



# +/- \$50 Bid Cap and Node Limitations on Up-To Congestion Transactions

APRIL 10 SPECIAL SESSION MIC

NOHA SIDHOM- INERTIA POWER

# Limitations Addressed in Problem Statement

- ▶ Section 1.10 of Attachment K of the PJM Tariff and Schedule 1 Section 1.10 of the Operating Agreement state that: “The maximum difference between the source and sink prices that a participant may specify shall be limited to +/- \$50/MWh.”
- ▶ Roughly 438 out of the 12,259 nodes on the PJM system are available for UTC transactions.

# Node Selection Process Outlined by PJM

- ▶ Step 1: Start with the historic set of eligible nodes that were available as sources and sinks for interchange transactions on the PJM OASIS.
- ▶ Step 2: Remove from the list of nodes described in Step 1 all load buses below 69 kV.
- ▶ Step 3: Remove from the resulting set of nodes from Step 2 all generator buses at which no generators of 100 megawatts or more are connected.
- ▶ Step 4: Remove from the results of Step 3 all electrically equivalent nodes.

# Concerns Regarding +/- \$50/MWh Bid Cap

- ▶ This bid limit does not comport with current LMP trends or price spreads between DA and RT.
- ▶ This bid limit prohibits this product from being a true hedge for asset owners.
- ▶ The current cap results in price insensitive bidding as Market Participants can not bid what they actually think the congestion is worth on peak days.
- ▶ Prevailing flow transactions are less likely to clear on peak days.
- ▶ However, counterflow transactions are much more likely to clear on those peak days. This results in a bias to the market.

# Concerns Regarding +/- \$50/MWh Bid Cap Cont'd


- ▶ There is no opportunity for accurate pricing. For example, if a Market Participant predicts the price will be at -\$150, that Market Participant has two choices:
  - ▶ Either bid -\$50, which is price insensitive; or
  - ▶ Do not bid at all and thus there is no price discovery
- ▶ What is the downside of Bidding -\$50: if you bid a large volume and set price, your downside is significant.
- ▶ Overall Result for Market: More risk taken by the Market Participant and less price discovery for the market. Example Two discussed later in the presentation demonstrates why a Market Participant would not bid -\$50.

# Concerns Regarding +/- \$50/MWh Bid Cap Cont'd

- ▶ The price limitation also forces Market Participants to bid alternate, less volatile paths.
- ▶ For example, if a Market Participant thinks congestion on a particular path will be -\$300 but can only bid -\$50 and thus does not want to take the potential downside risk, that Market Participant could locate a nearby path that is less volatile to transact on.
- ▶ Result: inaccurate highlighting of efficiencies in the system.

# Concerns with Node Availability



- ▶ Many nodes that would still be available after the 4 step process outlined by PJM are not available.
  - ▶ Node availability consistently changes without notice.
  - ▶ Market participants find an alternative path instead of highlighting the path with the greatest inefficiency. This is further exacerbated by the +/- \$50 bid cap.
  - ▶ Prohibits an Up-To Congestion Transaction from being a true hedge for asset owners.
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# Concerns with Node Availability

## Cont'd

- ▶ Currently, only 150 nodes are linked to generators. There are 1500 generator nodes in PJM. Thus, 10% of generators can hedge their RT risk.
- ▶ FTRs currently allow paths on all 1500 generator nodes.
- ▶ Fundamental Flaw: Generators do not have a more granular hedging tool. If there is a unit trip, their short-term hedging ability is extremely limited.



# Benefits of Expansion

- ▶ Market Participants will be able to place price sensitive bids.
- ▶ The bias to counterflow will be eliminated.
- ▶ Market Participants will bid the appropriate path instead of an alternative path.
- ▶ Expansion could lead to asset owning entities using a UTC as a hedge because it will be a true hedge and a more granular hedge than an FTR.
- ▶ During discussions of a spread bid in MISO, several Market Participants stated that they would use a UTC if it were more widely available in PJM.

