



# **Generation Interconnection**

## **Feasibility Study Report**

**for**

**Queue Project AG1-214**

**GROTTOES 12.5 KV**

**7.6 MW Capacity / 19 MW Energy**

January 2021

# Table of Contents

1	Introduction.....	4
2	Preface.....	4
3	General.....	5
4	Point of Interconnection.....	6
5	Cost Summary.....	6
6	Transmission Owner Scope of Work.....	6
7	Schedule.....	6
8	Transmission Owner Analysis.....	7
8.1	Power Flow Analysis.....	7
9	Interconnection Customer Requirements.....	8
9.1	System Protection.....	8
9.2	Compliance Issues and Interconnection Customer Requirements.....	8
9.3	Power Factor Requirements.....	8
10	Revenue Metering and SCADA Requirements.....	9
10.1	PJM Requirements.....	9
10.2	Interconnected Transmission Owner Requirements.....	9
11	Summer Peak - Load Flow Analysis.....	10
11.1	Generation Deliverability.....	10
11.2	Multiple Facility Contingency.....	10
11.3	Contribution to Previously Identified Overloads.....	10
11.4	Potential Congestion due to Local Energy Deliverability.....	11
11.5	System Reinforcements - Summer Peak Load Flow - Primary POI.....	11
11.6	Flow Gate Details.....	12
11.6.1	Index 1.....	13
11.6.2	Index 2.....	14
11.6.3	Index 3.....	15
11.6.4	Index 4.....	16
11.7	Queue Dependencies.....	17
11.8	Contingency Descriptions.....	18
12	Short Circuit Analysis.....	19
12.1	System Reinforcements - Short Circuit.....	19

13 Affected Systems .....20  
13.1 TVA.....20  
13.2 Duke Energy Progress.....20  
14 Attachment 1: One Line Diagram .....21

## 1 Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, 36.2, as well as the Feasibility Study Agreement between the Interconnection Customer (IC), and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Dominion.

## 2 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. 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 impact study is performed.

The Feasibility 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.

### 3 General

The Interconnection Customer (IC), has proposed a Storage generating facility located in Rockingham County, Virginia. The installed facilities will have a total capability of 19 MW with 7.6 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.

<b>Queue Number</b>	<b>AG1-214</b>
<b>Project Name</b>	GROTTOES 12.5 KV
<b>State</b>	Virginia
<b>County</b>	Rockingham
<b>Transmission Owner</b>	Dominion
<b>MFO</b>	19
<b>MWE</b>	19
<b>MWC</b>	7.6
<b>Fuel</b>	Storage
<b>Basecase Study Year</b>	2024

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

AG1-214 will interconnect with the Dominion transmission system at the Grottoes 115 kV substation.

## 5 Cost Summary

The AG1-214 project will be responsible for the following costs:

Description	Total Cost
Total Physical Interconnection Costs	\$ To be determined in two party IA
Total System Network Upgrade Costs	\$ 24,387,000 <sup>1</sup>
Total Costs	\$ 24,387,000 + To be determined in two party IA

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 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.

Cost allocations for any System Upgrades will be provided in the System Impact Study Report.

## 6 Transmission Owner Scope of Work

Remote Terminal Work: During the Facilities Study, ITO's System Protection Engineering Department will review transmission line protection as well as anti-islanding required to accommodate the new generation and interconnection substation. System Protection Engineering will determine the minimal acceptable protection requirements to reliably interconnect the proposed generating facility with the transmission system. The review is based on maintaining system reliability by reviewing ITO's protection requirements with the known transmission system configuration which includes generating facilities in the area. This review may determine that transmission line protection and communication upgrades are required at remote substations.

## 7 Schedule

The estimated schedule for the required Network Impact Reinforcements is identified in the "System Reinforcements" section of this report.

