Generation Interconnection

System Impact Study Report

for

Queue Project AF1-322

MEADOW LAKE 345 KV

84 MW Capacity / 200 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 White, Indiana. The installed facilities will have a total capability of 200 MW with 84 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is August 15, 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	**AF1-322**
Project Name	MEADOW LAKE 345 KV
State	Indiana
County	White
Transmission Owner	AEP
MFO	200
MWE	200
MWC	84
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

AF1-322 will interconnect with the AEP transmission system via a direct connection at the Meadow Lake Switch 345 kV switching station (Attachment 1).

To accommodate the interconnection at the Meadow Lake Switch 345 kV switching station, the station will have to be expanded requiring the installation of one (1) 345 kV circuit breaker (Attachment 1). Installation of associated protection and control equipment, 345 kV line risers, SCADA and 345 kV revenue metering will also be required.

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	$2,390,000
Non Direct Connection Network Upgrades	$45,000
Allocation for New System Upgrades*	$0
Contribution to Previously Identified Upgrades*	$300,000
Total Costs	**$3,817,000**

*As your project progresses through the study process and other projects modify their request or withdraw, then your cost allocation could change.

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 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 88-129. 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.

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
Expand the Meadow Lake Switch 345 kV station, install one (1) 345 kV circuit breakers. Installation of associated protection and control equipment, SCADA, and 345 kV revenue metering will also be required	$2,390,000
Total Direct Connection Facility Costs	**$2,390,000**

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 the P&C settings at the Meadow Lake Switch 345 kV station	$45,000
Total Non-Direct Connection Facility Costs	**$45,000**

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 the Interconnected Transmission Owner. The cost of the Interconnection Customer's generating plant and the costs for the line connecting the generating plant to the Interconnected Transmission Owner's Transmission circuit 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 the Interconnected Transmission Owner 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 AF1-322 was evaluated as a 200.0 MW (Capacity 84.0 MW) injection at the Meadow Lake 345 kV substation in the AEP area. Project AF1-322 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-322 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
41726290	242865	05JEFRSO	345.0	AEP	248000	06CLIFTY	345.0	OVEC	Z1	AEP_P4_#6189_05HANG R 765_D1	breaker	2354.0	102.64	103.09	AC	27.59
	243209	05ROCKPT	765.0	AEP	243208	05JEFRSO	765.0	AEP	1	AEP_P7-1_#11042	tower	3970.0	114.63	115.68	AC	36.4

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	TO BUS#	TO BUS	kV	TO BUS	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT	POST PROJECT	AC|DC	MW IMPACT

				BUS AREA				ARE A					LOADIN G %	LOADIN G %		
4142371 1	24286 5	05JEFRSO	345. 0	AEP	24800 0	06CLIFTY	345. 0	OVE C	Z1	AEP_P1- 2_#709	operatio n	2354. 0	101.04	101.48	AC	27.64
4363393 7	24387 8	05MEADO W	345. 0	AEP	25520 5	17REYNOL DS	345. 0	NIPS	1	AEP_P1- 2_#880 7-A	operatio n	2246. 0	116.14	122.1	AC	134.2
5204660 3	24387 8	05MEADO W	345. 0	AEP	25520 5	17REYNOL DS	345. 0	NIPS	2	AEP_P1- 2_#869 5	operatio n	2246. 0	116.14	122.1	AC	134.2

