ATSI BASELINE RTEP REPORT

For the 2011-2013 Period

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INTRODUCTION

The PJM Regional Transmission Expansion Planning (RTEP) Process requires that cost responsibility for facility enhancements be established. There are three types of facility enhancements for which cost assignment must be made:

- Attachment Facilities required solely to interconnect a new generation project,
- Network Facilities that are required to enhance the network solely or in part because of a proposed project, and
- Network Facilities required to support load growth.

In order to establish a starting point for development of Regional Transmission Expansion Plans and determine cost responsibility for expansion facilities, a 'baseline' analysis of system adequacy and security is necessary. The purpose of this analysis is threefold:

- to identify areas where the system, as planned, is not in compliance with the applicable reliability standards. For the purpose of this report, "applicable reliability standards" will be defined as NERC, RFC, local Transmission Owner, and PJM Reliability Planning Criteria). The baseline system will be analyzed using the same criteria and analysis methods that will be used for assessing the impact of proposed new generation projects. This will ensure that the need for system enhancement of the baseline system and enhancements due to generation projects are determined in a consistent and equitable manner.
- to propose facility expansion plans to bring those areas into compliance, including cost estimates and estimated in-service dates.
- to establish what will be included as baseline costs in the allocation of the costs of expansion for those generation projects proposing to connect to the PJM system.

The system as planned is tested for its compliance with applicable reliability standards to accommodate the forecast demand, committed resources, and commitments for firm transmission services for a specified time frame. Areas not in compliance with the standards are identified and enhancement plans are developed to achieve compliance.

This 'baseline' analysis and the resulting expansion plans served as the base system for the generator deliverability studies that were conducted for all generation that had an executed Interconnection Agreement with ATSI as of December 31, 2009.

The focus of this initial ATSI baseline analysis was on the PJM Generator Deliverability test. Generators that already had firm transmission rights on the ATSI system were assumed to be part of the base system. This assumption is based on the fact that ATSI had previously studied these generators for compliance with RFC, NERC, MISO and ATSI criteria when these generators applied for interconnection and transmission service. A PJM Generator Deliverability test had not previously been performed on these units since firm rights to transfer the generator MW's within the ATSI Control Area to PJM was provided through point to point transmission service requests. As part of this assessment, the PJM Generation Deliverability test was performed on a 2013 RTEP base case. The key findings in this report documents the results of the Generator Deliverability analyses and are the deliverability results for all generators expected to be in-

service by June 1, 2013 that had executed an Interconnection Agreement with ATSI as of December 31, 2009.

In addition to the 2013 Generator Deliverability analysis, 2013 Load Deliverability analysis is also being performed. Other 2013 studies that will be performed on the ATSI system include baseline thermal and voltage analysis as required by NERC TPL standards, including N-1-1 analysis.

PJM and ATSI will also review the near-term system to determine if any of the 2013 upgrades require acceleration to earlier years. Years 2014 and later will be studied as required as part of the continual RTEP studies that assess the entire PJM network. The results of future near-term and longer-term ATSI integration studies will be incorporated into the RTEP.

Any ATSI generation that executes an Interconnection Agreement (IA) with ATSI between January 1st, 2010 and May 31st, 2011 will be evaluated for deliverability. Generation that is found to be undeliverable and that has an expected in-service date after May 31st, 2011 (the PJM / ATSI integration date) will be requested to re-enter the PJM queue. At the time of integration, all other generation projects in the ATSI queue will be merged into the existing PJM queue and studied according to the PJM tariff requirements.

EXECUTIVE SUMMARY

PJM has responsibility for the development of a Regional Transmission Expansion Plan (RTEP) for the PJM system that will meet the needs of the region in a reliable, economic and environmentally acceptable manner. PJM also is responsible for recommending the assignment of any transmission expansion costs to the appropriate parties. In order to carry out these responsibilities, it is necessary to establish a starting point or 'baseline' from which the need and responsibility for enhancements can be determined.

