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-M-E-M-O-R-A-N-D-U-M-

DATE: November 16, 2009
TO: Ann Cole, Commission Clerk - PSC, Office of Commission Clerk
FROM: JoAnn E. Chase, Senior Analyst - PSC, Division of Economic Regulation *qc*
RE: Docket No. 090368-EI- Review of the continuing need and costs associated with Tampa Electric Company's five Combustion Turbines and Big Bend Rail Facility.

Please place the attached memorandum from the Office of Strategic Analysis and Governmental Affairs in the above docket file. The memorandum provides SGA's review of the continuing need and costs associated with Tampa Electric Company's five combustion turbines.

Thank you.

JEC:kb

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Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: October 29, 2009

TO: Timothy J. Devlin, Director, Division of Economic Regulation

FROM: Shevie B. Brown, Regulatory Analyst IV, Office of Strategic Analysis and Governmental Affairs
Phillip O. Ellis, Engineering Specialist I, Office of Strategic Analysis and Governmental Affairs

RE: Review of the continuing need and cost associated with Tampa Electric Company's Five Combustion Turbines.

Pursuant to Florida Public Service Commission (Commission) Order No. PSC-09-0283-FOF-EI, issued April 30, 2009, the Commission granted Tampa Electric Company (Tampa Electric) a step increase of \$28.3 million for five 60 mega-watt (MW) aero-derivative Combustion Turbine units (CTs) and \$4.6 million for the rail facilities for unloading coal at Tampa Electric's Big Bend station effective on January 1, 2010 under the following conditions:

- The five CTs scheduled to go in service during 2009 are actually in service in 2009.
- The five CTs are needed for load generation.
- The rail facility scheduled to go in service in 2009 is completed and in commercial operation by December 31, 2009.

On October 6, 2009, Staff submitted its first data request regarding the review and continuing need for the five CTs. On October 12, 2009, Tampa Electric submitted a Petition for Review of the Continuing Need and Cost Associated with Tampa Electric Company's Five Combustion Turbines and Big Bend Rail Facility. On October 16, 2009, Tampa Electric submitted its responses to staff's first set of data request. The information provided was used by staff to analyze whether the five CTs were in-service during 2009 and needed for load generation. The status of the Big Bend Rail Facility will be addressed by ECR staff.

In-Service Date Requirement

To begin with, the review of continuing need shows that Tampa Electric has met the condition that the five CTs be in service in 2009. Tampa Electric provided documentation to verify the in-service of the units in the following:

- The petition of Review of the Continuing Need and Cost Associated with the Five CTs and Big Bend Rail Facility filed October 12, 2009.

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- Commercial Operation Memorandums included in Appendix B of the petition.
- Tampa Electric's responses to question five of staff's first set of data requests filed October 16, 2009.
- May, July, and August A-Schedules filed by Tampa Electric with the Commission's Division of Economic Regulation.

The following chart consists of the name of the CT unit and its Commercial Operation date.

Unit	In Service Date
Bayside CT5	April 27, 2009
Bayside CT6	April 20, 2009
Bayside CT3	July 13, 2009
Bayside CT4	July 13, 2009
Big Bend CT4	August 26, 2009

Need for Load Generation Requirement

The combustion turbines will provide reliability benefits of black start and quick start capabilities. The black start capability provides reliability benefits as it allows for faster restoration of electric service following system disturbances. The quick start capability of the five CT units allows Tampa Electric to meet its operating reserve requirements and support the reliability of the bulk of the electric system within 10 minutes of a request for service. This allows other units to operate at their full capacity and optimum heat rate, instead of reducing the capacity and providing for spinning reserves. Tampa Electric states it is important not to interrupt its demand-side load management customers frequently so that they remain on the program. In addition, Tampa Electric states that the addition of the five CTs will continue to reduce the probability of interruption of service to both firm and interruptible customers. Staff notes that while this is a long term benefit to firm customers, the lower possibility of service reduction to an interruptible service customer is not a reliability benefit. These customers are aware that by participating in this program, there is a possibility of having their service curtailed. Interruptible customers receive a discount as a benefit of participating in the demand-side load management program.

As part of discovery, staff asked for information of monthly reserve margins under Tampa Electric's 2007 through 2009 Ten Year Site Plans. Staff did multiple calculations based on Tampa Electric's response in which one or more CTs was removed from the planned installed capacity. These can be found in Appendix A. The reserve margin in all scenarios show that Tampa Electric will fall below the 20 percent reserve margin during the January 2010 period. It should also be noted that even in the out years, if none of the five CTs were built, Tampa Electric would continue to have a need for capacity during its peak season. Tampa Electric states that the company does not normally schedule planned outages during the summer and winter peak periods.

