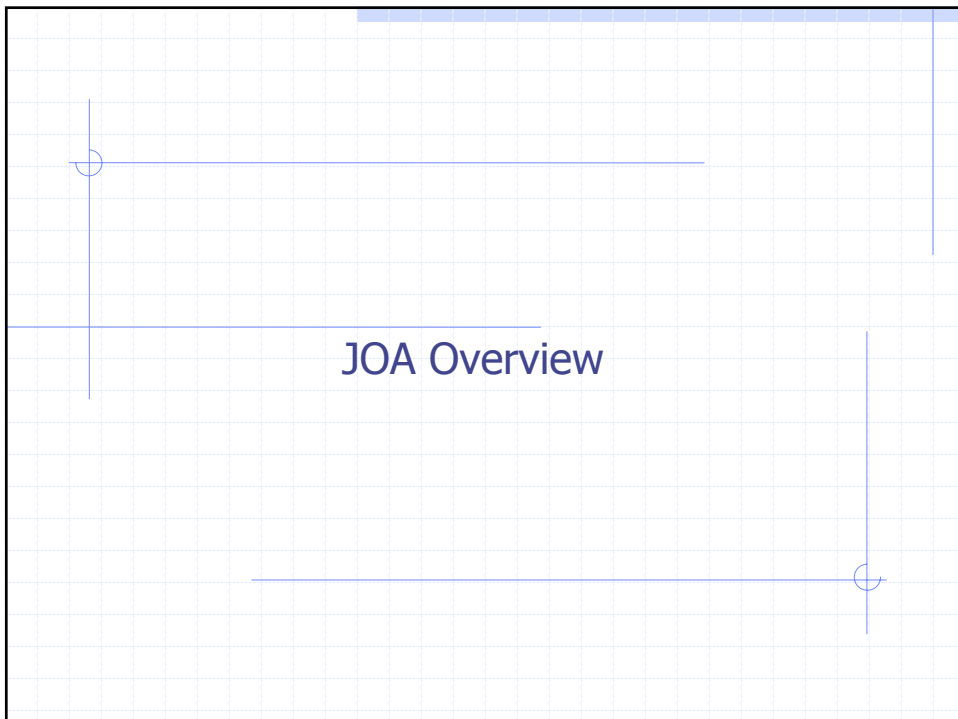




# **MISO-SPP Joint Operating Agreement**

Joint MWG, ORWG,  
RTWG Meeting  
Kansas City, MO  
July 14, 2004



## Need for JOA

- Order 2000 requires RTOs to develop and implement procedures for addressing parallel flows with other regions
- Order 2000 requires RTOs to ensure the integration of reliability practices within an interconnection and market interface practices among regions
- SPP required to file a seams agreement with MISO as a condition included in FERC's Order Granting RTO Status Subject to Fulfillment of Requirements issued 2-10-04
- FERC's Order on Compliance Filing issued 7-2-04 provided clarity on minimum content in seams agreement SPP required to file – compliance filing due by 8-1-04

## Required Minimum Content\*

- Procedures for ensuring AFC and ATC are calculated consistently, coordinated on a multi-system basis and published to market participants
- Procedures for developing consistent treatment of TRM and CBM
- Type and timing of information exchange related to AFC, ATC, TRM, and CBM
- Procedures for coordinating emergency and restoration procedures, prevention of system collapse and instability
- Procedures for coordinating operational model data updates and exchanging such data
- Details on notification and coordination of maintenance outages of generation and transmission lines impacting inter-RTO transfers

\*From FERC's Order on Compliance Filing

# Phased Approach

- JOA contemplates implementation of coordination objectives in 3 phases
  - Phase 1 - non-market to non-market
  - Phase 2 - non-market to market
  - Phase 3 - market to market
- Coordination objectives change with environment changes associated with different phases of RTO development

