

Submission of Supplemental Projects for Inclusion in the Local Plan

DEOK Transmission Zone M-3 Process Aero/Woodspoint

Need Number: DEOK-2018-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 6-27-2019

Previously Presented:

Need 11-29-2018

Solution 01-11-2019

Project Driver:

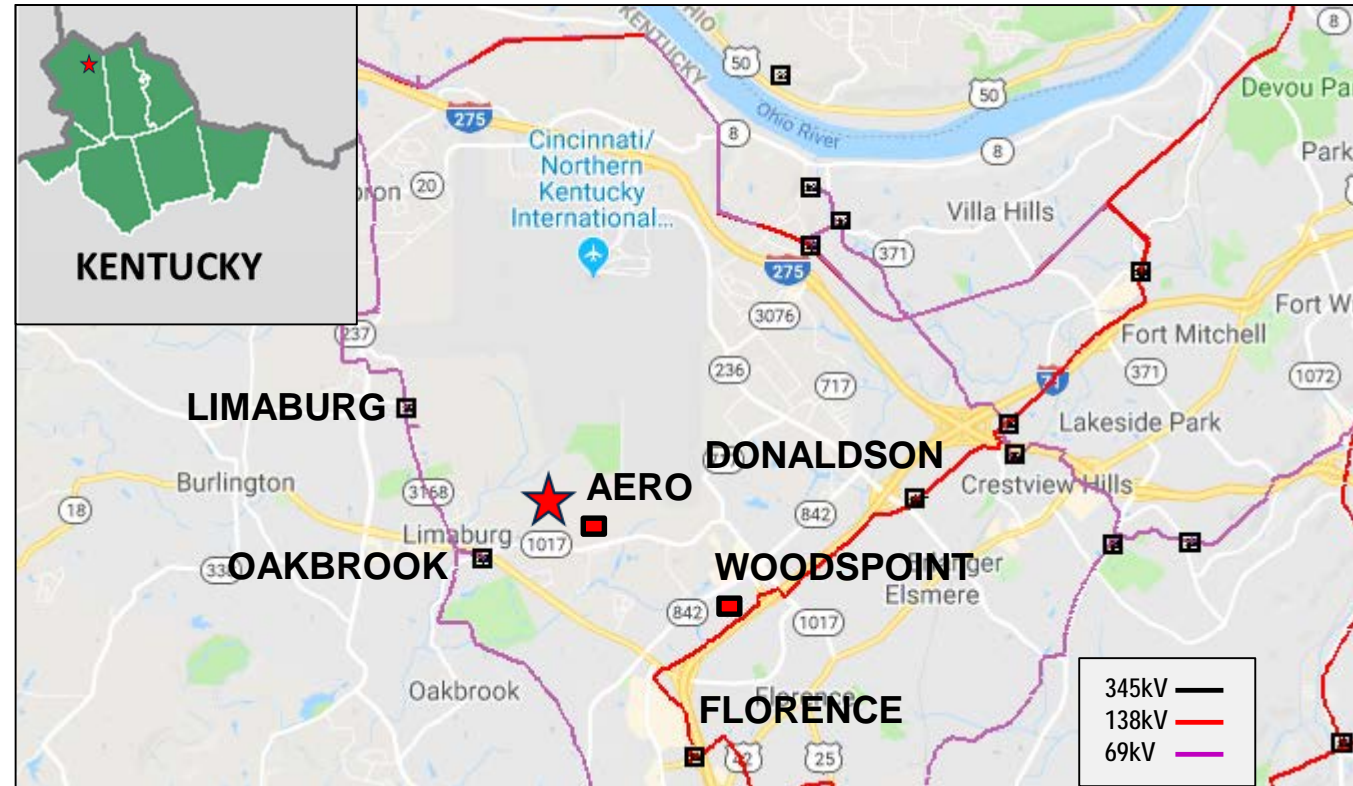
Customer Service

Specific Assumption Reference:

Serving new customer load

Problem Statement:

Amazon Prime Air has requested distribution service (13 kV) for a new air hub to be located at the Cincinnati/Northern Kentucky International Airport. Initial demand is projected to be 30 MW with phased growth to 80 MW.



DEOK Transmission Zone M-3 Process Aero/Woodspoint

Need Number: DEOK-2018-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 6-27-2019

Selected Solution:

Install a new 138 kV, 3-breaker ring bus substation, Woodspoint. Install a new 138 kV, 6-breaker ring bus, Aero, near Amazon Prime Hub. Install new 138 kV lines from Woodspoint to Aero, and from Aero to Oakbrook. The lines will be rated at 301 MVA. At Aero install four 138/13 kV, 22 MVA transformers. At Oakbrook install one 138/69 kVA, 150 MVA transformer with high side and low side breakers.

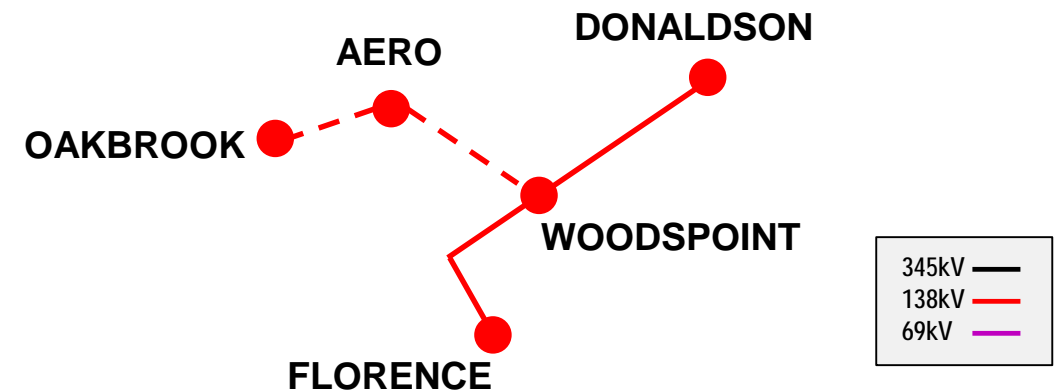
Estimated Cost: \$30,159,604

Projected In-Service: 12-31-2020

Supplemental Project ID: s1782

Project Status: Engineering

Model: 2022 Summer RTEP 50/50



DEOK Transmission Zone M-3 Process Garver

Need Number: DEOK-2018-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 6-27-2019