The responses to the data requests revealed that, in 2010, Tampa Electric will conduct scheduled maintenance which will affect 647 MW of capacity. A planning decision based on the excess reserve margin during the winter peak, allowed the opportunity to schedule the planned outages in the winter peak periods. The maintenance includes the installation of selective catalytic reduction (SCR) equipment at Big Bend Unit 2 during the November 2008 through April 2009 period and a final outage for installation of SCR equipment on Big Bend 1 during the November 2009 through April 2010 period. It should be noted that during this process, the earliest period in which the reserve margin will fall below 20 percent is the January 2010 period which is Tampa Electric's typical winter peak. Staff knows of no rules or regulations that dictate when environmental maintenance such as SCR should be performed.

Since the scheduled maintenance is not something that occurs regularly, it could be possible that other options may exist to maintain reliability. For example, entering into a short-term Purchase Power Agreement (PPA) to cover the temporary shortage. Staff noted several months in which the reserve margin was well over the 20 percent reserve margin criteria.

The initial 2009 need for the CTs was first identified in Tampa Electric's April 1, 2006, Ten Year Site Plan. On August 31, 2006, Tampa Electric issued a Request for Proposals (RFP) for peaking capacity. The contract for the CT generator equipment was awarded on December 21, 2007, with construction beginning around September 2008. By January 15, 2009, over 70 percent of the funds for all contracts involving the five CT projects were committed and could not be revoked. Doing so, would have represented sunk costs providing no benefits if construction had been stopped. Tampa Electric also states that the five new CTs are expected to provide fuel savings of approximately \$25 million over the life of the units. Moreover, Tampa Electric's monthly system net generation and fuel cost, Schedule A4, indicates that heat rate of each of the five CTs is lower than the existing Polk Unit 2 & 3 CTs. For example, the April 2009, Schedule A4 indicates that the Bayside Unit 5 CT heat rate (10,754 BTU/kWh) is 35 percent lower than the Polk 2 CT (16,642 BTU/kWh). The June 2009, Schedule A4 indicates that the Bayside 6 Unit CT heat rate (11,147 BTU/kWh) is 13 percent lower than the Polk 3 CT (12,871 BTU/kWh). These lower heat rates indicate that the units will run more efficiently and as a result are less costly to operate. As such, based on the information provided above, the benefits of the five CTs appear to provide of an immediate economic benefit and satisfy a long-term need for system reliability.

Conclusion

Based on the above, staff believes that Tampa Electric is in compliance with the requirements set forth in Order No. PSC-09-0283-FOF-EI related to the five CTs. As such, staff believes that there is a need for the five CTs based on immediate fuel cost savings and long term reliability.

If you have any additional questions, please don't hesitate to contact me.

Attachment

Cc: Robert L. Trapp, Acting Director, Office of Strategic Analysis and Governmental Affairs

Tom E. Ballinger, Utilities System/Engineering Spec Supv, Office of Strategic Analysis
and Governmental Affairs

Appendix A

Staff's Monthly Reserve Margin Calculations

Calculated using TECO's Response to ROG No. 3 and
Schedule 8 of TECO's 2007, 2008, and 2009 Ten-Year Site Plans