## Phase 1

- Includes coordination of data exchange, AFC/ATC, outages, emergency procedures, transmission planning, scheduling/checkouts, reactive power support
- These items should meet requirements identified in FERC's Order on Compliance Filing
- Minimal incremental cost for SPP to implement

## Phase 2

- Includes all phase 1 items plus Congestion Management Process (CMP)
- CMP changes AFC coordination between parties and properly accounts for market flows to improve congestion management at seams
- Significant costs and resources to implement

## Phase 3

- Includes all phase 1 and 2 items and contemplates additional coordination items to ensure increased market efficiencies
- Details yet to be developed

## Data Exchange, Article IV

- Real-time operating data
- Projected operating data
- SCADA data
- EMS Models
- Operations planning data

## ATC Coordination, Article V

- Require types and periodicity of data to be shared
  - Outage schedules for next 12 months updated at least daily
  - Dispatch order/unit commitment updated as required
  - Reservations posted daily with new requests and status changes updated hourly
  - Reservations to be excluded from ATC calculations
  - Load forecasts posted daily for each AFC period
  - Firm and non-firm AFCs
  - Flowgates, ratings and response factor cutoffs to be considered
  - Network model updates at least prior to peak load season
  - Dynamic schedule flows

## ATC Coordination, Article V

- Parties will respect each other's flowgate limitations
- Parties will use the response factor cutoff that the owning party uses on the foreign flowgate in AFC determinations

## Reciprocal Flowgate Coord., Article VI

- Allocates AFC, based on historical usage, for use in market dispatch and provision of transmission service
- Real-time actions governed by Congestion Management Process
  - Based on MISO-PJM white paper approved by NERC
  - Allows TLR process to properly recognize impacts of market operations
- To be discussed in more detail later

## Outage Coordination, Article VII

- Parties to exchange outage schedule information
- Parties must consider impacts of scheduled outages on other party's system
- Parties will discuss on a daily basis potential impacts of scheduled outages and work to resolve conflicts

## Emergency Procs, Article VIII

- Parties will closely communicate and coordinate during emergencies and restoration
- Parties to take joint actions for extreme loading conditions on border flowgates
- Parties will default to most conservative results if assessments differ

## Coordinated Planning, Article IX

- Establishes Joint Planning Committee
  - Consists of planning staffs of parties
  - Prepares procedures for model development
  - Prepares the Coordinated Plan
  - Coordinates all planning activities
  - Support review of coordinated plans by Federal and State entities
- Establishes Inter-regional Planning Stakeholder Advisory Committee
  - Drawn from stakeholder planning committees of Parties
  - Facilitates stakeholder review and input into Coordinated Plan

## Coordinated Planning, Article IX

- Data exchanged at least annually to support coordinated planning
  - Data needed for load flow, short-circuit, stability cases
  - Full detail planning models
  - Planning and reliability assessment documents
  - Status and timing of system upgrades
  - Transmission system maps
  - Contingency list and breaker diagrams
  - Status of interconnection and long-term service requests



## Coordinated Planning, Article IX

- Parties to perform single system planning and share results
- Parties to develop Coordinated System Plan
  - incorporates each party's annual planning reports
  - includes comprehensive, coordinated regional expansion study performed at least every 3 yrs
- Coordinate analysis of interconnection requests
- Coordinate analysis of long-term firm service requests

## Coordinated Planning, Article IX

- Costs for upgrades associated with interconnections and transmission service are recovered under terms of applicable tariff
- Costs for upgrades identified in Coordinated System Plan assigned to Parties
  - JPC to develop procedures for evaluating party's contribution to constraint and benefit received from upgrade
  - JPC to propose allocation of costs

## Coordinated Scheduling, Article X

- Parties will perform electronic schedule approvals and checkouts
- Process for resolving scheduling conflicts
- Parties will perform common types of checkouts

## Reactive Coordination, Article XI

- Parties required to establish and exchange voltage limits on critical locations
- Parties to monitor voltage limits in each other's area
- Requires quarterly exchange of voltage schedules
- Parties to maintain list of actions available to be taken in response to request for voltage support
- Establishes protocols for monitoring, communicating, and coordinating voltage support

