Emergency Assistance Model
Status Report
## John Adams NYSRC Consultant

April 5, 2017

ICS Meeting

First Draft 3/23/2017

Activities Since 3/1/2017 Meeting

- Finalized EA limit model results based on the initial data set which included only part of the PJM RTO.

- Developed EA limit model for a database that included the full PJM RTO provided to me on 3/8/2017 by NYISO staff

- Updated database provided by NYISO staff 3/18/2017

- Provided EA limit model to NYISO staff for testing on 3/19/2017

- Finalized results and developed recommendations
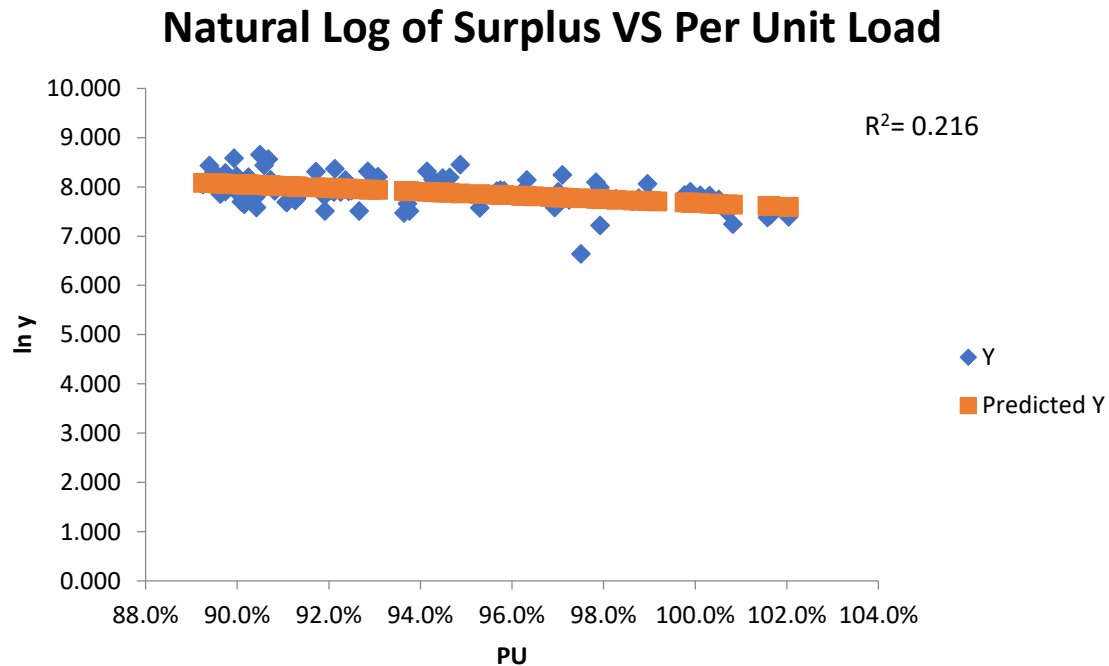
EA Limit Model Based on Initial Data Set

- Reviewed residual plot for initial linear model
- Residual plot shows a pattern that is heteroskedastic

Residual Plot for Linear Model
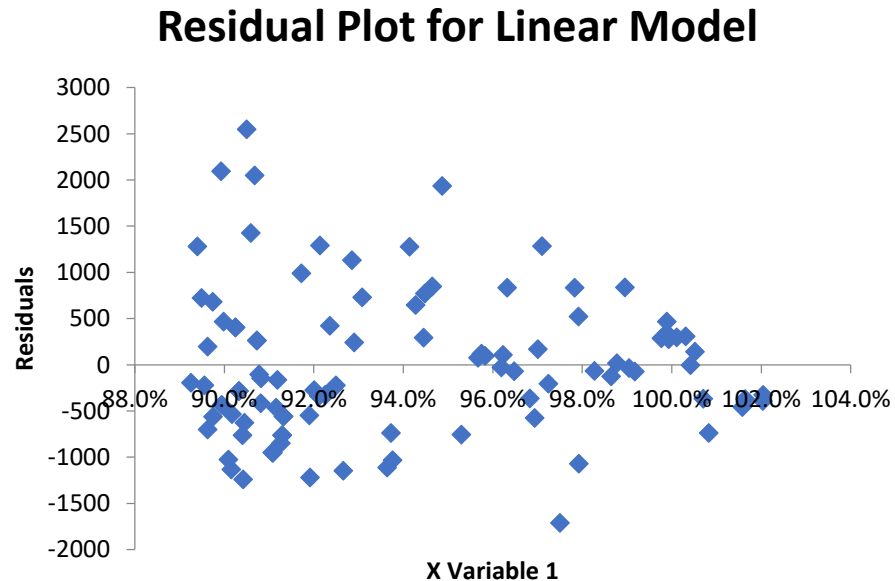
- Such a pattern suggest that a variable is missing or transformation is needed