Summary of Reserve Margin After Maintenance (%) by Scenario

Date	2007 Ten Year Site Plan				2008 Ten Year Site Plan						2009 Ten Year Site Plan					
	All CTs	-1	-2	-3	All CTs	-1	-2	-3	-4	-5	All CTs	-1	-2	-3	-4	-5
2009 4	50.1%	50.1%	50.1%	50.1%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
2009 5	31.1%	31.1%	31.1%	31.1%	33.8%	33.8%	33.8%	33.8%	32.3%	30.9%	38.1%	38.1%	38.1%	38.1%	36.6%	35.1%
2009 6	24.9%	24.9%	24.9%	24.9%	27.2%	27.2%	27.2%	27.2%	25.8%	24.4%	30.0%	30.0%	30.0%	30.0%	28.6%	27.2%
2009 7	21.1%	21.1%	21.1%	21.1%	23.5%	23.5%	23.5%	23.5%	22.1%	20.8%	25.6%	25.6%	25.6%	25.6%	24.2%	22.8%
2009 8	20.9%	20.9%	20.9%	20.9%	23.2%	23.2%	23.2%	23.2%	21.9%	20.5%	26.1%	26.1%	26.1%	26.1%	24.7%	23.3%
2009 9	25.7%	25.7%	25.7%	25.7%	28.0%	28.0%	28.0%	28.0%	26.6%	25.2%	30.9%	30.9%	30.9%	30.9%	29.4%	28.0%
2009 10	27.1%	27.1%	27.1%	27.1%	34.4%	32.9%	31.4%	29.9%	28.4%	26.9%	26.3%	24.8%	23.2%	21.7%	20.2%	18.6%
2009 11	43.3%	43.3%	43.3%	43.3%	47.0%	45.3%	43.6%	41.9%	40.2%	38.5%	53.7%	51.9%	50.1%	48.3%	46.5%	44.7%
2009 12	52.6%	52.6%	52.6%	52.6%	51.7%	50.0%	48.3%	46.6%	44.9%	43.2%	58.6%	56.8%	54.9%	53.1%	51.3%	49.4%
2010 1	20.0%	17.0%	17.0%	17.0%	20.6%	19.3%	17.9%	16.6%	15.2%	13.8%	19.6%	18.2%	16.7%	15.3%	13.8%	12.4%
2010 2	45.8%	42.1%	42.1%	42.1%	47.0%	45.3%	43.7%	42.0%	40.3%	38.7%	39.4%	37.7%	35.9%	34.2%	32.5%	30.8%
2010 3	47.7%	43.7%	43.7%	43.7%	32.9%	31.1%	29.4%	27.6%	25.9%	24.1%	47.8%	45.9%	43.9%	42.0%	40.1%	38.2%
2010 4	40.6%	37.0%	37.0%	37.0%	45.8%	44.1%	42.5%	40.9%	39.3%	37.6%	53.6%	51.9%	50.2%	48.6%	46.9%	45.3%
2010 5	30.0%	26.9%	26.9%	26.9%	34.1%	32.7%	31.3%	29.9%	28.4%	27.0%	37.4%	35.9%	34.5%	33.0%	31.5%	30.0%
2010 6	23.9%	20.9%	20.9%	20.9%	27.5%	26.2%	24.8%	23.5%	22.1%	20.8%	29.3%	27.9%	26.5%	25.1%	23.7%	22.3%
2010 7	20.1%	17.2%	17.2%	17.2%	23.9%	22.6%	21.2%	19.9%	18.6%	17.3%	24.9%	23.5%	22.2%	20.8%	19.5%	18.1%
2010 8	19.9%	17.0%	17.0%	17.0%	23.6%	22.3%	21.0%	19.7%	18.3%	17.0%	25.3%	23.9%	22.6%	21.2%	19.9%	18.5%
2010 9	24.7%	21.6%	21.6%	21.6%	28.4%	27.0%	25.7%	24.3%	22.9%	21.6%	20.8%	19.3%	17.9%	16.5%	15.1%	13.7%
2010 10	26.2%	22.9%	22.9%	22.9%	30.4%	28.9%	27.5%	26.0%	24.5%	23.1%	41.1%	39.6%	38.0%	36.5%	35.0%	33.5%
2010 11	36.6%	33.0%	33.0%	33.0%	42.6%	41.0%	39.3%	37.7%	36.0%	34.4%	47.2%	45.4%	43.7%	41.9%	40.1%	38.4%
2010 12	51.3%	47.6%	47.6%	47.6%	57.4%	55.8%	54.1%	52.4%	50.8%	49.1%	67.5%	65.7%	63.9%	62.1%	60.3%	58.5%

2007 TYSP - ALL CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 4	5,196	3,462	1,734	50.1%	0	1,734	50.1%	692	1,042
2009 5	5,196	3,962	1,234	31.1%	0	1,234	31.1%	792	442
2009 6	5,196	4,160	1,036	24.9%	0	1,036	24.9%	832	204
2009 7	5,196	4,291	905	21.1%	0	905	21.1%	858	47
2009 8	5,196	4,299	897	20.9%	0	897	20.9%	860	37
2009 9	5,196	4,135	1,061	25.7%	0	1,061	25.7%	827	234
2009 10	5,196	3,862	1,334	34.5%	287	1,047	27.1%	772	275
2009 11	5,196	3,449	1,747	50.7%	255	1,492	43.3%	690	802
2009 12	5,645	3,700	1,945	52.6%	0	1,945	52.6%	740	1,205
2010 1	5,956	4,628	1,328	28.7%	401	927	20.0%	926	1
2010 2	5,956	3,810	2,146	56.3%	401	1,745	45.8%	762	983
2010 3	5,956	3,589	2,367	66.0%	656	1,711	47.7%	718	993
2010 4	5,302	3,567	1,735	48.6%	287	1,448	40.6%	713	735
2010 5	5,302	4,077	1,225	30.0%	0	1,225	30.0%	815	410
2010 6	5,302	4,280	1,022	23.9%	0	1,022	23.9%	856	166
2010 7	5,302	4,413	889	20.1%	0	889	20.1%	883	6
2010 8	5,302	4,421	881	19.9%	0	881	19.9%	884	(3)
2010 9	5,302	4,253	1,049	24.7%	0	1,049	24.7%	851	198
2010 10	5,302	3,974	1,328	33.4%	287	1,041	26.2%	795	246
2010 11	5,302	3,554	1,748	49.2%	447	1,301	36.6%	711	590
2010 12	5,763	3,809	1,954	51.3%	0	1,954	51.3%	762	1,192

2007 TYSP - Excluding 1 Jan. CT									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 12	5,645	3,700	1,945	52.6%	0	1,945	52.6%	740	1,205
2010 1	5,815	4,628	1,187	25.6%	401	786	17.0%	926	(140)
2010 2	5,815	3,810	2,005	52.6%	401	1,604	42.1%	762	842
2010 3	5,815	3,589	2,226	62.0%	656	1,570	43.7%	718	852
2010 4	5,173	3,567	1,606	45.0%	287	1,319	37.0%	713	606
2010 5	5,173	4,077	1,096	26.9%	0	1,096	26.9%	815	281
2010 6	5,173	4,280	893	20.9%	0	893	20.9%	856	37
2010 7	5,173	4,413	760	17.2%	0	760	17.2%	883	(123)
2010 8	5,173	4,421	752	17.0%	0	752	17.0%	884	(132)
2010 9	5,173	4,253	920	21.6%	0	920	21.6%	851	69
2010 10	5,173	3,974	1,199	30.2%	287	912	22.9%	795	117
2010 11	5,173	3,554	1,619	45.6%	447	1,172	33.0%	711	461
2010 12	5,622	3,809	1,813	47.6%	0	1,813	47.6%	762	1,051

