



# Validation, Estimation, & Editing Protocols



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# Validation, Estimation, & Editing (VEE)

- Systems Measuring, Monitoring, Communicating, & Storing Billing Determinant Data is Subject to Interruptions & Corruption from Scheduled & Unscheduled Events
- VEE Protocols are Employed to Identify & Correct Anomalous Data, Fill Gaps in Missing Data, or Provide Reasonable Estimates for Unrecoverable Data
- Protocols are Based on Best Available Data, Logged Events, Physical Realities of Electricity, Market Rules, & Common Sense

# Nature of Data Subject to VEE

- NYISO Market Settlements are Based Upon Performance Data Measured & Monitored by Others & Submitted to the NYISO
  - ✓ *Generation Assets*
    - Real-Time Output & Status Sampled on 6-Second Basis
    - Hourly Revenue Quality Output Submitted Within 60 Days of Issuance of Initial Invoice
  - ✓ *Sub-zonal Tie-line Interconnections*
    - Real-Time Flows Sampled on 6-Second Basis
    - Hourly Revenue Quality Output Submitted Within 60 Days of Issuance of Initial Invoice
  - ✓ *Load Serving Entity Hourly Withdrawals*
    - Hourly Billing Quality Withdrawals Submitted Within 150 Days of Issuance of Initial Invoice

# Nature of Data Subject to VEE – cont.

- Generation Schedules
  - ✓ *Hourly SCUC Schedules*
  - ✓ *RTD Interval Basepoints (Nominally 5-minute)*
  - ✓ *6-Second & RTD Interval AGC Basepoints*
- Generation Performance (As Processed by NYISO)
  - ✓ *6-Second & RTD Interval Measurand & Status*
  - ✓ *Operation Out-of-Economic-Merit, During Start-up/Shutdown, & During Testing (Hourly)*
- Sub-zonal Tie-line Interconnections (As Processed by NYISO)
  - ✓ *6-Second & RTD Interval Measurand*

# VEE Protocols



Six-Second & Dispatch Interval Performance Data

# VEE of Performance (PTS) Data

- Screening Processes Automated Due to Volume of Data & Complexity of Screening Criteria
- Estimation Processes are Manually Implemented Per Documented Protocols & Subject to Peer Reviews
- Data Recoveries are Initiated Manually & Regenerated Through Automated Process
- Data Editing Processes are Manually Implemented & Subject to Peer Review

# PTS VEE – Null Test

## ■ Validation

- ✓ *Tests for Gaps in Data by Identifying Nulls in Performance Index, AGC Desired MW Basepoints, RTD Ramped MW Basepoints, & In-Service Flags*

## ■ Estimation

- ✓ *Determination if System-wide or Isolated to Specific Point(s)*
  - *System-wide Warrants Regeneration of Data From PI Historian & Possibly EMS Save-Cases by IT*
- ✓ *6-Second Data Retrieved from PI Historian Database*
- ✓ *Determination Whether Due to Telemetry Failure, Data Processing Failure, or Manual Override*
- ✓ *Hourly Data Retrieved from SDX Database & Compared to PTS Data*
- ✓ *If Correction Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval*
- ✓ *When Data Corrected, Control Error Computed for Interval Also Zero'd Out*

# PTS VEE – Avg Actual vs Instantaneous MW Test

## ■ Validation

- ✓ *Tests Consistency of Average Actual MW With Instantaneous MW by Identifying Intervals Where Average Actual MW = 0 & Instantaneous MW  $\neq$  0*
- ✓ *Screens Previous 3 & Subsequent 3 Intervals to Ensure Instantaneous MW  $\neq$  0*

## ■ Estimation

- ✓ *6-Second Data Retrieved from PI Historian Database*
- ✓ *Determination Whether Due to Telemetry Failure, Data Processing Failure, or Manual Override*
- ✓ *Hourly Data Retrieved from SDX Database & Compared to PTS Data*
- ✓ *If Correction to Avg Act MW Value Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval*
- ✓ *When Avg Act MW Value is Corrected, Control Error Computed for Interval Also Zero'd Out*

# PTS VEE – Positive Avg Act & Zero RTD MW Test

## ■ Validation

- ✓ *Tests Consistency of Average Actual MW With RTD Ramped Basepoint MW by Identifying Intervals Where Average Actual MW > 0 & RTD Ramped MW = 0*
- ✓ *Filters Out Ramping Intervals & PURPA Where These Instances Expected*

## ■ Estimation

- ✓ *Instances Typically Encountered for Units Ramping to HAM Schedules*
- ✓ *MIS Checked for HAM Schedules in Current & Subsequent Hour*
- ✓ *If HAM Schedule Exists & No Basepoints Observed, Operator's Logs Consulted to Identify Cause for No Basepoints*
- ✓ *Absent Logged Causation, Operations Staff Consulted for Further Guidance Regarding Whether to Enter Basepoints & Adjust Control Errors*

# PTS VEE – Zero Avg Act & Positive RTD MW Test

- Validation

- ✓ *Tests Consistency of Average Actual MW With RTD Ramped Basepoint MW by Identifying Intervals Where Average Actual MW = 0 & RTD Ramped MW > 0*
- ✓ *Filters Out Ramping Intervals & PURPA Where These Instances Expected*