# Benefits of Expansion Cont'd

- ▶ Additional participants are not limited to generators. An expanded product would allow retail providers, independent power products and renewable energy products to be able to hedge and minimize their transmission risks in the DA and RT markets.
- ▶ Allow for better price convergence as some constraints do not have an eligible UTC path or the bid cap prevents Market Participants from highlighting this constraint.
- ▶ Preposition Day-Ahead Market for Real-Time.
- ▶ Better price discovery overall.

# Concerns Regarding Solving DA Model

- ▶ PJM has recently implemented a soft bid cap of 3000 bids. PJM has the right to enforce that at its discretion.
- ▶ Recent IMM report shows that virtual volumes as whole have steadily increased and there was not a significant spike when the interface requirement was removed.
- ▶ Market participants will not bid more, they will bid smarter.
- ▶ Current credit screen and credit policy will prohibit a significant spike in volumes.

# Appendix A: Examples



# Example One

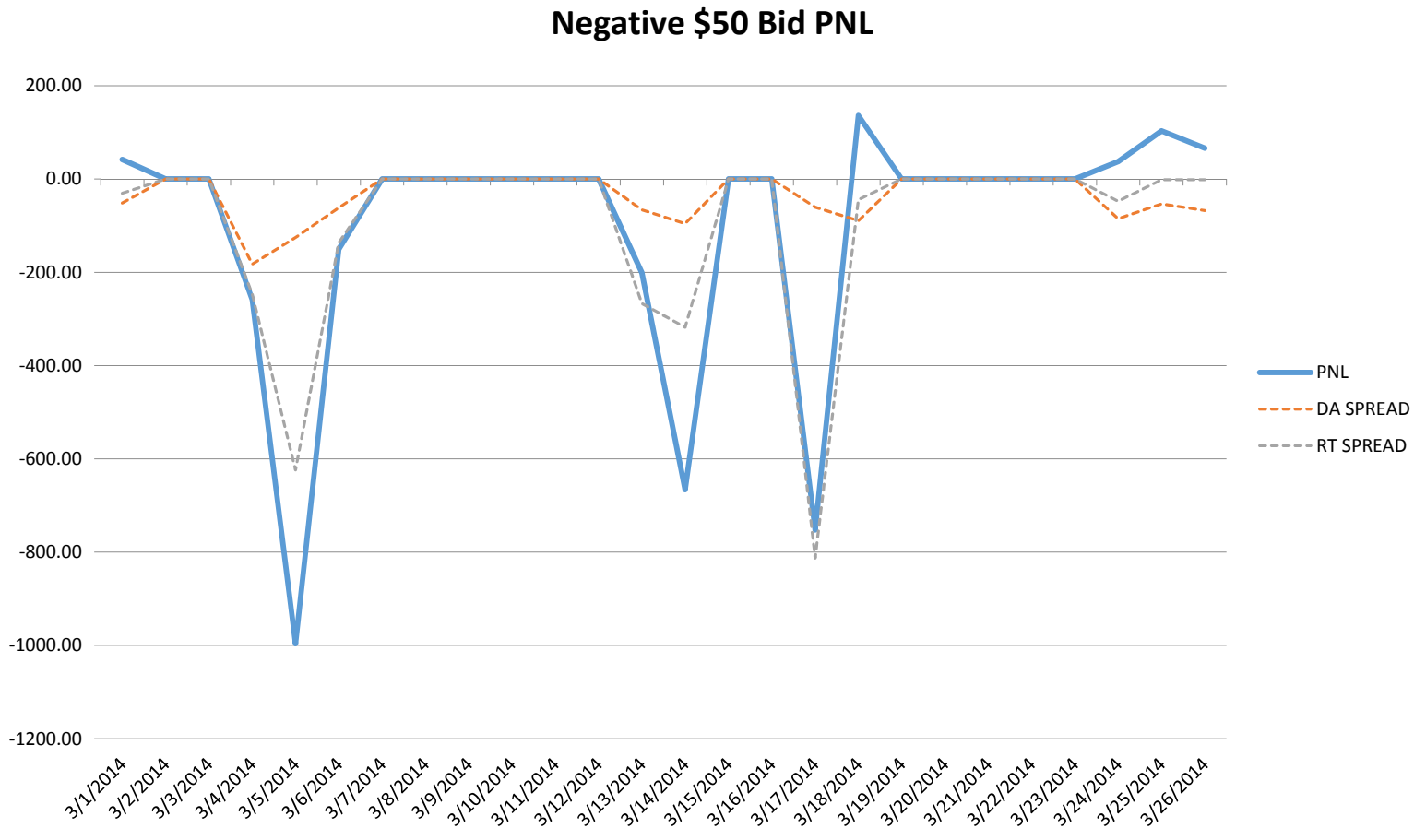
Key Takeaway: There is less downside risk if Market Participants can bid at a greater negative value.