2007 TYSP - Excluding 2 Jan. CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 12	5,645	3,700	1,945	52.6%	0	1,945	52.6%	740	1,205
2010 1	5,815	4,628	1,187	25.6%	401	786	17.0%	926	(140)
2010 2	5,815	3,810	2,005	52.6%	401	1,604	42.1%	762	842
2010 3	5,815	3,589	2,226	62.0%	656	1,570	43.7%	718	852
2010 4	5,173	3,567	1,606	45.0%	287	1,319	37.0%	713	606
2010 5	5,173	4,077	1,096	26.9%	0	1,096	26.9%	815	281
2010 6	5,173	4,280	893	20.9%	0	893	20.9%	856	37
2010 7	5,173	4,413	760	17.2%	0	760	17.2%	883	(123)
2010 8	5,173	4,421	752	17.0%	0	752	17.0%	884	(132)
2010 9	5,173	4,253	920	21.6%	0	920	21.6%	851	69
2010 10	5,173	3,974	1,199	30.2%	287	912	22.9%	795	117
2010 11	5,173	3,554	1,619	45.6%	447	1,172	33.0%	711	461
2010 12	5,622	3,809	1,813	47.6%	0	1,813	47.6%	762	1,051

2007 TYSP - Excluding 3 Jan. CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 12	5,645	3,700	1,945	52.6%	0	1,945	52.6%	740	1,205
2010 1	5,815	4,628	1,187	25.6%	401	786	17.0%	926	(140)
2010 2	5,815	3,810	2,005	52.6%	401	1,604	42.1%	762	842
2010 3	5,815	3,589	2,226	62.0%	656	1,570	43.7%	718	852
2010 4	5,173	3,567	1,606	45.0%	287	1,319	37.0%	713	606
2010 5	5,173	4,077	1,096	26.9%	0	1,096	26.9%	815	281
2010 6	5,173	4,280	893	20.9%	0	893	20.9%	856	37
2010 7	5,173	4,413	760	17.2%	0	760	17.2%	883	(123)
2010 8	5,173	4,421	752	17.0%	0	752	17.0%	884	(132)
2010 9	5,173	4,253	920	21.6%	0	920	21.6%	851	69
2010 10	5,173	3,974	1,199	30.2%	287	912	22.9%	795	117
2010 11	5,173	3,554	1,619	45.6%	447	1,172	33.0%	711	461
2010 12	5,622	3,809	1,813	47.6%	0	1,813	47.6%	762	1,051

2008 TYSP - ALL CTs

Date		Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
		(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009	4	5,214	3,400	1,814	53.4%	17	1,797	52.9%	680	1,117
2009	5	5,230	3,909	1,321	33.8%	0	1,321	33.8%	782	539
2009	6	5,230	4,111	1,119	27.2%	0	1,119	27.2%	822	297
2009	7	5,230	4,235	995	23.5%	0	995	23.5%	847	148
2009	8	5,230	4,245	985	23.2%	0	985	23.2%	849	136
2009	9	5,230	4,085	1,145	28.0%	0	1,145	28.0%	817	328
2009	10	5,401	3,806	1,595	41.9%	287	1,308	34.4%	761	547
2009	11	5,401	3,388	2,013	59.4%	422	1,591	47.0%	678	913
2009	12	5,882	3,626	2,256	62.2%	380	1,876	51.7%	725	1,151
2010	1	5,887	4,548	1,339	29.4%	400	939	20.6%	910	29
2010	2	5,887	3,733	2,154	57.7%	400	1,754	47.0%	747	1,007
2010	3	5,887	3,520	2,367	67.2%	1,209	1,158	32.9%	704	454
2010	4	5,382	3,495	1,887	54.0%	287	1,600	45.8%	699	901
2010	5	5,382	4,013	1,369	34.1%	0	1,369	34.1%	803	566
2010	6	5,382	4,220	1,162	27.5%	0	1,162	27.5%	844	318
2010	7	5,382	4,345	1,037	23.9%	0	1,037	23.9%	869	168
2010	8	5,382	4,355	1,027	23.6%	0	1,027	23.6%	871	156
2010	9	5,382	4,192	1,190	28.4%	0	1,190	28.4%	838	352
2010	10	5,382	3,908	1,474	37.7%	287	1,187	30.4%	782	405
2010	11	5,382	3,482	1,900	54.6%	417	1,483	42.6%	696	787
2010	12	5,863	3,724	2,139	57.4%	0	2,139	57.4%	745	1,394

