Transmission Expansion Advisory Committee FirstEnergy Supplemental Projects

April 2, 2024

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

JCPL Transmission Zone M-3 Process
Smithburg Substation

Need Number: JCPL-2024-005
Process Stage: Need Meeting 04/02/2024
Project Driver:
Equipment Material Condition, Performance and Risk, Operational Flexibility and Efficiency

Specific Assumption Reference:
System Performance Projects Global Factors

- Reliability of Bulk Electric System (BES) Facilities
- Past system reliability and performance
- Substation / line equipment limits

Add/Expand Bus Configuration

Problem Statement:

- Smithburg Substation 230 kV equipment is gas-insulated (GIS). It is over 40 years old and has a history of poor reliability and system performance and maintenance issues due to specialized parts needed for replacement.
- The Smithburg 230 kV GIS is configured as a nine-breaker, breaker-and-a-half configuration. Due overlapping equipment protection zones, N-1 contingencies or maintenance outages cause multiple elements to be removed from service:
  - An outage on the Larrabee – Smithburg No. 2 230 kV H2008 Line requires the Smithburg 500/230 kV No. 4 Transformer to be removed from service.
  - An outage on the Atlantic – Smithburg 230 kV G1021 Line requires the 230-34.5 kV No. 2 Transformer to be removed from service
- Transmission line ratings are limited by terminal equipment

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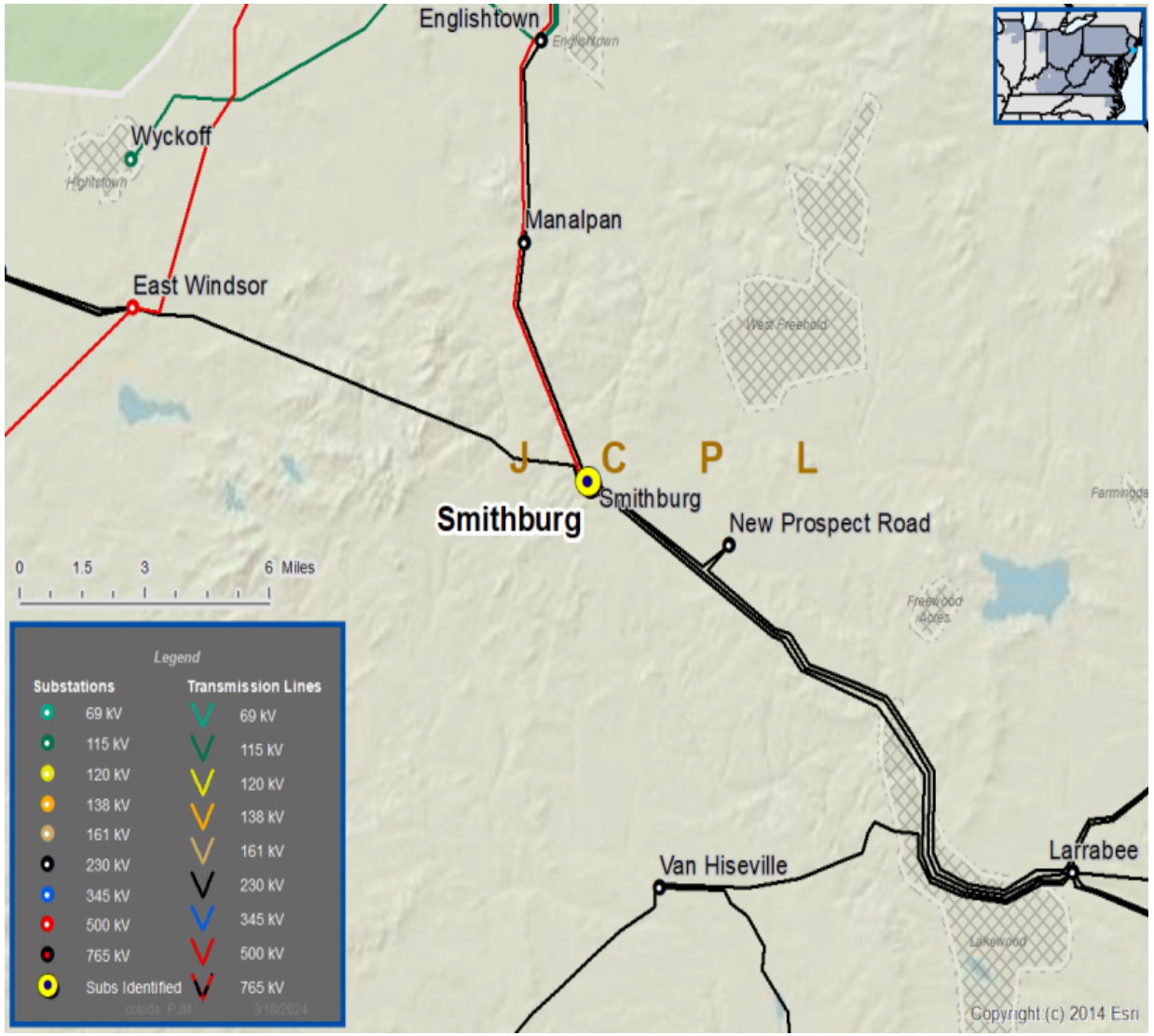


