Economic Planning Considerations

NYISO ESPWG

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Overall Framework

- Evaluate present and expected future benefit from eliminating targeted transmission constraints
  - Based on effect on BPC impact
- Historical analysis
  - Consider most persistent / largest impact constraints
  - Select sample days
  - Uncover 'just below the surface' limitations
  - Evaluate constraint interaction
  - Extrapolate from sample days to annual impact
- Future Analysis
  - Extrapolate from historical data and calculate a present value over a future period
  - Perform analysis of future year impact / account for planned system modifications

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Successive Constraint Relaxation - Process

- Start with fully constrained (actual) system model and calculate BPC and unhedged congestion metrics

- Relax (exclude or eliminate) constraint bearing largest impact on unhedged congestion payments

- Solve modified system model

- Calculate constraint relaxation impact on BPC metric

- Successively relax largest impact constraint and repeat process

Successive Constraint Relaxation – Historical Examples

- Focus on relaxing 'Dunwoodie-Shore Road' constraint
  - Most persistent constraint
  - Largest impact on past unhedged congestion payments
- Examples for 6 days in December 2004
  - 3 days in which constraint had largest impact
  - 3 days in which constraint did not have largest impact
- Constraint relaxation involves eliminating monitoring element (assumes appropriately increased ratings)
  - Eliminate flowgate
  - Eliminate monitoring under contingency
- Successive relaxation proceeded 5 stages for illustration
- Interfaces were not considered for relaxation

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Constraint Relaxation – Dec. 12, 2005