This example demonstrates potential Profit and Loss numbers at a bid of  $-\$50$ ,  $-\$100$  and  $-\$150$ .

# Raw Data

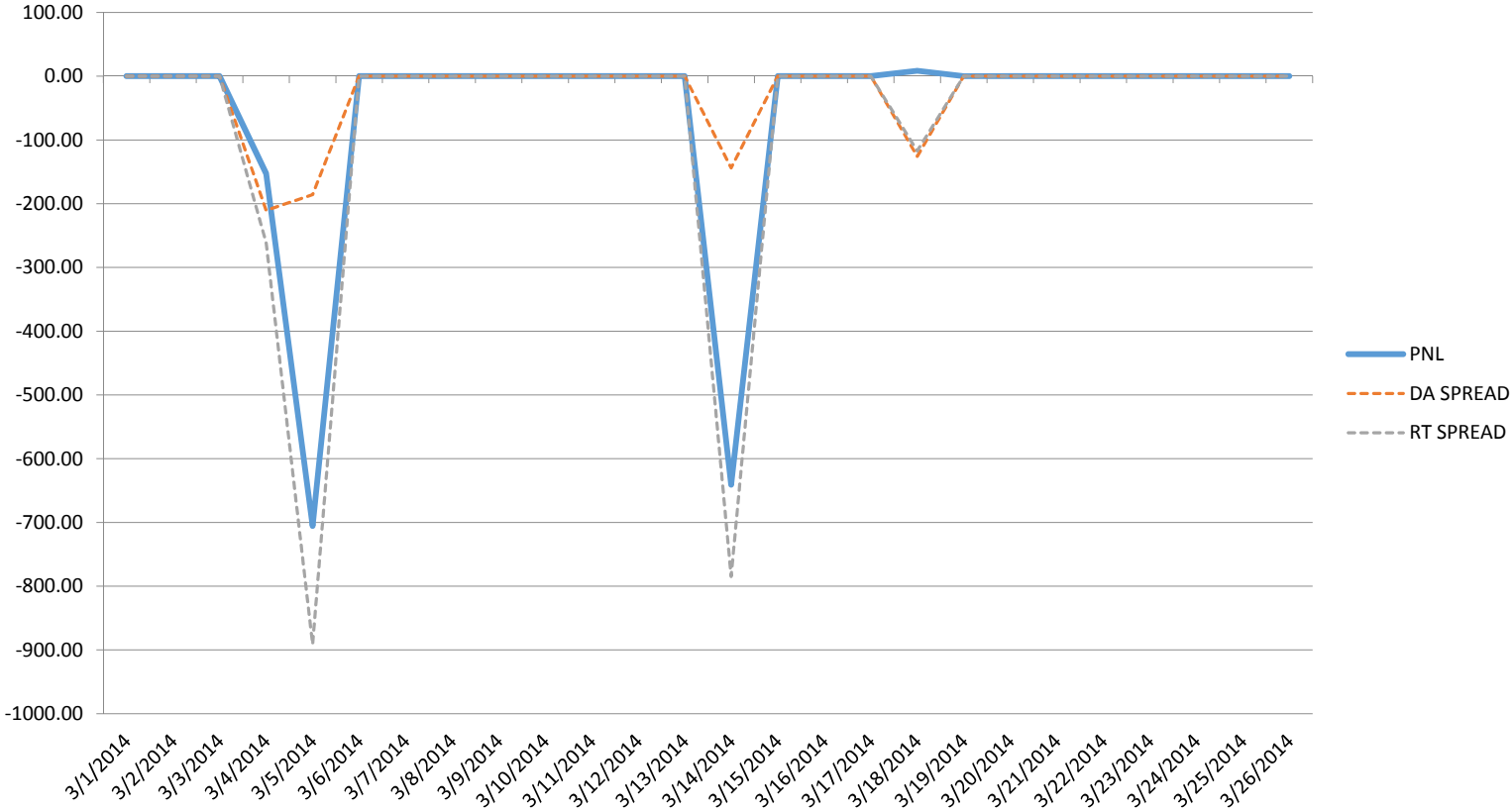
		SOURCE		PNODE		SINK		PNODE		SPREAD		
		MEADOWBROOK 500 KV		5022440		BLACKOAK 500 KV		5022433				
DATE	HE	DA		RT		DA		RT		DA	RT	RT LESS DA
3/1/2014	7		106.70	131.72			55.04	133.45		-51.66	1.73	53.39
3/1/2014	8		110.03	244.15			58.75	181.31		-51.28	-62.84	-11.56
3/1/2014	9		109.17	96.44			63.80	100.37		-45.37	3.93	49.30
3/1/2014	10		104.64	159.43			64.90	148.08		-39.74	-11.35	28.39
3/2/2014	7		47.21	35.99			40.05	36.08		-7.16	0.09	7.25
3/2/2014	8		56.43	41.46			39.95	42.94		-16.48	1.48	17.96
3/2/2014	9		56.21	57.94			41.67	56.85		-14.54	-1.09	13.45
3/2/2014	10		54.70	50.21			43.52	52.30		-11.18	2.09	13.27
3/3/2014	7		110.57	178.96			98.10	181.86		-12.47	2.90	15.37
3/3/2014	8		187.74	160.99			155.80	164.18		-31.94	3.19	35.13
3/3/2014	9		207.87	223.07			178.93	225.77		-28.94	2.70	31.64
3/3/2014	10		203.70	401.46			174.64	407.00		-29.06	5.54	34.60
3/4/2014	7		399.81	406.44			302.19	202.69		-97.62	-203.75	-106.13
3/4/2014	8		644.84	461.61			331.54	52.69		-313.30	-408.92	-95.62
3/4/2014	9		428.83	315.85			275.02	112.42		-153.81	-203.43	-49.62
3/4/2014	10		424.61	348.54			260.14	176.53		-164.47	-172.01	-7.54
3/5/2014	7		344.81	861.89			159.00	-29.40		-185.81	-891.29	-705.48