Previously Presented:

Need 11-29-2018

Solution 01-11-2019

Project Driver:

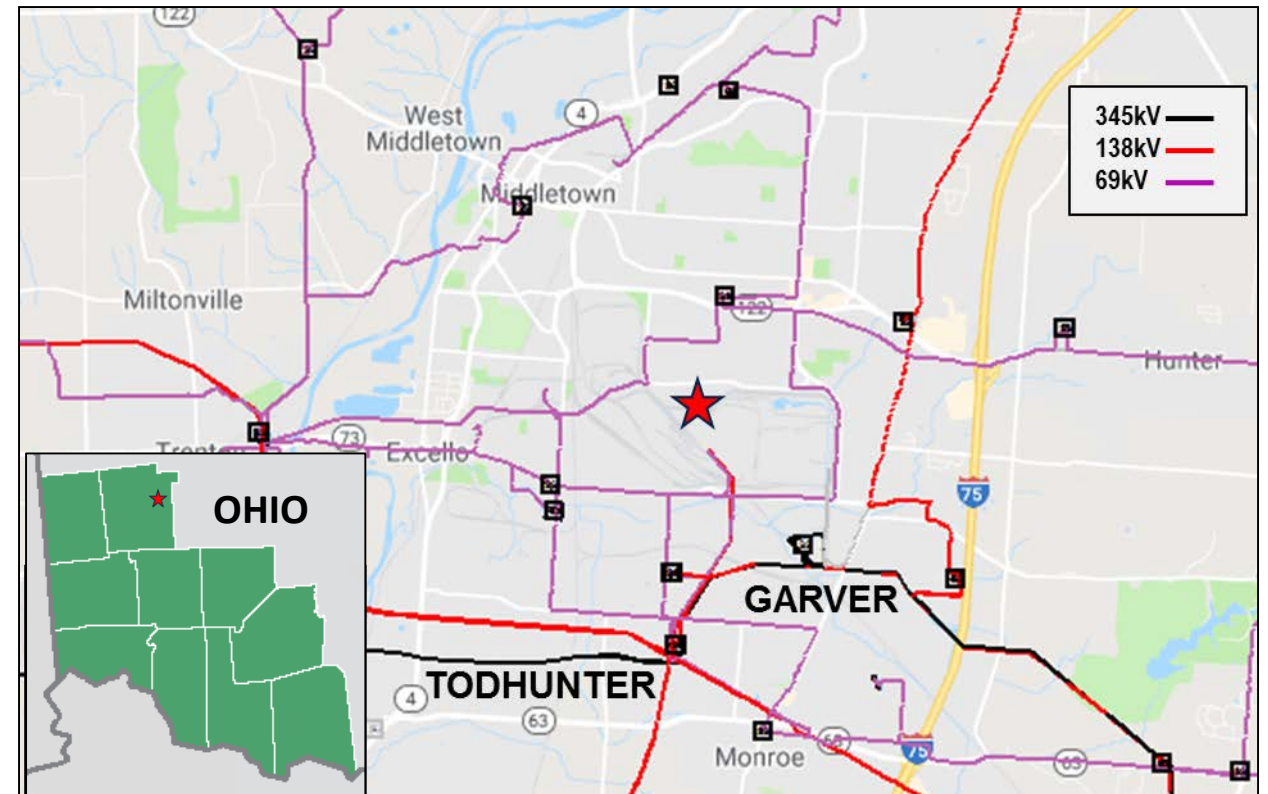
Operational Flexibility and Efficiency, Infrastructure Resilience, Customer Service

Specific Assumption Reference:

Operational options for switching, Diversify sources and source paths to load areas

Problem Statement:

A large industrial customer (200+ MW) is supplied by two 138 kV circuits. The circuits are fed from Todhunter on shared towers. Planned maintenance work on each circuit will require extended outages. The customer is at risk of complete interruption if the remaining circuit experiences an outage. Customer advises that complete interruption would have grave consequences on customer's processes potentially leading to ceasing operations (closure of plant). Customer also advises that a minimum of 75 MW is required for a safe shutdown of equipment.



DEOK Transmission Zone M-3 Process Garver

Need Number: DEOK-2018-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan 6-27-2019

Selected Solution:

Install a new 138 kV feeder from Garver substation to the customer. This 3rd feeder will have enough capacity to allow full production or safe shutdown of the plant without the loss of equipment. This third feeder will allow planned maintenance or emergent work to be preformed at Todhunter substation without the need to wait for a plant shutdown, benefitting all customers. Scope: Build 1.2 mile, 138 kV, 301 MVA feeder on an existing Duke right of way to the customer's property. Install two 138 kV breakers and associated equipment at Garver substation.