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-322	Upgrade Number
41726290	1	**05JEFRSO 345.0 kV - 06CLIFTY 345.0 kV Ckt Z1**	(N4106.1) Replace 4 Clifty switches. $2M. 12-18 months time estimate. (N4106.2) Replace 9 Clifty risers (Sub cond 2-1700 kcm AAC 61 Str). $175K. 12-18 months time estimate. (N4106.3) A sag check will be required for the ACSR ~ 2156 ~ 84/19 ~ BLUEBIRD Conductor Section 1 to determine if the line section can be operated above its emergency rating. Preliminary sag study results: Jefferson – Clifty Creek 345 kV line work will include one location of grading to remediate clearance location of concern in span 1 to 2. Cost is $244 K. If a rebuild is needed, rebuild the 0.75 mile ACSR ~ 2156 ~ 84/19 ~ BLUEBIRD @ 284 F - Conductor section 1. $1.96M. New SE rating expected to be 2826 MVA. This line overload is presently driven in prior queue cycle.	$2 M + $175K + $244 K	$0	N4106.1 N4106.2 N4106.3
		05ROCKPT 765.0 kV - 05JEFRSO 765.0 kV Ckt 1	(N6497.1) Rockport & Jefferson Relay Thermal Limits - An engineering study will need to be conducted to determine if the Relay Thermal limits settings (2996 A/3970 MVA) can be adjusted to mitigate the overload. New relay packages will be required if the settings cannot be adjusted. Estimated Cost for study: $50,000 ($25,000 each). Estimated Cost for new relay packages: $1.2 M ($600,000 each). New SE rating 3975 MVA. (N6497.2) Replace 6 Rockport 3000A CTs. $4.8 M. New SE rating expected to be 4142 MVA. This line overload is presently driven in prior queue cycle and N6497.1 and N6497.2 are required for a prior queue cycle. (N6497.3) Replace 2 Rockport 3000A non-oil Breakers at Rockport. $6 M. New SE rating 4571 MVA. N6497.3 is required for the AF1 queue cycle; however, AF1-322 does meet PJM cost allocation thresholds. (N6497.4) Replace 3, 3000A wave traps at Rockport and 3, 3000A wave traps at Jefferson. $300 K. New SE rating 5001 MVA.	$1.2 M + $4.8 M + $6 M + $300 K	$0 + $0 + $0 + $300 K	N6497.1 N6497.2 N6497.3 N6497.4
			Total Cost	**$14,719,000**	**$300,000**	

Note : 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.

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
4172629 0	24286 5	05JEFRSO	AEP	24800 0	06CLIFTY	OVEC	Z1	AEP_P4_#6189_05HANG R 765_D1	breaker	2354. 0	102.64	103.09	AC	27.59

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243441	05CKG2	22.1401	50/50	22.1401
243442	05RKG1	73.7066	50/50	73.7066
243443	05RKG2	72.5899	50/50	72.5899
243859	05FR-11G C	0.4665	50/50	0.4665
243862	05FR-12G C	0.4594	50/50	0.4594
243864	05FR-21G C	0.4903	50/50	0.4903
243866	05FR-22G C	0.4689	50/50	0.4689
243870	05FR-3G C	0.9497	50/50	0.9497
243873	05FR-4G C	0.7355	50/50	0.7355
244130	05ST.JOE CTR	12.7860	50/50	12.7860
246909	05MDL-1G C	0.9772	50/50	0.9772
246910	05MDL-2G C	0.4837	50/50	0.4837
246976	05MDL-3G C	0.4935	50/50	0.4935
246979	05MDL-4G C	0.4813	50/50	0.4813
247556	T-127 C	0.4886	50/50	0.4886
247900	05FR-11G E	10.5227	50/50	10.5227
247901	05FR-12G E	10.3480	50/50	10.3480
247902	05FR-21G E	11.0603	50/50	11.0603
247903	05FR-22G E	10.5899	50/50	10.5899
247904	05FR-3G E	21.4486	50/50	21.4486
247905	05FR-4G E	16.7987	50/50	16.7987
247906	05MDL-1G E	22.0274	50/50	22.0274
247907	05MDL-2G E	11.0344	50/50	11.0344
247912	05MDL-3G E	11.0344	50/50	11.0344
247913	05MDL-4G E	11.0344	50/50	11.0344
247943	T-127 E	11.0344	50/50	11.0344
247967	05OLIV SLR E	0.2178	Adder	0.26
250163	Y3-099 BAT	0.2468	50/50	0.2468
250167	Y3-100 BAT	0.2468	50/50	0.2468
251823	Z1-065 BAT	0.6554	50/50	0.6554
274775	LINCOLN ;6U	1.4108	50/50	1.4108
274776	LINCOLN ;7U	1.4108	50/50	1.4108
274777	LINCOLN ;8U	1.4108	50/50	1.4108
274788	**SE CHICAG;5U (Deactivation : 01/06/2020)**	**3.3059**	**Adder**	**3.89**
274789	**SE CHICAG;6U (Deactivation : 01/06/2020)**	**3.3146**	**Adder**	**3.9**
274790	**SE CHICAG;7U (Deactivation : 01/06/2020)**	**3.3582**	**Adder**	**3.95**