Transmission Line / Substation Locations	Existing Line Rating (MVA SN/SE/WN/WE)	Existing Conductor Rating (MVA SN/SE/WN/WE)
East Windsor – Smithburg 230 kV E2005 Line	1245 / 1272 / 1560 / 1560	1418 / 1739 / 1610 / 2062
Manalapan – Smithburg 230 kV M2039 Line	709 / 869 / 805 / 952	709 / 869 / 805 / 1031

JCPL Transmission Zone M-3 Process
Kittatinny Substation

Need Number: JCPL-2024-014

Process Stage: Need Meeting 04/02/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Projects Global Factors

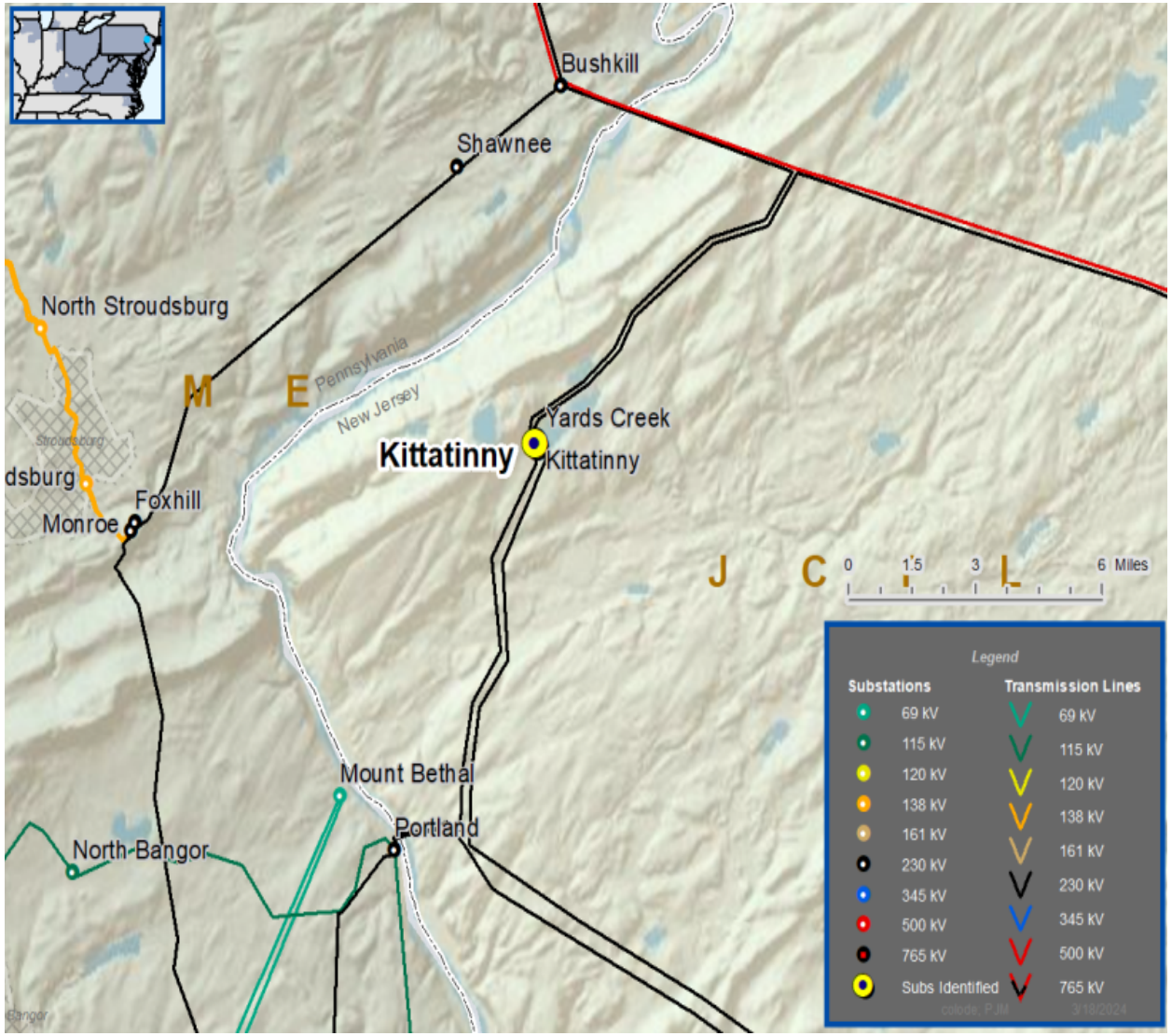
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 230-34.5 kV No. 4 Transformer at Kittatinny was manufactured approximately 64 years ago and is reaching end of life.
- Most recent DGA results showed elevated ethane gas levels compared with IEEE Standards
- Transformer is constructed with Type U bushings
  - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing Transformer Ratings:
  - 92 / 122 / 121 / 136 MVA (SN/SSTE/WN/WSTE)



