Generation Interconnection

System Impact Study Report

for

Queue Project AF1-229

GALION-SOUTH BERWICK 345 KV

72 MW Capacity / 120 MW Energy

August, 2020

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1 Introduction

This System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 205, as well as the System Impact Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is AEP

2 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances an Interconnection Customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the Feasibility Study, but the actual allocation will be deferred until the System Impact Study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Wyandot, Ohio. The installed facilities will have a total capability of 120 MW with 72 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is October 31, 2022. This study does not imply a TO commitment to this in-service date.

The objective of this System Impact Study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the ITO transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required for maintaining the reliability of the ITO transmission system.

Queue Number	**AF1-229**
Project Name	GALION-SOUTH BERWICK 345 KV
State	Ohio
County	Wyandot
Transmission Owner	AEP
MFO	120
MWE	120
MWC	72
Fuel	Solar
Basecase Study Year	2023

Any new service customers who can feasibly be commercially operable prior to June 1st of the basecase study year are required to request interim deliverability analysis.

4 Point of Interconnection

AF1-229 will interconnect with the AEP transmission system via a new station cut into Galion (ATSI) –South Berwick (AEP) 345 kV circuit.

To accommodate the interconnection on the Galion (ATSI) – South Berwick (AEP) 345 kV circuit, a new three (3) circuit breaker 345 kV station physically configured and operated as a ring bus will be constructed (see Attachment 1). Installation of associated protection and control equipment, 345 kV line risers, SCADA, and 345 kV revenue metering will also be required. AEP reserves the right to specify the final acceptable configuration considering design practices, future expansion and compliance requirements.

Installation of the generator lead first span exiting the POI station, including the first structure outside the AEP fence, will also be included in AEP's scope. In the case where the generator lead is a single span, the structure in the customer station will be the customer's responsibility.

5 Cost Summary

This project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$1,082,000
Direct Connection Network Upgrade	$17,440,000
Non Direct Connection Network Upgrades	$1,255,000
Allocation for New System Upgrades*	$0
Contribution to Previously Identified Upgrades*	$75,597
Total Costs	$19,852,597

*As your project progress through the study process, as things withdraw, then this may result in changes to your cost allocation.

The estimates provided in this report are preliminary in nature, as they were determined without the benefit of detailed engineering studies. Final estimates will require an on-site review and coordination to determine final construction requirements. In addition, Stability analysis will be completed during the Facilities Study stage. It is possible that a need for additional upgrades could be identified by these studies.

This total cost excludes a Federal Income Tax Gross Up charges. This tax may or may not be charged based on whether this project meets the eligibility requirements of IRS Notice 2016-36, 2016-25 I.R.B. (6/20/2016). If at a future date it is determined that the Federal Income Tax Gross charge is required, the Transmission Owner shall be reimbursed by the Interconnection Customer for such taxes.

Note 1: PJM Open Access Transmission Tariff (OATT) section 217.3A outline cost allocation rules. The rules are further clarified in PJM Manual 14A Attachment B. The allocation of costs for a network upgrade will start with the first Queue project to cause the need for the upgrade. Later queue projects will receive cost allocation contingent on their contribution to the violation and are allocated to the queues that have not closed less than 5 years following the execution of the first Interconnection Service Agreement which identifies the need for this upgrade.

Note 2: For customers with System Reinforcements listed: If your present cost allocation to a System Reinforcement indicates $0, then please be aware that as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, the cost responsibilities can change and a cost allocation may be assigned to your project. In addition, although your present cost allocation to a System Reinforcement is presently $0, your project may need this system reinforcement completed to be deliverable to the PJM system. If your project comes into service prior to completion of the system reinforcement, an interim deliverability study for your project will be required.