274791	SE CHICAG;8U (Deactivation : 01/06/2020)	3.3582	Adder	3.95
274792	SE CHICAG;9U (Deactivation : 01/06/2020)	3.3605	Adder	3.95
274793	SE CHICAG;0U (Deactivation : 01/06/2020)	3.3605	Adder	3.95
274794	SE CHICAG;1U (Deactivation : 01/06/2020)	3.3605	Adder	3.95
274795	SE CHICAG;2U (Deactivation : 01/06/2020)	3.3605	Adder	3.95
910542	X3-005 E	0.4873	Adder	0.57
913222	Y1-054 E	-1.9752	Adder	-2.32
922912	AB1-080	0.7577	50/50	0.7577
930041	AB1-006 C	0.6352	50/50	0.6352
930042	AB1-006 E	23.9998	50/50	23.9998
930461	AB1-087	93.8245	50/50	93.8245
930471	AB1-088	93.8245	50/50	93.8245
930501	AB1-091 O1	47.7364	Adder	56.16
932601	AC2-080 C O1	3.4778	50/50	3.4778
932602	AC2-080 E O1	23.2742	50/50	23.2742
932931	AC2-117	4.0058	Adder	4.71
933281	AC2-140 C	4.1378	50/50	4.1378
933282	AC2-140 E	0.2178	50/50	0.2178
933441	AC2-157 C	12.9648	50/50	12.9648
933442	AC2-157 E	21.1532	50/50	21.1532
934721	AD1-100 C	13.0139	Adder	15.31
934722	AD1-100 E	60.7316	Adder	71.45
937041	AD2-138 C	4.7084	50/50	4.7084
937042	AD2-138 E	22.0436	50/50	22.0436
939351	AE1-166 C O1	6.7666	Adder	7.96
939352	AE1-166 E O1	6.2461	Adder	7.35
939631	AE1-193 C	5.6968	Adder	6.7
939632	AE1-193 E	38.1249	Adder	44.85
939641	AE1-194 C	5.6968	Adder	6.7
939642	AE1-194 E	38.1249	Adder	44.85
939651	AE1-195 C	5.6968	Adder	6.7
939652	AE1-195 E	38.1249	Adder	44.85
939681	AE1-198 C	16.9152	Adder	19.9
939682	AE1-198 E	14.3735	Adder	16.91
940581	AE2-045 C O1	15.7837	50/50	15.7837
940582	AE2-045 E O1	21.6691	50/50	21.6691
941341	AE2-130 C	151.3296	50/50	151.3296
941342	AE2-130 E	100.8864	50/50	100.8864
941551	AE2-152 C O1	7.8076	Adder	9.19
941552	AE2-152 E O1	5.2051	Adder	6.12
941571	AE2-154 C	4.4827	50/50	4.4827
941572	AE2-154 E	29.9998	50/50	29.9998
942601	AE2-276	8.5295	50/50	8.5295
944201	AF1-088 FTIR	170.5900	50/50	170.5900

944911	AF1-156 C	5.4492	Adder	6.41
944912	AF1-156 E	3.6328	Adder	4.27
945391	AF1-204 C O1	6.7065	50/50	6.7065
945392	AF1-204 E O1	20.1195	50/50	20.1195
945421	AF1-207 C	4.7345	50/50	4.7345
945422	AF1-207 E	20.3305	50/50	20.3305
945501	AF1-215 C O1	22.2660	50/50	22.2660
945502	AF1-215 E O1	14.8440	50/50	14.8440
946581	AF1-322 C	11.5861	50/50	11.5861
946582	AF1-322 E	15.9999	50/50	15.9999
WEC	WEC	3.0127	Confirmed LTF	3.0127
LGE-0012019	LGE-0012019	6.3129	LTF	6.3129
CBM-W2	CBM-W2	25.6101	Confirmed LTF	25.6101
NY	NY	1.1292	Confirmed LTF	1.1292
O-066	O-066	12.6538	Confirmed LTF	12.6538
CHEOAH	CHEOAH	1.0065	Confirmed LTF	1.0065
G-007	G-007	1.9614	Confirmed LTF	1.9614
MADISON	MADISON	36.3807	Confirmed LTF	36.3807
MEC	MEC	12.1082	Confirmed LTF	12.1082
CALDERWOOD	CALDERWOOD	1.0024	Confirmed LTF	1.0024
BLUEG	BLUEG	29.6891	Confirmed LTF	29.6891
TRIMBLE	TRIMBLE	10.3537	Confirmed LTF	10.3537
CATAWBA	CATAWBA	0.7206	Confirmed LTF	0.7206
CBM-W1	CBM-W1	84.9179	Confirmed LTF	84.9179