## Additional Provisions, Article XII

- Parties will work to develop consistency of energy prices at the border
- Parties will explore market methods for relieving each other's binding constraints in real-time
- Should develop consistent proxy bus modeling approaches at borders
- Coordinated emergency redispatch
- Equitable compensation for generation redispatch

Congestion Management Process  
(CMP)

## Issues Introduced by Markets

- Flows created by RTO real-time dispatch will likely significantly differ from historical CA dispatch
- Intra-market transactions may not be tagged or reserved on OASIS
- Impacts of “into” or “out of” market transactions diluted or incorrect using existing IDC methods
- Market flows difficult to predict beyond near-term
- Rights, physical and/or financial, may be administered by coordinating parties at significantly different times
- How to assign transmission priority to market flows?

## Need for CMP

- Real-time impacts of market flows must be quantified and prioritized for the party implementing a market
- Process for allocating excess flowgate capacity needed when either party implements a market to ensure parties do not “burden” each other’s system through overselling of transmission service or unrestrained market dispatch
- Recognizes that parties have historically impacted other’s system and limits future usage based on those historical impacts that existed prior to market startup
- Provides method for acquiring foreign flowgate capacity on coordinated basis

# Components of CMP

- Reciprocal allocation process
  - Allocates capacity on set of flowgates to parties
  - Allocations used by parties as “base” operating limits
  - Supplements current AFC calculation/coordination processes
- Congestion management
  - Quantifies impacts of untagged market flows for the IDC
  - Provides information to the IDC for more accurate calculation of tagged market transaction impacts
  - Determines transmission priority of untagged market flows using base limits established in reciprocal allocation process

# Flowgates in CMP

- Flowgates included are determined by series of tests
  - CA gen to load impact > 5% using IDC and offline analysis, no outages
  - CA to CA TDFs > 5% using IDC and offline analysis
  - CA gen to load impact > 5% using offline analysis, single outage, if > 3% impact under other tests
- All Flowgates that are impacted per any of the tests by one of the parties will be included in the congestion management process – Coordinated Flowgates
- Flowgates that are impacted by both parties will be included in the reciprocal allocation process – Reciprocal Coordinated Flowgate

## Reciprocal Allocation

- Allocation of flowgate capacity is based on parties' historic impacts on flowgates
- Flowgate allocations are recalculated at an agreed upon schedule to consider impacts of outages and load changes
  - **Seasonal Firm** – bi-annual run for months 6 through 18
  - **Monthly Firm** – six Months into the future
  - **Weekly Firm** – one week into future
  - **Two Day Ahead Firm** – two days into future
  - **Day Ahead Non-firm** – current day for 24 hours

## Reciprocal Allocation

- Historic impacts include CA Gen to Load impacts and Firm PtP impacts
- Gen to Load impacts include
  - designated resources as of the "freeze" date
  - new resources if impacts do not exceed freeze date impacts
- Firm PtP impacts include firm reservations confirmed prior to the "freeze" date

## Reciprocal Allocation

- An allocation is assigned to all Reciprocal Entities
- The Seasonal Firm run sets the initial Flowgate Allocation
- Subsequent “runs” of the allocation process may change the allocation, but not the Historic Ratio
- The Historic Ratio is defined as the ratio of the company’s impact to all companies’ impacts

## Reciprocal Allocation

- Allocation for a Reciprocal Entity will not be decreased in value for any given Run
- A portion of the Flowgate Capacity is reserved for potential additional Reciprocal Entities.
  - This is defined as an ‘Expansion Margin’ for the Flowgate
  - The ‘Expansion Margin’ is released for a Flowgate 6 months prior to the current day if additional entities have not indicated they will be pursuing a Reciprocal relationship with the JOA entity