6 Transmission Owner Scope of Work

6.1 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
345 kV Revenue Metering	$431,000
Generator lead first span exiting the POI station, including the first structure outside the fence	$651,000
Total Attachment Facility Costs	$1,082,000

6.2 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Construct a new three (3) circuit breaker 345 kV switching station physically configured and operated as a ring bus. Installation of associated protection and control equipment, 345 kV line risers and SCADA will also be required.	$17,440,000
Total Direct Connection Facility Costs	$17,440,000

6.3 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Review and revise line protections & controls at the South Berwick 345 kV station	$45,000
Review and revise line protections & controls at the Galion 345 kV station	$TBD by ATSI in Facilities Study
345 kV Transmission Line Cut In	$1,210,000
Total Non-Direct Connection Facility Costs	$1,255,000

7 Incremental Capacity Transfer Rights (ICTRs)

None

8 Schedule

It is anticipated that the time between receipt of executed Agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would generally be between 24 to 36 months after signing Agreement execution.

9 Interconnection Customer Requirements

It is understood that the Interconnection Customer is responsible for all costs associated with this interconnection. The costs above are reimbursable to AEP. The cost of the Interconnection Customer's generating plant and the costs for the line connecting the generating plant to AEP's 345kV Facilities are not included in this report; these are assumed to be the Interconnection Customer's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

Requirement from the PJM Open Access Transmission Tariff:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 Meteorological Data Reporting Requirements

The solar generation facility shall provide the Transmission Provider with site-specific meteorological data including:

- Back Panel temperature (Fahrenheit)
- Irradiance (Watts/meter^2)
- Ambient air temperature (Fahrenheit) – (Accepted, not required)
- Wind speed (meters/second) – (Accepted, not required)
- Wind direction (decimal degrees from true north) – (Accepted, not required)

10.3 Interconnected Transmission Owner Requirements

The IC will be required to comply with all Interconnected Transmission Owner's revenue metering requirements for generation interconnection customers located at the following link:

http://www.pjm.com/planning/design-engineering/to-tech-standards/

11 Summer Peak Analysis

The Queue Project AF1-229 was evaluated as a 120.0 MW (Capacity 72.0 MW) injection tapping the Galion to South Berwick 345 kV line in the AEP area. Project AF1-229 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-229 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

11.1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

11.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

11.3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
43548345	242936	05FOSTOR	345.0	AEP	242935	05E LIMA	345.0	AEP	1	ATSI-P7-1-TE-345-029A	tower	1318.0	116.8	118.96	AC	28.53

11.4 Steady-State Voltage Requirements

None

11.5 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
51950114	242935	05E LIMA	345.0	AEP	242945	05SW LIM	345.0	AEP	1	AEP_P1-2_#11144-B	operation	971.0	99.19	100.19	AC	11.62
43548162	242936	05FOSTOR	345.0	AEP	242935	05E LIMA	345.0	AEP	1	Base Case	operation	1025.0	110.82	113.32	AC	25.62

11.6 System Reinforcements

<table>
<tr><th>ID</th><th>Idx</th><th>Facility</th><th>Upgrade Description</th><th>Cost</th><th>Cost Allocated to AF1-229</th><th>Upgrade Number</th></tr>
<tr><td>43548345</td><td>1</td><td>05FOSTOR 345.0 kV - 05E LIMA 345.0 kV Ckt 1</td><td>Replace five sub Cond 2156 ACSR 84/19 Std at E Lima. $500K. Time Estimate 12-18 months. New expected SE rating 1409 MVA. PJM Network Upgrade N6538.1

This upgrade is required for a prior queue cycle.

Sag study is required on the line. The cost is expected to be around $20,000. The SE rating after the sag study is expected to be 1539 MVA. Rebuild/Reconductor, cost: $ 8 million. Time Estimate 6-12 months for sag study. PJM Network Upgrade N6538.2

This upgrade is required for a prior queue cycle.