In order to establish the baseline, PJM has defined the period from 2011 through 2013 as the initial ATSI "baseline" planning period. The existing system plus any planned modifications to the transmission system scheduled to be in service prior to the 2013 summer peak period was chosen as the base system. Generators in the ATSI Control Area were studied in three categories as explained below:

- ✓ Category 1 generators – generators in the ATSI Control Area that were in-service and have or had firm delivery rights anytime before December 31, 2009 and generators in the ATSI Control Area that had executed an Interconnection Agreement with ATSI before December 31, 2009 and will be in-service as of May 31, 2011.
- ✓ Category 2 generators – generators in the ATSI Control Area that were in-service before December 31, 2009, but never had firm delivery rights.
- ✓ Category 3 generators – generators in the ATSI Control Area that had executed an Interconnection Agreement with ATSI before December 31, 2009 but not in-service as of May 31, 2011.

Category 1 generators were modeled in the original base case. This category of generation was considered to have firm delivery rights and the responsibility for any identified reliability impacts and the associated system upgrades would be assigned to ATSI. Generator Deliverability analysis and common mode outage analysis was performed on the base case. Any system problems were documented, potential upgrades were identified to mitigate all problems, and the system model was updated accordingly. This was the reference system by which the category 2 generation was studied.

The generator deliverability analysis was next completed for all Category 2 generators. All Category 2 generators were found to be deliverable. This was the reference system by which the Category 3 generation was studied.

Prior to integration, category 3 generators will be studied with all Category 1 generators modeled, any required system upgrades to alleviate identified reliability problems, and all deliverable Category 2 generators. If any additional reliability problems are identified, any Category 3 generators that cause or contribute to a reliability problem will be deemed non-deliverable. Category 3 generators that do not cause or contribute to a reliability problem will be found to be deliverable.

Category 3 non-deliverable generators that want to be studied individually can submit a Feasibility Study request to PJM which will be handled through the existing interconnection processes as identified in the PJM tariff.

A list of all studied generation resources, the MW value studied, and the deliverability results are contained in the Category 1 and Category 2 Generator Deliverability Results section of this document.

KEY FINDINGS

The following areas of the system as planned through 2013 were found to be non-compliant with the PJM Generator Deliverability test or the common mode outage test without additional system upgrades. These areas are described below along with the potential reinforcements required to achieve compliance.

1) In 2013, the Lemoyne - Maclean 138kV circuit is overloaded (116.68%) for breaker failure operation of the Bayshore 138kV BK-JL Breaker. The circuit will be re-conductored with 954 ACSS conductor. The estimated cost is $4,265,625.

2) In 2013, the East Akron - Sammis 138kV circuit is overloaded (108.93%) for the common tower outage of the Sammis-Dobbins 138kV and Sammis-Boardman 138kV lines. The circuit will be rebuilt for 8 miles with either 605 or 795 ACSR conductor. The estimated cost is $13,800,000.

3) In 2013, the Masury - Shenango 138kV circuit is overloaded (106.94%) for the common tower outage of the Crossland-Shenango #1 138kV and Crossland-Shenango #2 lines. The circuit terminal and sections of substation bus conductor will be replaced at Shenango 138kV Substation with either 795 ACSR conductor or equivalent Copper wire. The estimated cost is $246,562.

4) In 2013, the Bayshore - Chevy 138kV circuit is overloaded (106.43%) for breaker failure operation of the Bayshore 138kV BK-3K, BK-13254, BK-13256, BUS-K, BK-13252, or BK-KM Breaker. The circuit will be re-conductored with 636 ACSS conductor. The estimated cost is $4,269,375.

5) In 2013, the East Akron - Hanna 138kV circuit is overloaded (105.75%) for breaker failure operation of the West Ravenna 138kV BK-15K and the common tower outage of Hanna-West Ravenna #1 and Hanna-West Ravenna #2 138kV lines. The limiting component of the circuit is an 800 Amp wavetrap that will be replaced with a 1200 Amp wavetrap. The estimated cost is $51,750.

