CARIS Grouped Congested Element Results
(Selection of the Three Studies)

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September 4, 2009

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Grouped Elements (Study) Process

◆ **Tariff Requirement:**

The NYISO, in conjunction with ESPWG, will develop criteria for the selection and grouping of the three congestion and resource integration studies that comprise each CARIS, as a well as for setting the associated timelines for completion of the selected studies. Study selection criteria may include congestion estimates, and shall include a process to prioritize the three studies that comprise each CARIS. Criteria shall also include a process to set the cut off date for inputs into and completion of each CARIS study cycle.

◆ **Approved Procedure:**

The three congested elements with the highest present value ranking shall be utilized for further assessment under the CARIS process for that cycle. This assessment will be accomplished in multiple iterations to include additional elements that appear as limiting when each of the top three constrained elements are unconstrained. The assessed element groupings will then be ranked based upon change in production cost. The three ranked groupings with the largest change in production cost will then be selected as the three CARIS studies.

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Introduction

- **Proposal: Use two stage process for ranking and grouping**
  - *To use production cost savings only for ranking and grouping would require relaxing every constraint one by one*
  - *Historic congestion reports from PROBE do not have each individual constraint relaxed*
  - *Need a filtering method to first rank the elements while still limiting multiple iterations of "relaxing" steps*
  - *Demand dollar congestion is readily available for both historic period and forecasted congestion simulations, and provides an indication of potential production cost savings*

- **First Stage**
  - *Step 1: First screen ranked elements on demand dollar congestion*
  - *Step 2: Allows for assessment of negative congestion and other exceptions*

- **Second Stage**
  - *Selection and groupings for each CARIS study based on production cost savings*

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Definition of demand dollar congestion

- The NYCA Demand Dollar Congestion value for a constraint is basically defined as the sum of the (zonal load) x (constraint shadow price) x (area GSF on the constraint) for all areas and hours. This value is then sensitive to the location of the reference bus (producing negative GSF) and to the direction of the flow on the constrained element

- Negative Dollar Demand congestion is a real congestion as the constrained elements are bottling cheaper generation on one side of the constraint from being delivered to load centers on the other side of the constraint

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Definition of Production Cost Savings

- ### Total NYCA wide production costs
  - *Change in NYCA source production cost*
  - *Need to account for change in interchange quantities*

- ### Change in NYCA source production cost
  - *Measure change in NYCA source production from relaxation or potential solution insertion*
  - *Changes in NYCA sources can be from changes in interchange*

- ### Accounting for interchange
  - *Post processing to determine quantity and price of interchange for each external interface*

Stage 1:
Selection of Primary Elements for Study Consideration

- **Step 1 - Prioritization**
  - *Line up historic congested elements and projected elements for a fifteen year period based on Demand$ Congestion*
  - *Identify elements that:*
    - **Are common to both**
    - **Are missing from one or the other (orphaned)**
    - **Show negative projected congestion**
    - **Are exceptions for diminishing returns**
  - *Calculate Present Value of congestion (using Demand$ Congestion metric) for common elements, sort and identify top five for candidates for relaxing test*

- **Step 2 - Review the exceptions** :
  - *Diminishing returns - if a congested element shows a significant decline, exclude from list*
  - *Negative congestion – Rank on absolute value and add top two as candidates*
  - *Orphaned – Compare ranking value to just the 10 years of projected above and if greater substitute*

- **Stage 1 provides for flexibility**
  - *Given all of the considerations in the above, identify the top five elements as primary*

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Stage 2:
Grouping Elements for CARIS Studies

- ◆ In order to identify additional elements that may have a significant impact on congestion, each primary element being studied will be relieved independently of each other for a mid and horizon year (2013 and 2017).

- ◆ The primary element's constraint is relieved by replacing its limit with 9999, and any potential constraint duplicative or redundant with the primary constraint (e.g. Dunwoodie-Shore Road)

- ◆ The resultant list of top congested elements from the two years of analysis will be reviewed to determine:
    - ▪ *The resultant reduction in total NYCA congestion*
    - ▪ *If any additional new elements become congested*
    - ▪ *Significant increase in the other primary element's congestion*
    - ▪ *Production cost savings from the relaxation*

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Stage 2:
Grouping Elements for CARIS Studies

- *The primary constraint will be assessed for grouping with a new element if the new element*
  - is electrically adjacent to the primary element
  - in the top five of congested elements based on Demand$ Congestion

- *If passes above, the new element's limit will also be increased to 9999*
  - Elements are grouped if the production cost savings increases by 50% or more
  - Repeat process if other additional elements pass above criteria

- *If after an initial grouping, the change in total NYCA production cost is not more than 3 million dollars, the original primary constraint will be removed from the list*

- If more than three groupings are revealed the three groupings with the highest improvement in production cost savings will be selected as the three studies.