Replace sub Cond 2870 MCM ACSR at E Lima. $100K. Time Estimate 12-18 months. New expected SE rating 1707 MVA. PJM Network Upgrade N6538.3

The cost allocation is as follows:

<table>
<tr><th>Queue</th><th>MW contribution</th><th>Percentage of Cost</th><th>Cost($100,000)</th></tr>
<tr><td>AF1-227</td><td>9.20</td><td>24.40%</td><td>$24,403</td></tr>
<tr><td>AF1-229</td><td>28.5</td><td>75.60%</td><td>$75,597</td></tr>
</table>
</td><td>$500 K + $20 K + $100 K</td><td>$0 + $0 + $75.597 K</td><td>N6538.1
N6538.2
N6538.3</td></tr>
<tr><td></td><td></td><td></td><td>Total Cost</td><td>$620,000</td><td>$75,597</td><td></td></tr>
</table>

11.7 Flow Gate Details

The following indices contain additional information about each facility presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. The intent of the indices is to provide more details on which projects/generators have contributions to the flowgate in question. All New Service Queue Requests, through the end of the Queue under study, that are contributors to a flowgate will be listed in the indices. Please note that there may be contributors that are subsequently queued after the queue under study that are not listed in the indices. Although this information is not used "as is" for cost allocation purposes, it can be used to gage the impact of other projects/generators. It should be noted the project/generator MW contributions presented in the body of the report are Full MW Impact contributions which are also noted in the indices column named "Full MW Impact", whereas the loading percentages reported in the body of the report, take into consideration the PJM Generator Deliverability Test rules such as commercial probability of each project as well as the ramping impact of "Adder" contributions. The MW Impact found and used in the analysis is shown in the indices column named "Gendeliv MW Impact".

11.7.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
43548345	242936	05FOSTOR	AEP	242935	05E LIMA	AEP	1	ATSI-P7-1-TE-345-029A	tower	1318.0	116.8	118.96	AC	28.53

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
238564	02BAYSG1	5.4493	50/50	5.4493
238670	**02DVBSG1 (Deactivation : 31/05/2020)**	**24.4165**	**50/50**	**24.4165**
238885	02LEMOG1	6.2310	50/50	6.2310
238886	02LEMOG2	6.2310	50/50	6.2310
238887	02LEMOG3	6.2310	50/50	6.2310
238888	02LEMOG4	6.2310	50/50	6.2310
238979	02NAPMUN	5.2669	Adder	6.2
239293	02BS-PKR	0.4757	50/50	0.4757
241902	Y1-069 GE	32.3177	50/50	32.3177
244357	05GRANGER EL	0.2413	Adder	0.28
247548	V4-010 C	3.4580	Adder	4.07
247549	V3-028 C	-1.0596	Adder	-1.25
247551	**U4-028 C (Suspended)**	**1.6715**	**Adder**	**1.97**
247552	**U4-029 C (Suspended)**	**1.6715**	**Adder**	**1.97**
247940	**U4-028 E (Suspended)**	**11.1864**	**Adder**	**13.16**
247941	**U4-029 E (Suspended)**	**11.1864**	**Adder**	**13.16**
247947	V4-010 E	23.1419	Adder	27.23
924791	AB2-131 C OP	3.1909	Adder	3.75
924792	AB2-131 E OP	5.2062	Adder	6.12
925751	AC1-051 C	0.7653	Adder	0.9
925752	AC1-051 E	5.1216	Adder	6.03
927181	AC1-212 C	-0.1289	Adder	-0.15
927183	AC1-212 BAT	1.5886	Merchant Transmission	1.5886
931951	AB1-107 1	53.4010	50/50	53.4010
931961	AB1-107 2	127.9444	50/50	127.9444
932051	AC2-015 C	5.3897	Adder	6.34
932052	AC2-015 E	6.3861	Adder	7.51
932791	AC2-103 C	8.0092	50/50	8.0092
932792	AC2-103 E	53.6094	50/50	53.6094
934252	AD1-052 E1	0.8493	Adder	1.0
934262	AD1-052 E2	0.8493	Adder	1.0
934461	AD1-070 C O1	6.4901	50/50	6.4901
934462	AD1-070 E O1	30.4673	50/50	30.4673
934761	AD1-103 C O1	13.4664	50/50	13.4664
934762	AD1-103 E O1	90.1214	50/50	90.1214
934891	AD1-118	15.3916	50/50	15.3916
936722	AD2-091 BAT	8.2015	Merchant Transmission	8.2015
936752	AD2-096 BAT	2.8860	Merchant Transmission	2.8860
937021	AD2-136 C O1	6.0175	Adder	7.08
937022	AD2-136 E O1	40.2711	Adder	47.38

