1. Purpose

The purpose of this procedure is to address operational concerns due to multiple generating units that have pseudo-tied out of one Balancing Authority (BA) and into another BA yet physically reside in the Reliability Footprint of the original (native) area. This procedure will:

- Provide PJM and MISO System Operators with guidance regarding dispatch of the pseudo-tied units.
- Document RC, TOP, and BA authority for pseudo-tied units.
- Document actions and expectations when the transmission system is congested.
    - M2M process
    - Local congestion, non-M2M process

2. References

2.1 Rate Schedule 05 MISO-PJM JOA and CMP

2.2 PJM's Manual 3: Transmission Operations

2.3 MISO's RTO-AOP-012 Safe Operating Mode with PJM Procedure

2.4 NERC Standard TOP-001.1a, R1, R2, and R7.3.

3. Procedure Description

3.1. Authority:

3.1.1. Authorities for Pseudo-Tied Units into PJM:

- MISO will be the native RC, responsible for transmission related congestion (SOLs and IROLs) on the transmission system where the pseudo-tied units are connected. PJM will be the attaining RC, responsible for the capacity and dispatch of the pseudo-tied units physically within the MISO RC footprint.
- Transmission Operators within the MISO RC Footprint will be TOP for the pseudo-tied units that are physically located within their respective TOP area.
- PJM will be the BA for all pseudo-tied units.
- During restoration activities when the pseudo-tied unit is within the impacted area (i.e. when the TOP has implemented its System Restoration Plan), the TOP will work with MISO to determine dispatch requirements for the pseudo-tied unit and will communicate directly with the Asset Owner of the unit. MISO will communicate the units dispatch to PJM. PJM and MISO will work together with the impacted TO(s)/TOP(s) to determine at what stage

during restoration that the impacted units can be reliably pseudo-tied into the attaining BA.

3.1.2. Authorities for Pseudo-Tied Units into MISO:

- PJM will be the native RC, responsible for transmission related congestion (SOLs and IROLs) on the transmission system where the pseudo-tied units are connected. MISO will be the attaining RC, responsible for the capacity and dispatch of the pseudo-tied units physically within the PJM RC footprint.
- PJM or PJM's Transmission Owners (in the case of AEP) will be TOP of pseudo-tied units that are physically located within their TOP zone.
- MISO will be the BA for all pseudo-tied units.
- During restoration activities when the pseudo-tied unit is within the impacted area (i.e. when the PJM has implemented its System Restoration Plan), PJM will determine dispatch requirements for the pseudo-tied unit and will communicate directly with the Asset Owner of the unit. PJM will communicate the units dispatch to MISO. PJM and MISO will work together with the impacted TO(s)/TOP(s) to determine at what stage during restoration that the impacted units can be reliably pseudo-tied into the attaining BA.

Note: TOP authority is referenced in NERC Standard TOP-001-3.

3.2. Congestion Management:

3.2.1. M2M Process:

- PJM and MISO will follow all existing M2M processes to bind on existing M2M flowgates to redispatch pseudo-tied units via their respective SCED algorithms to relieve congestion.
- PJM and MISO will perform flowgate tests on an "as-needed" basis to accommodate new flowgates.
  - Outage Coordination procedures will be followed to determined new temporary M2M flowgates due to planned outages.
  - PJM and MISO will make every effort to proactively create flowgates resulting from planned outages for inclusion in respective Day-Ahead Markets.
  - Critical M2M Flowgate Request Process is available for creating flowgates in real time.
  - PJM and MISO should avoid the use of substitute flowgates. Limited use is outlined in Section 8.1.5 of the CMP.
- If volatility occurs on M2M flowgates and is significantly impacted by pseudo-tie units, PJM and MISO will investigate the use of shadow price and market flow relief overrides prior to implementation of Safe Op Mode (SOM).

- As a last resort, SOM will be available for use in those cases where pseudo-tied units have an appreciable impact on facilities without an existing flowgate. Existing SOM procedures will be followed in these cases.

3.2.2. Local Congestion Mitigation:

The following local congestion process will be followed to mitigate non-M2M constraints (thermal or voltage / actual or post-contingency) within the native RC's footprint for which the native RC does not have any internal dispatch options and requires support from pseudo-tied units.

3.2.2.1. Units Pseudo-Tied into PJM from MISO:

- PJM will share Day-Ahead commitment of pseudo-tied resources with MISO for use in MISO's Reliability Analysis studies.
  - PJM sends the commitment via a secure e-mail path to MISO.
- Pseudo-tied unit is on line and MISO (or a MISO TOP) needs to redispatch the unit for a localized, non-M2M constraint:
  - MISO will contact PJM to request unit be redispatched and will provide a specific output target
  - PJM will log the unit as running for MISO
  - MISO will contact PJM to end redispatch
  - MISO (or MISO TOP) will pay for applicable PJM deviation charges and MISO reactive charges once settlement process is established
- Pseudo-tied unit is off-line and was not picked up in PJM's Day-Ahead market:
  - MISO will request unit operation for next day
  - PJM will log the unit as running for MISO
  - MISO will request PJM release unit when it is no longer needed
  - MISO (or MISO TOP) will pay unit start up plus applicable PJM deviation charges and MISO reactive charges once settlement process is established