2008 TYSP - Excluding 1 Oct. CT									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 8	5,230	4,245	985	23.2%	0	985	23.2%	849	136
2009 9	5,230	4,085	1,145	28.0%	0	1,145	28.0%	817	328
2009 10	5,344	3,806	1,538	40.4%	287	1,251	32.9%	761	490
2009 11	5,344	3,388	1,956	57.7%	422	1,534	45.3%	678	856
2009 12	5,820	3,626	2,194	60.5%	380	1,814	50.0%	725	1,089
2010 1	5,825	4,548	1,277	28.1%	400	877	19.3%	910	(33)
2010 2	5,825	3,733	2,092	56.0%	400	1,692	45.3%	747	945
2010 3	5,825	3,520	2,305	65.5%	1,209	1,096	31.1%	704	392
2010 4	5,325	3,495	1,830	52.4%	287	1,543	44.1%	699	844
2010 5	5,325	4,013	1,312	32.7%	0	1,312	32.7%	803	509
2010 6	5,325	4,220	1,105	26.2%	0	1,105	26.2%	844	261
2010 7	5,325	4,345	980	22.6%	0	980	22.6%	869	111
2010 8	5,325	4,355	970	22.3%	0	970	22.3%	871	99
2010 9	5,325	4,192	1,133	27.0%	0	1,133	27.0%	838	295
exclud 10	5,325	3,908	1,417	36.3%	287	1,130	28.9%	782	348
2010 11	5,325	3,482	1,843	52.9%	417	1,426	41.0%	696	730
2010 12	5,801	3,724	2,077	55.8%	0	2,077	55.8%	745	1,332

2008 TYSP - Excluding 2 Oct CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 8	5,230	4,245	985	23.2%	0	985	23.2%	849	136
2009 9	5,230	4,085	1,145	28.0%	0	1,145	28.0%	817	328
2009 10	5,287	3,806	1,481	38.9%	287	1,194	31.4%	761	433
2009 11	5,287	3,388	1,899	56.1%	422	1,477	43.6%	678	799
2009 12	5,758	3,626	2,132	58.8%	380	1,752	48.3%	725	1,027
2010 1	5,763	4,548	1,215	26.7%	400	815	17.9%	910	(95)
2010 2	5,763	3,733	2,030	54.4%	400	1,630	43.7%	747	883
2010 3	5,763	3,520	2,243	63.7%	1,209	1,034	29.4%	704	330
2010 4	5,268	3,495	1,773	50.7%	287	1,486	42.5%	699	787
2010 5	5,268	4,013	1,255	31.3%	0	1,255	31.3%	803	452
exclud 6	5,268	4,220	1,048	24.8%	0	1,048	24.8%	844	204
2010 7	5,268	4,345	923	21.2%	0	923	21.2%	869	54
2010 8	5,268	4,355	913	21.0%	0	913	21.0%	871	42
2010 9	5,268	4,192	1,076	25.7%	0	1,076	25.7%	838	238
2010 10	5,268	3,908	1,360	34.8%	287	1,073	27.5%	782	291
2010 11	5,268	3,482	1,786	51.3%	417	1,369	39.3%	696	673
2010 12	5,739	3,724	2,015	54.1%	0	2,015	54.1%	745	1,270

2008 TYSP - Excluding 3 Oct CTs										
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference	
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)	
2009 8	5,230	4,245	985	23.2%	0	985	23.2%	849	136	
2009 9	5,230	4,085	1,145	28.0%	0	1,145	28.0%	817	328	
2009 10	5,230	3,806	1,424	37.4%	287	1,137	29.9%	761	376	
2009 11	5,230	3,388	1,842	54.4%	422	1,420	41.9%	678	742	
2009 12	5,696	3,626	2,070	57.1%	380	1,690	46.6%	725	965	
2010 1	5,701	4,548	1,153	25.4%	400	753	16.6%	910	(157)	
2010 2	5,701	3,733	1,968	52.7%	400	1,568	42.0%	747	821	
2010 3	5,701	3,520	2,181	62.0%	1,209	972	27.6%	704	268	
2010 4	5,211	3,495	1,716	49.1%	287	1,429	40.9%	699	730	
2010 5	5,211	4,013	1,198	29.9%	0	1,198	29.9%	803	395	
2010 6	5,211	4,220	991	23.5%	0	991	23.5%	844	147	
2010 7	5,211	4,345	866	19.9%	0	866	19.9%	869	(3)	
2010 8	5,211	4,355	856	19.7%	0	856	19.7%	871	(15)	
2010 9	5,211	4,192	1,019	24.3%	0	1,019	24.3%	838	181	
2010 10	5,211	3,908	1,303	33.3%	287	1,016	26.0%	782	234	
2010 11	5,211	3,482	1,729	49.7%	417	1,312	37.7%	696	616	
2010 12	5,677	3,724	1,953	52.4%	0	1,953	52.4%	745	1,208	

