

Congestion Management

Proposed Summer 2008 Activities

Overview of Redispatch Pilot and Curtailment Calculator Prototype

June 10, 2008



Results of 2007 Summer Pilot

- 2007 Summer Redispatch Pilot
 - Was very successful
 - 11 events, 6 were tests and 5 actual events
 - Because of Redispatch Pilot - Curtailments were reduced but not eliminated
 - Energy settlements totaled less than \$50,000
 - Redispatched a total of about 1400 MWs
 - Findings
 - Need more bids
 - About 3 times more effective than curtailments
 - Full report on TBL external website (under Congestion Management)



Results of 2007/2008 Winter Pilot

- Cross cascades winter redispatch
 - Started 12/2007, ended 4/30/2008
 - Cross cascades paths overloaded if West side generation was off-line
 - Used an early warning system to get bidders to bid – due to the possibility of advance knowledge of an event
 - Ran 2 tests (1 successful, 1 not) and 2 near events



Two Tools Proposed for Summer 2008

- Reliability Redispatch Pilot
 - Redispatch effort will be similar to last summers
 - Pilot will run from July 1, 2008 to September 30, 2009
 - Bids will be accepted 10 minutes to the hour of flow (20 minutes last summer)
 - Propose to expand pilot to participants outside BPA's Balancing Authority
 - BPA will be available to discuss automating the bid process



Two Tools Proposed for Summer 2008 (continued)

- Curtailment Calculator Prototype
 - Developing an in-hour non-firm curtailment calculator for BPA's ten internal network flowgates
 - Will replace BPA's existing RODS based calculators
 - Curtailment uses e-tags
 - Curtails based on flowgate impact, consistent with the OATT
 - Both tools could be used independently to manage an event



Proposed Spring 2009 Activities

- Integrated Curtailment and Redispatch System (ICRS)
 - Developing in-hour curtailment calculator for the ten internal network flowgates that will be integrated with the reliability redispatch tool
 - Both tools could be used by BPA's Dispatchers to manage an event
 - Integrated tool will have the ability to curtail non-firm tags initially (ability to curtail firm tags in the future)
 - Tool will curtail based on flowgate impact, consistent with the OATT



Related Issues for this Summers Activities

- Need more bids for Redispatch Pilot to be successful
- Stopping hourly sales an hour or two after an event (via OASIS)
- No advance notice will be provided, due to summer's unanticipated events
- Expanding effort to include participants outside BPA's Balancing Authority



Next Steps

- Draft Redispatch agreement was sent out the week of May 19th
- Today - Meeting with participants to discuss Redispatch and associated Agreements
- Offer training and live meeting sessions, if needed
- If appropriate number of participants sign up for Reliability Redispatch Pilot, could begin by July 1, 2008
- Integrated Redispatch and curtailment tool should be available by March 2009



Congestion Management

Calculate Redispatch

35-MW Paul-Allston Example

June 10, 2008



35-MW Paul-Allston Example

Required Relief = 35

Bids

Generator	INC \$	DEC \$	INC MW	DEC MW	Used INC MW	Used DEC MW	Available INC MW	Available DEC MW	Redispatch Contact
CAR	\$80.00	\$20.00	40	40	0	0	40	40	EWEB Dispatcher
CHJ	\$80.00	\$20.00	100	100	0	0	100	100	BPAP Hydro Desk
CHP	\$80.00	\$20.00	30	30	0	0	30	30	CHP Plant Operator
CNT	\$80.00	\$20.00	75	75	0	0	75	75	CNT Plant Operator
GCL	\$80.00	\$20.00	200	200	0	0	200	200	BPAP Hydro Desk
HPP	\$80.00	\$20.00	25	25	0	0	25	25	HPP Plant Operator
JDA	\$80.00	\$20.00	45	45	0	0	45	45	BPAP Hydro Desk
LAN	\$80.00	\$20.00	75	75	0	0	75	75	Avista Energy Disp
TDA	\$80.00	\$20.00	30	30	0	0	30	30	BPAP Hydro Desk
...



35-MW Paul-Allston Example

1. Add the first bid pair to the Suggestion List and update the Cumulative Relief, Cumulative Price and # of Calls

Bid Stack

INC	DEC	INC PTFD	DEC PTFD	PAIR PTFD	INC \$	DEC \$	PAIR \$	EFF \$	INC MW	DEC MW	PAIR MW	Potential Relief
CAR	CHP	-0.2043	0.3885	-0.5928	\$80.00	\$20.00	\$60.00	\$101.21	40	30	30	17.7
TDA	CHP	-0.1719	0.3885	-0.5604	\$80.00	\$20.00	\$60.00	\$107.06	30	30	30	16.8
CAR	CNT	-0.2043	0.3514	-0.5557	\$80.00	\$20.00	\$60.00	\$107.97	40	75	40	22.2
...