## Reciprocal Allocation

- For each flowgate, both forward and reverse PtP and Generation to Load impacts are sorted into:
  - Impacts Greater Than/Equal To 5%
  - Impacts Less Than 5%
- Allocations are assigned to each reciprocal party for all Reciprocal Flowgates in both the forward and reverse directions
- Flowgate Limit is determined
  - Limit = TTC-CBM-TRM

## Reciprocal Allocation

- TRM and CBM is first subtracted from the flowgate limit or TTC
- All entities are then granted a share of a reciprocal coordinated flowgate equivalent to their historic flows with impacts of 5% or greater
- If there is still unclaimed flowgate capability, reciprocal entities are granted a pro rata share based on their historic flows with impacts <5%
- If there is still unclaimed flowgate capability,
  - Reciprocal Entities are granted a pro rata share (based on their historic ratio) of that capability, or
  - Owning party retains excess capacity and other party may acquire upon request or purchase



# Allocation Example #1

## Seasonal Run

- Flowgate Data
  - TTC= 700 MW
  - TRM= 200 MW
  - CBM = 100 MW
- Impacts (GtL + PtP)  $\geq$  5%
  - SPP = 50 MW
  - MISO = 25 MW
  - Other = 100 MW
- Impacts (GtL + PtP)  $<$  5%
  - SPP = 30 MW
  - MISO = 70 MW
  - Other = 30 MW

# Allocation Example #1

## Seasonal Run

1. Subtract TRM and CBM from TTC  
 $700 - 200 - 100 = 400 \text{ MW}$
2. Subtract the  $\geq$  5% impacts of all parties  
 $400 \text{ MW} - (50 \text{ MW} + 25 \text{ MW} + 100 \text{ MW}) = 225 \text{ MW}$
3. Next, subtract the  $<$ 5% impacts  
 $225 \text{ MW} - (30 \text{ MW} + 70 \text{ MW} + 30 \text{ MW}) = 95 \text{ MW}$
4. Finally, share the excess based on the Historic Ratio
  - SPP =  $95 \text{ MW} \times (80 \text{ MW} / 305 \text{ MW}) = 25 \text{ MW}$
  - MISO =  $95 \text{ MW} \times (95 \text{ MW} / 305 \text{ MW}) = 29 \text{ MW}$
  - Other =  $95 \text{ MW} \times (130 \text{ MW} / 305 \text{ MW}) = 40 \text{ MW}$

# Allocation Example #1

## Seasonal Run

TOTAL ALLOCATIONS :

SPP = 50MW + 30MW + 25MW = 105MW

MISO = 25MW + 70MW + 29MW = 124MW

Other = 100 MW + 30MW + 40MW = 171MW

105MW + 124MW + 171MW = 400MW (FG Limit)

**Expansion Margin** = (<5% + Extra MW Added for Other) = 70 MW\*

\*Will be released for Allocation Between SPP and MISO in Next Allocation (Monthly Run) if entity does not become a Reciprocal Entity

# Allocation Example #2

## Monthly Run

- Seasonal Run allocations from Example #1
  - SPP = 105 MW
  - MISO = 124 MW
  - Other = 171 MW
- Monthly Run
  - Other Entities will only be given their >5% Impacts
  - Expansion Margin will be allocated to Reciprocal Entities using the Historical Ratio
  - Total Monthly Allocations will be compared with Seasonal Run. Whichever value is greater is given to the Reciprocal entity

## Allocation Example #2

### Monthly Run

- Impacts (GtL + PtP)  $\geq$  5%
  - SPP = 50 MW
  - MISO = 25 MW
  - Other = 100 MW
- Impacts (GtL + PtP)  $<$  5%
  - SPP = 30 MW
  - MISO = 70 MW
  - Other = 30 MW