---

<sup>1</sup> This project currently causes and/or contributes to overloads of the Transmission System (see Summer Peak Load Flow Analysis section below) and therefore has potential to have cost allocation for the system reinforcements listed in the report. This will be re-evaluated in the System Impact phase. The results may vary with queue customers withdrawing from the queue and other generators deactivating over time. If a customer is the first to cause the need for a project (causes loading to exceed 100% of rating), then the customer is responsible. If a customer contributes to a facility that is already overloaded by a prior queue, then they may receive cost allocation.

If the customer is ultimately responsible for network upgrades, then the schedule for those upgrades will be refined in future study phases. The customer would need to wait for those upgrades to be completed prior to commercial operation unless determined deliverable by an interim deliverability study. The elapsed time to complete any network upgrades is provided in the System Reinforcements table of this report.

## 8 Transmission Owner Analysis

Dominion assessed the impact of the proposed AG1-214 for compliance with NERC Reliability Criteria on the Dominion Transmission System. The system was assessed using the summer 2024 AG1 case provided to Dominion by PJM.

When performing a generation analysis, Dominion's main analysis includes load flow study results following a single contingency event for both normal and stressed system conditions. Dominion Criteria considers a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. A full listing of Dominion's Planning Criteria and interconnection requirements can be found in the Company's Facility Connection Requirements which are publicly available at: <http://www.dominionenergy.com>.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC Planning and Operating Reliability Criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically, in Planning Studies, NERC Planning Event 3 and 6 Contingency Conditions (Loss of generator, transmission circuit, transformer, shunt device, or Single Pole of a DC line followed by the loss of a generator, transmission circuit, transformer, shunt device or single pole of a DC line) allow for re-dispatch of generating units to resolve potential reliability deficiencies. For Dominion Planning Criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility Load Dump Rating.

### 8.1 Power Flow Analysis

PJM performed a power flow analysis of the transmission system using a 2024 summer peak load flow model and the results were verified by Dominion. Additionally, Dominion performed an analysis of its transmission system and no further deficiencies were identified.

## 9 Interconnection Customer Requirements

### 9.1 System Protection

The IC must design its Customer Facilities in accordance with all applicable standards, including the standards in Dominion’s “Dominion Energy Electric Transmission Generator Interconnection Requirements” documented in Dominion’s Facility Interconnection Requirements “Exhibit C” located at:

<https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>. Preliminary Protection requirements will be provided as part of the Facilities Study. Detailed Protection Requirements will be provided once the project enters the construction phase.

### 9.2 Compliance Issues and Interconnection Customer Requirements

The proposed Customer Facilities must be designed in accordance with Dominion’s “Dominion’s Facility Interconnection Requirements” document located at: <https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>. In particular, the IC is responsible for the following:

1. The purchase and installation of a fully rated protection device (circuit breaker, circuit switcher, fuse) to protect the IC’s GSU transformer(s).
2. The purchase and installation of the minimum required Dominion generation interconnection relaying and control facilities as described in the System Protection section noted above. This includes over/under voltage protection, over/under frequency protection, and zero sequence voltage protection relays.
3. The purchase and installation of supervisory control and data acquisition (“SCADA”) equipment to provide information in a compatible format to the Dominion Transmission System Control Center.
4. Compliance with the Dominion and PJM generator power factor and voltage control requirements.

The GSU(s) associated with the IC queue request shall meet the grounding requirements as noted in Dominion’s “Dominion’s Facility Interconnection Requirements” document located at: <https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>.

The IC will also be required to meet all PJM, SERC, and NERC reliability criteria and operating procedures for standards compliance. For example, the IC will need to properly locate and report the over and under voltage and over and under frequency system protection elements for its units as well as the submission of the generator model and protection data required to satisfy the PJM and SERC audits. Failure to comply with these requirements may result in a disconnection of service if the violation is found to compromise the reliability of the Dominion system.

### 9.3 Power Factor Requirements

The IC shall design its non-synchronous Customer Facility with the ability to maintain a power factor of at least 0.95 leading (absorbing VARs) to 0.95 lagging (supplying VARs) measured at the high-side of the facility substation transformer(s) connected to the Dominion transmission system.