2008 TYSP - Excluding 3 Oct CTs and 1 May CT										
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference	
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)	
2009 4	5,214	3,400	1,814	53.4%	17	1,797	52.9%	680	1,117	
2009 5	5,173	3,909	1,264	32.3%	0	1,264	32.3%	782	482	
2009 6	5,173	4,111	1,062	25.8%	0	1,062	25.8%	822	240	
2009 7	5,173	4,235	938	22.1%	0	938	22.1%	847	91	
2009 8	5,173	4,245	928	21.9%	0	928	21.9%	849	79	
2009 9	5,173	4,085	1,088	26.6%	0	1,088	26.6%	817	271	
2009 10	5,173	3,806	1,367	35.9%	287	1,080	28.4%	761	319	
2009 11	5,173	3,388	1,785	52.7%	422	1,363	40.2%	678	685	
2009 12	5,634	3,626	2,008	55.4%	380	1,628	44.9%	725	903	
2010 1	5,639	4,548	1,091	24.0%	400	691	15.2%	910	(219)	
2010 2	5,639	3,733	1,906	51.1%	400	1,506	40.3%	747	759	
2010 3	5,639	3,520	2,119	60.2%	1,209	910	25.9%	704	206	
2010 4	5,154	3,495	1,659	47.5%	287	1,372	39.3%	699	673	
2010 5	5,154	4,013	1,141	28.4%	0	1,141	28.4%	803	338	
2010 6	5,154	4,220	934	22.1%	0	934	22.1%	844	90	
2010 7	5,154	4,345	809	18.6%	0	809	18.6%	869	(60)	
2010 8	5,154	4,355	799	18.3%	0	799	18.3%	871	(72)	
2010 9	5,154	4,192	962	22.9%	0	962	22.9%	838	124	
2010 10	5,154	3,908	1,246	31.9%	287	959	24.5%	782	177	
2010 11	5,154	3,482	1,672	48.0%	417	1,255	36.0%	696	559	
2010 12	5,615	3,724	1,891	50.8%	0	1,891	50.8%	745	1,146	

2008 TYSP - Excluding 3 Octs and 2 May CTs

Date		Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
		(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009	4	5,214	3,400	1,814	53.4%	17	1,797	52.9%	680	1,117
2009	5	5,116	3,909	1,207	30.9%	0	1,207	30.9%	782	425
2009	6	5,116	4,111	1,005	24.4%	0	1,005	24.4%	822	183
2009	7	5,116	4,235	881	20.8%	0	881	20.8%	847	34
2009	8	5,116	4,245	871	20.5%	0	871	20.5%	849	22
2009	9	5,116	4,085	1,031	25.2%	0	1,031	25.2%	817	214
2009	10	5,116	3,806	1,310	34.4%	287	1,023	26.9%	761	262
2009	11	5,116	3,388	1,728	51.0%	422	1,306	38.5%	678	628
2009	12	5,572	3,626	1,946	53.7%	380	1,566	43.2%	725	841
2010	1	5,577	4,548	1,029	22.6%	400	629	13.8%	910	(281)
2010	2	5,577	3,733	1,844	49.4%	400	1,444	38.7%	747	697
2010	3	5,577	3,520	2,057	58.4%	1,209	848	24.1%	704	144
2010	4	5,097	3,495	1,602	45.8%	287	1,315	37.6%	699	616
2010	5	5,097	4,013	1,084	27.0%	0	1,084	27.0%	803	281
2010	6	5,097	4,220	877	20.8%	0	877	20.8%	844	33
2010	7	5,097	4,345	752	17.3%	0	752	17.3%	869	(117)
2010	8	5,097	4,355	742	17.0%	0	742	17.0%	871	(129)
2010	9	5,097	4,192	905	21.6%	0	905	21.6%	838	67
2010	10	5,097	3,908	1,189	30.4%	287	902	23.1%	782	120
2010	11	5,097	3,482	1,615	46.4%	417	1,198	34.4%	696	502
2010	12	5,553	3,724	1,829	49.1%	0	1,829	49.1%	745	1,084

2009 TYSP - ALL CTs

Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 4	5,142	3,331	1,811	54.4%	701	1,110	33.3%	666	444
2009 5	5,142	3,724	1,418	38.1%	0	1,418	38.1%	745	673
2009 6	5,142	3,955	1,187	30.0%	0	1,187	30.0%	791	396
2009 7	5,142	4,095	1,047	25.6%	0	1,047	25.6%	819	228
2009 8	5,142	4,078	1,064	26.1%	0	1,064	26.1%	816	248
2009 9	5,310	3,892	1,418	36.4%	217	1,201	30.9%	778	423
2009 10	5,210	3,622	1,588	43.8%	634	954	26.3%	724	230
2009 11	5,210	3,118	2,092	67.1%	417	1,675	53.7%	624	1,051
2009 12	5,681	3,337	2,344	70.2%	389	1,955	58.6%	667	1,288
2010 1	5,692	4,217	1,475	35.0%	647	828	19.6%	843	(15)
2010 2	5,692	3,534	2,158	61.1%	766	1,392	39.4%	707	685
2010 3	5,692	3,195	2,497	78.2%	971	1,526	47.8%	639	887
2010 4	5,181	3,374	1,807	53.6%	0	1,807	53.6%	675	1,132
2010 5	5,181	3,770	1,411	37.4%	0	1,411	37.4%	754	657
2010 6	5,181	4,006	1,175	29.3%	0	1,175	29.3%	801	374
2010 7	5,181	4,149	1,032	24.9%	0	1,032	24.9%	830	202
2010 8	5,181	4,135	1,046	25.3%	0	1,046	25.3%	827	219
2010 9	5,181	3,945	1,236	31.3%	417	819	20.8%	789	30
2010 10	5,181	3,672	1,509	41.1%	0	1,509	41.1%	734	775
2010 11	5,181	3,165	2,016	63.7%	522	1,494	47.2%	633	861
2010 12	5,669	3,384	2,285	67.5%	0	2,285	67.5%	677	1,608