DATE	PNL	DA SPREAD	RT SPREAD
3/1/2014	41.83	-51.47	-30.56
3/2/2014	0.00	0.00	0.00
3/3/2014	0.00	0.00	0.00
3/4/2014	-258.91	-182.30	-247.03
3/5/2014	-996.28	-125.65	-623.79
3/6/2014	-150.02	-61.67	-136.68
3/7/2014	0.00	0.00	0.00
3/8/2014	0.00	0.00	0.00
3/9/2014	0.00	0.00	0.00
3/10/2014	0.00	0.00	0.00
3/11/2014	0.00	0.00	0.00
3/12/2014	0.00	0.00	0.00
3/13/2014	-201.03	-65.94	-266.97
3/14/2014	-666.17	-95.87	-317.92
3/15/2014	0.00	0.00	0.00
3/16/2014	0.00	0.00	0.00
3/17/2014	-752.42	-60.45	-812.87
3/18/2014	136.11	-89.53	-44.16
3/19/2014	0.00	0.00	0.00
3/20/2014	0.00	0.00	0.00
3/21/2014	0.00	0.00	0.00
3/22/2014	0.00	0.00	0.00
3/23/2014	0.00	0.00	0.00
3/24/2014	37.38	-85.02	-47.64
3/25/2014	103.25	-53.22	-1.60
3/26/2014	66.29	-67.63	-1.34
<b>Total</b>	<b>\$(2,639.97)</b>		