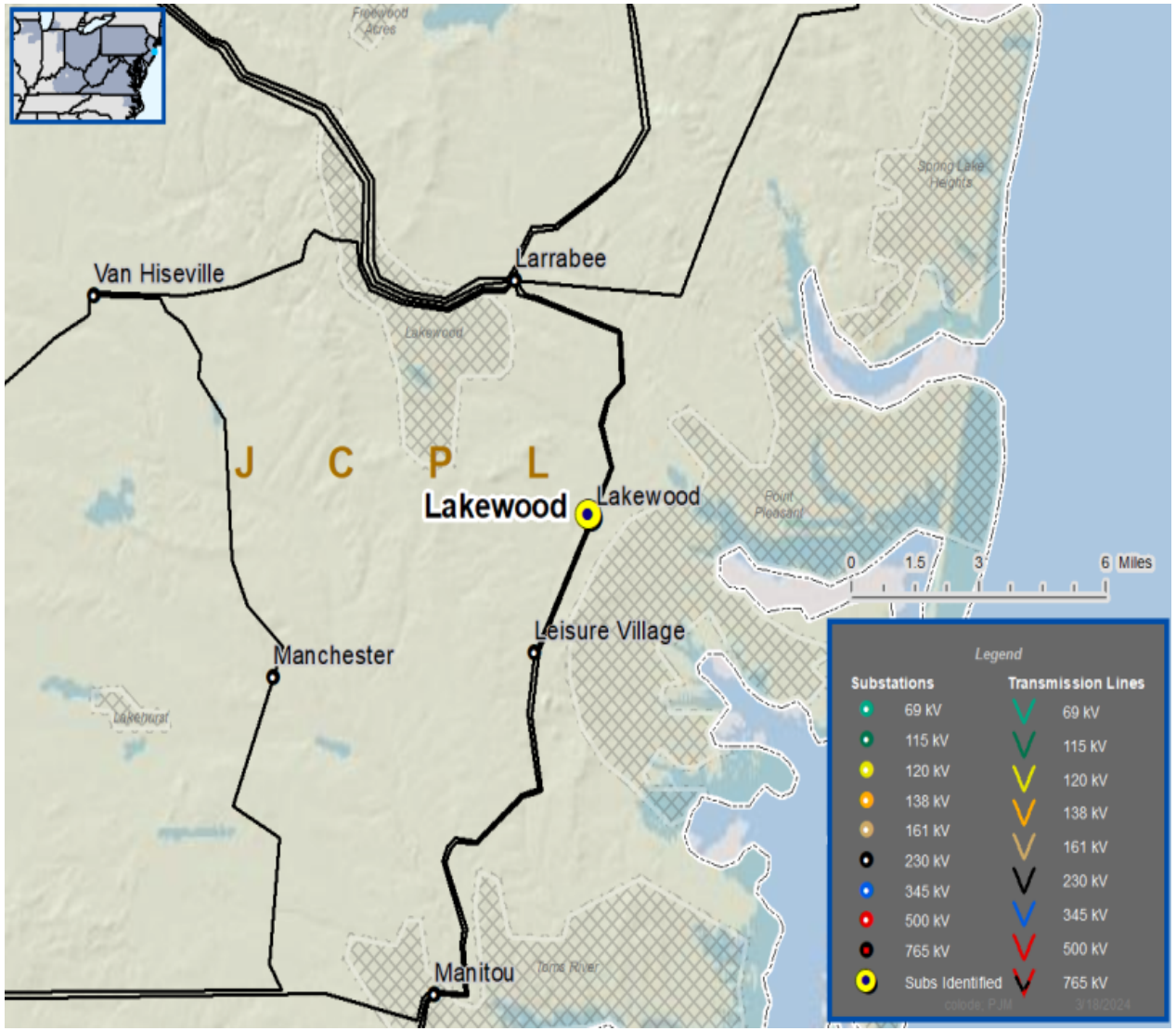
JCPL Transmission Zone M-3 Process
Lakewood Gen Substation

Need Number: JCPL-2024-015
Process Stage: Need Meeting 04/02/2024
Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:
System Performance Projects Global Factors
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers
Past System Reliability/Performance

Problem Statement:
- The 230-34.5 kV No. 6 Transformer at Lakewood Gen was manufactured approximately 57 years ago and is reaching end of life.
- The transformer has exhibited leaking oil from the radiators, pumps and gauges.
  - Incidental oil leaks at end-of-life period increases risk of failure.
- Existing Transformer Ratings:
  - 105 / 129 / 132 / 144 MVA (SN/SSTE/WN/WSTE)



Appendix

High Level M-3 Meeting Schedule

Assumptions

Activity	Timing
Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
Stakeholder comments	10 days after Assumptions Meeting

Needs

Activity	Timing
TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
Stakeholder comments	10 days after Needs Meeting

Solutions

Activity	Timing
TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
Stakeholder comments	10 days after Solutions Meeting

Submission of Supplemental Projects & Local Plan

Activity	Timing
Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
Post selected solution(s)	Following completion of DNH analysis
Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

03/xx/2024– V1 – Original version posted to pjm.com