Generation Interconnection

System Impact Study Report

for

Queue Project AF1-313

WES DEL-ROYERTON 138 KV

24 MW Capacity / 40 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.

3 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Delaware County, Indiana. The installed facilities will have a total capability of 40 MW with 24 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is December 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	**AF1-313**
Project Name	WES DEL-ROYERTON 138 KV
State	Indiana
County	Delaware
Transmission Owner	AEP
MFO	40
MWE	40
MWC	24
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

AF1-313 will interconnect with the AEP transmission system via a new station cut into the Wes Del to Royerton 138 kV section of Delaware to Desoto 138kV circuit.

To accommodate the interconnection on the West Del to Royerton 138kVline, a new three (3) circuit breaker 138kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus will be constructed (see Figure 1). Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 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.

Note: An AEP baseline project b3103.1 replaces the existing Royerton 138kV station with a 4 breaker ring bus configuration. Details regarding this project is available at the following link.

https://www.pjm.com/~/media/committees-groups/stakeholder-meetings/ipsac/2020/20200327/20200327-pjm-2019-issues-and-solutions-near-miso-seam.ashx

5 Cost Summary

This project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$788,000
Direct Connection Network Upgrade	$8,040,000
Non Direct Connection Network Upgrades	$860,000
Allocation for New System Upgrades*	$0
Contribution to Previously Identified Upgrades*	$0
Total Costs	**$9,688,000**

*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
138kV Revenue Metering	$388,000
Generator lead first span exiting the POI station, including the first structure outside the fence	$400,000
Total Attachment Facility Costs	**$788,000**

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 138 kV switching station physically configured in a breaker and half bus arrangement but operated as a ring-bus (See Attachment 1). Installation of associated protection and control equipment, 138 kV line risers and SCADA will also be required.	$8,040,000
Total Direct Connection Facility Costs	**$8,040,000**

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
138kV Transmission Line Cut In	$770,000
Review and revise the P&C relay settings at the Delaware 138 kV station	$45,000
Review and revise the P&C relay settings at the Desoto 138 kV station	$45,000
Total Non-Direct Connection Facility Costs	**$860,000**

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 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 AF1-313 was evaluated as a 40.0 MW (Capacity 24.0 MW) injection tapping the West Del to Royerton 138 kV line in the AEP area. Project AF1-313 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-313 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)

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
42312931	248001	06DEARB1	345.0	OVEC	248013	06PIERCE	345.0	OVEC	1	DEOK_P2-3_C21403_MIAMIFORT	breaker	972.0	99.83	100.13	AC	3.3
86753474	946030	AF1-268 TAP	138.0	AEP	243319	05JAY	138.0	AEP	1	AEP_P7-1_#11087-C	tower	393.0	99.55	100.28	AC	3.43

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)

None

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.

None

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-313	Upgrade Number
42312931	1	**06DEARB1 345.0 kV - 06PIERCE 345.0 kV Ckt 1**	Perform a sag study. OVEC's cost estimate for performing the sag study is $125K. New SE rating to be 1204 MVA. This line is first overloaded in a prior queue cycle.	$125 K	$0	N/A
86753474	2	**AF1-268 TAP 138.0 kV - 05JAY 138.0 kV Ckt 1**	1) Replace 2 risers at Jay 138 kV substation. Time estimate 24-36 months. Cost estimate: $70K. Note: There is a supplemental project, S2015.3, which may increase the SE rating to 409 MVA which may inlcude this work scope. AEP will need to confirm this during the Facilities Study. 2) A Sag Study will be required on the 12.53 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE - Conductor section 1 to mitigate the overload. The new ratings after sag study will be: S/N: 409 MVA, S/E: 620 MVA, Depending on the sag study results, the cost for this upgrade is expected to be between $50,120(no remediation required, just sag study) and $18.8 million (complete line Reconductor/rebuild). Time Estimate: a) Sag Study: 6-12 months b) Rebuild: The standard time required for construction differs from state to state. An approximate construction time would be 24 to 36 months after signing an interconnection agreement. This line is first overloaded in a prior queue cycle.	$70 K + $50.12 K	$0	N6279.1 N6279.2
			Total Cost	**$245,120**	**$0**	