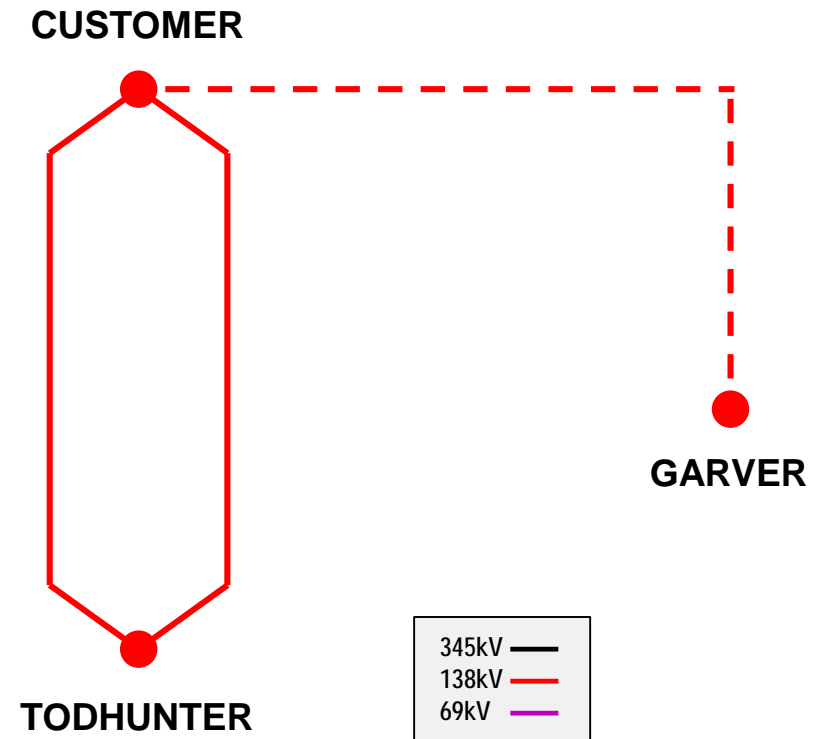
Estimated Cost: \$7,560,154

Projected In-Service: 12-31-2019

Supplemental Project ID: s1783

Project Status: Under Construction

Model: 2022 Summer RTEP 50/50



Need Number: DEOK-2019-002

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 04-23-2019

Needs Meeting 02-20-2019

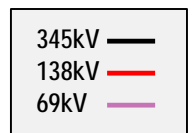
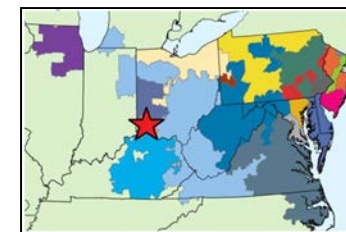
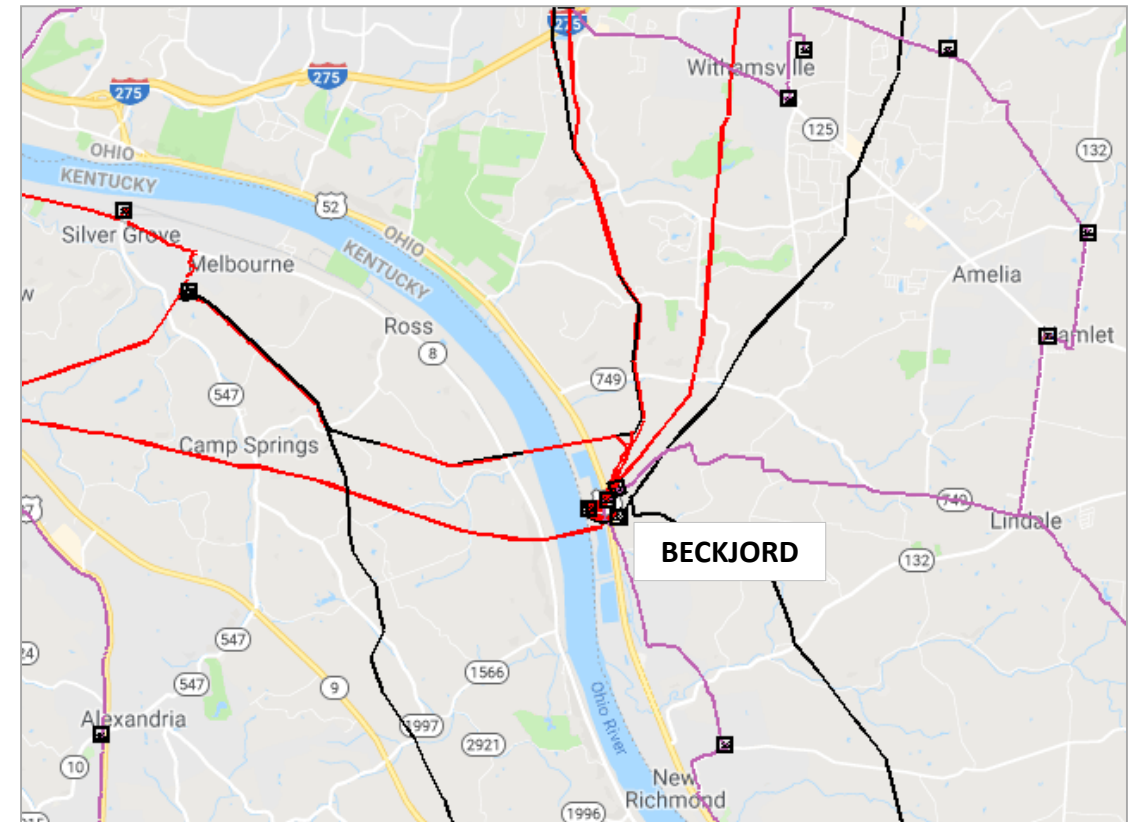
Project Driver: Equipment Condition, Performance and Risk

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slides 6 - 7

Problem Statement:

Beckjord 138kV buses 3 and 4 are 66 years old, constructed of copper bus with cap and pin insulators, and are in deteriorating condition. The breakers on these busses are oil filled and obsolete. Rebar is showing through the deteriorating structural and equipment foundations.



Need Number: DEOK-2019-002

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Replace/repair foundations as necessary. Rebuild buses 3 and 4.
Retire one oil filled circuit breaker no longer in service. Replace three oil filled circuit breakers.