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
AB1-006	Meadow Lake 345kV	In Service
AB1-080	Dumont-Olive 345kV	In Service
AB1-087	Sullivan 345kV #1	Active
AB1-088	Sullivan 345kV #2	Active
AB1-091	Davis Creek 345kV	Active
AC2-080	Olive-Reynolds 345kV	Active
AC2-117	University Park North	Engineering and Procurement
AC2-140	DC Cook Unit 2	Engineering and Procurement
AC2-157	Sullivan 345 kV	Active
AD1-100	Loretto-Wilton & Braidwood-Davis Creek	Active
AD2-138	Olive-Reynolds 345kV	Active
AE1-166	Loretto-Wilton & Braidwood-Davis Creek	Active
AE1-193	Crete 345 kV	Active
AE1-194	Crete 345 kV	Active
AE1-195	Crete 345 kV	Active
AE1-198	Crete 345 kV	Active
AE2-045	Olive-Reynolds 345 kV	Active
AE2-130	Rockport 765 kV	Active
AE2-152	Loretto-Wilton & Braidwood-Davis Creek	Active
AE2-154	Meadow Lake 345 kV (MLV VIII)	Active
AE2-276	Sullivan 345kV	Active
AF1-088	Sullivan 345 kV	Active
AF1-156	Braidwood-Davis Creek	Active
AF1-204	Eugene 345 kV	Active
AF1-207	Reynolds–Olive #1 345 kV	Active
AF1-215	Reynolds-Olive 345 kV	Active
AF1-322	Meadow Lake 345 kV	Active
X3-005	Wildwood 12kV	In Service
Y1-054	Rochelle 138kV	In Service
Y3-099	Beckjord 2 MW-1	In Service
Y3-100	Beckjord 2 MW-2	In Service
Z1-065	Wiley 34.5kV	In Service

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
AEP_P1-2_#8695	CONTINGENCY 'AEP_P1-2_#8695' OPEN BRANCH FROM BUS 243878 TO BUS 255205 CKT 1 / 243878 05MEADOW 345 255205 17REYNOLDS 345 1 END
AEP_P1-2_#709	CONTINGENCY 'AEP_P1-2_#709' OPEN BRANCH FROM BUS 242924 TO BUS 243208 CKT 1 / 242924 05HANG R 765 243208 05JEFRSO 765 1 END
AEP_P1-2_#8807-A	CONTINGENCY 'AEP_P1-2_#8807-A' OPEN BRANCH FROM BUS 243878 TO BUS 255205 CKT 2 / 243878 05MEADOW 345 255205 17REYNOLDS 345 2 END
AEP_P4_#6189_05HANG R 765_D1	CONTINGENCY 'AEP_P4_#6189_05HANG R 765_D1' OPEN BRANCH FROM BUS 242921 TO BUS 242924 CKT 1 / 242921 05CORNU 765 242924 05HANG R 765 1 OPEN BRANCH FROM BUS 242924 TO BUS 243208 CKT 1 / 242924 05HANG R 765 243208 05JEFRSO 765 1 OPEN BRANCH FROM BUS 242921 TO BUS 242934 CKT 1 / 242921 05CORNU 765 242934 05CORNU 345 1 REMOVE UNIT 1A FROM BUS 247245 / 247245 05HRKG1A 18.0 REMOVE UNIT 1B FROM BUS 247246 / 247246 05HRKG1B 18.0 REMOVE UNIT 1S FROM BUS 247247 / 247247 05HRKG1S 18.0 REMOVE UNIT 2A FROM BUS 247248 / 247248 05HRKG2A 18.0 REMOVE UNIT 2B FROM BUS 247249 / 247249 05HRKG2B 18.0 REMOVE UNIT 2S FROM BUS 247250 / 247250 05HRKG2S 18.0 END
AEP_P7-1_#11042	CONTINGENCY 'AEP_P7-1_#11042' OPEN BRANCH FROM BUS 243878 TO BUS 255205 CKT 1 / 243878 05MEADOW 345 255205 17REYNOLDS 345 1 OPEN BRANCH FROM BUS 243878 TO BUS 255205 CKT 2 / 243878 05MEADOW 345 255205 17REYNOLDS 345 2 END