Suggestion List

Redispatch Contact	Generator	INC MW	DEC MW
EWEB Dispatcher Dispatch	CAR	30	
CHP Plant Operator	CHP		30

This bid Relief: **17.7**
 This bid Price: **\$1,800 (\$60 x 30 MW)**

Cumulative Relief: **17.7**
 Cumulative Price: **\$1,800**
 Number of Calls: **2**



35-MW Paul-Allston Example

2. Update both bids of the pair to reflect the MW used

Bids

Generator	INC \$	DEC \$	INC MW	DEC MW	Used INC MW	Used DEC MW	Available INC MW	Available DEC MW	Redispatch Contact
CAR	\$80.00	\$20.00	40	40	30	0	10	40	EWEB Dispatcher
CHP	\$80.00	\$20.00	30	30	0	30	30	0	CHP Plant Operator

3. Re-calculate the Bid Stack



35-MW Paul-Allston Example

4. Add the next bid pair to the Suggestion List and update the Cumulative Relief, Cumulative Price and # of Calls

Bid Stack

INC	DEC	INC PTFD	DEC PTFD	PAIR PTFD	INC \$	DEC \$	PAIR \$	EFF \$	INC MW	DEC MW	PAIR MW	Potential Relief
CAR	CNT	-0.2043	0.3514	-0.5557	\$80.00	\$20.00	\$60.00	\$107.97	10	75	10	5.5
TDA	CNT	-0.1719	0.3514	-0.5233	\$80.00	\$20.00	\$60.00	\$114.65	30	75	30	15.6
...

Suggestion List

Redispatch Contact	Generator	INC MW	DEC MW
EWEB Dispatcher	CAR	30	10
CHP Plant Operator	CHP		30
CNT Plant Operator	CNT		10

This bid Relief: **5.5**
 This bid Price: **\$600** (\$60 x 10 MW)

Cumulative Relief: **23.2**
 Cumulative Price: **\$2,400**
 Number of Calls: **3**



35-MW Paul-Allston Example

5. Update both bids of the pair to reflect the MW used

Bids

Generator	INC \$	DEC \$	INC MW	DEC MW	Used INC MW	Used DEC MW	Available INC MW	Available DEC MW	Redispatch Contact
CAR	\$80.00	\$20.00	40	40	40	0	0	40	EWEB Dispatcher
CHP	\$80.00	\$20.00	30	30	0	30	30	0	CHP Plant Operator
CNT	\$80.00	\$20.00	75	75	0	10	75	65	CNT Plant Operator

6. Re-calculate the Bid Stack



35-MW Paul-Allston Example

7. The next bid pair provides more relief than needed to meet the Required Relief

Required Relief = **35**

Cumulative Relief (**23.2**) + this bid Relief (**15.6**) = **38.8**

3.8 MW too much relief

Bid Stack

INC	DEC	INC PTDF	DEC PTDF	PAIR PTDF	INC \$	DEC \$	PAIR \$	EFF \$	INC MW	DEC MW	PAIR MW	Potential Relief
TDA	CNT	-0.1719	0.3514	-0.5233	\$80.00	\$20.00	\$60.00	\$114.65	30	65	30	15.6
JDA	CNT	-0.1567	0.3514	-0.5081	\$80.00	\$20.00	\$60.00	\$118.08	45	65	45	22.8
...

8. Calculate the MW to use from the last bid so that the exact Required Relief is met

Relief Needed = Required Relief - Cumulative Relief

Required Relief (**35**) - Cumulative Relief (**23.2**) = **11.8**

9. Calculate MW to Use from this bid

MW to Use = Relief Needed / (Pair PTDF x -1), rounded up

Relief Needed (**11.8**) / (Pair PTDF(-**0.5233** x -1) = **22.549**, rounded up to **23**



35-MW Paul-Allston Example

12. Add the last bid, with the adjusted Potential Relief, MW to Use, Pair Price to the Suggestion List and update the Cumulative Relief, Cumulative Price and # of Calls

Bid Stack

INC	DEC	INC PTFD	DEC PTFD	PAIR PTFD	INC \$	DEC \$	PAIR \$	EFF \$	INC MW	DEC MW	PAIR MW	Potential Relief
TDA	CNT	-0.1719	0.3514	-0.5233	\$80.00	\$20.00	\$60.00	\$114.65	30	65	30	15.6
JDA	CNT	-0.1567	0.3514	-0.5081	\$80.00	\$20.00	\$60.00	\$118.08	45	65	45	22.8
...

