



**Generation Interconnection
System Impact Study Report
for
Queue Project AF1-007
INDIAN RIVER 230 KV I
1.9 MW Capacity / 7.3 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 DPL.

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 an uprate to a planned Offshore Wind generating facility located in Sussex, Delaware. This project is an increase to the Interconnection Customer's AB1-056 project, which will share the same point of interconnection. The AF1-007 queue position is a 7.3 MW uprate (1.9 MW Capacity uprate) to the previous project. The total installed facilities will have a capability of 255.1 MW with 66.3 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this uprate project is October 01, 2021. This study does not imply a TO commitment to this in-service date.

Queue Number	AF1-007
Project Name	INDIAN RIVER 230 KV I
State	Delaware
County	Sussex
Transmission Owner	DPL
MFO	255.1
MWE	7.3
MWC	1.9
Fuel	Offshore Wind
Basecase Study Year	2023

New Service Customers proposing queue projects that 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

AF1-007 will interconnect with the DPL on transmission system as an uprate to AB1-056, via a new terminal position at the Indian River 230 kV substation created by the AB1-056 project.

5 Cost Summary

The AF1-007 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ 0
Allocation towards System Network Upgrade Costs*	\$ 0
Total Costs	\$ 0

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

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.

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.

5.1 DPL Costs

Cost estimates will further be refined as a part of the Impact Study and Facilities Study for this project. The Interconnection Customer will be responsible for all costs incurred by DPL in connection with the AF1-007

project. DPL reserves the right to reassess issues presented in this document and, upon appropriate justification, submit additional costs related to the AF1-007 project.

6 Transmission Owner Scope of Work

No additional work is needed to accommodate this interconnection. Refer to AB1-056 ISA for scope of work.

7 Schedule

Refer to AB1-056 for schedule.

8 Transmission Owner Analysis

None

9 Interconnection Customer Requirements

9.1 Required Relaying and Communications

Relaying and communications will be established as part of AB1-056 project. No additional work would be required. Refer to AB1-056 ISA for scope of work.

9.2 Interconnection Customer Scope of Direct Connection Work

The IC is responsible for all design and construction related to activities on their side of the Point of Interconnection. Site preparation, including grading and an access road, as necessary, is assumed to be by the IC. Route selection, line design, and right-of-way acquisition of the direct connect facilities is not included in this report and is the responsibility of the IC. Protective relaying and metering design and installation must comply with DPL's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff.

9.3 DPL Interconnection Customer Scope of Direct Connection Work Requirements

- DPL requires that an IC circuit breaker is located within 500 feet of the DPL substation to facilitate the relay protection scheme between DPL and the IC at the Point of Interconnection (POI).

9.4 Special Operating Requirements

1. DPL will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility. Such disconnection may be facilitated by a generator breaker, or other method depending upon the specific circumstances and the evaluation by DPL.

2. DPL reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering and telecommunications facilities, owned by DPL.
3. Interconnection Customer shall design its non-synchronous generation facility with the ability to maintain a power factor between 0.95 leading and 0.95 lagging measured at the generator terminals.

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 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/>

Metering will be established as part of AB1-056 project. No additional work would be required. Refer to AB1-056 ISA for scope of work.

11 Summer Peak Analysis

The Queue Project AF1-007 was evaluated as a 7.3 MW (Capacity 1.9 MW) injection as an uprate to AB1-056 at the Indian River 230 kV substation in the DPL area. Project AF1-007 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-007 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 ARE A	TO BUS#	TO BUS	kV	TO BUS ARE A	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPACT
40940353	232107	TOWNSEND	138.0	DP&L	232106	MIDLTNTP	138.0	DP&L	1	DPL_P7_1_DBL_1NCB_FSA	tower	348.0	99.98	100.27	AC	1.33

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.

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.

None

11.6 System Reinforcements

ID	Idx	Facility	Upgrade Description	Cost	Cost Allocated to AF1-007	Upgrade Number
40940353	1	TOWNSEND 138.0 kV - MIDLTNTP 138.0 kV Ckt 1	Project Id: N6465 Description: Upgrade disconnect switch at Middletown Tap Type: FAC Total Cost: \$100,000 Time Estimate: 12.0 Months Ratings: 390.0/478.0/478.0 Notes: Although n6465 is sufficient to mitigate the overload, both Upgrades n6465 and n6407 will be required. This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AF1-007 presently does not receive cost allocation for this upgrade. Project Id: N6407 Description: To mitigate the (DP&L) TOWNSEND to MIDLTNTP 138 kV line (from bus 232107 to bus 232106 ckt 1) overload, it will require increasing the emergency rating of the Townsend to Middletown Tap 138 kV line by reconductoring a small portion of the line Type: FAC Total Cost: \$100,000 Time Estimate: 9-12 Months Ratings: 329.0/372.0/372.0 Notes: Although n6465 is sufficient to mitigate the overload, both Upgrades n6465 and n6407 will be required. This constraint is driven by a prior queue. Per PJM cost allocation rules, Queue Project AF1-007 presently does not receive cost allocation for this upgrade.	\$200,000	\$0	N6465 N6407
			TOTAL COST	\$200,000	\$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	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	ACID C	MW IMPACT
40940353	232107	TOWNSEND	DP&L	232106	MIDLTNT P	DP&L	1	DPL_P7_1_DBL_1NCB_FS A	tower	348.0	99.98	100.27	AC	1.33