2009 TYSP - Excluding 1 Sept. CT									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 8	5,142	4,078	1,064	26.1%	0	1,064	26.1%	816	248
2009 9	5,310	3,892	1,418	36.4%	217	1,201	30.9%	778	423
2009 10	5,154	3,622	1,532	42.3%	634	898	24.8%	724	174
2009 11	5,154	3,118	2,036	65.3%	417	1,619	51.9%	624	995
2009 12	5,620	3,337	2,283	68.4%	389	1,894	56.8%	667	1,227
2010 1	5,631	4,217	1,414	33.5%	647	767	18.2%	843	(76)
2010 2	5,631	3,534	2,097	59.3%	766	1,331	37.7%	707	624
2010 3	5,631	3,195	2,436	76.2%	971	1,465	45.9%	639	826
2010 4	5,125	3,374	1,751	51.9%	0	1,751	51.9%	675	1,076
2010 5	5,125	3,770	1,355	35.9%	0	1,355	35.9%	754	601
2010 6	5,125	4,006	1,119	27.9%	0	1,119	27.9%	801	318
2010 7	5,125	4,149	976	23.5%	0	976	23.5%	830	146
2010 8	5,125	4,135	990	23.9%	0	990	23.9%	827	163
2010 9	5,125	3,945	1,180	29.9%	417	763	19.3%	789	(26)
2010 10	5,125	3,672	1,453	39.6%	0	1,453	39.6%	734	719
2010 11	5,125	3,165	1,960	61.9%	522	1,438	45.4%	633	805
2010 12	5,608	3,384	2,224	65.7%	0	2,224	65.7%	677	1,547

2009 TYSP - Excluding 2 Sept. CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 8	5,142	4,078	1,064	26.1%	0	1,064	26.1%	816	248
2009 9	5,310	3,892	1,418	36.4%	217	1,201	30.9%	778	423
2009 10	5,098	3,622	1,476	40.8%	634	842	23.2%	724	118
2009 11	5,098	3,118	1,980	63.5%	417	1,563	50.1%	624	939
2009 12	5,559	3,337	2,222	66.6%	389	1,833	54.9%	667	1,166
2010 1	5,570	4,217	1,353	32.1%	647	706	16.7%	843	(137)
2010 2	5,570	3,534	2,036	57.6%	766	1,270	35.9%	707	563
2010 3	5,570	3,195	2,375	74.3%	971	1,404	43.9%	639	765
2010 4	5,069	3,374	1,695	50.2%	0	1,695	50.2%	675	1,020
2010 5	5,069	3,770	1,299	34.5%	0	1,299	34.5%	754	545
2010 6	5,069	4,006	1,063	26.5%	0	1,063	26.5%	801	262
2010 7	5,069	4,149	920	22.2%	0	920	22.2%	830	90
2010 8	5,069	4,135	934	22.6%	0	934	22.6%	827	107
2010 9	5,069	3,945	1,124	28.5%	417	707	17.9%	789	(82)
2010 10	5,069	3,672	1,397	38.0%	0	1,397	38.0%	734	663
2010 11	5,069	3,165	1,904	60.2%	522	1,382	43.7%	633	749
2010 12	5,547	3,384	2,163	63.9%	0	2,163	63.9%	677	1,486

2009 TYSP - Excluding 3 Sept. CTs									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 8	5,142	4,078	1,064	26.1%	0	1,064	26.1%	816	248
2009 9	5,310	3,892	1,418	36.4%	217	1,201	30.9%	778	423
2009 10	5,042	3,622	1,420	39.2%	634	786	21.7%	724	62
2009 11	5,042	3,118	1,924	61.7%	417	1,507	48.3%	624	883
2009 12	5,498	3,337	2,161	64.8%	389	1,772	53.1%	667	1,105
2010 1	5,509	4,217	1,292	30.6%	647	645	15.3%	843	(198)
2010 2	5,509	3,534	1,975	55.9%	766	1,209	34.2%	707	502
2010 3	5,509	3,195	2,314	72.4%	971	1,343	42.0%	639	704
2010 4	5,013	3,374	1,639	48.6%	0	1,639	48.6%	675	964
2010 5	5,013	3,770	1,243	33.0%	0	1,243	33.0%	754	489
2010 6	5,013	4,006	1,007	25.1%	0	1,007	25.1%	801	206
2010 7	5,013	4,149	864	20.8%	0	864	20.8%	830	34
2010 8	5,013	4,135	878	21.2%	0	878	21.2%	827	51
2010 9	5,013	3,945	1,068	27.1%	417	651	16.5%	789	(138)
2010 10	5,013	3,672	1,341	36.5%	0	1,341	36.5%	734	607
2010 11	5,013	3,165	1,848	58.4%	522	1,326	41.9%	633	693
2010 12	5,486	3,384	2,102	62.1%	0	2,102	62.1%	677	1,425