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
42312931	248001	06DEARB1	OVEC	248013	06PIERCE	OVEC	1	DEOK_P2-3_C2 1403_MIAMIFORT	breaker	972.0	99.83	100.13	AC	3.3

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
243795	05HDWTR1G C	0.5478	50/50	0.5478
247264	05LAWG1A	6.7332	50/50	6.7332
247265	05LAWG1B	6.7332	50/50	6.7332
247266	05LAWG1S	10.7518	50/50	10.7518
247267	05LAWG2A	6.7332	50/50	6.7332
247268	05LAWG2B	6.7332	50/50	6.7332
247269	05LAWG2S	10.7518	50/50	10.7518
247543	V3-007 C	0.5478	50/50	0.5478
247929	S-071 E	5.8132	Adder	6.84
247935	V3-007 E	20.6973	50/50	20.6973
247958	05WLD G2 E	10.7139	Adder	12.6
247963	05HDWTR1G E	20.6973	50/50	20.6973
247968	Z2-115 E	0.0604	Adder	0.07
250163	Y3-099 BAT	0.1441	Merchant Transmission	0.1441
250167	Y3-100 BAT	0.1441	Merchant Transmission	0.1441
251947	08EBND2	12.7912	50/50	12.7912
920501	AA2-148 C OP	2.7243	50/50	2.7243
920502	AA2-148 E OP	18.2319	50/50	18.2319
923881	AB2-028 C	1.8937	Adder	2.23
923882	AB2-028 E	12.6736	Adder	14.91
926691	AC1-152	2.1240	50/50	2.1240
926851	AC1-172	2.1240	50/50	2.1240
926881	AC1-175 C	9.0402	50/50	9.0402
926882	AC1-175 E	14.7498	50/50	14.7498
932681	AC2-090 C	4.5201	50/50	4.5201
932682	AC2-090 E	7.3749	50/50	7.3749
932841	AC2-111 C O1	2.0197	Adder	2.38
932842	AC2-111 E O1	3.2952	Adder	3.88
933592	AC2-176 E O1	6.7554	Adder	7.95
933601	AC2-177 C O1	3.0927	50/50	3.0927
933602	AC2-177 E O1	20.6973	50/50	20.6973
934161	AD1-043 C O1	2.9186	Adder	3.43
934162	AD1-043 E O1	4.7620	Adder	5.6
934961	AD1-128 C	4.0640	Adder	4.78
934962	AD1-128 E	6.6307	Adder	7.8
936561	AD2-071 C	3.8652	Adder	4.55
936562	AD2-071 E	1.9038	Adder	2.24
939761	AE1-207 C	3.8453	Adder	4.52
939762	AE1-207 E	5.3102	Adder	6.25
939771	AE1-208 C	3.4707	Adder	4.08
939772	AE1-208 E	4.7328	Adder	5.57
939781	AE1-209 C O1	1.0485	Adder	1.23