## Allocation Example #2

### Monthly Run

1. Subtract TRM and CBM from TTC  
 $700 - 200 - 100 = 400$  MW
  2. Subtract the  $\geq$  5% impacts of all parties  
 $400\text{MW} - (50\text{MW} + 25\text{MW} + 100\text{MW}) = 225\text{MW}$
  3. Next, subtract the  $<$ 5% impacts  
 $225\text{MW} - (30\text{MW} + 70\text{MW}) = 125\text{MW}$
  4. Finally, share the excess based on the Historic Ratio  
SPP =  $125\text{MW} \times (80\text{MW}/175\text{MW}) = 57\text{MW}$   
MISO =  $125\text{MW} \times (95\text{MW}/175\text{MW}) = 68\text{MW}$
- \*Expansion Margin is now Zero

## Allocation Example #2

### Monthly Run

TOTAL ALLOCATIONS For Monthly Run:

[>5% Impacts + <5% Impacts +Extra Room]

SPP = 50MW + 30MW + 57MW = 137MW

MISO = 25MW + 70MW + 68MW = 163MW

Other = 100 MW + 0MW + 0MW =100 MW

137MW + 163MW +100MW = 400MW (FG Limit)

Expansion Margin = 0 MW\*

(<5% + Extra MW Added for Other)

## Allocation Example #2

- Compare Allocations to Seasonal Run to ensure no Allocations are reduced for the Reciprocal Entities
- SPP
  - Seasonal = 105 MW
  - Monthly = 137 MW
- MISO
  - Seasonal = 124 MW
  - Monthly = 163 MW

## Use of Allocation in AFC Process

- A Reciprocating Entity's flowgate allocations will be used in that party's AFC/ATC process, treated like TFCs on the Reciprocal Coordinated flowgates
- The allocated TFCs are then converted to allocated AFCs and compared to traditional AFCs calculated in the existing AFC/ATC process
- Reciprocating Entities will use the lowest of these two numbers when deciding to grant transmission service
- Necessary to ensure that flowgate is not oversold even though allocations may still exist

## Market Flow

- When approaching near real-time, Market Entities that are Reciprocal Entities will be required to submit real-time Market Flow information to IDC for current/next hour
- Market Flow is the summation of the impact of the market generation (at current output) on a Flowgate for a given time period
  - $MF = \text{Current Gen MW} * \text{GLD Factor} - (\text{PtP Transactions})$
  - Summed for all generation in the market footprint

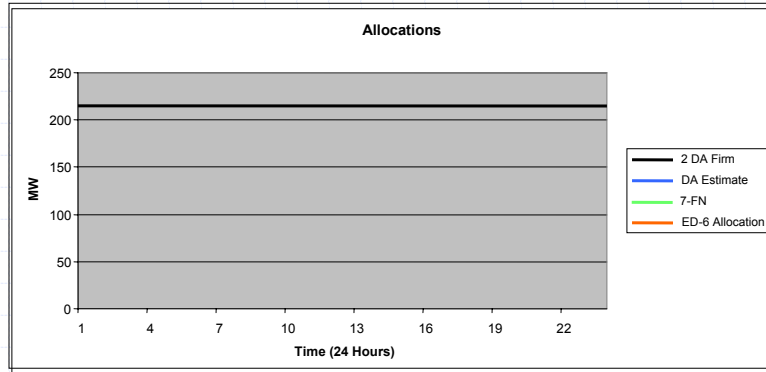
## Market Flow

- Market Flow is given one of three priorities:
  - Firm Network = Historic NNL
  - Non-Firm Priority 6- (ED-6)
  - Non-Firm Priority 2- (ED-2)
- This priority is used during NERC TLR