Estimated Transmission Cost: \$ 5,552,779

Projected In-Service: 12-31-2020

Supplemental Project ID: S1926

Project Status: Engineering

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**



Need Number: DEOK-2019-003

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 03-25-2019

Needs Meeting 02-20-2019

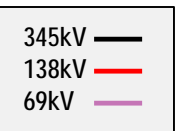
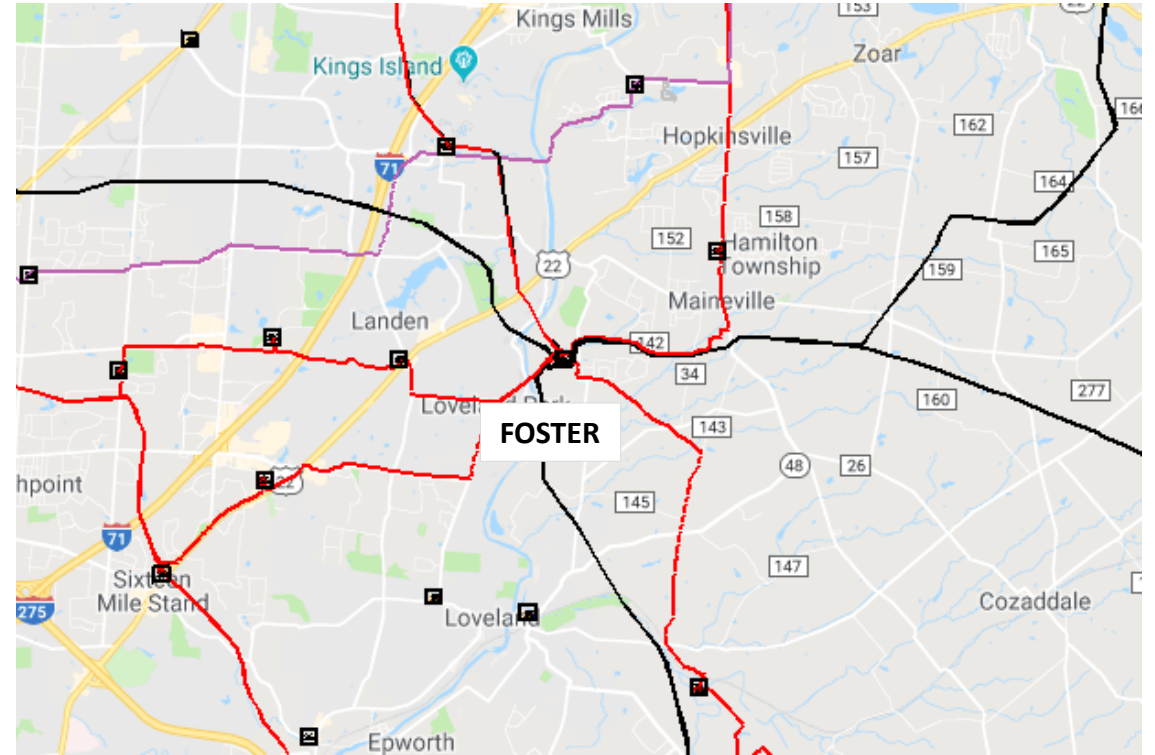
Project Driver: Equipment Condition, Performance and Risk

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slides 6 - 7

Problem Statement:

Technical Services continues to have problems with the mechanisms on three 345kV breakers at Foster. The manufacturer no longer makes the mechanism for these 1990 vintage breakers. The breakers also have an on-going problem leaking SF6 gas.



Need Number: DEOK-2019-003

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Replace the three 2000A breakers with 3000A breakers.

Estimated Transmission Cost: \$ 2,716,629

Projected In-Service: 12-31-2019

Supplemental Project ID: S1927

Project Status: Construction

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**





DEOK Transmission Zone M-3 Process Maineville

Need Number: DEOK-2019-006

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 03-25-2019

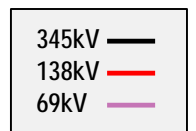
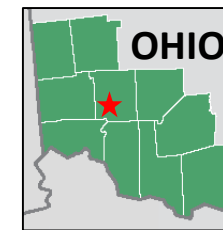
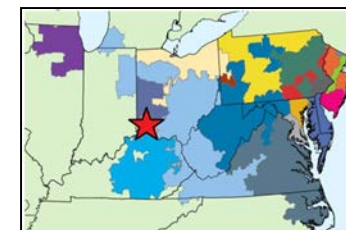
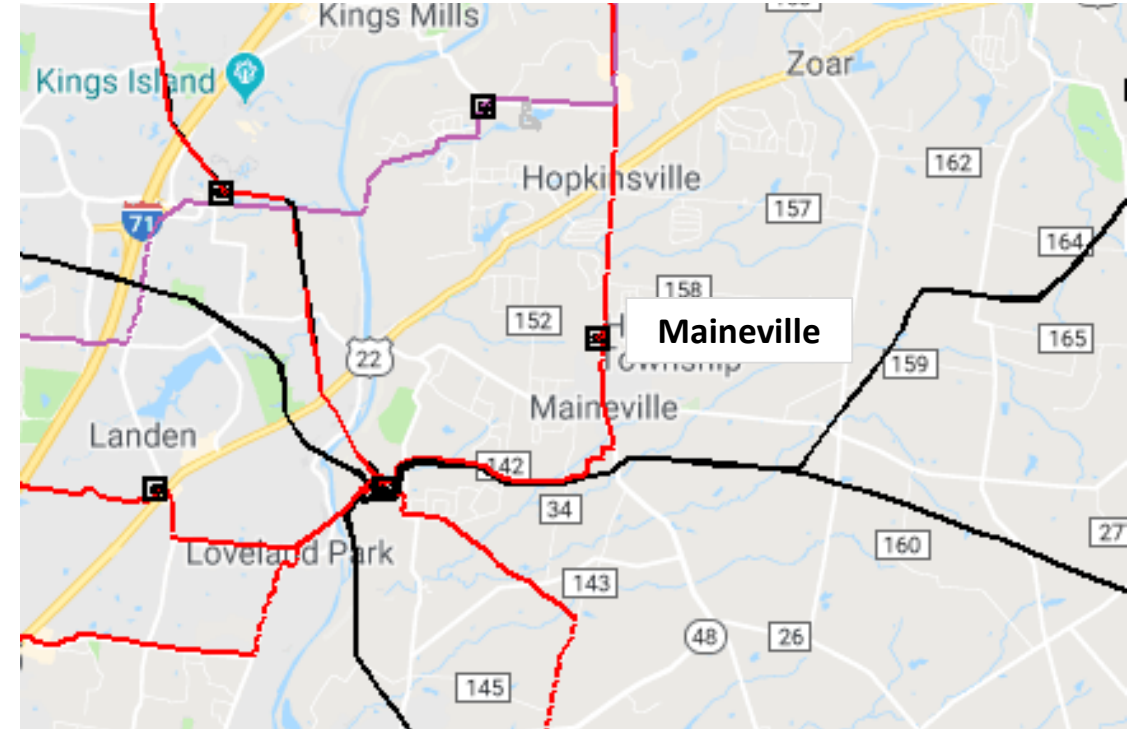
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