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
232404	W1-003 C	0.5542	50/50	0.5542
232405	W1-003 E	0.9090	50/50	0.9090
232406	W1-004 FULL	0.5542	50/50	0.5542
232407	W1-004 E	0.9090	50/50	0.9090
232408	W1-005 C	0.5542	50/50	0.5542
232409	W1-005 E	0.9090	50/50	0.9090
232410	W1-006 C	0.5542	50/50	0.5542
232411	W1-006 E	0.9090	50/50	0.9090
232412	X1-032 E	0.8192	50/50	0.8192
232417	X3-008 C	0.3395	50/50	0.3395
232418	X3-008 E	3.1277	50/50	3.1277
232422	X3-066 FULL	0.1697	50/50	0.1697
232423	X3-066 E	1.5632	50/50	1.5632
232424	Y1-079 C	0.2501	50/50	0.2501
232425	Y1-079 E	2.3039	50/50	2.3039
232426	Y1-080 FULL	0.0532	50/50	0.0532
232427	Y1-080 E	0.4932	50/50	0.4932
232428	Y3-058 C	0.2134	50/50	0.2134
232429	Y3-058 E	1.9656	50/50	1.9656
232433	Z2-076 E	0.3208	Adder	0.38
232435	Z2-077 E	0.3208	Adder	0.38
232436	AB1-176 C	0.6345	50/50	0.6345
232813	VAUGHN	0.1186	50/50	0.1186
232902	EASTMUNI	3.8060	50/50	3.8060
232907	VN8	6.1239	50/50	6.1239
232910	NRG_G1	1.8688	50/50	1.8688
232911	NRG_G2	1.8688	50/50	1.8688
232915	OH NUG4	1.1804	50/50	1.1804
232916	OH NUG5	1.1804	50/50	1.1804
232919	VN10	0.4239	50/50	0.4239
232922	MR3 (Deactivation : 01/06/2021)	9.0862	Adder	10.69
232926	CRISFLD1	0.3640	50/50	0.3640
293670	O-025 C	0.2190	50/50	0.2190
917082	Z2-012 E	2.1263	Adder	2.5
918831	AA1-102	1.3649	50/50	1.3649
919831	AA2-069 (Suspended)	40.1751	Adder	47.26
923282	AB1-137 C	0.6591	Adder	0.78
923283	AB1-137 E	0.2825	Adder	0.33
923322	AB1-141 C OP	5.7567	50/50	5.7567
923323	AB1-141 E OP	2.6864	50/50	2.6864
923332	AB1-142 C OP	5.7567	50/50	5.7567