Constraint Relaxation Impact
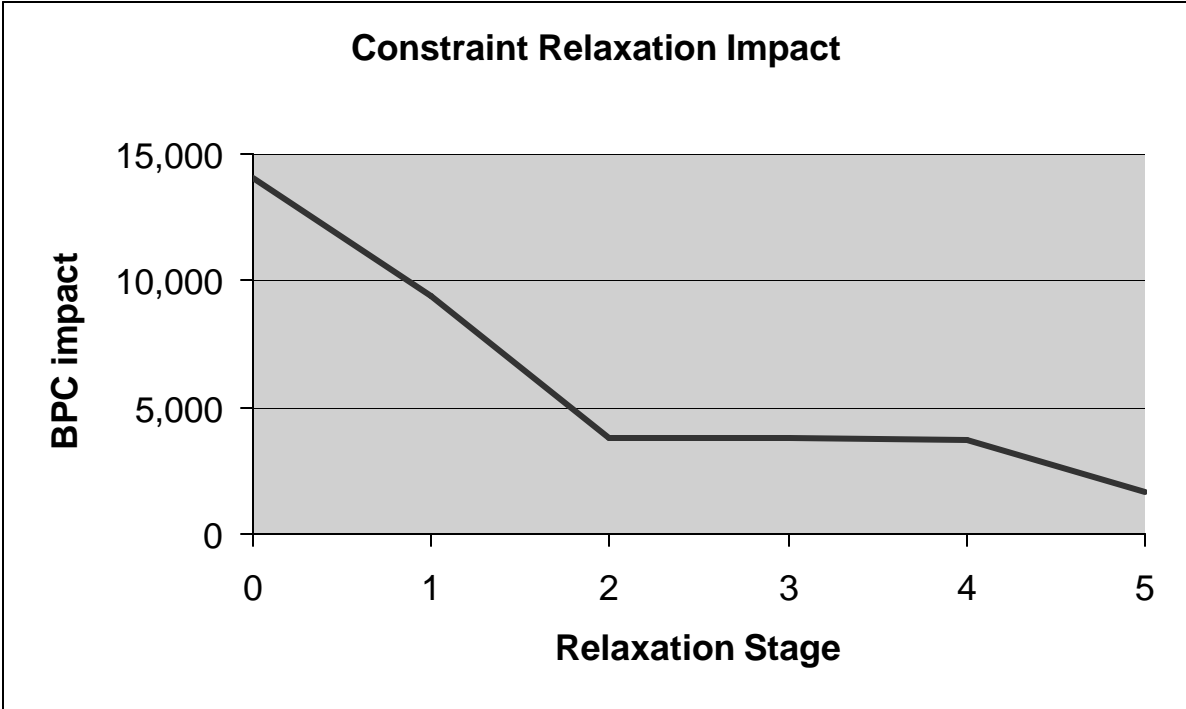
scenario
Base - fully constrained
1 - relax Dunwoodie-Shore Rd
2 - relax E13th-W49th str
3 - relax Rainey-Dunwoodie72
4 - relax Rainey-Dunwoodie71
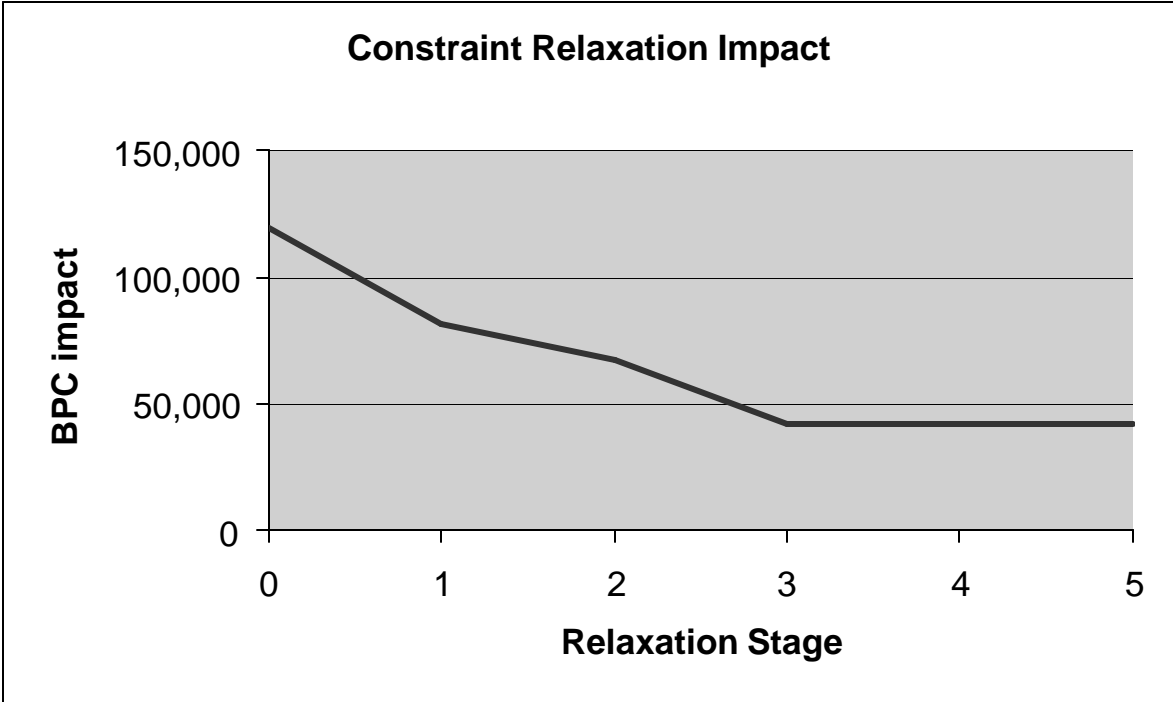5 - Valley Str-E. Garden City