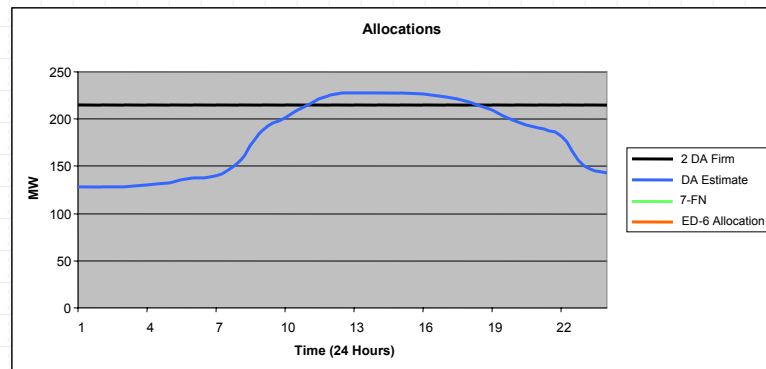
## Market Flow Components

- Firm Network = Historic Gen to Load
  - Two Day Ahead GtL sets the Firm Market Flow Limit
  - If impact of real time market dispatch on the Flowgate is less than than this limit all Market Flow is considered Firm Network
- ED-6
  - Initial ED-6 limit is set during the Daily Run by comparing the estimated Daily allocation with the Two Day Ahead GtL
  - Any excess allocation will be put into the ED-6 bucket and sets the ED-6 limit for the FG
- ED-2
  - Any real-time Market Flow above the ED-6 limit on a Flowgate will be considered ED-2

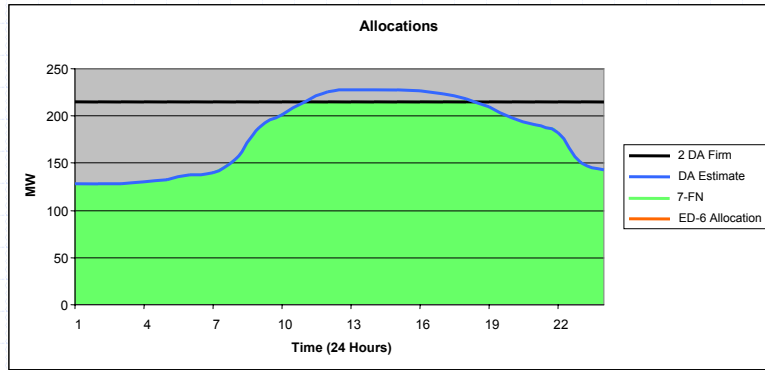
## 2 DA Firm



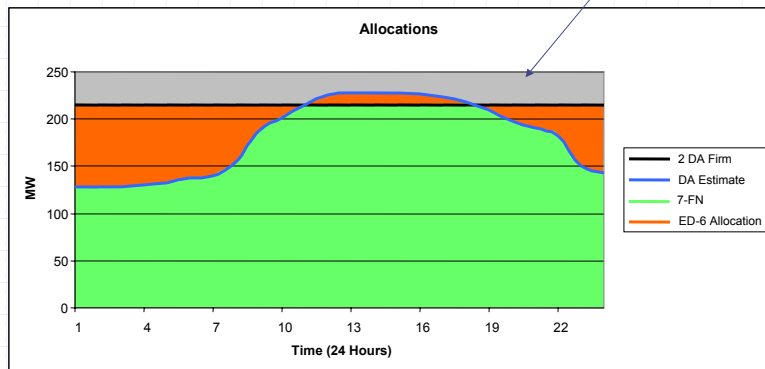
## DA Estimate



# Firm Limit



# ED-6 Limit





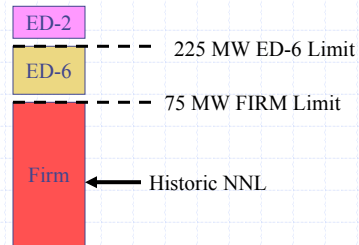
# Market Flow Examples

Flowgate A: Limit =300 MW

Example 1: Unconstrained  
HR XX:00:  
Market Flow = 150 MW  
(Market Generation – Pt-Pt Tags)

Components:

FIRM =75  
ED-6 =75  
ED-2 =0



Example 2: Constrained  
HR XX:00 +1  
Market Flow = 600  
(Market Generation – Pt-Pt Tags)

Components:

