PJM Upgrade Request

Queue V3-052

500MW
NI Hub

System Impact Study Report
(REVISED)

October 2010

Preface

The intent of this System Impact Study is to determine a plan, with cost and construction time estimates, for the Network Upgrades necessary to provide the Incremental Auction Revenue Rights (IARRs) associated with the Upgrade Request as provided by the New Service Customer pursuant to Section 7.8 of Schedule 1 of the Operating Agreement and Part VI of the PJM Tariff.

In some instances, a New Service Customer with an associated Upgrade Request may not be responsible for 100% of the identified Network Upgrade cost because other transmission network uses exist. An estimate of the sharing of the Network Upgrade costs will be provided.

Queue Position V3-052 500 MW NI HUB – AD HUB Upgrade Request
System Impact Study Report

General

The New Service Customer, Edison Mission Marketing & Trading, Inc. has requested evaluation of the required Network Upgrades to support awarding to the New Service Customer IARRs, in the amount of 500 MW, having specified a source location of NI HUB, and the sink location as AD HUB.

Network Upgrades

Cost Summary

This Upgrade Request was studied in conjunction with other Upgrade Requests in order to provide the least cost option for all requests. This study resulted in identifying the following required reinforcements in order to grant the IARRs associated with the V3-052 project.

Item	Limiting Constraint		Estimated mitigation	Estimated Cost ($M)
1	Burnham-Munster 345 kV	ComEd	Replace line trap at TSS 177 Burnham	0.1
2	Crete-St Johns Tap 345 kV	ComEd	Reconductor approximately 11.75 miles of 345 kV line 94507. Existing documentation suggests that sag limitations may exist.	9.5
		ComEd	Additional review and surveys will need to be conducted to determine the actual upgrade necessary in facility study stage.	-
		NIPS	recondcondutoring approximately 1 mile line in NIPS	0.75
3	East Frankfort-Crete 345 kV	ComEd	Reconductor approximately 12.51 miles of 345 kV line 6607. Existing documentation suggests that sag limitations may exist. Additional review and surveys will need to be conducted to determine the actual upgrade necessary in facility study stage.	10
4	Schahfer-Burr Oak 345kV line 34513	NIPS	Add new 2,000 Amp breaker and associated bus work	1.14

Item	Limiting Constraint		Estimated mitigation	Estimated Cost ($M)
5	Dune Acres-Michigan City 138 1&2	NIPS	Reconductor both circuits with ACSS ; Upgrade line and breaker drops	3.2
6	Cook-Palisades345	AEP	Develop a new 345/138 kV Station (Marcellus) at the intersection of AEP's Valley - Flowerfield 138 kV line and AEP's Twin Branch - Argenta 345 kV line. Cut in the existing Cook - Palisades circuit into Benton Harbor 345 kV Station. Benton Harbor will have two lines from Cook and two lines from Palisades at 345 kV. Construct a new 345kV line from Marcellus and Cook substations	210
7	State Line-Wolf Lake 138	NIPS	None required if rights associated with Transmission Upgrade Agreement referenced in FERC Docket ER09-1539 specific to the State Line-Wolf Lake reconductoring are transferred to this V3-052 request	0
8	Dune Acres-Michigan City 138 1	NIPS	refer to upgrade 5	0

Total estimated costs: $234.69M

Notes:

- Detailed Engineering & Construction Estimates TBD during Facility Study
- Estimates for time required to construct the reinforcements will be identified during the Facilities Study
- The above estimates do not include 1) tax gross-up, 2) Real estate and permitting costs.

Additional Studies

In addition to the studies listed above, PJM has also performed analysis which indicates that the following upgrades and conditions would be necessary to accommodate approximately 500MW ARR's if the source sink pair is modified to be NI Hub to Donald C. Cook 765kV substation.

Assumptions:
1. State Line- Wolf Lake upgrade that increased rating to 504 Base, 509 emergency in service.
2. MISO Project 1528: Rising 345/138 KV Transformer upgrade to get rating to 560 MVA in service.
3. Dune Acres-Michigan City Network upgrade previously funded by customer in service.

Item	Location	Estimated mitigation	Estimated Cost ($M)
1	Burnham substation	Replace line trap	0.1
2	Crete-St Johns Tap 345 kV	Reconductor approximately 11.75 miles of 345 kV line 94507. Existing documentation suggests that sag limitations may exist.	9.5
		Additional review and surveys will need to be conducted to determine the actual upgrade necessary in facility study stage.	-
		Recondcondutoring approximately 1 mile line in NIPS	0.75
3	East Frankfort-Crete 345 kV	Replace line trap on 345kV line 6607 at TSS 66 East Frankfort	0.1
		Replace line trap on 345kV line 6607 at TSS 945 Crete Energy Center	0.1
		Reconductor approximately 12.51 miles of 345 kV line 6607. Existing documentation suggests that sag limitations may exist.	10
		Additional review and surveys will need to be conducted to determine the actual upgrade necessary in facility study stage.	-

Item	Location	Estimated mitigation	Estimated Cost ($M)
4	Burr Oak substation	Add new 2,000 Amp breaker and associated bus work	1.14
5	Burr Oak 345/138kV transformer	Option 1: $8,142,000 - Replace the existing 345/138KV 300MVA transformer with a 500MVA unit. Replace the two 138KV, 2000A secondary breakers and associated disconnect switches with 3000A. Replace the existing 345KV primary M.O. switch with a circuit switcher. Replace the relaying on the transformer and Cir.34513.	8.1-10.4
		Option 2: $10, 344,000 - Add a 345/138KV, 500MVA transformer, two 345KV breakers with associated M.O. disconnect switches, one 138KV, 3000A secondary breaker and replace another 138KV, 2000A breaker with a 3000A breaker. Install a 345KV circuit switcher on the primary of the transformer. Replace the existing relaying on Cir.34513. Install a new 345KV dead end structure for Cir.34509 and strain bus from this structure to the existing dead end structure for this circuit.	
		Midwest ISO and NIPSCo are still evaluating the options at Burr Oak. The addition of the larger transformer at Burr Oak results in 138 kV loading and fault current issues. If we pursue the larger transformer at Burr Oak, ADDITIONAL COSTS MAY BE INCURRED to upgrade the 138 kV system (138 kV reconductoring up to approximately 30 miles) and breaker duty cycle upgrade. Midwest ISO and NIPSCO are looking into other more viable and potentially less expensive options to avoid 138 kV system upgrades.	

Item	Location	Estimated mitigation	Estimated Cost ($M)
6	Marengo-Pleasant Valley 12204 138kV line	Reconductor approximately 9.2 miles and replace relays	7.2

Total estimated costs: 39.29