937381	AD2-191 C (Withdrawn : 06/03/2020)	2.8416	Adder	3.34
937382	AD2-191 E (Withdrawn : 06/03/2020)	19.0169	Adder	22.37
938911	AE1-119	120.9340	50/50	120.9340
939161	AE1-146 C O1	8.4055	Adder	9.89
939162	AE1-146 E O1	3.9253	Adder	4.62
941741	AE2-174 C	4.6350	Adder	5.45
941742	AE2-174 E	21.6989	Adder	25.53
941761	AE2-176 C	9.7850	Adder	11.51
941762	AE2-176 E	6.5233	Adder	7.67
941781	AE2-181 C	3.6368	Adder	4.28
941782	AE2-181 E	2.4245	Adder	2.85
942042	AE2-216 BAT	9.0217	Merchant Transmission	9.0217
942661	AE2-282 C O1	5.7510	Adder	6.77
942662	AE2-282 E O1	3.0261	Adder	3.56
943961	AF1-064 C O1	6.1469	50/50	6.1469
943962	AF1-064 E O1	3.0551	50/50	3.0551
944551	AF1-120 C	3.4847	Adder	4.1
944552	AF1-120 E	1.7554	Adder	2.07
944571	AF1-122 C O1	1.7744	Adder	2.09
944572	AF1-122 E O1	2.4503	Adder	2.88
945401	AF1-205 C O1	3.4164	Adder	4.02
945402	AF1-205 E O1	2.2776	Adder	2.68
945411	AF1-206 C O1	15.6416	Adder	18.4
945412	AF1-206 E O1	10.4278	Adder	12.27
945623	AF1-227 BAT	9.1660	Merchant Transmission	9.1660
945641	AF1-229 C	17.1202	50/50	17.1202
945642	AF1-229 E	11.4134	50/50	11.4134
946203	AF1-285 BAT	2.9574	Merchant Transmission	2.9574
950311	G934 C	2.0760	PJM External (MISO)	2.0760
950312	G934 E	8.3040	PJM External (MISO)	8.3040
950351	J466	3.3600	PJM External (MISO)	3.3600
950791	J201 C	0.4014	PJM External (MISO)	0.4014
950792	J201 E	1.6054	PJM External (MISO)	1.6054
950871	J246 C	0.1059	PJM External (MISO)	0.1059
950872	J246 E	0.4237	PJM External (MISO)	0.4237
950942	J325 E	0.4625	PJM External (MISO)	0.4625
951531	J533 C	3.0264	PJM External (MISO)	3.0264
951532	J533 E	12.1056	PJM External (MISO)	12.1056
951571	J538 C	3.0612	PJM External (MISO)	3.0612
951572	J538 E	12.2448	PJM External (MISO)	12.2448
951941	J602 C	2.9780	PJM External (MISO)	2.9780
951942	J602 E	16.1120	PJM External (MISO)	16.1120
952201	J589 C	2.5100	PJM External (MISO)	2.5100
952202	J589 E	13.5800	PJM External (MISO)	13.5800
952312	J646 E	0.2014	PJM External (MISO)	0.2014
952401	J752 C	1.7093	PJM External (MISO)	1.7093
952402	J752 E	9.2477	PJM External (MISO)	9.2477
952611	J717 C	2.8028	PJM External (MISO)	2.8028
952612	J717 E	15.1641	PJM External (MISO)	15.1641
952761	J728 C	2.6066	PJM External (MISO)	2.6066
952762	J728 E	14.1213	PJM External (MISO)	14.1213
952881	J758	12.4120	PJM External (MISO)	12.4120