DATE	PNL	DA SPREAD	RT SPREAD
3/1/2014	0.00	0.00	0.00
3/2/2014	0.00	0.00	0.00
3/3/2014	0.00	0.00	0.00
3/4/2014	-152.78	-210.53	-261.45
3/5/2014	-705.48	-185.81	-891.29
3/6/2014	0.00	0.00	0.00
3/7/2014	0.00	0.00	0.00
3/8/2014	0.00	0.00	0.00
3/9/2014	0.00	0.00	0.00
3/10/2014	0.00	0.00	0.00
3/11/2014	0.00	0.00	0.00
3/12/2014	0.00	0.00	0.00
3/13/2014	0.00	0.00	0.00
3/14/2014	-641.01	-143.92	-784.93
3/15/2014	0.00	0.00	0.00
3/16/2014	0.00	0.00	0.00
3/17/2014	0.00	0.00	0.00
3/18/2014	8.51	-125.78	-117.27
3/19/2014	0.00	0.00	0.00
3/20/2014	0.00	0.00	0.00
3/21/2014	0.00	0.00	0.00
3/22/2014	0.00	0.00	0.00
3/23/2014	0.00	0.00	0.00
3/24/2014	0.00	0.00	0.00
3/25/2014	0.00	0.00	0.00
3/26/2014	0.00	0.00	0.00
<b>Total</b>	<b>\$(1,490.76)</b>		