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
939782	AE1-209 E O1	7.0171	Adder	8.26
939791	AE1-210 C O1	1.0485	Adder	1.23
939792	AE1-210 E O1	7.0171	Adder	8.26
940981	AE2-089 C O1	4.8126	Adder	5.66
940982	AE2-089 E O1	3.2084	Adder	3.77
940991	AE2-090 C	5.4500	Adder	6.41
940992	AE2-090 E	3.6333	Adder	4.27
941691	AE2-169	2.0824	Adder	2.45
941711	AE2-171	1.9202	Adder	2.26
941721	AE2-172	2.2889	Adder	2.69
942071	AE2-219 C	2.5911	Adder	3.05
942072	AE2-219 E	3.5782	Adder	4.21
942081	AE2-220 C	6.2449	50/50	6.2449
942082	AE2-220 E	8.6239	50/50	8.6239
942221	AE2-234 C O1	1.1816	Adder	1.39
942222	AE2-234 E O1	0.5344	Adder	0.63
942791	AE2-297 C O1	10.7046	50/50	10.7046
942792	AE2-297 E O1	7.1364	50/50	7.1364
944031	AF1-071 C	0.5049	Adder	0.59
944032	AF1-071 E	0.8238	Adder	0.97
944121	AF1-080	1.2315	Adder	1.45
944531	AF1-118 C O1	14.4407	Adder	16.99
944532	AF1-118 E O1	4.3553	Adder	5.12
944541	AF1-119 C O1	9.2546	Adder	10.89
944542	AF1-119 E O1	3.9663	Adder	4.67
944831	AF1-148 C O1	5.3171	Adder	6.26
944832	AF1-148 E O1	3.5447	Adder	4.17
945371	AF1-202 C O1	2.3374	Adder	2.75
945372	AF1-202 E O1	11.4122	Adder	13.43
945561	AF1-221 C O1	14.7105	50/50	14.7105
945562	AF1-221 E O1	4.4217	50/50	4.4217
945581	AF1-223 C O1	6.1873	Adder	7.28
945582	AF1-223 E O1	4.1249	Adder	4.85
946031	AF1-268 C O1	3.9275	Adder	4.62
946032	AF1-268 E O1	1.7815	Adder	2.1
946491	AF1-313 C O1	1.6852	Adder	1.98
946492	AF1-313 E O1	1.1235	Adder	1.32
WEC	WEC	0.8401	Confirmed LTF	0.8401
LGEE	LGEE	0.6549	Confirmed LTF	0.6549
CBM-W2	CBM-W2	18.1654	Confirmed LTF	18.1654
NY	NY	0.4689	Confirmed LTF	0.4689
TVA	TVA	1.2488	Confirmed LTF	1.2488
O-066	O-066	5.6918	Confirmed LTF	5.6918
CBM-S1	CBM-S1	8.0088	Confirmed LTF	8.0088
G-007	G-007	0.8809	Confirmed LTF	0.8809
MADISON	MADISON	11.1424	Confirmed LTF	11.1424
MEC	MEC	3.8549	Confirmed LTF	3.8549
CATAWBA	CATAWBA	0.1222	Confirmed LTF	0.1222
CBM-W1	CBM-W1	26.6713	Confirmed LTF	26.6713

11.7.2 Index 2

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
86753474	946030	AF1-268 TAP	AEP	243319	05JAY	AEP	1	AEP_P7-1_#11087-C	tower	393.0	99.55	100.28	AC	3.43

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
247935	V3-007 E	10.0291	Adder	11.8
247963	05HDWTR1G E	10.0291	Adder	11.8
923881	AB2-028 C	1.2827	Adder	1.51
923882	AB2-028 E	8.5841	Adder	10.1
926881	AC1-175 C	4.3805	Adder	5.15
926882	AC1-175 E	7.1472	Adder	8.41
927181	AC1-212 C	-0.1223	Adder	-0.14
927183	AC1-212 BAT	1.5066	Merchant Transmission	1.5066
932681	AC2-090 C	2.1903	Adder	2.58
932682	AC2-090 E	3.5736	Adder	4.2
933592	AC2-176 E O1	-53.8375	Adder	-63.34
933601	AC2-177 C O1	1.4986	Adder	1.76
933602	AC2-177 E O1	10.0291	Adder	11.8
934961	AD1-128 C	3.3944	Adder	3.99
934962	AD1-128 E	5.5382	Adder	6.52
939761	AE1-207 C	3.0256	Adder	3.56
939762	AE1-207 E	4.1783	Adder	4.92
939771	AE1-208 C	2.4749	Adder	2.91
939772	AE1-208 E	3.3749	Adder	3.97
939781	AE1-209 C O1	0.8584	Adder	1.01
939782	AE1-209 E O1	5.7444	Adder	6.76
939791	AE1-210 C O1	0.8584	Adder	1.01
939792	AE1-210 E O1	5.7444	Adder	6.76
941691	AE2-169	1.4850	Adder	1.75
941721	AE2-172	1.8010	Adder	2.12
942081	AE2-220 C	3.0260	Adder	3.56
942082	AE2-220 E	4.1788	Adder	4.92
944531	AF1-118 C O1	17.7481	Adder	20.88
944532	AF1-118 E O1	5.3528	Adder	6.3
944541	AF1-119 C O1	9.2415	Adder	10.87
944542	AF1-119 E O1	3.9607	Adder	4.66
944831	AF1-148 C O1	6.2966	Adder	7.41
944832	AF1-148 E O1	4.1978	Adder	4.94
945371	AF1-202 C O1	2.2447	Adder	2.64
945372	AF1-202 E O1	10.9592	Adder	12.89
945581	AF1-223 C O1	5.9418	Adder	6.99
945582	AF1-223 E O1	3.9612	Adder	4.66
946031	AF1-268 C O1	12.9469	50/50	12.9469
946032	AF1-268 E O1	5.8726	50/50	5.8726
946491	AF1-313 C O1	1.7469	Adder	2.06
946492	AF1-313 E O1	1.1646	Adder	1.37