Duke Energy Distribution has requested a new delivery point at Maineville substation. Loading on the single 138/13kV 22MVA transformer at Maineville has reached its nameplate rating.



Need Number: DEOK-2019-006

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Expand Maineville substation. Extend the 138kV bus. Add a second 138/13kV 22MVA transformer, 13kV bus work and breakers for two feeder exits. The new transformer will be switch connected to the 138kV bus similar to TB1.

Transmission Cost Estimate: \$0

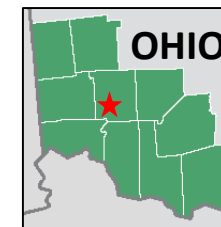
Projected In-service Date: 06-01-2020

Supplemental Project ID: S1928

Project Status: Engineering

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**





DEOK Transmission Zone M-3 Process Hamlet

Need Number: DEOK-2019-008

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 03-25-2019

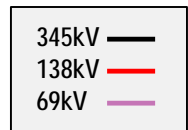
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

Duke Energy Distribution has requested a new delivery point at Hamlet substation. Winter loading on the single 69/13kV 10.5MVA transformer at Hamlet has reached 96% of its nameplate rating. New residential subdivisions in this area are planned to be completed by 2021. Winter loading is expected to increase 10% since gas service in much of this area is not available.



Need Number: DEOK-2019-008

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Extend the 69kV bus. Add a second 69/13kV 10.5MVA transformer, 13kV bus work and breaker for one feeder exit at Hamlet. The new transformer will be switch connected to the 69kV bus similar to TB1.

**Bubble Diagram Not Applicable
Station Modifications Only**

Transmission Cost Estimate: \$0

Projected In-service Date: 06-01-2020

Supplemental Project ID: S1929

Project Status: Engineering

Model: 2018 RTEP Summer



Need Number: DEOK-2019-009

Process Stage: Local Plan Submission 09-10-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 03-25-2019

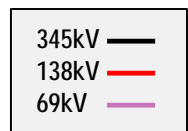
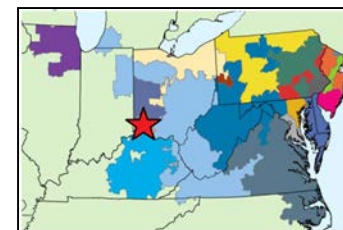
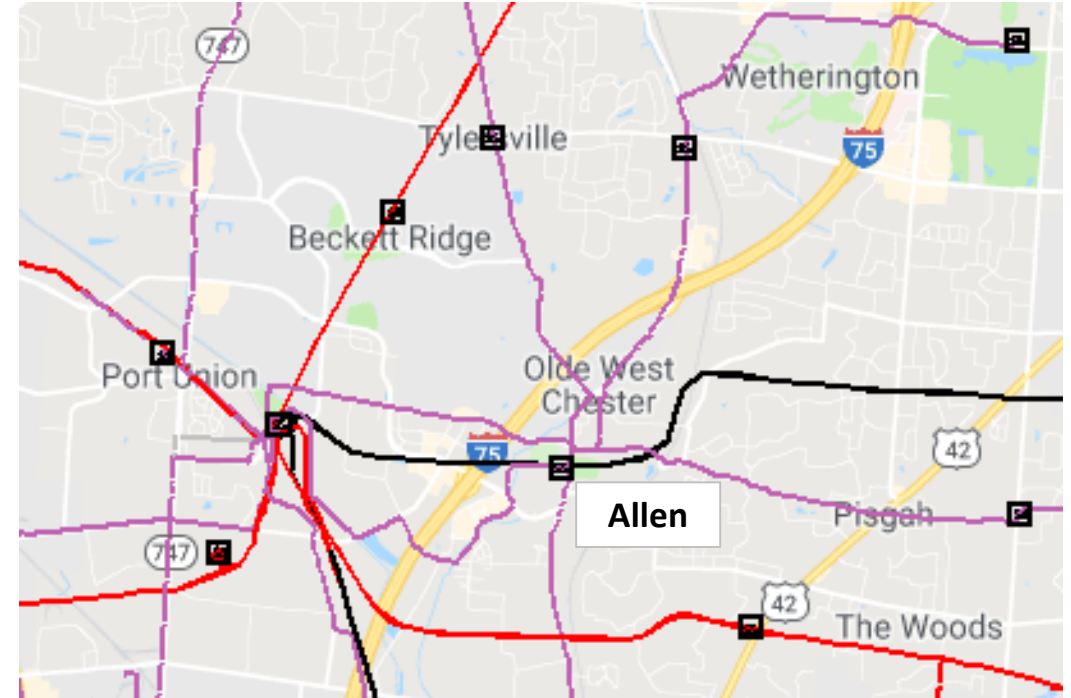
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

Duke Energy Distribution has requested a new delivery point at Allen substation. Loading on Allen's single 69/13kV 22MVA transformer has reached the nameplate rating.