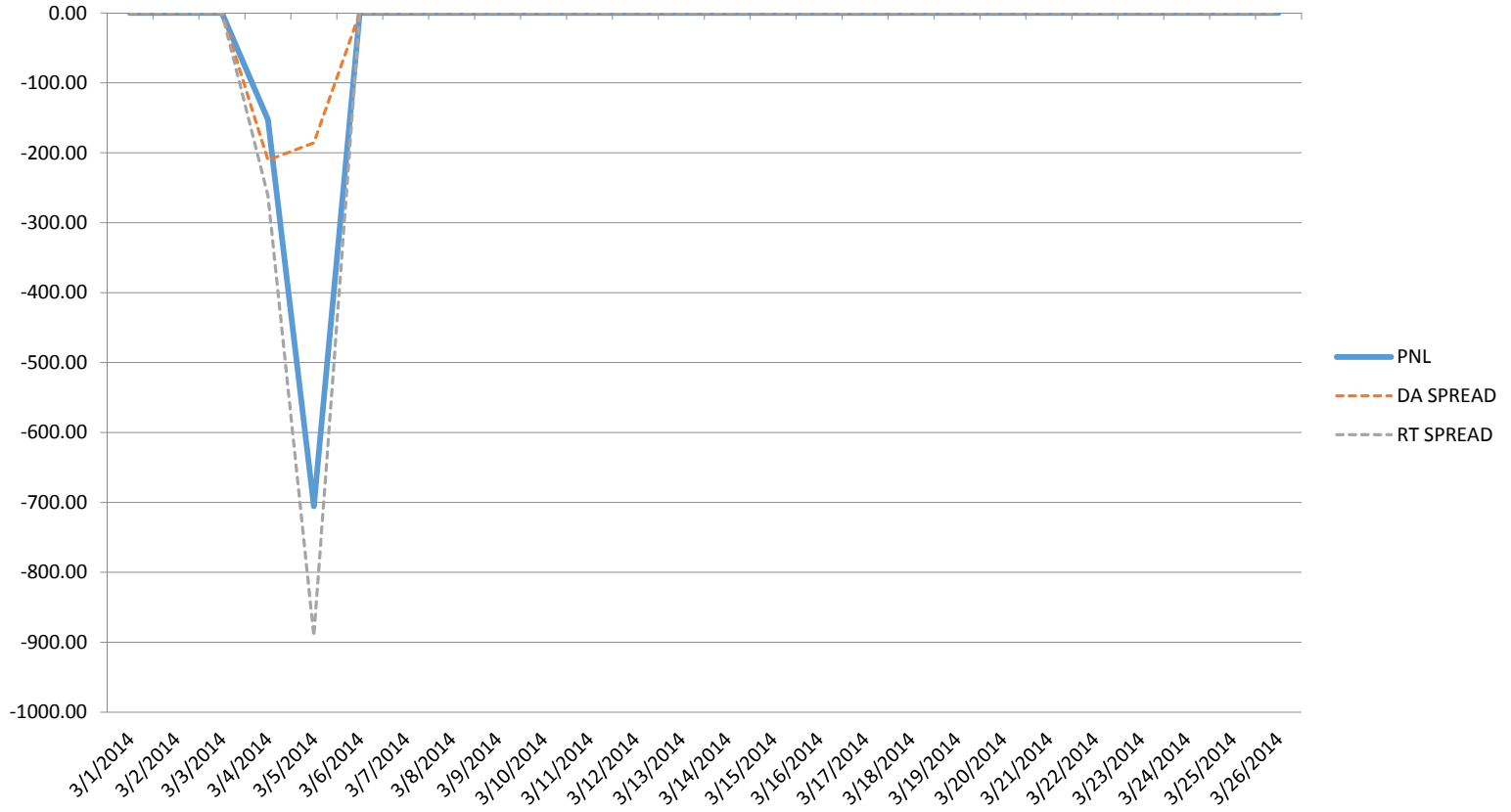
### Negative \$100 Bid PNL





DATE	PNL	DA SPREAD	RT SPREAD
3/1/2014	0.00	0.00	0.00
3/2/2014	0.00	0.00	0.00
3/3/2014	0.00	0.00	0.00
3/4/2014	-152.78	-210.53	-261.45
3/5/2014	-705.48	-185.81	-891.29
3/6/2014	0.00	0.00	0.00
3/7/2014	0.00	0.00	0.00
3/8/2014	0.00	0.00	0.00
3/9/2014	0.00	0.00	0.00
3/10/2014	0.00	0.00	0.00
3/11/2014	0.00	0.00	0.00
3/12/2014	0.00	0.00	0.00
3/13/2014	0.00	0.00	0.00
3/14/2014	0.00	0.00	0.00
3/15/2014	0.00	0.00	0.00
3/16/2014	0.00	0.00	0.00
3/17/2014	0.00	0.00	0.00
3/18/2014	0.00	0.00	0.00
3/19/2014	0.00	0.00	0.00
3/20/2014	0.00	0.00	0.00
3/21/2014	0.00	0.00	0.00
3/22/2014	0.00	0.00	0.00
3/23/2014	0.00	0.00	0.00
3/24/2014	0.00	0.00	0.00
3/25/2014	0.00	0.00	0.00
3/26/2014	0.00	0.00	0.00
<b>Total</b>	<b>\$ (858.26)</b>		

### Negative \$150 Bid PNL



# Example Two

## Key Takeaway:

If a Market Participant were to bid \$50, this example would not have cleared from January 22, 2014 to January 25, 2014. The prices were simply too volatile and the bid cap prevented Market Participants from pre-positioning the DA Market.

If a Market Participant went against congestion in this example and bid -\$50, it would have cleared every time with the exception of 2 hours during that time period. However, it would have incurred an average loss of \$199 per MW per day.