952971	J793	165.9771	PJM External (MISO)	165.9771
953071	J794 C	0.1652	PJM External (MISO)	0.1652
953072	J794 E	0.8940	PJM External (MISO)	0.8940
953271	J701 C	0.8319	PJM External (MISO)	0.8319
953272	J701 E	4.5008	PJM External (MISO)	4.5008
953291	J796	22.3465	PJM External (MISO)	22.3465
953321	J799	27.3181	PJM External (MISO)	27.3181
953361	J806	11.5207	PJM External (MISO)	11.5207
953771	J832	7.6620	PJM External (MISO)	7.6620
953781	J833	14.5510	PJM External (MISO)	14.5510
953811	J839	12.1880	PJM External (MISO)	12.1880
953941	J857	8.7165	PJM External (MISO)	8.7165
954111	J875	18.6045	PJM External (MISO)	18.6045
955071	J984 C	2.1590	PJM External (MISO)	2.1590
955072	J984 E	11.6810	PJM External (MISO)	11.6810
955121	J989	8.5000	PJM External (MISO)	8.5000
955181	J996	11.2704	PJM External (MISO)	11.2704
955261	J1005	18.7140	PJM External (MISO)	18.7140
955591	J1043 C	1.1530	PJM External (MISO)	1.1530
955592	J1043 E	20.4312	PJM External (MISO)	20.4312
955781	J1062	25.3620	PJM External (MISO)	25.3620
956011	J1088	14.0355	PJM External (MISO)	14.0355
956021	J1089	16.0786	PJM External (MISO)	16.0786
956031	J1090	8.9037	PJM External (MISO)	8.9037
956161	J1103	2.1766	PJM External (MISO)	2.1766
956741	J1172	5.1095	PJM External (MISO)	5.1095
956751	J1173	10.2672	PJM External (MISO)	10.2672
956801	J1178	5.8201	PJM External (MISO)	5.8201
NEWTON	NEWTON	1.5946	Confirmed LTF	1.5946
FARMERCITY	FARMERCITY	0.0673	Confirmed LTF	0.0673
G-007A	G-007A	0.4579	Confirmed LTF	0.4579
VFT	VFT	1.2707	Confirmed LTF	1.2707
PRAIRIE	PRAIRIE	3.5697	Confirmed LTF	3.5697
COFFEEN	COFFEEN	0.2723	Confirmed LTF	0.2723
CHEOAH	CHEOAH	0.6707	Confirmed LTF	0.6707
EDWARDS	EDWARDS	0.3699	Confirmed LTF	0.3699
TILTON	TILTON	0.9085	Confirmed LTF	0.9085
MADISON	MADISON	3.5986	Confirmed LTF	3.5986
GIBSON	GIBSON	1.0068	Confirmed LTF	1.0068
CALDERWOOD	CALDERWOOD	0.6710	Confirmed LTF	0.6710
BLUEG	BLUEG	3.5276	Confirmed LTF	3.5276
TRIMBLE	TRIMBLE	1.1380	Confirmed LTF	1.1380
CATAWBA	CATAWBA	0.3818	Confirmed LTF	0.3818
CBM-W1	CBM-W1	39.7443	Confirmed LTF	39.7443

11.8 Queue Dependencies

The Queue Projects below are listed in one or more indices for the overloads identified in your report. These projects contribute to the loading of the overloaded facilities identified in your report. The percent overload of a facility and cost allocation you may have towards a particular reinforcement could vary depending on the action of these earlier projects. The status of each project at the time of the analysis is presented in the table. This list may change as earlier projects withdraw or modify their requests.