EA Limit Model Based on Initial Data Set (continued)

- Used natural log transformation: ln y = ax + b
- It resulted in the following fit:

**Natural Log of Surplus VS Per Unit Load**

$R^2 = 0.216$

EA Limit Model Based on Initial Data Set (continued)

• Equation Resulted in the following EA limits by LFU bin

EA Limts By LFU Bin Based on Log Model of the Initial Data Set

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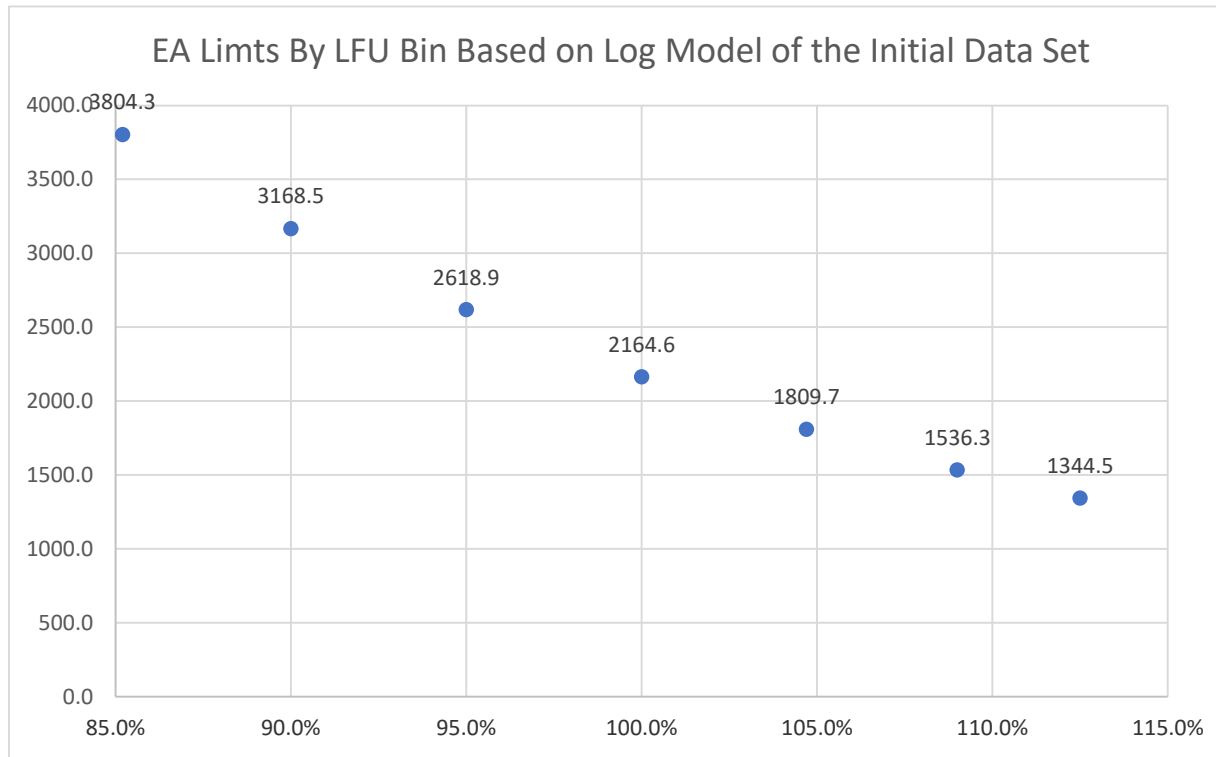
EA Limit Analysis Based on Data Set with Full PJM RTO

- Scatter plot of surplus reserves VS load as a per unit of summer peak forecast.