## **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/>

## 11 Summer Peak - Load Flow Analysis

The Queue Project AG1-214 was evaluated as a 19.0 MW (Capacity 7.6 MW) injection at the Grottoes 115 kV substation in the Dominion area. Project AG1-214 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AG1-214 was studied with a commercial probability of 53.0 %. 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
163199428	314794	6DOOMS	230.0	DVP	963470	AG1-196 TAP	230.0	DVP	1	DVP_P7-1: LN 253-2109	tower	830.0	99.91	101.67	DC	14.67

### 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
166925383	313706	3ELKTON	115.0	DVP	314798	3MERCK5	115.0	DVP	1	DVP_P7-1: LN 2017-2134-B	tower	251.0	107.32	108.75	DC	3.57
166925384	313706	3ELKTON	115.0	DVP	314798	3MERCK5	115.0	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	107.28	108.71	DC	3.57
166925403	314802	3GROTOES	115.0	DVP	940450	AE2-029 TAP	115.0	DVP	1	DVP_P7-1: LN 2017-2134-B	tower	251.0	104.24	105.67	DC	3.57
166925404	314802	3GROTOES	115.0	DVP	940450	AE2-029 TAP	115.0	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	104.2	105.63	DC	3.57
166925376	940450	AE2-029 TAP	115.0	DVP	313706	3ELKTON	115.0	DVP	1	DVP_P7-1: LN 2017-2134-B	tower	251.0	109.44	110.86	DC	3.57
166925377	940450	AE2-029 TAP	115.0	DVP	313706	3ELKTON	115.0	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	109.4	110.82	DC	3.57

### 11.4 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

### 11.5 System Reinforcements - Summer Peak Load Flow - Primary POI

ID	Idx	Facility	Upgrade Description	Cost
166925376,166925377	4	AE2-029 TAP 115.0 kV - 3ELKTON 115.0 kV Ckt 1	<u>DVP</u> dom-400 (443) : Reconductor 5.31 miles of 115 kV Line 119 from Elkton to AE2-029 Tap with 636 ACSR 150 C. Project Type : FAC Cost : \$3,186,000 Time Estimate : 30-36 Months	\$3,186,000
163199428	1	6DOOMS 230.0 kV - AG1-196 TAP 230.0 kV Ckt 1	<u>DVP</u> dom-373 (416) : Rebuild 11.17 miles of 230 kV Line 272 from Dooms to AG1-196 Tap with 2-636 ACSR 150 C Project Type : FAC Cost : \$16,755,000 Time Estimate : 36-40 Months	\$16,755,000
166925383,166925384	2	3ELKTON 115.0 kV - 3MERCCK5 115.0 kV Ckt 1	<u>DVP</u> dom-264 (307) : Reconductor 2.47miles of 115 kV line 119 from Elkton DP to Merck with 636 ACSR 150 C Project Type : FAC Cost : \$1,482,000 Time Estimate : 30-36 Months	\$1,482,000
166925404,166925403	3	3GROTOES 115.0 kV - AE2-029 TAP 115.0 kV Ckt 1	<u>DVP</u> dom-374 (417) : Reconductor 4.94 miles of 115 kV Line 119 from Grottoes to AE2-029 Tap with 636 ACSR 150 C Project Type : FAC Cost : \$2,964,000 Time Estimate : 30-36 Months	\$2,964,000
			<b>TOTAL COST</b>	<b>\$24,387,000</b>

## 11.6 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".

---

### 11.6.1 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
163199428	314794	6DOOMS	DVP	963470	AG1-196	DVP	1	DVP_P7-1: LN 253-2109	tower	830.0	99.91	101.67	DC	14.67