Queue Number	Project Name	Status
AB1-107	Bayshore-GM Powertrain 138 kV & Lallendorf 345kV	Engineering and Procurement
AB2-131	Galion-Roberts South 138kV	Active
AC1-051	Willard-S. Greenwich 69kV	Active
AC1-212	Minster 69kV	Engineering and Procurement
AC2-015	Chatfield-Howard 138kV	Active
AC2-103	Beaver-Davis Besse 345 kV I	Active
AD1-052	Freemont Energy Center	Under Construction
AD1-070	Fostoria Central 138 kV	Active
AD1-103	Beaver-Davis Besse 345 kV II	Active
AD1-118	Lemoyne	Active
AD2-091	Hardin Tap 345kV	Active
AD2-096	Marysville 345kV	Active
AD2-136	Melmore Tap 138kV	Active
AD2-191	Melmore 138kV	Withdrawn
AE1-119	Lemoyne 345 kV	Active
AE1-146	Ebersole #2-Fostoria Central 138 kV	Active
AE2-174	Seneca 138 kV	Active
AE2-176	Groton 138 kV Solar	Active
AE2-181	Snyder 69kV	Active
AE2-216	Hardin Switch 345 kV	Active
AE2-282	East Fayette 138 kV	Active
AF1-064	Weston 69 kV	Active
AF1-120	East Fayette 2 138 kV	Active
AF1-122	Cardington 138 kV	Active
AF1-205	Napolean Muni 138 kV	Active
AF1-206	Fayette-Lyons 138 kV	Active
AF1-227	Marysville-East Lima 345 kV	Active
AF1-229	Galion-South Berwick 345 kV	Active
AF1-285	Gunn Road 345 kV	Active
U4-028	Fostoria Central-Greenlawn-Howard 138kV	Suspended
U4-029	Fostoria Central-Greenlawn-Howard 138kV	Suspended
V3-028	East Lima-Marysville 345kV	Under Construction
V4-010	Tiffin Center 138kV	Engineering and Procurement
Y1-069	Bay Shore-Fostoria Central 345kV & Bayshore-Monroe 345kV	In Service
J1005	MISO	MISO
J1043	MISO	MISO
J1062	MISO	MISO
J1088	MISO	MISO
J1089	MISO	MISO

J1090	MISO	MISO
J1103	MISO	MISO
J1172	MISO	MISO
J1173	MISO	MISO
J1178	MISO	MISO
J201	MISO	MISO
J246	MISO	MISO
J325	MISO	MISO
J466	MISO	MISO
J533	MISO	MISO
J538	MISO	MISO
J589	MISO	MISO
J602	MISO	MISO
J646	MISO	MISO
J701	MISO	MISO
J717	MISO	MISO
J728	MISO	MISO
J752	MISO	MISO
J758	MISO	MISO
J793	MISO	MISO
J794	MISO	MISO
J796	MISO	MISO
J799	MISO	MISO
J806	MISO	MISO
J832	MISO	MISO
J833	MISO	MISO
J839	MISO	MISO
J857	MISO	MISO
J875	MISO	MISO
J984	MISO	MISO
J989	MISO	MISO
J996	MISO	MISO

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
Base Case	
AEP_P1-2_#11144-B	CONTINGENCY 'AEP_P1-2_#11144-B' OPEN BRANCH FROM BUS 945620 TO BUS 242939 CKT 1 / 945620 AF1-227 TAP 345 242939 05MARYSV 345 1 END
ATSI-P7-1-TE-345-029A	CONTINGENCY 'ATSI-P7-1-TE-345-029A' /* X1-027A - BEAVER & BEAVER - HAYES 345 DISCONNECT BRANCH FROM BUS 907060 TO BUS 238569 CKT 1 /* X1-027A_AT12 345 02BEAVER 345 DISCONNECT BRANCH FROM BUS 239289 TO BUS 238569 CKT 1 /* 02HAYES 345 02BEAVER 345 END

12 Light Load Analysis

Not Required

13 Short Circuit Analysis

The following Breakers are overdutied

None

14 Stability and Reactive Power Requirements for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be evaluated during the Facilities Study Phase

15 Affected Systems

15.1 TVA

TVA Impacts to be determined during later study phases (as applicable).

15.2 Duke Energy Progress

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

15.3 MISO

MISO Impacts to be determined during later study phases (as applicable).

15.4 LG&E

LG&E Impacts to be determined during later study phases (as applicable).

16 Attachment 1: One-Line Diagram and Point of Interconnection Map