Need Number: DEOK-2019-009

Process Stage: Local Plan Submission 09-10-2019

Selected Solution:

Extend the 69kV bus. Add a second 69/13kV 22MVA transformer, 13kV bus work and breakers for two feeder exits at Allen. The new transformer will be switch connected to the 69kV bus similar to TB1.

**Bubble Diagram Not Applicable
Station Modifications Only**

Transmission Cost Estimate: \$0

Projected In-service Date: 06-01-2020

Supplemental Project ID: S1930

Project Status: Engineering

Model: 2018 RTEP Summer



Need Number: DEOK-2019-010

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 03-25-2019

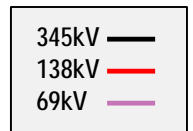
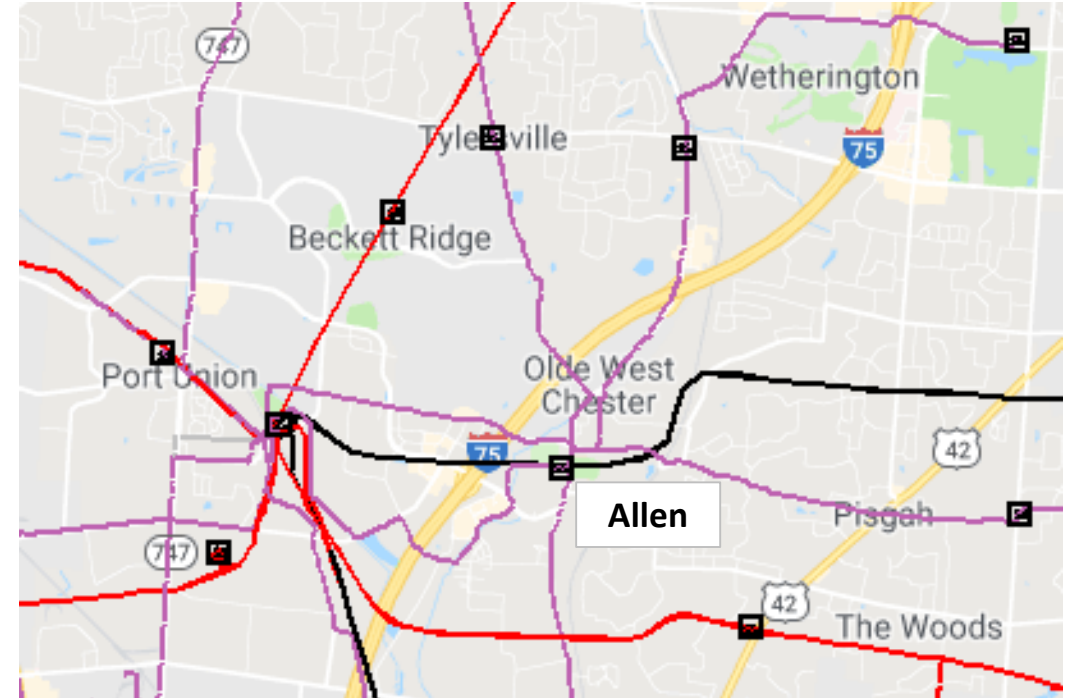
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

Duke Energy Distribution has requested a new delivery point in the Mason Ohio area. New light industrial load growth requires 7MW of service by 2021 with and additional 15MW expected by 2022.



Need Number: DEOK-2019-010

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Build a new 69kV distribution substation, Landen, with two 13kV feeder exits. Loop the 69kV Pisgah-Kings Mills feeder through the substation. Install one 69/13kV 22.4MVA transformer with a high side circuit switcher.