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
WEC	WEC	0.0186	Confirmed LTF	0.0186
LGEE	LGEE	0.6629	Confirmed LTF	0.6629
CPLE	CPLE	0.1508	Confirmed LTF	0.1508
CBM-W2	CBM-W2	6.6421	Confirmed LTF	6.6421
NY	NY	0.0404	Confirmed LTF	0.0404
TVA	TVA	0.8288	Confirmed LTF	0.8288
O-066	O-066	0.4166	Confirmed LTF	0.4166
CBM-S2	CBM-S2	1.6878	Confirmed LTF	1.6878
CBM-S1	CBM-S1	5.9470	Confirmed LTF	5.9470
G-007	G-007	0.0634	Confirmed LTF	0.0634
MEC	MEC	0.5117	Confirmed LTF	0.5117

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
AA2-148	Madison-Tanners Creek 138kV	Active
AB2-028	Fall Creek-Desoto 345kV	Active
AC1-152	Lawrenceburg 345kV PB I	In Service
AC1-172	Lawrenceburg 345kV PB II	Partially in Service - Under Construction
AC1-175	Losantville 345kV	Active
AC1-212	Minster 69kV	Engineering and Procurement
AC2-090	Losantville 345kV	Active
AC2-111	College Corner 138kV	Active
AC2-176	Jay 138 kV	Under Construction
AC2-177	Desoto-Tanners Creek 345kV	Active
AD1-043	Makahoy 138 kV	Active
AD1-128	Modoc 138 kV	Active
AD2-071	Strawton-Pipe Creek 138 kV	Active
AE1-207	Mississinewa-Gaston 138 kV	Active
AE1-208	Delaware-Van Buren 138 kV	Active
AE1-209	Desoto 345 kV	Active
AE1-210	Desoto 345 kV	Active
AE2-089	Pennville-Adams 138 kV	Active
AE2-090	Randolph-Hodgin 138 kV	Active
AE2-169	Delaware-Van Buren 138 kV	Active
AE2-171	Makahoy 138 kV	Active
AE2-172	Mississinewa-Gaston 138 kV	Active
AE2-219	Bluff Point-Randolph 138 kV	Active
AE2-220	Losantville 345 kV	Active
AE2-234	Liberty Center-Buckeye Tap 69 kV	Active
AE2-297	Madison-Tanners Creek 138 kV	Active
AF1-071	College Corner 138 kV	Active
AF1-080	Deer Creek-Fisher Body-Mullin 138 kV	Active
AF1-118	Sorenson-Desoto 345 kV	Active
AF1-119	Keystone-Desoto 345 kV	Active
AF1-148	Sorenson-Desoto 345 kV	Active
AF1-202	Keystone-Desoto 345 kV	Active
AF1-221	College Corner-Drewersburg 138 kV	Active
AF1-223	Jay-Desoto 138 kV	Active
AF1-268	Desoto-Jay 138 kV	Active
AF1-313	Wes Del-Royerton 138 kV	Active
V3-007	Desoto-Tanners Creek #1 345kV	Under Construction
Y3-099	Beckjord 2 MW-1	In Service
Y3-100	Beckjord 2 MW-2	In Service

Queue Number	Project Name	Status
Z2-115	Deer Creek 12.47kV	In Service

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
DEOK_P2-3_C2 1403_MIAMIFORT	CONTINGENCY 'DEOK_P2-3_C2 1403_MIAMIFORT' OPEN BRANCH FROM BUS 243233 TO BUS 249567 CKT 1 / 243233 05TANNER 345 249567 08M.FORT 345 1 OPEN BRANCH FROM BUS 249567 TO BUS 251950 CKT 7 / 249567 08M.FORT 345 251950 08M.FRT7 22.0 7 END
AEP_P7-1_#11087-C	CONTINGENCY 'AEP_P7-1_#11087-C' OPEN BRANCH FROM BUS 944540 TO BUS 243225 CKT 1 / 944540 AF1-119 TAP 345 243225 05KEYSTN 345 1 OPEN BRANCH FROM BUS 944530 TO BUS 243232 CKT 2 / 944530 AF1-118 TAP 345 243232 05SORENS 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).