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943572	AF1-028 BAT	122.6400	50/50	122.6400
961721	AG1-012 BAT	1.4789	Merchant Transmission	1.4789
962883	AG1-137 BAT	71.5740	50/50	71.5740
963022	AG1-151 BAT	61.3200	50/50	61.3200
963472	AG1-196 BAT	127.9770	50/50	127.9770
963633	AG1-214 BAT	14.6735	50/50	14.6735
WEC	WEC	0.1225	Confirmed LTF	0.1225
LGEE	LGEE	0.2714	Confirmed LTF	0.2714
CPLE	CPLE	0.5719	Confirmed LTF	0.5719
CBM-W2	CBM-W2	4.6144	Confirmed LTF	4.6144
NY	NY	0.2621	Confirmed LTF	0.2621
TVA	TVA	0.8386	Confirmed LTF	0.8386
O-066	O-066	3.4929	Confirmed LTF	3.4929
SIGE	SIGE	0.1003	Confirmed LTF	0.1003
CBM-S2	CBM-S2	8.3520	Confirmed LTF	8.3520
CBM-S1	CBM-S1	0.2162	Confirmed LTF	0.2162
G-007	G-007	0.5481	Confirmed LTF	0.5481
MEC	MEC	0.6896	Confirmed LTF	0.6896
LAGN	LAGN	1.0063	Confirmed LTF	1.0063
CBM-W1	CBM-W1	5.0472	Confirmed LTF	5.0472

## 11.6.2 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
166925384	313706	3ELKTON	DVP	314798	3MERCK5	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	107.28	108.71	DC	3.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940451	AE2-029 C	8.0589	50/50	8.0589
940452	AE2-029 E	5.3726	50/50	5.3726
943572	AF1-028 BAT	63.5660	50/50	63.5660
961721	AG1-012 BAT	0.8236	Merchant Transmission	0.8236
963022	AG1-151 BAT	31.7830	50/50	31.7830
963631	AG1-214 C	1.4290	50/50	1.4290
963632	AG1-214 E	2.1434	50/50	2.1434
WEC	WEC	0.0737	Confirmed LTF	0.0737
LGEE	LGEE	0.1621	Confirmed LTF	0.1621
CPLE	CPLE	0.3099	Confirmed LTF	0.3099
CBM-W2	CBM-W2	2.6970	Confirmed LTF	2.6970
NY	NY	0.1510	Confirmed LTF	0.1510
TVA	TVA	0.4844	Confirmed LTF	0.4844
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0591	Confirmed LTF	0.0591
CBM-S2	CBM-S2	4.6249	Confirmed LTF	4.6249
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.3192	Confirmed LTF	0.3192
MEC	MEC	0.4100	Confirmed LTF	0.4100
LAGN	LAGN	0.5827	Confirmed LTF	0.5827
CBM-W1	CBM-W1	3.0423	Confirmed LTF	3.0423

### 11.6.3 Index 3

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
166925404	314802	3GROTOES	DVP	940450	AE2-029 TAP	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	104.2	105.63	DC	3.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
943572	AF1-028 BAT	63.5660	50/50	63.5660
961721	AG1-012 BAT	0.8236	Merchant Transmission	0.8236
963022	AG1-151 BAT	31.7830	50/50	31.7830
963631	AG1-214 C	1.4290	50/50	1.4290
963632	AG1-214 E	2.1434	50/50	2.1434
WEC	WEC	0.0737	Confirmed LTF	0.0737
LGEE	LGEE	0.1621	Confirmed LTF	0.1621
CPLE	CPLE	0.3099	Confirmed LTF	0.3099
CBM-W2	CBM-W2	2.6970	Confirmed LTF	2.6970
NY	NY	0.1510	Confirmed LTF	0.1510
TVA	TVA	0.4844	Confirmed LTF	0.4844
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0591	Confirmed LTF	0.0591
CBM-S2	CBM-S2	4.6249	Confirmed LTF	4.6249
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.3192	Confirmed LTF	0.3192
MEC	MEC	0.4100	Confirmed LTF	0.4100
LAGN	LAGN	0.5827	Confirmed LTF	0.5827
CBM-W1	CBM-W1	3.0423	Confirmed LTF	3.0423