6) In 2013, the General Mills – Jackman 138kV circuit is overloaded (103.42%) for breaker failure operation of the Bayshore 138kV BK-13254, BK-13256, BUS-K, BK-13252, or BK-KM Breaker. The circuit (1.6mi) will be re-conductored with 636 ACSS conductor. The estimated cost is $646,875.

7) In 2013, the Crossland - Shenango #2 138kV circuit is overloaded (100.34%) for breaker failure operation of the Shenango 138kV BK-18 Breaker. The limiting component of the circuit is an 840 Amp meter that will be replaced with a higher rated meter. The estimated cost is $15,000.

PJM also conducted a 2013 Load Deliverability thermal and 2013 Load Deliverability voltage analysis of the ATSI and PJM West load deliverability areas (LDA's). No reliability issues were identified in the ATSI system.

OBJECTIVE AND SCOPE

The objectives of this study were as follows:

- To identify areas where the system as planned for the period 2011through 2013 would not be in compliance with applicable reliability criteria.
- To develop and recommend potential facility expansion plans, including cost estimates and estimated in service dates, to bring those areas into compliance.
- To establish what will be included as baseline expansion costs for the allocation of the costs of expansion for future ATSI generation projects.

The scope of this study included analysis for the period 2011 through 2013 to determine compliance with the PJM Deliverability requirements.

The system was not analyzed under non-peak load flow conditions on the basis that the system can and will be dispatched to remain within first contingency operating limits. Transmission constraints on market dispatch are economic constraints. Economic constraints are not considered violations of reliability criteria as long as the system can be adjusted to remain within reliability limits on a pre-contingency basis. Performance of the planned system under intermediate and light load conditions will be analyzed in the PJM Reliability Assessment to verify that the system as planned can indeed be operated in compliance with applicable reliability criteria. This will include a determination that the generation resources in ATSI are sufficient and are appropriately dispersed so that the generation dispatch can be adjusted to maintain the system within established thermal equipment ratings and voltage criteria limits under intermediate and light load conditions.

DELIVERABILITY ANALYSIS METHODOLOGY

Deliverability analysis was based on a representation of the 2013 forecast peak load with all firm transmission services committed for the 2013 period represented in the base case (see below).

FROM	TO	MW
PJM	AMIL (AMRN)	-148
PJM	CIN	580
PJM	EKPC	0
PJM	IP	0
PJM	LGEE	-154
PJM	OVEC	-2726
PJM	ALTW	264
PJM	ALTE	155
PJM	CPLE	198
PJM	CPLW	250
PJM	DUK	63
PJM	MEC	1370
PJM	MECS	574
PJM	NIPS	0
PJM	NYIS	859
PJM	WEC	930
PJM	DLCO	0
PJM	TVA	835
PJM	NEPTUNE	685
PJM	ITC	-296
PJM	MISO FE(GEN)	300
PJM	VFT	330
Total		4069

Study of all voltage limits was completed using this base system. For analysis pertaining to thermal limits including Generator Deliverability a multitude of dispatch patterns were analyzed. A complete description of the Generator Deliverability procedures is contained in Attachment C of PJM Manual M14B.

The 2013 base case was used to analyze network transfer capability. To maintain reliability in a competitive capacity market, resources must contribute to the deliverability of electricity in the Control Area in two ways: 1) energy must be deliverable from the aggregate of resources available to the Control Area to load in portions of the Control Area experiencing a localized capacity emergency, or deficiency, 2) capacity resources within a given electrical area must, in aggregate, be able to be exported to other areas of the Control Area within some bounds that separate the reliability requirements of the Control Area from the reasonable economic function of the market place. PJM has developed two methods for evaluating the adequacy of network transfer capability for each of these deliverability requirements. These methods are described in more detail in Attachment C of PJM Manual M14B.