12 Light Load Analysis

Not required.

13 Short Circuit Analysis

The following Breakers are overdutied

None

14 Stability and Reactive Power

To be determined in 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).

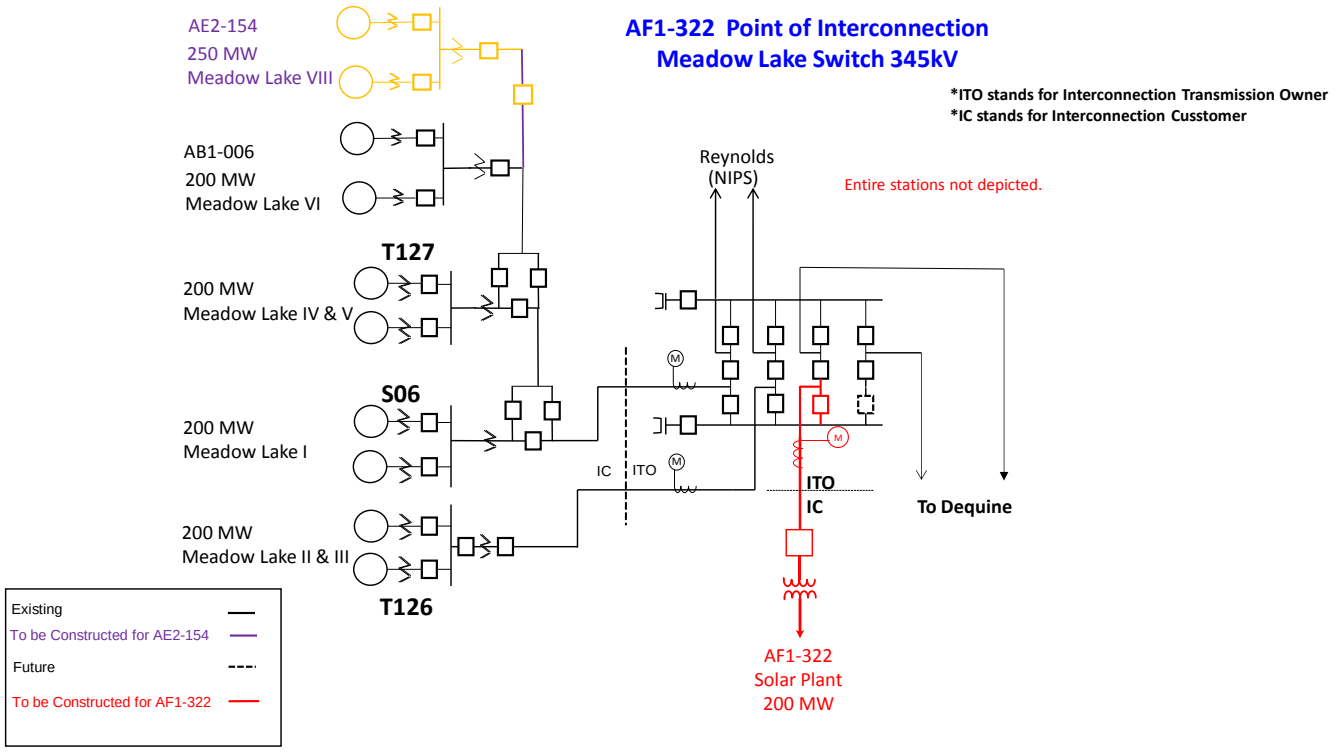
15.3 MISO

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



17 Attachment 2: Site Map