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Initial Results of Relaxing the Primary Constraints

Annual Absolute Dollar Demand Congestion ($M)

Congested Contraint	2013					2017				
	Base	Central East Relaxed	Leeds-PV Relaxed	Dunwoodie-Long Island Pass 3 Relaxed	West Central Relaxed	Base	Central East Relaxed	Leeds-PV Relaxed	Dunwoodie-Long Island Pass 3 Relaxed	West Central Relaxed
Leeds to Pleasant Valley	38.52	39.52	0.00	49.00	42.72	44.15	47.27	0.00	52.36	
Central East Interface	35.14	0.00	38.76	36.70	49.82	86.47	0.00	91.49	89.50	
Dunwoodie- Long Island Interface	29.97	29.69	32.51	0.00	29.21	26.45	26.22	29.11	0.00	
WEST CENTRAL-OP	24.85	30.11	28.10	32.00	3.92	34.13	41.91	36.25	33.57	
PJM_LINDEN GOETHALS	9.62	9.64	9.96	9.69	9.53	9.77	9.68	9.83	9.48	
Ontario North-NYISO	7.83	7.94	8.03	7.90	7.63	7.89	8.29	8.13	7.93	
LIPA Cable	5.08	5.16	5.66	0.30	5.17	4.78	4.93	5.33	1.39	
NYCLP Greenwood	1.43	1.46	1.96	1.30	1.74	2.19	2.26	2.59	2.16	
NYCA Production Saving										

• **No additional electrically adjacent congested elements were found for Central East or Leeds-PV.**

• **Upon relieving the Dunwoodie to Shore Rd. line, Dunwoodie to Long Island Interface, Dunwoodie 345/138 transformer for loss of Y49 showed up next. Therefore, this will be grouped with the Dunwoodie-Shore Rd. line for determining a potential solution.**

•**West Central relaxed to 1720, included for example of effect**

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- ## **Proposed Criteria/Metrics:**

  - *Utilize an unweighted present value cost of congestion for the most congested elements considering both historic and projected data.*

  - *The congestion metric to be used will be the change in total bid/forecasted production costs in accordance with Appendix A to Attachment Y of the NYISO OATT.*

- # **The same metric will be used for both historic and projected congestion.**

- # **Historic Congestion Considerations**

  - *Use historic positive unhedged congestion data for the most recent 60 months.*

  - *Utilize the data from the NYISO's quarterly historic congestion reports.*

Note: Not all metrics are readily available for the historic

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◆ **Projected Congestion Considerations**

- ▪ *Use 10-years of forecast data.*

- ▪ *Projection will utilize the base case assumptions from the most recent CRP.*

- ▪ *Projection will utilize the additional agreed-upon future inputs (e.g. – fuel costs, unit parameters) for the base case CARIS analysis*

◆ **Note: Not all metrics are readily available for the historic, like negative congested elements, production cost savings on individual element relaxation, and there may be elements in historic and not in projected and vice versa. We need to make allowances for all of this.**

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◆ Prioritization Methodology

- ▪ *Congestion will be identified from the list of most congested monitored element/contingency pairs.*

- ▪ *Based upon the combination of historic and projected congestion metrics noted above, the ranking for each congested element shall be determined by formula:*

  - • *Present Value in Year 1 = [(Sum of the Future Value of Congestion from the Prior 5 Historic 12-Month Periods) + (Sum of the Present Value of Congestion from the Future 10 years)]*

- ▪ *The discount rate to be used for the present value analysis shall be the current weighted average cost of capital for the NY Transmission Owners*

- ▪ **The three congested elements with the highest present value ranking shall be utilized for further assessment under the CARIS process for that cycle. This assessment will be accomplished in multiple iterations to include additional elements that appear as limiting when each of the top three constrained elements are unconstrained. The assessed element groupings will then be ranked based upon change in production cost. The three ranked groupings with the largest change in production cost will then be selected as the three CARIS studies.**

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- *Exception:* If future system changes (e.g. – generation, transmission or demand side additions) produce a significant declining trend in congestion over an identified congested element in later years of the study period, such element shall be excluded from the rankings.

- The NYISO shall perform these computations for each CARIS cycle, and review them with ESPWG.

- Other Issues
    - *Provide the flexibility for grouping elements:*
    - *NYISO to assess and recommend groupings to ESPWG based on the individual rankings and proximity of congested elements.*

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