The CETO/CETL method will be used to determine if the Capacity Emergency Transfer Limit (CETL) to each of the various electrical areas of PJM is sufficient to deliver each respective area's Capacity Emergency Transfer Objective (CETO).

The PJM Generation Deliverability procedure was used to determine if Network Transfer Capability was adequate to deliver all capacity resources out of defined areas to the network.

CATEGORY 1 AND CATEGORY 2 GENERATOR DELIVERABILITY RESULTS

The Category 1 and Category 2 generator deliverability results are listed below. The generation noted as capacity resources below are Category 1 generators and the generation noted as energy resources are Category 2 generators. As of December 31st, 2009, there were no Category 3 generators in ATSI.

PSSE NAME	ID	PMAX	Unit Commercial Name	Resource Type	Result
02ASHTG5	5	244	Ashtabula Unit 5	Capacity Resource	Deliverable
02AVONG7	7	95	Avong Unit 7	Capacity Resource	Deliverable
02AVONG9	9	638	Avon Unit 9	Capacity Resource	Deliverable
02BAYSG1	1	136	Bay Shore Unit 1	Capacity Resource	Deliverable
02BAYSG2	2	138	Bay Shore Unit 2	Capacity Resource	Deliverable
02BAYSG3	3	142	Bay Shore Unit 3	Capacity Resource	Deliverable
02BAYSG4	4	215	Bay Shore Unit 4	Capacity Resource	Deliverable
02BAYSHO	99	16	Bay Shore CT	Capacity Resource	Deliverable
02BEAVGA	A	57	Beaver Unit A (West Lorain 1A)	Capacity Resource	Deliverable
02BEAVGB	B	57	Beaver Unit B (West Lorain 1B)	Capacity Resource	Deliverable
02BURGG3	3	94	R E Burger Unit 3	Capacity Resource	Deliverable
02BURGG4	4	156	R E Burger Unit 4	Capacity Resource	Deliverable
02BURGG5	5	156	R E Burger Unit 5	Capacity Resource	Deliverable
02BURGGD	D	6.3	R E Burger Unit EMD	Capacity Resource	Deliverable
02FRMENG 1	1	180	Calpine Fremont Energy Center No. 1	Capacity Resource	Deliverable
02FRMENG 2	2	180	Calpine Fremont Energy Center No. 2	Capacity Resource	Deliverable
02FRMENG 3	3	325	Calpine Fremont Energy Center No. 3	Capacity Resource	Deliverable
02DVBSG1	1	896	Davis Besse Unit 1	Capacity Resource	Deliverable
02EASTG1	1	132	Eastlake Unit 1	Capacity Resource	Deliverable
02EASTG2	2	132	Eastlake Unit 2	Capacity Resource	Deliverable
02EASTG3	3	132	Eastlake Unit 3	Capacity Resource	Deliverable
02EASTG4	4	240	Eastlake Unit 4	Capacity Resource	Deliverable
02EASTG5	5	597	Eastlake Unit 5	Capacity Resource	Deliverable
02EDGEGA	A	19	Edgewater Unit CTA	Capacity Resource	Deliverable
02EDGEGB	B	19	Edgewater Unit CTB	Capacity Resource	Deliverable
02LEMOG1	1	150	Lemoyne Unit 1	Capacity Resource	Deliverable
02LEMOG2	2	150	Lemoyne Unit 2	Capacity Resource	Deliverable
02LEMOG3	3	150	Lemoyne Unit 3	Capacity Resource	Deliverable
02LEMOG4	4	150	Lemoyne Unit 4	Capacity Resource	Deliverable
02LKDG18	18	245	Lake Shore 18	Capacity Resource	Deliverable
02MNFDG1	1	830	Bruce Mansfield Unit 1	Capacity Resource	Deliverable
02MNFDG2	2	830	Bruce Mansfield Unit 2	Capacity Resource	Deliverable
02MNFDG3	3	830	Bruce Mansfield Unit 3	Capacity Resource	Deliverable
02NCUNTD	D	6	New Castle Diesel Unit 23 kV	Capacity Resource	Deliverable
02NILEG1	1	109	Niles Unit 1	Capacity Resource	Deliverable
02NILEG2	2	108	Niles Unit 2	Capacity Resource	Deliverable
02NWCAG3	3	93	New Castle Unit 3	Capacity Resource	Deliverable
02NWCAG4	4	92	New Castle Unit 4	Capacity Resource	Deliverable
02NWCAG5	5	141	New Castle Unit 5	Capacity Resource	Deliverable
02PERRG1	1	1260	Perry Unit 1	Capacity Resource	Deliverable