Date	HE	DA	RT	Counterflow	Prevailing Flow
1/22/2014	1	\$173.57	\$1.73	\$171.84	(\$171.84)
1/22/2014	2	\$166.24	\$5.45	\$160.79	(\$160.79)
1/22/2014	3	\$167.32	\$169.98	(\$2.66)	\$2.66
1/22/2014	4	\$152.35	\$153.78	(\$1.43)	\$1.43
1/22/2014	5	\$189.92	\$110.08	\$79.84	(\$79.84)
1/22/2014	6	\$211.13	\$528.87	(\$317.74)	\$317.74
1/22/2014	7	\$270.36	\$477.60	(\$207.24)	\$207.24
1/22/2014	8	\$150.17	\$780.49	(\$630.32)	\$630.32
1/22/2014	9	\$162.92	\$540.23	(\$377.31)	\$377.31
1/22/2014	10	\$134.87	\$568.34	(\$433.47)	\$433.47
1/22/2014	11	\$158.75	\$342.23	(\$183.48)	\$183.48
1/22/2014	12	\$144.49	\$735.80	(\$591.31)	\$591.31
1/22/2014	13	\$87.64	\$888.37	(\$800.73)	\$800.73
1/22/2014	14	\$103.86	\$534.68	(\$430.82)	\$430.82
1/22/2014	15	\$83.96	\$441.50	(\$357.54)	\$357.54
1/22/2014	16	\$152.54	\$332.98	(\$180.44)	\$180.44
1/22/2014	17	\$128.35	\$188.76	(\$60.41)	\$60.41
1/22/2014	18	\$124.96	\$1,174.69	(\$1,049.73)	\$1,049.73
1/22/2014	19	\$119.39	\$785.72	(\$666.33)	\$666.33
1/22/2014	20	\$178.98	\$1,060.30	(\$881.32)	\$881.32
1/22/2014	21	\$132.54	\$832.77	(\$700.23)	\$700.23
1/22/2014	22	\$131.07	\$1,143.23	(\$1,012.16)	\$1,012.16
1/22/2014	23	\$102.65	\$829.43	(\$726.78)	\$726.78
1/22/2014	24	\$127.78	\$484.26	(\$356.48)	\$356.48

1/23/2014	1	\$659.32	\$630.02	\$29.30	(\$29.30)
1/23/2014	2	\$533.09	\$715.93	(\$182.84)	\$182.84
1/23/2014	3	\$495.45	\$606.76	(\$111.31)	\$111.31
1/23/2014	4	\$600.74	\$747.98	(\$147.24)	\$147.24
1/23/2014	5	\$600.75	\$749.47	(\$148.72)	\$148.72
1/23/2014	6	\$970.42	\$531.07	\$439.35	(\$439.35)
1/23/2014	7	\$805.60	\$666.06	\$139.54	(\$139.54)
1/23/2014	8	\$619.02	\$696.59	(\$77.57)	\$77.57
1/23/2014	9	\$702.52	\$674.16	\$28.36	(\$28.36)
1/23/2014	10	\$456.74	\$376.55	\$80.19	(\$80.19)
1/23/2014	11	\$644.93	\$725.52	(\$80.59)	\$80.59
1/23/2014	12	\$650.08	\$526.01	\$124.07	(\$124.07)
1/23/2014	13	\$503.45	\$109.09	\$394.36	(\$394.36)
1/23/2014	14	\$556.01	\$290.10	\$265.91	(\$265.91)
1/23/2014	15	\$568.11	\$203.35	\$364.76	(\$364.76)
1/23/2014	16	\$587.67	\$142.63	\$445.04	(\$445.04)
1/23/2014	17	\$541.75	\$21.40	\$520.35	(\$520.35)
1/23/2014	18	\$674.17	\$129.55	\$544.62	(\$544.62)
1/23/2014	19	\$211.79	\$293.66	(\$81.87)	\$81.87
1/23/2014	20	\$413.03	\$1,085.80	(\$672.77)	\$672.77
1/23/2014	21	\$584.25	\$1,182.40	(\$598.15)	\$598.15
1/23/2014	22	\$484.71	\$1,087.46	(\$602.75)	\$602.75
1/23/2014	23	\$552.22	\$1,176.23	(\$624.01)	\$624.01
1/23/2014	24	\$414.38	\$1,103.82	(\$689.44)	\$689.44