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
923603	AB1-176 E	1.0463	50/50	1.0463
923921	AB2-032 C	5.7993	50/50	5.7993
923922	AB2-032 E	2.7291	50/50	2.7291
923951	AB2-036 C	12.6928	50/50	12.6928
923952	AB2-036 E	20.7667	50/50	20.7667
924681	AB2-120 C OP	6.5094	Adder	7.66
924682	AB2-120 E OP	10.6206	Adder	12.49
924781	AB2-130 C OP	5.4764	Adder	6.44
924782	AB2-130 E OP	8.9353	Adder	10.51
924801	AB2-133 C OP	11.5595	50/50	11.5595
924802	AB2-133 E OP	14.6609	50/50	14.6609
924821	AB2-135 C	12.3191	50/50	12.3191
924822	AB2-135 E	14.0495	50/50	14.0495
924831	AB2-136 C	5.9522	50/50	5.9522
924832	AB2-136 E	6.3123	50/50	6.3123
924971	AB2-153 C	3.2408	50/50	3.2408
924972	AB2-153 E	5.2876	50/50	5.2876
925151	AB2-172 C OP	4.7924	50/50	4.7924
925152	AB2-172 E OP	7.8191	50/50	7.8191
925251	AB2-179 C OP	26.8592	50/50	26.8592
925252	AB2-179 E OP	8.8578	50/50	8.8578
925261	AB2-180 C	2.9589	50/50	2.9589
925262	AB2-180 E	1.2681	50/50	1.2681
925271	AB2-185 C OP	5.2023	50/50	5.2023
925272	AB2-185 E OP	2.2295	50/50	2.2295
926131	AC1-091 C	0.6417	Adder	0.75
926132	AC1-091 E	1.0524	Adder	1.24
926141	AC1-092 C	0.6417	Adder	0.75
926142	AC1-092 E	1.0524	Adder	1.24
926151	AC1-093 C	0.6075	Adder	0.71
926152	AC1-093 E	1.0011	Adder	1.18
926161	AC1-094 C	0.5134	Adder	0.6
926162	AC1-094 E	0.8471	Adder	1.0
927031	AC1-190 C	8.7535	50/50	8.7535
927032	AC1-190 E	3.7515	50/50	3.7515
927191	AC1-213 C	0.6596	50/50	0.6596
927192	AC1-213 E	0.4328	50/50	0.4328
930201	AB1-056 C	9.9441	Adder	11.7
930202	AB1-056 E	28.3190	Adder	33.32
930881	AB1-137 C	0.6591	Adder	0.78
930882	AB1-137 E	0.2825	Adder	0.33
930932	AB1-142 E OP	2.6864	50/50	2.6864
932161	AC2-023 C	5.6986	50/50	5.6986
932162	AC2-023 E	4.1503	50/50	4.1503
933631	AC2-185 C	1.3005	Adder	1.53
933632	AC2-185 E	2.1219	Adder	2.5
933641	AC2-186 C	3.1358	Adder	3.69
933642	AC2-186 E	5.1164	Adder	6.02
936611	AD2-076 C O1	8.1874	50/50	8.1874
936612	AD2-076 E O1	13.3584	50/50	13.3584
938651	AE1-087 C	4.0357	50/50	4.0357
938652	AE1-087 E	1.0089	50/50	1.0089

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
938891	AE1-117 C O1	6.5139	Adder	7.66
938892	AE1-117 E O1	17.3442	Adder	20.4
938901	AE1-118 C O1	6.5188	Adder	7.67
938902	AE1-118 E O1	17.3573	Adder	20.42
939151	AE1-145	3.4255	Adder	4.03
939361	AE1-167 C O1 (Withdrawn : 04/22/2020)	1.0276	Adder	1.21
939362	AE1-167 E O1 (Withdrawn : 04/22/2020)	0.8564	Adder	1.01
939621	AE1-192 C O1	8.0595	Adder	9.48
939622	AE1-192 E O1	3.9440	Adder	4.64
941021	AE2-093 C	5.9740	50/50	5.9740
941022	AE2-093 E	9.4917	50/50	9.4917
941181	AE2-112 C	2.8405	50/50	2.8405
941182	AE2-112 E	4.6345	50/50	4.6345
942441	AE2-257 C	5.1665	Adder	6.08
942442	AE2-257 E	13.6209	Adder	16.02
943361	AF1-007 C	0.2934	Adder	0.35
943362	AF1-007 E	0.8338	Adder	0.98
943441	AF1-015 C	1.9105	50/50	1.9105
943442	AF1-015 E	2.6383	50/50	2.6383
943651	AF1-036 C	3.6936	50/50	3.6936
943652	AF1-036 E	5.1006	50/50	5.1006
944921	AF1-157 C O1	2.4568	Adder	2.89
944922	AF1-157 E O1	1.6379	Adder	1.93
945661	AF1-231 C	1.3035	Adder	1.53
945662	AF1-231 E	1.9552	Adder	2.3
945781	AF1-243	0.8574	Adder	1.01
945791	AF1-244	1.6441	50/50	1.6441
945931	AF1-258	0.6763	50/50	0.6763
945941	AF1-259	0.3362	50/50	0.3362
946041	AF1-269 (Withdrawn : 05/12/2020)	2.5837	50/50	2.5837
NEWTON	NEWTON	0.1859	Confirmed LTF	0.1859
FARMERCITY	FARMERCITY	0.0097	Confirmed LTF	0.0097
NY	NY	0.0603	Confirmed LTF	0.0603
PRAIRIE	PRAIRIE	0.4469	Confirmed LTF	0.4469
O-066	O-066	0.5309	Confirmed LTF	0.5309
COFFEEN	COFFEEN	0.0345	Confirmed LTF	0.0345
CHEOAH	CHEOAH	0.0871	Confirmed LTF	0.0871
EDWARDS	EDWARDS	0.0606	Confirmed LTF	0.0606
TILTON	TILTON	0.1090	Confirmed LTF	0.1090
G-007	G-007	0.0520	Confirmed LTF	0.0520
GIBSON	GIBSON	0.0945	Confirmed LTF	0.0945
CALDERWOOD	CALDERWOOD	0.0865	Confirmed LTF	0.0865
BLUEG	BLUEG	0.3003	Confirmed LTF	0.3003
TRIMBLE	TRIMBLE	0.0963	Confirmed LTF	0.0963
CATAWBA	CATAWBA	0.0616	Confirmed LTF	0.0616