Suggestion List

Redispatch Contact	Generator	INC MW	DEC MW
EWEB Dispatcher	CAR	30	
CHP Plant Operator	CHP		30
CNT Plant Operator	CNT		10
BPAP Hydro Desk	TDA	23	

This bid Relief: **12.0**
 This bid Price: **\$1,380** (\$60 x 23 MW)

Cumulative Relief: **35.2**
 Cumulative Price: **\$3,780**
 Number of Calls: **4**



35-MW Paul-Allston Example

13. Update both bids of the pair to reflect the MW used

Bids

Generator	INC \$	DEC \$	INC MW	DEC MW	Used INC MW	Used DEC MW	Available INC MW	Available DEC MW	Redispatch Contact
CNT	\$80.00	\$20.00	75	75	0	33	75	42	CNT Plant Operator
TDA	\$80.00	\$20.00	30	30	23	0	7	30	BPAP Hydro Desk

14. The final set of Bids that were used will look like this:

Bids

Generator	INC \$	DEC \$	INC MW	DEC MW	Used INC MW	Used DEC MW	Available INC MW	Available DEC MW	Redispatch Contact
CAR	\$80.00	\$20.00	40	40	40	0	0	40	EWEB Dispatcher
CHP	\$80.00	\$20.00	30	30	0	30	30	0	CHP Plant Operator
CNT	\$80.00	\$20.00	75	75	0	33	75	42	CNT Plant Operator
TDA	\$80.00	\$20.00	30	30	23	0	7	30	BPAP Hydro Desk

15. The final Call List will show the total that each generator needs to INC or DEC, like this:

Call List

Redispatch Contact	Generator	Request
EWEB Dispatcher	CAR - Carmen Smith	40
CHP Plant Operator	CHP - Chehalis	-30
CNT Plant Operator	CNT - Centralia	-33
BPAP Hydro Desk	TDA - The Dalles	23



Break



Congestion Management

Calculate Curtailment Example

June 10, 2008



Curtailment Example for 76 MW

1. Retrieve Tag Stack

ID	POR	POD	Entry MW	Product Code	PORPTDF	PODPTDF	Entry PTFD	Entry Pot. Relief MW
A	BC.US.Border	BPAT.PGEPOD	60	0-NX	0.06517	-0.33497	0.40014	24.0082
B	ChehalisPwr	BPAPower	50	0-NX	0.36190	-0.07776	0.43965	21.9826
C	Centralia	BPAT.PGEPOD	30	0-NX	0.33778	-0.33497	0.67275	20.1825
D	BPAT.PGEPOR	BC.US.Border	65	1-NS	0.46652	0.06517	0.40134	26.0874
E	BC.US.Border	BPAT.PGEPOD	25	1-NS	0.06517	-0.33497	0.40014	10.0034
F	WhtCrkWind	BC.US.Border	38	1-NS	0.32334	0.06517	0.25817	9.8103
G	CENTRALIA	PSEI.SYSTEMPOD	20	1-NS	0.33778	0.08438	0.25340	5.0681

2. Subtotal first priority block (0-NX) and compare with Relief Target (76 MW)

Subtotal 0-NX = 24.0082 + 21.9826 + 20.1825 = 66.1733

Subtotal 0-NX = 66.1733 < 76 = Relief Target



3. Curtail all 0-NX by 100%

ID	POR	POD	Entry MW	Product Code	Entry PTDF	Initial %	MW to Curtail	Entry Act. Relief MW
A	BC.US.Border	BPAT.PGEPOD	60	0-NX	0.40014	100.000%	60	24.0082
B	ChehalisPwr	BPAPower	50	0-NX	0.43965	100.000%	50	21.9826
C	Centralia	BPAT.PGEPOD	30	0-NX	0.67275	100.000%	30	20.1825
D	BPAT.PGEPOR	BC.US.Border	65	1-NS	0.40134	0.000%	-	0.0000
E	BC.US.Border	BPAT.PGEPOD	25	1-NS	0.40014	0.000%	-	0.0000
F	WhtCrkWind	BC.US.Border	38	1-NS	0.25817	0.000%	-	0.0000
G	CENTRALIA	PSEI.SYSTEMPOD	20	1-NS	0.25340	0.000%	-	0.0000