Estimated Transmission Cost: \$0

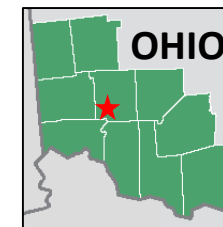
Projected In-Service: 12-31-2020

Supplemental Project ID: S1931

Project Status: Engineering

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**



Need Number: DEOK-2019-011

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 03-25-2019

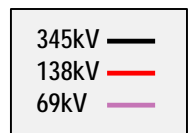
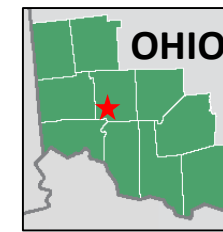
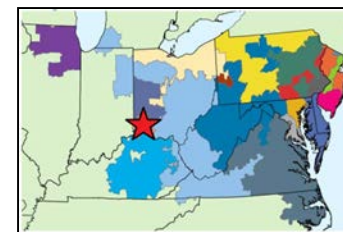
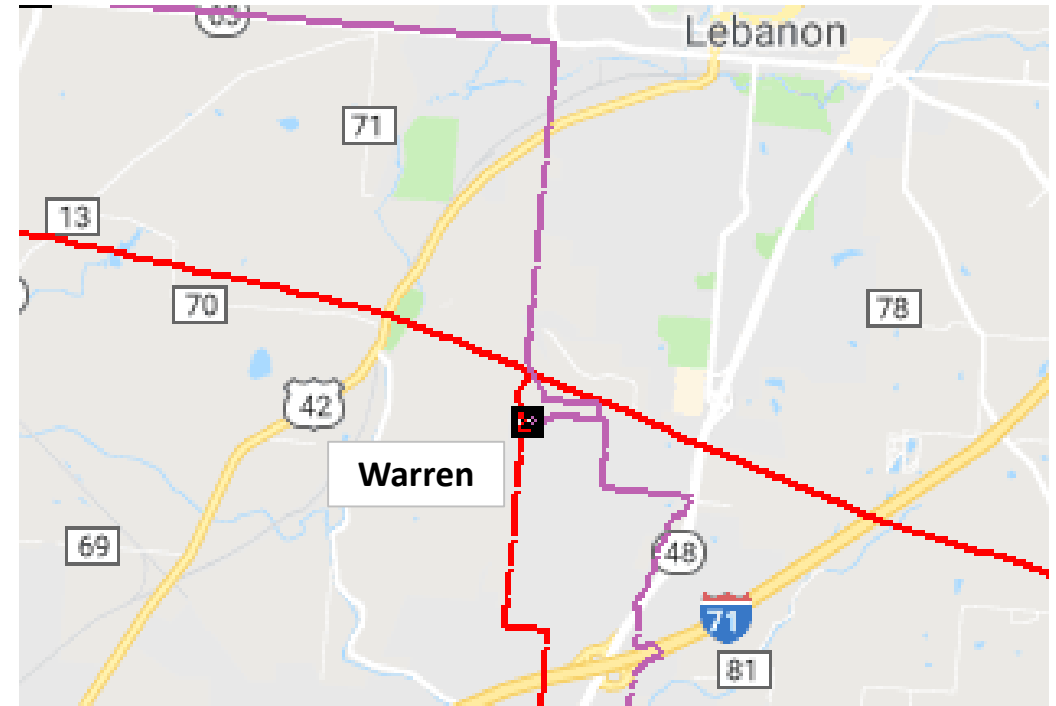
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

Warren 138/69kV 100MVA TB1 showed a sharp increase in gassing in 2016. Over the past three years the gas levels continue to increase. The main gasses of concern are ethane and ethylene, indicating a potential deterioration of insulation. Indications are trending towards a possible failure. (continued)

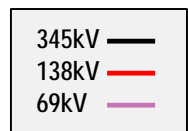
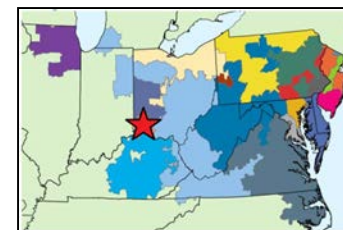
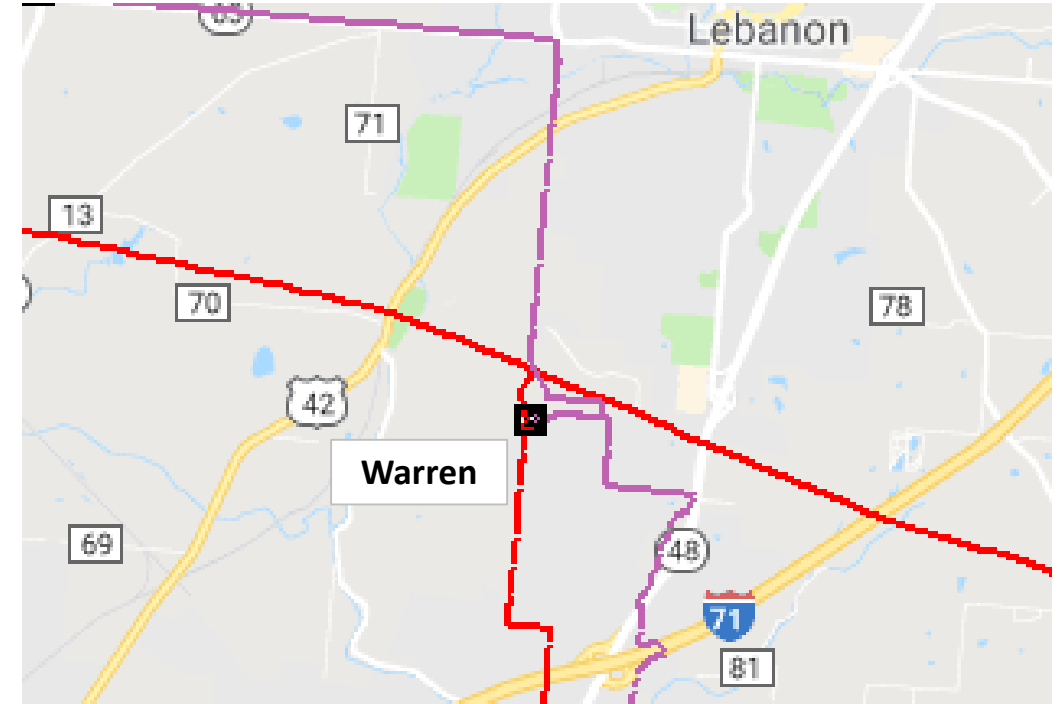


Need Number: DEOK-2019-011

Process Stage: Local Plan Submission 09-11-2019

Problem Statement:

(continued) There has also been an increase in power factor during routine testing indicating the transformer trending towards the end of its useful life. This 62 year old transformer is FOA rated. The capacity of the original cooling equipment has degraded with age. In the event of a failure, it would take an extended amount of time to replace this transformer with a spare (3-4 months). It would require foundation modifications, physical bus modifications, new conduits and control cables. This transformer supplies 69kV service to The City of Lebanon Electric Department.



Need Number: DEOK-2019-011

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Replace TB1 with a 138/69kV 150MVA transformer. Replace jumpers to the high side and low side transformer bushings and lightning arrestors. Install new high voltage and low voltage surge arrestors.