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
AA1-102	Kings Creek-Loretto 138kV	Partially in Service - Under Construction
AA2-069	Cartanza 230kV	Suspended
AB1-056	Indian River 230kV I	Engineering and Procurement
AB1-137	Frankford 25kV	Engineering and Procurement
AB1-141	Church-Wye Mills 138 kV I	Engineering and Procurement
AB1-142	Church-Wye Mills 138 kV II	Engineering and Procurement
AB1-176	Price 25kV II	Active
AB2-032	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-036	Church-Steele 138kV	Active
AB2-120	Piney Grove-New Church 138kV	Active
AB2-130	Laurel 69kV	Active
AB2-133	Chestertown-Church 69kV	Active
AB2-135	Church-Kent 69kV	Active
AB2-136	West Cambridge-Vienna 69kV	Active
AB2-153	Church-Wye Mills 138 kV	Engineering and Procurement
AB2-172	Todd 69kV	Active
AB2-179	Townsend 138kV	Engineering and Procurement
AB2-180	Rockawalkin 69kV	Active
AB2-185	Wye Mills 25kV	Active
AC1-091	Cedar Creek 138kV I	Active
AC1-092	Cedar Creek 138kV II	Active
AC1-093	Cedar Creek 138kV III	Active
AC1-094	Cedar Creek 138kV IV	Active
AC1-190	East New Market 69kV	Active
AC1-213	North Salisbury 25kV	Active
AC2-023	Hebron 69kV	Active
AC2-185	Cedar Creek 138kV II	Active
AC2-186	Harrington 25kV	Active
AD2-076	Centreville 69 kV	Active
AE1-087	Todd 69 kV	Active
AE1-117	Bethany 138 kV	Active
AE1-118	Bethany-138th Street 138 kV	Active
AE1-145	Wallops Island 69 kV	Active
AE1-167	Wattsville 12 kV	Withdrawn
AE1-192	Belle Haven-Tasley 69 kV	Active
AE2-093	Easton-Steele 138 kV	Active
AE2-112	Carville 138 kV	Active
AE2-257	Cedar Neck 69 kV	Active
AF1-007	Indian River 230 kV I	Active

Queue Number	Project Name	Status
AF1-015	Easton-Steele 138 kV	Active
AF1-036	Carville 138 kV	Active
AF1-157	Laurel-Sussex 69 kV	Active
AF1-231	New Church 138 kV	Active
AF1-243	Tasley 25 kV	Active
AF1-244	Kingston 25 kV	Active
AF1-258	Rockawalkin 69 kV	Active
AF1-259	Price 25 kV	Active
AF1-269	Airey-Golden Hill 69 kV	Withdrawn
W1-003	Oak Hall	In Service
W1-004	Oak Hall	In Service
W1-005	Oak Hall	In Service
W1-006	Oak Hall	In Service
X1-032	Costen 25kV	In Service
X3-008	Todd 69kV	Under Construction
X3-066	Church Hill 69kV	In Service
Y1-079	Wye Mills 69kV	In Service
Y1-080	Dorchester 12kV	In Service
Y3-058	Rockawalkin 69kV	In Service
Z2-012	Weirwood-Eastville 69kV	In Service
Z2-076	Worcester South 25kV	In Service
Z2-077	Worcester North 25kV	In Service

11.9 Contingency Descriptions

Contingency Name	Contingency Definition
DPL_P7_1_DBL_1NCB_FSA	CONTINGENCY 'DPL_P7_1_DBL_1NCB_FSA' /* #1 & #2 KEENEY-STEELE 230 OPEN LINE FROM BUS 231003 TO BUS 232000 CKT 1 OPEN LINE FROM BUS 231003 TO BUS 923960 CKT 2 OPEN LINE FROM BUS 232000 TO BUS 923960 CKT 2 DISCONNECT BUS 923961 DISCONNECT BUS 923962 END

12 Light Load Analysis

The Queue Project AF1-007 was evaluated as a 7.3 MW injection as an uprate to AB1-056 at the Indian River 230 kV substation in the DPL area. Project AF1-007 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-007 was studied with a commercial probability of 100.0 %. Potential network impacts were as follows:

12.1 Generation Deliverability

(Single or N-1 contingencies)

None

12.2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies)

None

12.3 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

12.4 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.