#### 11.6.4 Index 4

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
166925377	940450	AE2-029 TAP	DVP	313706	3ELKTON	DVP	1	DVP_P7-1: LN 2017-2134-A	tower	251.0	109.4	110.82	DC	3.57

Bus #	Bus	Gendeliv MW Impact	Type	Full MW Impact
940451	AE2-029 C	8.0589	50/50	8.0589
940452	AE2-029 E	5.3726	50/50	5.3726
943572	AF1-028 BAT	63.5660	50/50	63.5660
961721	AG1-012 BAT	0.8236	Merchant Transmission	0.8236
963022	AG1-151 BAT	31.7830	50/50	31.7830
963631	AG1-214 C	1.4290	50/50	1.4290
963632	AG1-214 E	2.1434	50/50	2.1434
WEC	WEC	0.0737	Confirmed LTF	0.0737
LGEE	LGEE	0.1621	Confirmed LTF	0.1621
CPLE	CPLE	0.3099	Confirmed LTF	0.3099
CBM-W2	CBM-W2	2.6970	Confirmed LTF	2.6970
NY	NY	0.1510	Confirmed LTF	0.1510
TVA	TVA	0.4844	Confirmed LTF	0.4844
O-066	O-066	2.0392	Confirmed LTF	2.0392
SIGE	SIGE	0.0591	Confirmed LTF	0.0591
CBM-S2	CBM-S2	4.6249	Confirmed LTF	4.6249
CBM-S1	CBM-S1	0.1254	Confirmed LTF	0.1254
G-007	G-007	0.3192	Confirmed LTF	0.3192
MEC	MEC	0.4100	Confirmed LTF	0.4100
LAGN	LAGN	0.5827	Confirmed LTF	0.5827
CBM-W1	CBM-W1	3.0423	Confirmed LTF	3.0423

## 11.7 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.

Queue Number	Project Name	Status
AE2-029	Grottoes-Merck 115kV	Active
AF1-028	Endless Caverns 115 kV	Active
AG1-012	Mewdow Brook-Strasburg 138 kV II	Active
AG1-137	Harrisonburg 230 kV	Active
AG1-151	Endless Caverns 115 kV	Active
AG1-196	Grottoes-Dooms 230 kV	Active
AG1-214	Grottoes 12.5 kV	Active

## 11.8 Contingency Descriptions

Contingency Name	Contingency Definition
<b>DVP_P7-1: LN 253-2109</b>	CONTINGENCY 'DVP_P7-1: LN 253-2109' /* . OPEN BRANCH FROM BUS 314806 TO BUS 314817 CKT 1 /* 6HARSNBG 230.00 - 6VALLEY 230.00 OPEN BRANCH FROM BUS 314750 TO BUS 314806 CKT 1 /* 6DAYTON 230.00 - 6HARSNBG 230.00 OPEN BRANCH FROM BUS 314750 TO BUS 314817 CKT 1 /* 6DAYTON 230.00 - 6VALLEY 230.00 OPEN BUS 314750 /* ISLAND: 6DAYTON 230.00 END
<b>DVP_P7-1: LN 2017-2134-B</b>	CONTINGENCY 'DVP_P7-1: LN 2017-2134-B' /* . OPEN BRANCH FROM BUS 314800 TO BUS 314805 CKT 1 /* 6END
<b>DVP_P7-1: LN 2017-2134-A</b>	CONTINGENCY 'DVP_P7-1: LN 2017-2134-A' /* . OPEN BRANCH FROM BUS 314800 TO BUS 944070 CKT 1 /* 6END

## 12 Short Circuit Analysis

The following Breakers are overdutied

None

### 12.1 System Reinforcements - Short Circuit

None

## **13 Affected Systems**

### **13.1 TVA**

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

### **13.2 Duke Energy Progress**

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

## 14 Attachment 1: One Line Diagram