3.2.2.2. Units Pseudo-Tied into MISO from PJM:

- MISO will share Day-Ahead commitment of pseudo-tied resources with PJM for use in PJM's Reliability Analysis studies.
  - MISO shares the commitment by phone.
- Pseudo-tied unit is on line and PJM (or a PJM TO) needs to redispatch the unit for a localized, non-M2M constraint:
  - PJM will contact MISO to request unit be redispatched and will provide a specific output target
  - MISO will log the unit as running for PJM
  - PJM will contact MISO to end redispatch

        - PJM (or PJM TO) will pay for applicable MISO deviation charges once the settlement process is established
    - Pseudo-tied unit is off-line and was not picked up in MISO's Day-Ahead market:
        - PJM will request unit operation for next day
        - MISO will log the unit as running for PJM
        - PJM will request MISO release unit when it is no longer needed
        - PJM (or PJM TO) will pay unit start up plus applicable MISO deviation charges once the settlement process is established

3.3. Communication:

Exceptions to this communication process will occur during restoration activities as noted above.

- For pseudo-tied units into PJM all communications from a MISO TOP to PJM shall include MISO
- For pseudo-tied unit into MISO all communications from a PJM TO to MISO shall include PJM
- For pseudo-tied units into PJM, all pseudo-tie generation instructions should come from PJM
    - MISO RC and MISO TOPs can direct units to take action in extreme emergency conditions to preserve public safety, personnel safety, and/or prevent equipment damage.
- For pseudo-tied units into MISO, all pseudo-tie generation instructions should come from MISO
    - PJM RC and PJM TOs can direct units to take action in extreme emergency conditions to preserve public safety, personnel safety, and/or prevent equipment damage.

3.4. Outage Coordination:

- PJM and MISO pseudo-tie generation planned outages are submitted in advance with respect to PJM and MISO outage submittal rules.
- MISO and PJM respective transmission outages shall be coordinated with PJM and MISO respective pseudo-tied generator outages with respect to PJM and MISO outage submittal rules.
- PJM and MISO shall work together to accommodate all outages, however, as a last resort, conflicting outages will be rescheduled based on First-In, Last-Out approach.
- M2M Flowgate creation and unit commitment needs for planned outages will be addressed as noted in the processes above.

- PJM and MISO will make every effort to proactively create flowgates resulting from planned outages for inclusion in respective Day-Ahead Markets.

PJM and MISO should avoid the use of proxy flowgates. A new flowgate definition must be requested as soon as reasonably practicable. Limited use is outlined in Section 8.1.5 of the CMP.

4. Revision History

Issue No	Reason for Issue	Revised By	Issue Date	Effective Date	Annual Review Date
RTO-PTU-OP1-r0	Procedure Creation	Andy Witmeier	2/15/16	2/8/16	9/1/2016
RTO-PTU-OP1-r1	Annual Review	Andy Witmeier	8/14/17	8/14/17	9/1/2018

5. Procedure Approvals

Revision:	Name	Title	Approval Date
MISO Approver r1:	Andy Witmeier	Sr. Manager Central Region Reliability Coordination	8/11/2017
PJM Approver r1:	Donnie Bielak	Manager, Reliability Engineering	8/11/2017
MISO Approver r0:	Andy Witmeier	Sr. Manager Central Region Reliability Coordination	2/2/2016
PJM Approver r0:	Phil D'Antonio	Manager, Reliability Engineering	2/8/2016

Appendix – List of Pseudo-Tied Units

List of units should be reviewed quarterly to correspond to MISO model changes.

Pseudo-Tied Units in MISO:

Pseudo-Tie Unit	MP	Attaining BA/(LBA)	Native RC	Original BA/LBA	TO / TOP	Capacity	Start Date
Madison CTs (1-8)	DEI	MISO (CIN)	PJM	PJM	DEOK / PJM	40MW each	1/1/12
Fowler Ridge Wind Farm (partial)	SIGE	MISO	PJM	PJM	AEP/ PJM	50 MW	3/1/10

Pseudo-Tied Units in PJM:

Pseudo-Tie Unit	MP	Attaining BA/(LBA)	Native RC	Original BA/LBA	TO / TOP	Capacity	Start Date
Tilton CTs 1-4	Calpine	PJM	MISO	AMIL	AMRN	45MW each	3/1/16
Gibson unit 5 (partial)	DEI	PJM	MISO	CIN	CIN	156MW	3/1/16
Duck Creek unit 1 (partial)	Dynegy	PJM	MISO	AMIL	AMRN	329MW	6/1/16
Coffeen unit 1 (partial)	Dynegy	PJM	MISO	AMIL	AMRN	151MW	6/1/16
Coffeen unit 2 (partial)	Dynegy	PJM	MISO	AMIL	AMRN	50MW	6/1/16
Prairie State unit 1 (partial)	AMP, IMEA, and NIMPA	PJM	MISO	AMIL	AMRN	325MW	6/1/16
Prairie State unit 2 (partial)	AMP, IMEA, and NIMPA	PJM	MISO	AMIL	AMRN	325MW	6/1/16
Edwards unit 2 (partial)	Dynegy	PJM	MISO	AMIL	AMRN	150MW	6/1/16
Newton unit 1 (partial)	Dynegy and IMEA	PJM	MISO	AMIL	AMRN	395MW	6/1/16