FIRM =75  
ED-6 =150  
ED-2 =375

# Congestion Management & TLR

- Market Entities plan to use TLR in conjunction with Market Re-Dispatch to relieve constraints
- More real-time data in TLR Process
  - Market Flow
  - Marginal Units
- Market Flow will be curtailed equitably with non-firm and firm PtP Transactions

## Issues Being Reconsidered

## Issues

- TRM and CBM
- System Expansion
- Consider 50% Impacts
- Expansion Margins
- Allocation of Excess Capacity
- Unused Allocations

## TRM and CBM

- TRM and CBM are currently deducted from the flowgate rating prior to allocation
- Appropriate for TRM due to regional nature
- CBM more local or dedicated in nature, propose to remove the CBM component after allocation calculation
- Each party can then deduct appropriate CBM from its allocation

## System Expansion

- CMP currently has a specific freeze date on transactions and generation, benefits of network improvements realized in allocations
- Considering use of same freeze date for network topology changes
  - Benefits of transmission enhancements accrue to the party responsible for the enhancement
  - Transmission enhancements made after the freeze date excluded from allocation process
  - May use a threshold to determine amount of benefit, i.e. wave traps may be excluded

## Consider 50% Impacts

- Currently, sufficient allocation must exist for 100% of transmission request impacts to be granted
- Consider requiring allocation for only 50% of transmission service request impacts when request requires another TP to complete the path

## Expansion Margins

- Currently hold an expansion margin for third parties beyond 6 months (PJM and MISO want to get rid of this)
- Currently include third party flowgates in allocation
- Does this provide proper incentive for other parties to participate?

## Allocation of Excess Capacity

- Two options being considered
- Allocate excess capacity to flowgate owner
  - How does other party obtain excess capacity?
- Allocate excess capacity to parties based on historic impacts
  - Must deal with issue of unused allocations

## Unused Allocations

- Unused allocation issue is where either MISO or SPP are restricted due to lack of an allocation while other party still has an unused allocation
- Considering to address two situations where this occurs
  - To avoid building new facilities for long term firm requests because one party does not have an allocation
  - To not have unused allocations in real-time by one party while other party is restricted
- Considering two-part solution for sharing unused allocation
  - During first 14 days
  - During months 1 through 18

## During First 14 Days

- Goal is to not have one party with unused allocation in real-time while other party is restricted
- Would essentially ignore allocation in recognition that one party was not going to fully utilize their allocation and it is available to other party
- Both parties would have to get back to their original allocation if congestion occurred
- Since the allocations have not changed, the sharing of unused allocation would be uncompensated - Use It or Lose It

## Example Situation #1

- Both parties are on the path, one with an allocation and the other with no allocation.
- In order to accommodate the transaction, the party with the allocation must agree to decrement for the other party's 50% impact.
- If congestion occurs, the party with the allocation is responsible for 100% impacts. Must also have AFCs before approve.

## Example Situation #2

- The party with no allocation is on the path, but not the other party.
- The party with no allocation reduces its allocation by the impact and then adds its negative allocation to the positive allocation of the other party.
- If net number is positive and AFC exists, can approve.

## Example Situation #3

- On a day-ahead basis, MISO and SPP will pool their unused allocations to operate their markets
- If MISO allocation is not fully utilized, it becomes available to SPP market
- If SPP allocation is not fully utilized, it becomes available to MISO market

## During Months 1 - 18

- Goal is to not have one party build new facilities in response to a long-term request because they do not have an allocation
- There would be an exchange of allocation provided there are no other allocation commitments and sufficient AFC exists
- Credits will be given for use of allocation that can be applied to other flowgates in the same time period
- Roll-over rights granted based on this process will continue to create credits

## Use of Credits

- Only long-term firm requests can initiate an allocation exchange that may result in creation of credits
- Credits can be applied to unused allocations of the deficient entity during the same time period
- A party with credits can apply these either to long-term firm requests or to obtain unused allocations even when no long-term firm request exists
- To the extent credits have not been used before the time period ends, the credits expire



Questions?

