier 1 or Tier 2 spinning have their actual MW monitored. Tier 1 units are not penalized if their output fails to match their expected response as they are only compensated for their actual response. Tier 2 units assigned spinning by market operations are compensated whether or not they are actually called on to supply spinning so they are penalized if their MW output fails to meet their assignment.

There were significant changes to the geographic structure of PJM's Spinning Reserve Markets in 2005. In Phase 4, PJM had three Spinning Reserve Markets: the PJM Mid-Atlantic Spinning Reserve Zone, the Western Spinning Reserve Zone and the ComEd Spinning Reserve Zone. During Phase 4, the Western Spinning Reserve Zone was comprised of AP, AEP, DAY and DLCO Control Zones. In Phase 5, the Dominion Control Zone was integrated into PJM and became the Southern Spinning Reserve Zone. Dominion remained a separate Spinning Reserve Market because as a member of SERC it has distinct spinning reserve requirements and reserve-sharing agreements.

Under the Spinning Reserve Market rules, Tier 2 spinning resources are paid to be available as spinning reserve, regardless of whether the units are called upon to generate in response to a spinning event and are subject to penalties if they do not provide spinning reserve when called. The price for Tier 2 spinning resources is determined in a market for Tier 2 spinning resources. Several steps are necessary before the hourly Tier 2 Spinning Reserve Market is cleared. Ninety minutes prior to the start of the hour, PJM estimates the amount of Tier 1 reserve available from every unit; 60 minutes prior to the

21 See "PJM Manual 11: Scheduling Operations," Revision 23 (December 7, 2004), pp. 66-67.