Constraint Relaxation – Dec. 18, 2005

Constraint Relaxation Impact
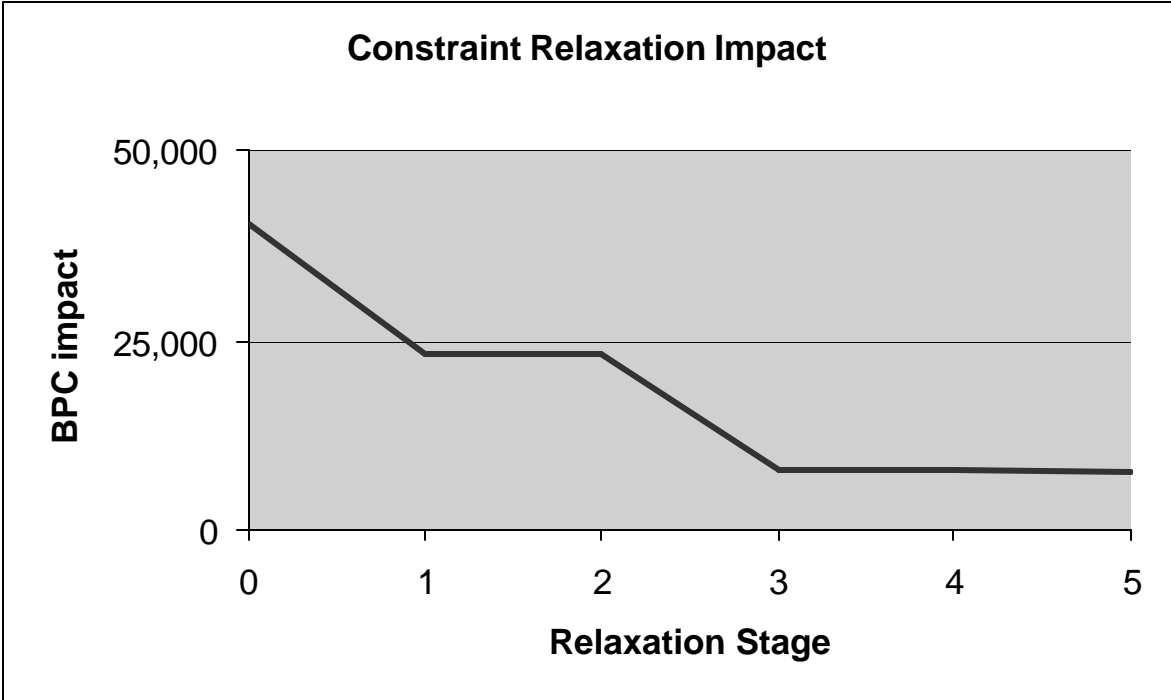
scenario
Base - fully constrained
1 - relax Dunwoodie-Shore Rd
2 - relax E179th-Hellgate E.
3 - relax Sprainbrook-E. Garden City
4 - relax Shore Rd 345/138 #1
5 - relax Shore Rd 345/138 #2

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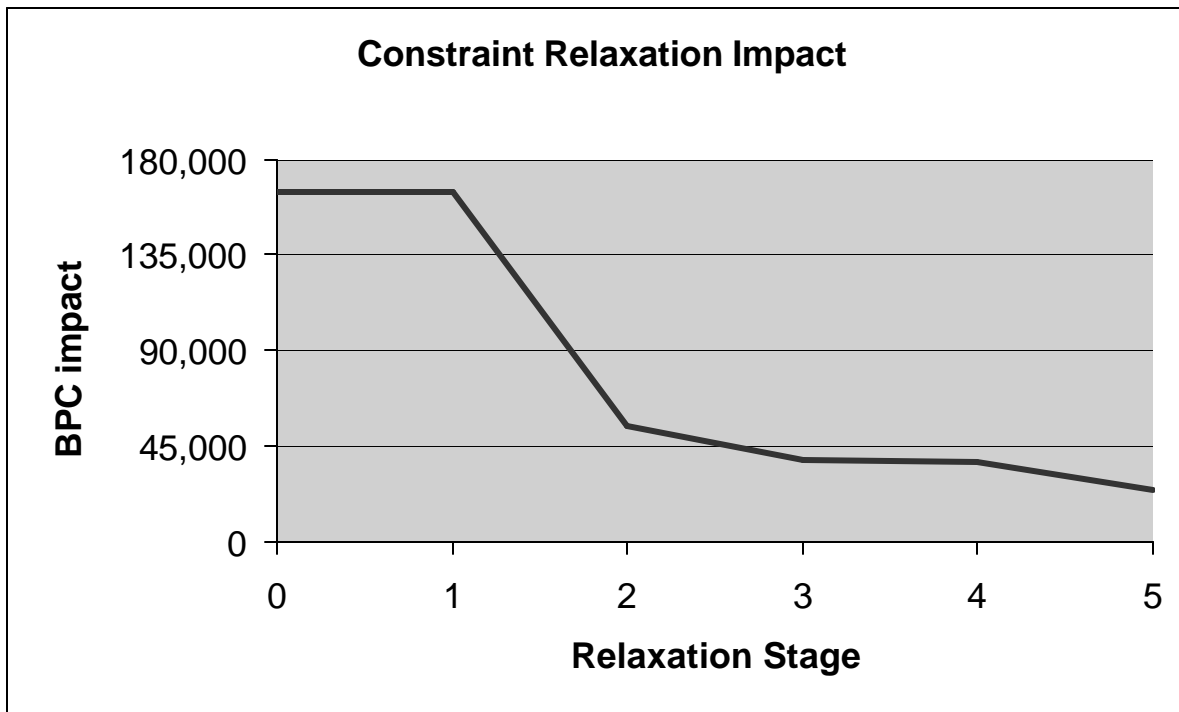Power Grid Engineering & Markets