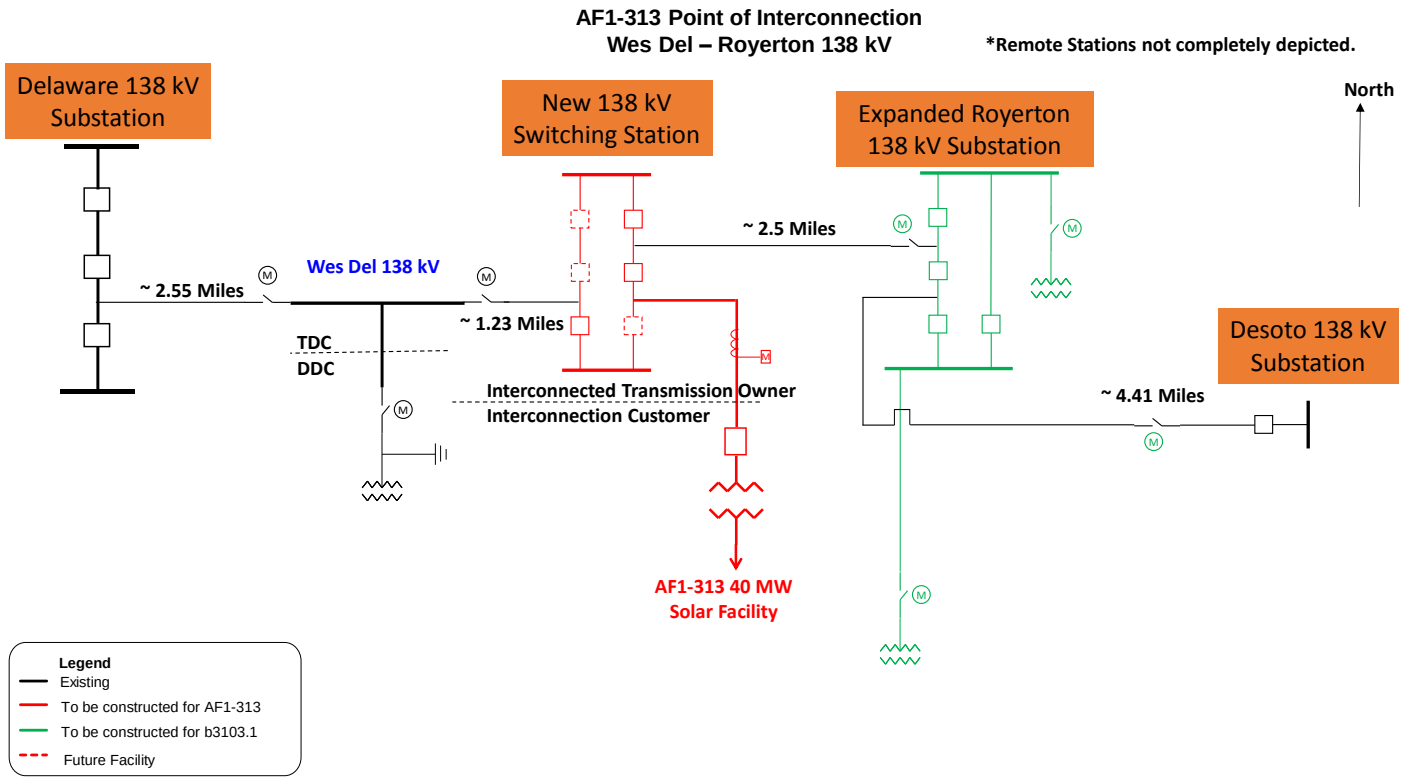
15.3 MISO

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 Location