2009 TYSP - Excluding 3 Sept CTs and 1 April CT									
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)
2009 4	5,142	3,331	1,811	54.4%	701	1,110	33.3%	666	444
2009 5	5,086	3,724	1,362	36.6%	0	1,362	36.6%	745	617
2009 6	5,086	3,955	1,131	28.6%	0	1,131	28.6%	791	340
2009 7	5,086	4,095	991	24.2%	0	991	24.2%	819	172
2009 8	5,086	4,078	1,008	24.7%	0	1,008	24.7%	816	192
2009 9	5,254	3,892	1,362	35.0%	217	1,145	29.4%	778	367
2009 10	4,986	3,622	1,364	37.7%	634	730	20.2%	724	6
2009 11	4,986	3,118	1,868	59.9%	417	1,451	46.5%	624	827
2009 12	5,437	3,337	2,100	62.9%	389	1,711	51.3%	667	1,044
2010 1	5,448	4,217	1,231	29.2%	647	584	13.8%	843	(259)
2010 2	5,448	3,534	1,914	54.2%	766	1,148	32.5%	707	441
2010 3	5,448	3,195	2,253	70.5%	971	1,282	40.1%	639	643
2010 4	4,957	3,374	1,583	46.9%	0	1,583	46.9%	675	908
2010 5	4,957	3,770	1,187	31.5%	0	1,187	31.5%	754	433
2010 6	4,957	4,006	951	23.7%	0	951	23.7%	801	150
2010 7	4,957	4,149	808	19.5%	0	808	19.5%	830	(22)
2010 8	4,957	4,135	822	19.9%	0	822	19.9%	827	(5)
2010 9	4,957	3,945	1,012	25.7%	417	595	15.1%	789	(194)
2010 10	4,957	3,672	1,285	35.0%	0	1,285	35.0%	734	551
2010 11	4,957	3,165	1,792	56.6%	522	1,270	40.1%	633	637
2010 12	5,425	3,384	2,041	60.3%	0	2,041	60.3%	677	1,364

2009 TYSP - Excluding 3 Sept CTs and 2 April CTs										
Date	Total Capacity Available	Firm Peak Demand	Reserve Margin Before Maintenance		Scheduled Maintenance	Reserve Margin After Maintenance		20% Reserve Margin	Difference	
	(MW)	(MW)	(MW)	(%)	(MW)	(MW)	(%)	(MW)	(MW)	
2009 4	5,142	3,331	1,811	54.4%	701	1,110	33.3%	666	444	
2009 5	5,030	3,724	1,306	35.1%	0	1,306	35.1%	745	561	
2009 6	5,030	3,955	1,075	27.2%	0	1,075	27.2%	791	284	
2009 7	5,030	4,095	935	22.8%	0	935	22.8%	819	116	
2009 8	5,030	4,078	952	23.3%	0	952	23.3%	816	136	
2009 9	5,198	3,892	1,306	33.6%	217	1,089	28.0%	778	311	
2009 10	4,930	3,622	1,308	36.1%	634	674	18.6%	724	(50)	
2009 11	4,930	3,118	1,812	58.1%	417	1,395	44.7%	624	771	
2009 12	5,376	3,337	2,039	61.1%	389	1,650	49.4%	667	983	
2010 1	5,387	4,217	1,170	27.7%	647	523	12.4%	843	(320)	
2010 2	5,387	3,534	1,853	52.4%	766	1,087	30.8%	707	380	
2010 3	5,387	3,195	2,192	68.6%	971	1,221	38.2%	639	582	
2010 4	4,901	3,374	1,527	45.3%	0	1,527	45.3%	675	852	
2010 5	4,901	3,770	1,131	30.0%	0	1,131	30.0%	754	377	
2010 6	4,901	4,006	895	22.3%	0	895	22.3%	801	94	
2010 7	4,901	4,149	752	18.1%	0	752	18.1%	830	(78)	
2010 8	4,901	4,135	766	18.5%	0	766	18.5%	827	(61)	
2010 9	4,901	3,945	956	24.2%	417	539	13.7%	789	(250)	
2010 10	4,901	3,672	1,229	33.5%	0	1,229	33.5%	734	495	
2010 11	4,901	3,165	1,736	54.8%	522	1,214	38.4%	633	581	
2010 12	5,364	3,384	1,980	58.5%	0	1,980	58.5%	677	1,303	