Surplus Reseves VS Load as PU of the Peak Forecast
Data Includes Full PJM RTO

$R^2 = .015$

- Y
- Predicted Y
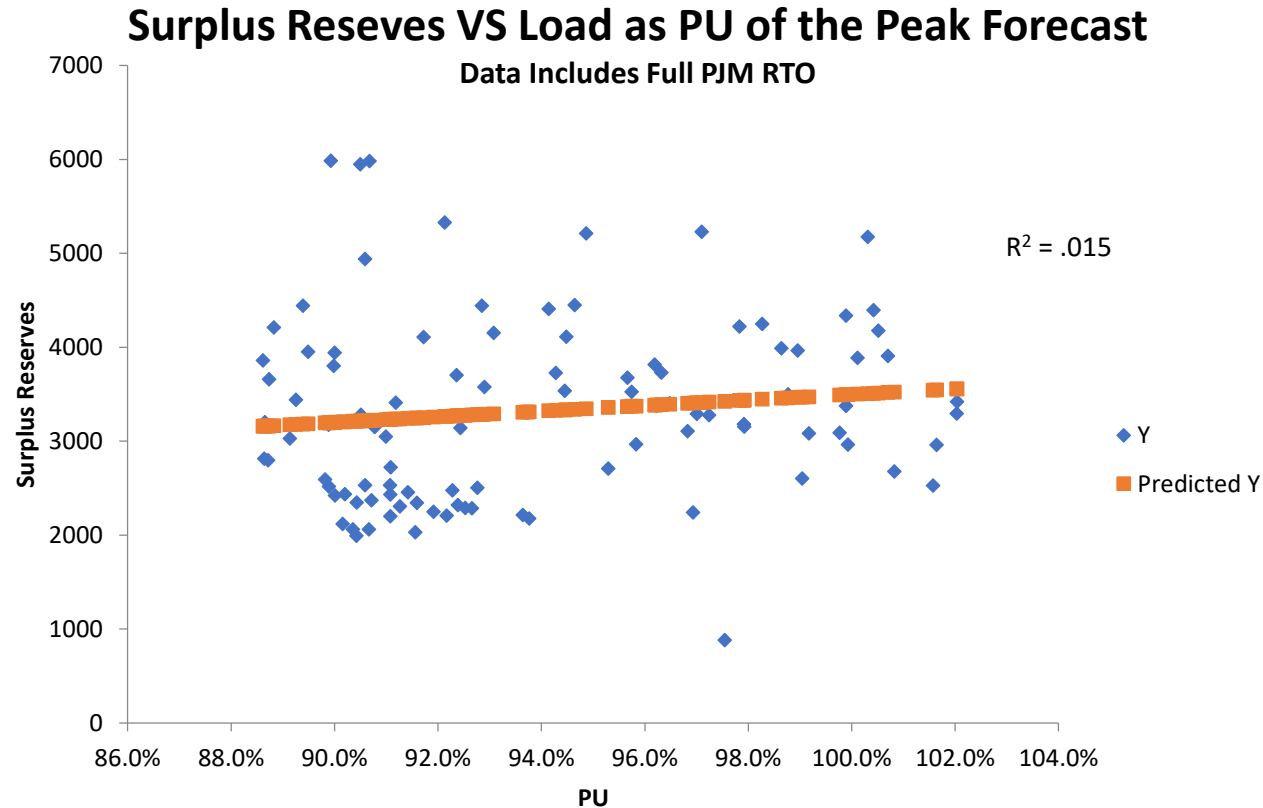
EA Limit Analysis Based on Data Set with Full PJM RTO (cont.)

- Data indicates flat to slightly upward sloping line VS downward sloping trend for data set that only included the Mid-Atlantic and Dominion (MAD) Regions of the PJM RTO.

- R^2 is essentially 0 and suggest EA limit based on an overall average of the surplus reserves.

- Difference between the two is most likely results from the overall difference in resource mix between the MAD Region and the full PJM RTO – IE. mix of baseload, variable, intermediate and peaking resources.

- Another factor could be overall dispatch practices in PJM.

- This result suggest there very little change in surplus reserve by load level

EA Limit Analysis Based on Data Set with Full PJM RTO (cont.)

- A EA limit based on the overall average of surplus reserves for all load level was recommended for sensitivity testing.

- An EA limit of 3318 was tested and resulted in the following sensitivity results:

Case Description	IRM	LCR (J)	LCR (K)	LCR (G-J)
Case 0 (starting point): 2017 IRM final base Case	18.1%	81.6%	103.5%	91.5%
Case 1 (sensitivity): EA limit of 3318 MW for NYCA	18.2%	81.7%	103.6%	91.6%

- The EA limit of 3318 based on data which includes surplus reserves for the whole PJM RTO resulted a slight increase of IRM of 0.1%.

Conclusions and Recommendation

- The data with the full PJM RTO implies that surplus reserves do not vary as function of load level.

- Although one would suspect that surpluses would be less at higher load levels, the data does not provide sufficient evidence of such.

- The primary difference between the IRM sensitivity result presented in the July 2016 NYISO "white paper" and the current result is that the EA limit for the paper was derived from data that only included the MAD region while the current result included the entire PJM RTO.

- Current modeling practice is to model the entire PJM RTO in the base case.

Conclusions and Recommendation (cont.)

- Including an EA limit in the MARS model is a useful tool for exercising some control over the level of EA that model depends on in meeting the 0.1 criterion.

- If the concept of an EA limit is adopted for the 2018 IRM base case, it should be derived from data that includes the full PJM RTO.

- At a minimum, the concept of a EA limit should be included as a sensitivity.