02RICHG1	1	11	Richland Unit 1	Capacity Resource	Deliverable
02RICHG2	2	11	Richland Unit 2	Capacity Resource	Deliverable
02RICHG3	3	11	Richland Unit 3	Capacity Resource	Deliverable
02RICHG4	4	118	Richland Unit 4	Capacity Resource	Deliverable
02RICHG5	5	118	Richland Unit 5	Capacity Resource	Deliverable
02RICHG6	6	118	Richland Unit 6	Capacity Resource	Deliverable
02SAMMG1	1	180	W H Sammis Unit 1	Capacity Resource	Deliverable
02SAMMG2	2	180	W H Sammis Unit 2	Capacity Resource	Deliverable
02SAMMG3	3	180	W H Sammis Unit 3	Capacity Resource	Deliverable
02SAMMG4	4	180	W H Sammis Unit 4	Capacity Resource	Deliverable
02SAMMG5	5	300	W H Sammis Unit 5	Capacity Resource	Deliverable
02SAMMG6	6	620	W H Sammis Unit 6	Capacity Resource	Deliverable
02SAMMG7	7	620	W H Sammis Unit 7	Capacity Resource	Deliverable
02SAMMIS	D	13	W H Sammis EMD	Capacity Resource	Deliverable
02WLORG-2	2	85	West Lorain 2	Capacity Resource	Deliverable
02WLORG-3	3	85	West Lorain 3	Capacity Resource	Deliverable
02WLORG-4	4	85	West Lorain 4	Capacity Resource	Deliverable
02WLORG-5	5	85	West Lorain 5	Capacity Resource	Deliverable
02WLORG-6	6	85	West Lorain 6	Capacity Resource	Deliverable
02CLARKA	A	25	Clark Ct A	Capacity Resource	Deliverable
02CLARKB	B	25	Clark Ct B	Capacity Resource	Deliverable
02STRYCT	1	17	Stryker CT	Capacity Resource	Deliverable
02EASTG6	6	24	Eastlake Unit 6	Capacity Resource	Deliverable
02NILE-A	A	25	Niles Peaker	Capacity Resource	Deliverable
02AVG10	10	21	Avon #10 Generator Bus	Capacity Resource	Deliverable
COLLW 11	1	17.2		Energy Resource	Deliverable
COLLW 11	D1	1.9		Energy Resource	Deliverable
COLLW 11	D2	1.9		Energy Resource	Deliverable
COLLW 11	D3	1.9		Energy Resource	Deliverable
COLLW 11	D4	1.9		Energy Resource	Deliverable
COLLW 11	D5	1.9		Energy Resource	Deliverable
COLLW 11	D6	1.9		Energy Resource	Deliverable
02CPPW41	1	17.2	Cpp West 41St Street - 11 kV	Energy Resource	Deliverable
02CPPW41	2	17.2	Cpp West 41St Street - 11 kV	Energy Resource	Deliverable
CARBONLM	1	19		Energy Resource	Deliverable
GALON M2	MA	24.7		Energy Resource	Deliverable
GALON M2	MB	11.85		Energy Resource	Deliverable
BG5 72	1	11		Energy Resource	Deliverable
BG5 72	2	11		Energy Resource	Deliverable