Constraint Relaxation – Dec. 27, 2005

Constraint Relaxation Impact

BPC impact (y-axis): 0, 50,000, 100,000, 150,000

Relaxation Stage (x-axis): 0, 1, 2, 3, 4, 5

scenario
Base - fully constrained
1 - relax Dunwoodie-Shore Rd
2 - relax Sprainbrook-E. Garden City
2 - relax E13th-W49th str
4 - relax Vernon-Kent Ave
5 - Valley Str-E. Garden City

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Constraint Relaxation – Dec. 4, 2005

Constraint Relaxation Impact

scenario
Base - fully constrained
1 - relax E179th-Hell tap W.
2 - relax W49th-Sprainbrook
3 - relax Dunwoodie-Shore Rd
4 - relax CarlPlace-E. Garden City
5 - relax CarlPlace-Glenwood

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Constraint Relaxation – Dec. 10, 2005

Constraint Relaxation Impact
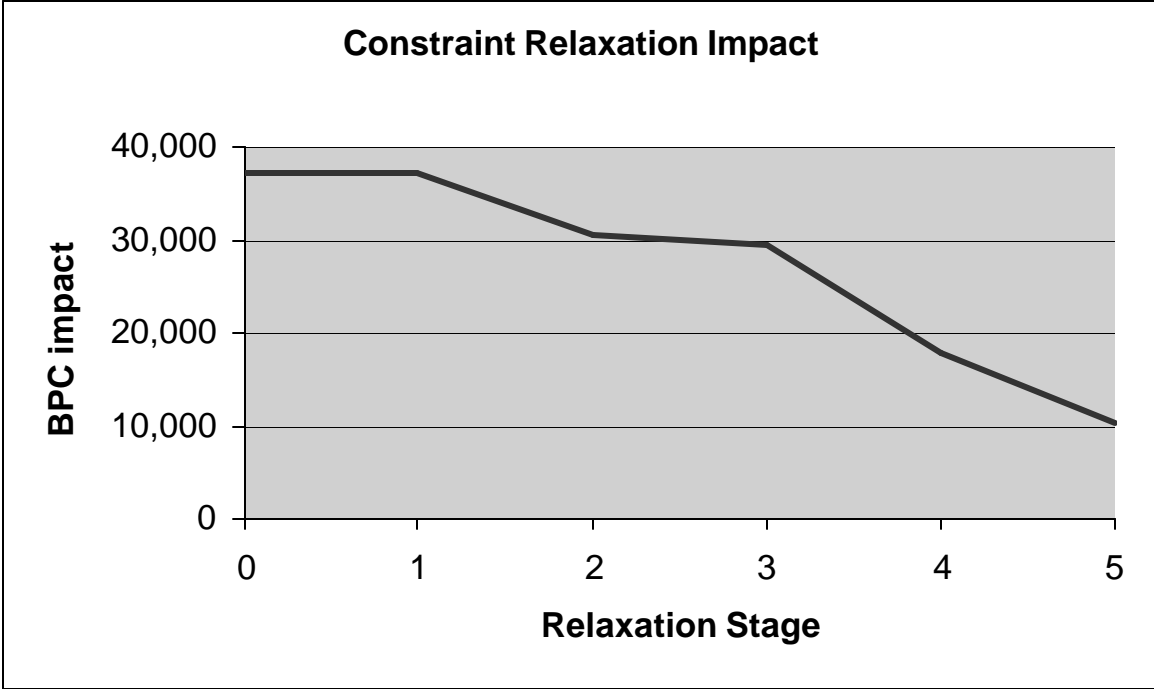
scenario
Base - fully constrained
1 - relax Rainey-Dunwoodie71
2 - relax Rainey-Dunwoodie72
3 - relax CarlPlace-E. Garden City
4 - relax Queensbridge-Vernon (1&2)
5 - relax Dunwoodie-Shore Rd

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Constraint Relaxation – Dec. 25, 2005