Estimated Transmission Cost: \$3,493,100

Projected In-Service: 12-31-2020

Supplemental Project ID: S1932

Project Status: Engineering

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**





DEOK Transmission Zone M-3 Process Trenton

Need Number: DEOK-2019-012

Process Stage: Local Plan Submission 09-11-2019

Previously Presented:

Solutions Meeting 05-20-2019

Needs Meeting 04-23-2019

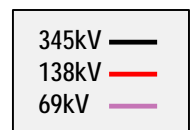
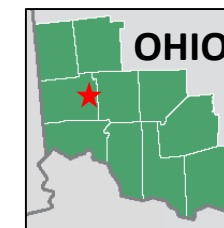
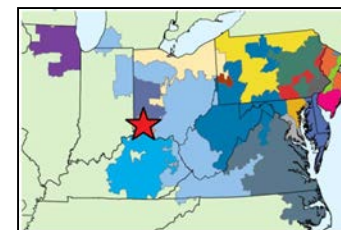
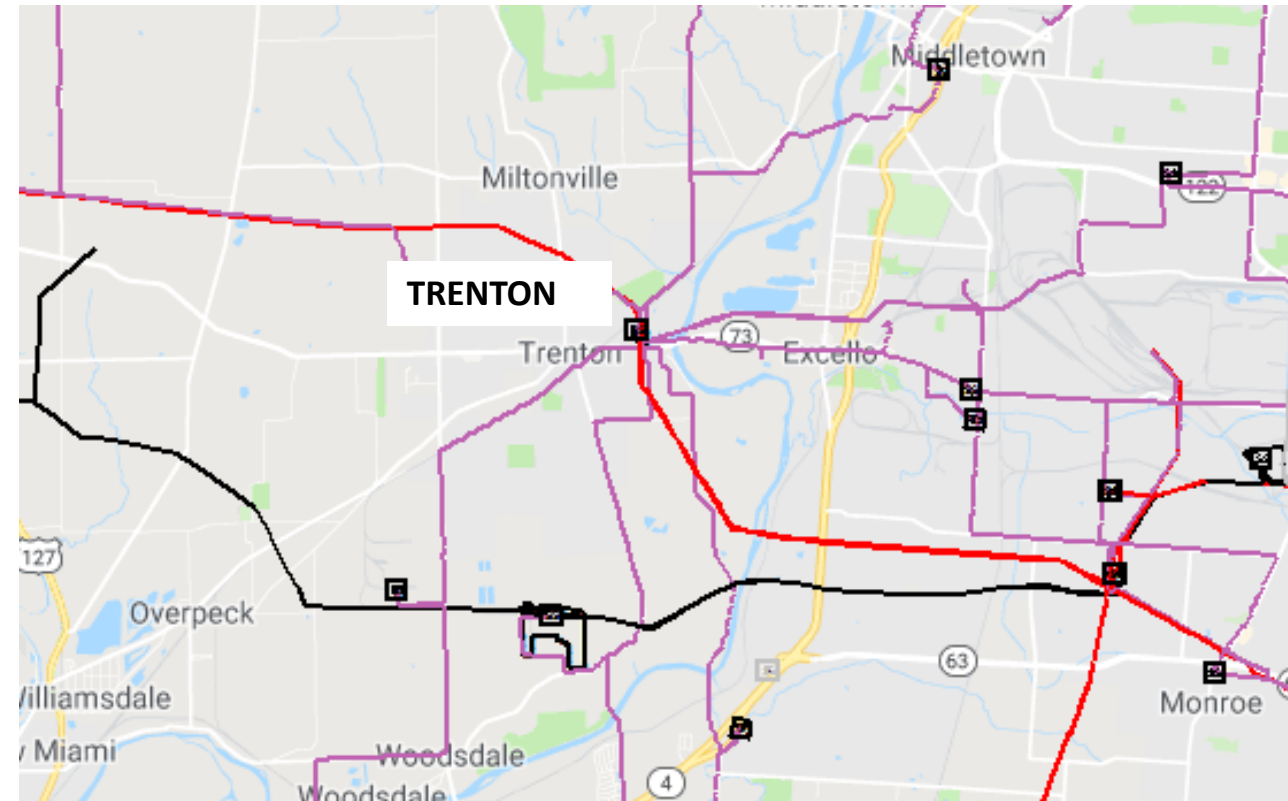
Project Driver: Customer Service

Specific Assumption Reference:

Duke Energy Ohio & Kentucky Local Planning Assumptions slide 10

Problem Statement:

An existing distribution customer is consolidating manufacturing to a facility served from Trenton substation. An additional 5MW of service is required by 01-01-2021. There are two distribution transformers at Trenton, a 22.4MVA experiencing loads near 20MVA and a 33MVA seeing loads at 34MVA.



Need Number: DEOK-2019-012

Process Stage: Local Plan Submission 09-11-2019

Selected Solution:

Install a 69/13kV 22MVA transformer, 13kV bus work and breakers for two feeder exits at Trenton. Reconfigure distribution feeders to balance load across all transformers. The new transformer will be connected to an existing breaker on the 69kV bus.

Transmission Cost Estimate: \$0

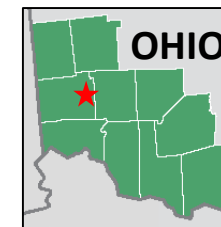
Projected In-service Date: 12-31-2020

Supplemental Project ID: S1933

Project Status: Engineering

Model: 2018 RTEP Summer

**Bubble Diagram Not Applicable
Station Modifications Only**



Revision History

- 6/27/2019 – V1 – Local Plan posted to pjm.com for S1381 – S1382
- 8/2/2019 – V2 – Corrected supplemental IDs to s1782 and s1783
- 9/11/2019 – V3 – Local Plan posted to pjm.com for S1926 – S1933
- 9/13/2019 – V4 – Slides #13 S1929, corrected the project description