1/24/2014	1	\$111.44	\$547.00	(\$435.56)	\$435.56
1/24/2014	2	\$79.01	\$605.66	(\$526.65)	\$526.65
1/24/2014	3	\$107.76	\$751.81	(\$644.05)	\$644.05
1/24/2014	4	\$99.49	\$890.04	(\$790.55)	\$790.55
1/24/2014	5	\$183.09	\$666.60	(\$483.51)	\$483.51
1/24/2014	6	\$224.99	\$336.57	(\$111.58)	\$111.58
1/24/2014	7	\$89.60	\$1,041.39	(\$951.79)	\$951.79
1/24/2014	8	\$813.81	\$1,472.58	(\$658.77)	\$658.77
1/24/2014	9	\$546.46	\$1,986.78	(\$1,440.32)	\$1,440.32
1/24/2014	10	\$518.03	\$891.13	(\$373.10)	\$373.10
1/24/2014	11	\$380.51	\$739.41	(\$358.90)	\$358.90
1/24/2014	12	\$457.41	\$486.59	(\$29.18)	\$29.18
1/24/2014	13	\$433.93	\$406.54	\$27.39	(\$27.39)
1/24/2014	14	\$397.10	\$539.08	(\$141.98)	\$141.98
1/24/2014	15	\$397.51	\$561.49	(\$163.98)	\$163.98
1/24/2014	16	\$371.15	\$201.03	\$170.12	(\$170.12)
1/24/2014	17	\$463.08	\$332.50	\$130.58	(\$130.58)
1/24/2014	18	\$461.23	\$504.98	(\$43.75)	\$43.75
1/24/2014	19	\$583.03	\$651.25	(\$68.22)	\$68.22
1/24/2014	20	\$466.76	\$740.26	(\$273.50)	\$273.50
1/24/2014	21	\$426.45	\$690.57	(\$264.12)	\$264.12
1/24/2014	22	\$430.63	\$710.02	(\$279.39)	\$279.39
1/24/2014	23	\$486.31	\$524.23	(\$37.92)	\$37.92
1/24/2014	24	\$26.01	\$790.15	(\$764.14)	\$764.14

1/25/2014	1	\$289.58	\$688.32	(\$398.74)	\$398.74
1/25/2014	2	\$239.34	\$648.57	(\$409.23)	\$409.23
1/25/2014	3	\$228.01	\$661.93	(\$433.92)	\$433.92
1/25/2014	4	\$244.35	\$516.29	(\$271.94)	\$271.94
1/25/2014	5	\$245.60	\$600.64	(\$355.04)	\$355.04
1/25/2014	6	\$276.60	\$314.31	(\$37.71)	\$37.71
1/25/2014	7	\$257.27	\$553.76	(\$296.49)	\$296.49
1/25/2014	8	\$697.05	\$548.65	\$148.40	(\$148.40)
1/25/2014	9	\$899.52	\$569.90	\$329.62	(\$329.62)
1/25/2014	10	\$889.00	\$834.73	\$54.27	(\$54.27)
1/25/2014	11	\$583.25	\$791.16	(\$207.91)	\$207.91
1/25/2014	12	\$423.24	\$612.51	(\$189.27)	\$189.27
1/25/2014	13	\$384.80	\$589.25	(\$204.45)	\$204.45
1/25/2014	14	\$366.67	\$576.36	(\$209.69)	\$209.69
1/25/2014	15	\$292.92	\$483.06	(\$190.14)	\$190.14
1/25/2014	16	\$240.90	\$179.42	\$61.48	(\$61.48)
1/25/2014	17	\$299.57	\$114.91	\$184.66	(\$184.66)
1/25/2014	18	\$356.34	\$308.00	\$48.34	(\$48.34)
1/25/2014	19	\$490.31	\$340.49	\$149.82	(\$149.82)
1/25/2014	20	\$451.67	\$27.02	\$424.65	(\$424.65)
1/25/2014	21	\$390.20	\$48.03	\$342.17	(\$342.17)
1/25/2014	22	\$415.60	\$198.07	\$217.53	(\$217.53)
1/25/2014	23	\$342.32	\$62.78	\$279.54	(\$279.54)
1/25/2014	24	\$7.17	\$21.95	(\$14.78)	\$14.78