Constraint Relaxation Impact
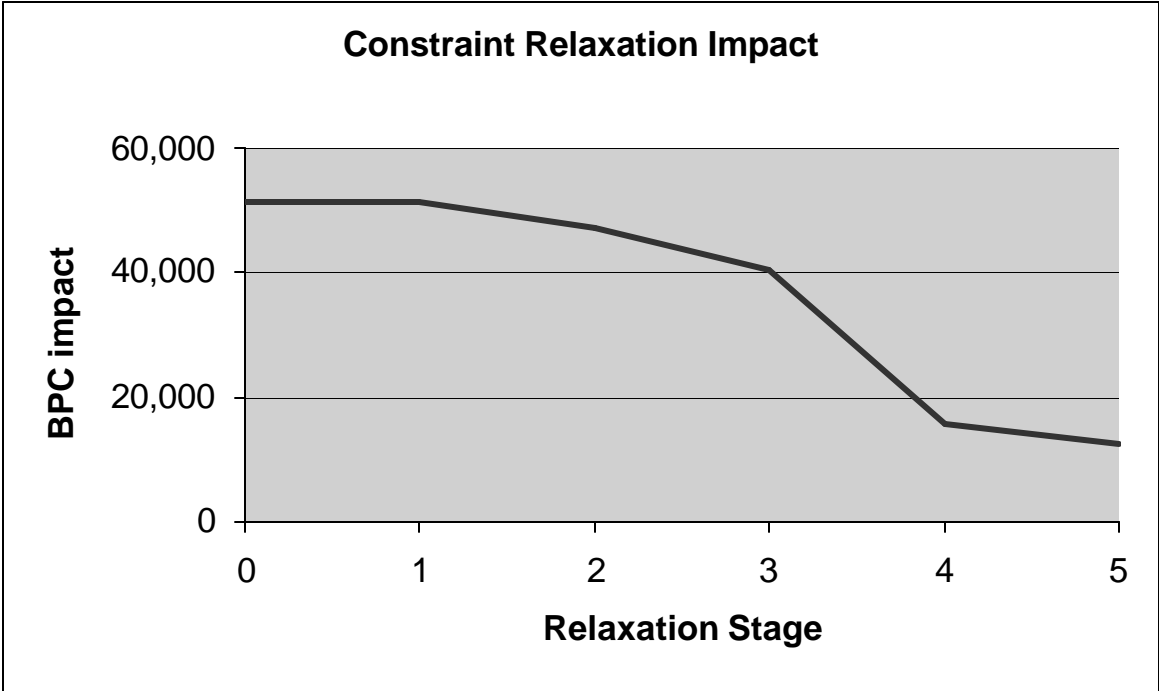
scenario
Base - fully constrained
1 - relax E179th-Hellgate E.
2 - relax E13th-W49th str
3 - relax Dunwoodie-Shore Rd
4 - Valley Str-E. Garden City
5 - relax Sprainbrook-E. Garden City

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Successive Relaxation – Historical Examples

	order relaxed	BPC impact	
		total daily	Dun-Shore relaxation effect
4-Dec	3	164,106	9.25%
10-Dec	5	37,235	20.44%
12-Dec	1	14,029	33.37%
18-Dec	1	40,174	42.67%
25-Dec	3	51,295	12.71%
27-Dec	1	119,229	31.40%

Successive Relaxation – Historical Examples

	order relaxed	BPC impact	
		total daily	Dun-Shore relaxation effect
4-Dec	3	164,106	15,180
10-Dec	5	37,235	7,611
12-Dec	1	14,029	4,681
18-Dec	1	40,174	17,142
25-Dec	3	51,295	6,520
27-Dec	1	119,229	37,438

3 days (#1)	173,432	59,262	34.17%
3 days (not #1)	252,636	29,310	11.60%
6 days	426,068	88,572	20.79%

Observations

- Relative constraint significance (relaxation stage) seemingly a significant factor

- Constraint relaxation effect on BPC not correlated to effect on congestion payments

- Larger sample required for improved confidence

Next Steps

- Continue concentrating on single constraint
- Expand sample to two weeks (summer, winter)
  - sufficient size?
  - week per quarter?
- Develop multipliers to yearly BPC values
  - automate process?
  - consider yearly run?
- Investigate relaxation order
- Develop framework for overall process
- Report back to group with more comprehensive results