4. Calculate Relief Needed

Relief Needed = Target - Current Relief = 76 - 66.1733 = 9.8267



5. Subtotal next priority block (1-NS)

Subtotal 1-NS = 26.0874 + 10.0034 + 9.8103 + 5.0681 = 50.9691

ID	POR	POD	Entry MW	Product Code	PORPTDF	PODPTDF	Entry PTFD	Entry Pot. Relief MW
A	BC.US.Border	BPAT.PGEPOD	60	0-NX	0.06517	-0.33497	0.40014	24.0082
B	ChehalisPwr	BPAPower	50	0-NX	0.36190	-0.07776	0.43965	21.9826
C	Centralia	BPAT.PGEPOD	30	0-NX	0.33778	-0.33497	0.67275	20.1825
D	BPAT.PGEPOR	BC.US.Border	65	1-NS	0.46652	0.06517	0.40134	26.0874
E	BC.US.Border	BPAT.PGEPOD	25	1-NS	0.06517	-0.33497	0.40014	10.0034
F	WhtCrkWind	BC.US.Border	38	1-NS	0.32334	0.06517	0.25817	9.8103
G	CENTRALIA	PSEI.SYSTEMPOD	20	1-NS	0.33778	0.08438	0.25340	5.0681

6. Compare with Relief Needed

Subtotal 1-NS = 50.9691 > 9.8267 = Relief Needed



7. Calculate Initial % for 1-NS block

Initial % = $9.8267 / 50.9691 = 19.280\%$

8. Distribute Initial % and round **MW to Curtail** to nearest MW

ID	POR	POD	Entry MW	Product Code	Entry PTFD	Initial %	MW to Curtail	Entry Act. Relief MW
A	BC.US.Border	BPAT.PGEPOD	60	0-NX	0.40014	100.000%	60	24.0082
B	ChehalisPwr	BPAPower	50	0-NX	0.43965	100.000%	50	21.9826
C	Centralia	BPAT.PGEPOD	30	0-NX	0.67275	100.000%	30	20.1825
D	BPAT.PGEPOR	BC.US.Border	65	1-NS	0.40134	19.280%	13	5.2175
E	BC.US.Border	BPAT.PGEPOD	25	1-NS	0.40014	19.280%	5	2.0007
F	WhtCrkWind	BC.US.Border	38	1-NS	0.25817	19.280%	7	1.8072
G	CENTRALIA	PSEI.SYSTEMPOD	20	1-NS	0.25340	19.280%	4	1.0136

9. Meet Relief Needed?

Subtotal 0-NX Act. Relief = 66.1733

Subtotal 1-NS Act. Relief = 10.6984

Total Relief = 76.8717 > 76

10. End



Congestion Management

Stopping Hourly Sales After an Event

June 10, 2008



Hourly Sales Issues

- BPAT is proposing to stop hourly sales to prevent future OTC excursions, for an hour or two after an OTC excursion or an excursion is imminent on a flowgate
- Currently, BPAT accepts all hourly schedule requests on the network
- This usually is not a problem until flows exceed the flowgate OTC
- While BPAT Dispatchers are mitigating for an OTC excursion or an excursion is identified as imminent on a flowgate, hourly sales are continuing



What's the Difference from Last Summers Redispatch Pilot?

- During last Summer's Redispatch Pilot, BPAT denied sales of both firm and non-firm hourly service through a manual process developed to suspend hourly sales an hour or two following an event
- This manual approach was possible because reservations were still being taken by submitting tags **and** contacting BPAT by telephone
- Since the OATI automation became operation in December 2007, reservations are no longer taken via telephone, thus eliminating this approach for denying hourly sales
- However, although the manual process is no longer an option, the need to deny hourly sales an hour or two after an event, still remains



How does BPAT propose to limit hourly sales after an event?

- BPAT proposes to have OATI develop the capability to suspend hourly firm sales on the network during or following an OTC excursion some time this summer
- Developing this capability will allow Transmission Service Requests:
 - To be accepted that will either relieve the selected flowgate(s) or has a deminimis impact on the flowgate
 - To be refused that will further load the selected flowgate(s)
- Suspending hourly service would not apply to hourly transmission already purchased



Why is this Important for this Summer's Pilot and Prototype?