None

12.5 System Reinforcements

None

12.6 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".

None

12.7 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.

None

12.8 Contingency Descriptions

None

13 Short Circuit Analysis

The following Breakers are overdutied:

None

13.1 System Reinforcements - Short Circuit

None

14 Stability and Reactive Power

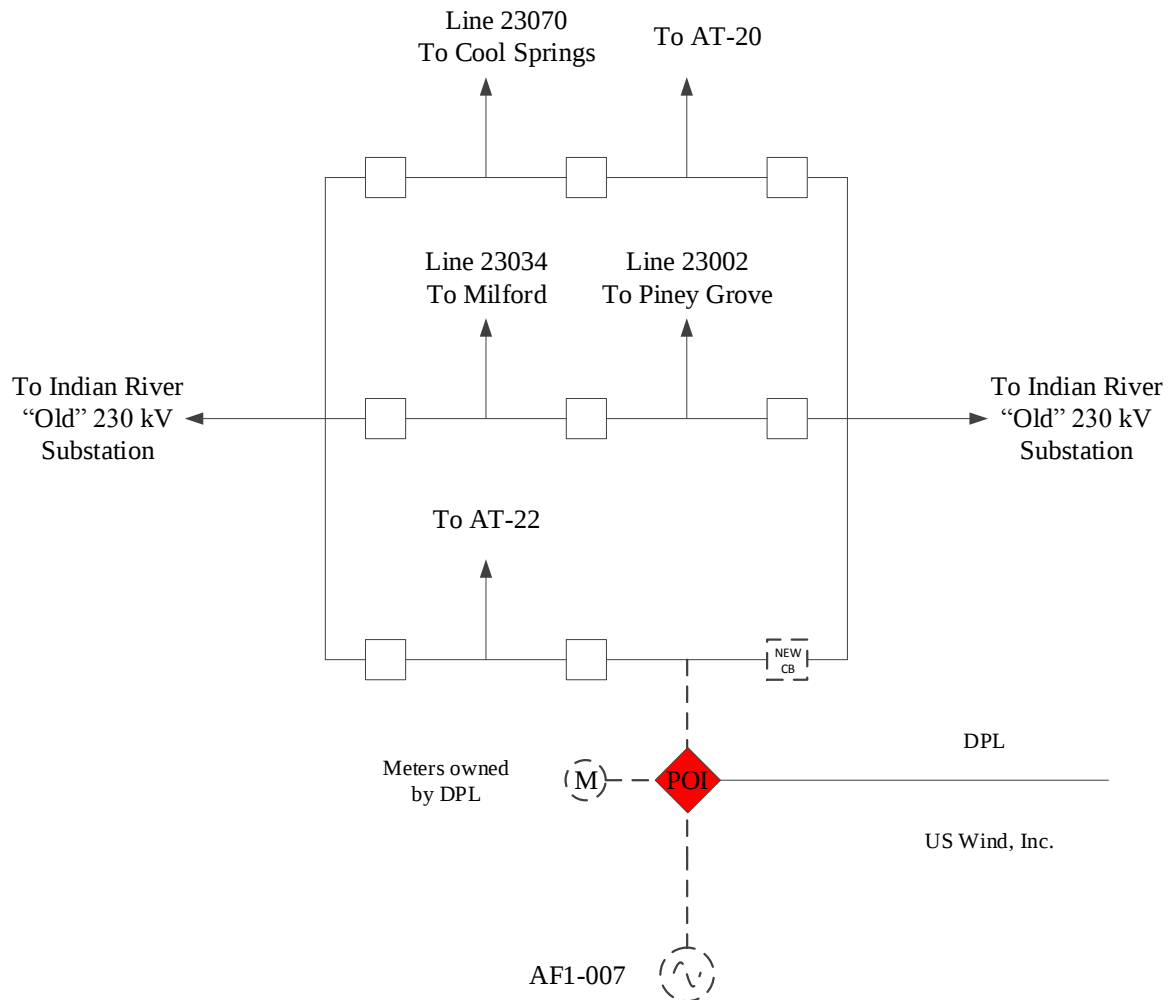
To be determined in the Facilities Study Phase.

15 Affected Systems

None

16 Attachment 1: One Line Diagram

AF1-007 Indian River 230 kV



An Interconnection Customer circuit breaker will be required no more than 500 feet from the DPL substation.



Existing Point of
Interconnection