- Having this capability for this summer will:
 - Enable BPAT to test the “proof of concept” for the curtailment calculators for a pre-determined period of time
 - Allow adequate time to monitor and determine changes, as needed; and
 - Allow the capability to be extended or removed as information is gathered



Congestion Management

Cross Balancing Authority Redispatch (X-BAR)

June 10, 2008



What is X-BAR?

- BPAT is proposing to expand the existing Reliability Redispatch Pilot (RRP) program.
- There has been a desire from the region to include generators that are located outside of the Bonneville Power Administration's Transmission Services (BPAT) Balancing Authority Area (BAA).
- BPAT would use the proposed 2008-2009 RRP to gather information about the impact of including generators external to the BPAT BAA.
- This program will be called: Cross-Balancing Authority Redispatch or X-BAR ("crossbar").



Previous Redispatch Pilot's

- BPAT's previous RRP's have only been available to generators within the BPAT BAA.
- Since there were no changes to controller totals, tagging was not required.
- Schedules were calculated after the fact and were used for settlement.



Why is this Being Considered Now?

- BPAT has a number of concerns about the technical and logistical feasibility of developing a multi-balancing authority redispatch system.
- Concerns stem from ensuring that communications with participants is clear so that the right generators move - by the right amounts of MW - at the right times.
- This summer, we propose to address the following issues:
 - generator instruction;
 - Net Scheduled Interchange (NSI) management;
 - validation/settlement;
 - and how tagging fits in with this process.



Initial X-BAR Questions

- Several approaches have been considered to include new generation outside of the BPAT's BAA
- Initially the proposed approach has been designed to simplify the implementation and minimize the investment in order to answer a number of questions.
- These questions are:
 - Will this effort increase the number of generators bidding?
 - Will these external generators be located appropriately to mitigate the congestion on the network?
 - Will these generators be able to respond to the redispatch requests?
 - Will the responses be timely?
 - Will the redispatch actually provide the relief calculated on the appropriate flowgates?



Model Proposed to be Used for X-BAR

■ ATF Model

- The simplified design being proposed is referred to as the ATF (After-the-Fact) Model.
- Here are the elements of this proposal for generators external to the BPAT BAA:
 - The Bid process to INC and DEC would be the same as the Bid process within BPAT BAA
 - BPAT Dispatch would give redispatch instructions via phone calls to the appropriate generator contacts
 - Controller total changes to NSI would be done manually
- Tags would be handled after-the-fact, if required, similar to BPAT's business practice for the self supply of operating reserve deliveries.
 - For INC delivery: schedule from the generator to BPAT
 - For DEC delivery: schedule from BPAT to Generator Owner's Load within host BA or BA Load.



Pros and Cons of ATF Model

- **ATF Model - Concept:** Minimal tagging and scheduling would be required. If required, tagging would be done using ATF tags.
- **Pros:**
 - No tags prior to the hour.
 - Doesn't require programming.
 - Allows BPAT to test the effects of redispatch, rather than the scheduling and tagging procedures.
 - Similar treatment to other programs (counter-schedule and Reserve Sharing).
- **Cons:**
 - Manual procedures introduce possibilities of errors.



Other Models Considered and Eliminated for Now

- **Capacity Model - Concept:** Use capacity tags to set aside transmission and then update when dispatched, similar to On-Demand Rights products, such as reserves.
- **Pros:**
 - Doesn't require programming.
 - Use established procedures.
- **Cons:**
 - Requires transmission and tags ahead of time.
 - Cost of firm transmission could drive price up or discourage participation.



Other Models Considered and Eliminated for Now (cont'd)

- **Dynamic Model - Concept:** Use dynamic signals for individual plants in other BAs. This schedule could be updated with the redispatch instruction by BPA or the Bidder.
- **Pros:**
 - Minimize errors from mismatched controller totals.
 - Integration is done automatically.
- **Cons:**
 - Need to purchase firm transmission and tag prior to the hour could drive prices up or discourage participation.
 - Would require programming and cost of setup.



Other Models Considered and Eliminated for Now (Cont'd)

- **BEAR Model - Concept:** This is the Balanced External Area Generation (BEAR) model that would have the external BA redispatch (INC and DEC) generators wholly within its own BAA.
- **Pros:**
 - Interchange tagging not required.
 - Simple for BPAT to administer.
- **Cons:**
 - Limited combinations of generators and limited relief.



Next Steps

- Work with a selected few Participants outside of BPAT's BAA that might provide the greatest benefits in testing concepts during the RRP.
- Continue to answer questions relevant to the various Models considered for future development
- Others?