- Estimation

- ✓ *6-Second Data Retrieved from PI Historian to Determine Whether Unit Operated*
- ✓ *If Pi Data Indicates Operation, PTS Data Regenerated or If Correction Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval & Control Errors Set to Zero*
- ✓ *MIS Checked for HAM Schedules in Current & If No HAM Schedule Observed, Operator's Logs Consulted to Identify Cause for Operation in R/T*
- ✓ *Absent Logged Causation, Operations Staff Consulted for Further Guidance Regarding Adjustments to Basepoints or Control Errors*

# PTS VEE – Bad Scan Instantaneous MW Test

## ■ Validation

- ✓ *Tests for Spikes in Telemetered Data*
- ✓ *Tests for Instances Where Generators' Instantaneous MW Values > 1 MW & Avg Actual MW > 3 MW Varying by >20% Within an RTD Interval*

## ■ Estimation

- ✓ *6-Second Data Retrieved from PI Historian to Determine Telemetry Error or Reflective of Actual Operation*
- ✓ *If PI Data Indicates Telemetry Error, AGC Desired & RTD Ramped Basepoints Compared to Unit Avg Actual MW*
- ✓ *If Correction to Avg Actual MW Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval & Control Errors Set to Zero*

# PTS VEE – Ramp Rate Test

## ■ Validation

- ✓ *Tests for Spikes in Telemetered Data*
- ✓ *Compares Changes in Generators' Avg Actual MW Between RTD Intervals With Bid Ramp Rates*

## ■ Estimation

- ✓ *6-Second Data Retrieved from PI Historian to Determine Telemetry Error or Reflective of Actual Operation*
- ✓ *If PI Data Indicates Telemetry Error, AGC Desired & RTD Ramped Basepoints Compared to Unit Avg Actual MW & Bid Ramps Rates*
- ✓ *If Correction to Avg Actual MW Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval & Control Errors Set to Zero*

# PTS VEE – Negative Avg Actual MW Test

## ■ Validation

- ✓ *Tests for Generators (Exclusive of Pump Storage Units) With Avg Actual MW < 3 MW to Identify Instances Where Sign Convention May Have Been Inadvertently Changed on Telemetry*

## ■ Estimation

- ✓ *6-Second Data Retrieved from PI Historian Database*
- ✓ *Determination Whether Due to Telemetry Failure, Data Processing Failure, or Manual Override*
- ✓ *Hourly Data Retrieved from SDX Database & Compared to PTS Data*
- ✓ *If Correction Warranted, Estimate Calculated as Average of 1<sup>st</sup> Good Interval Preceding & Following Bad Interval*
- ✓ *When Data Corrected, Control Error Computed for Interval Also Zero'd Out*

# VEE Protocols



Hourly Revenue Quality Tie-Line & Generator Metering Data

# VEE of Hourly Revenue Quality Data

- Screening Comprised of Automated & Manually Implemented Processes
  - ✓ *Mechanized Hourly Revenue Quality Data Comparisons to Hourly Integrated PTS Data*
  - ✓ *Manual Screening for Negatives in Sub-Zonal Loads*
- Manual Screening Implemented Per Documented Protocols & Subject to Peer Reviews
- Potential Anomalies or Missing Data Reported to Meter Authorities for Reconciliation & Resolution, Where Warranted
- All Editing Performed by Meter Authorities

# VEE of Hourly Revenue Quality Data

- Review, Challenge, & Correction Period for Hourly Revenue Quality Metering Data is Specified in the Tariff
- Revisions Beyond Tariff-Specified Periods Only Allowed Through an Order of the FERC or a Court of Competent Jurisdiction
- NYISO Staff Administer Review, Challenge, & Update Process Per Tariff (Schedule Posted on Website)
- E-mailed Weekly Notifications to Marketplace Maintaining Visibility of Review & Correction Period Time Frames
- VEE Re-Performed After Each Opportunity for Meter Authorities to Update Data

# VEE of Hourly Tie-Line & Gen Metering

- Per RMR Manual §4.4 (Data Processing):  
*“Revenue metering data should be submitted to the NYISO by the next business day.”*
- By Noon 1<sup>st</sup> Business Day Following Service Day, NYISO Locks SDX Database Preventing Data Updates During VEE
- Sub-zonal Loads Screened for Negative Values
  - ✓ *Meter Authorities Informed of Observed Instances & Resolution Expedited*
  - ✓ *May Warrant Suspension of Settlement Processing Until Resolved &/or Noticing Marketplace If Settlements Already Processed With Potentially Material Data Errors*

# VEE of Hourly Tie-Line & Gen Metering

- Hourly Tie-line and Generator Revenue Quality Data Compared to Hourly Integrated Instantaneous (PTS) Metering Data
  - ✓ *Differences of  $\geq 10\%$  Reported to Meter Authorities As Potential Errors*
  - ✓ *Differences of  $\geq 25$  MW &  $\geq 25\%$  Reported to Meter Authorities As Potentially Errors, Warranting Immediate Attention*
    - May Warrant Suspension of Settlement Processing Until Resolved &/or Noticing Marketplace If Settlements Already Processed With Potentially Material Data Errors
- ~2 Business Days Following Initial Lock Down & Analysis, Database Unlocked, Enabling Data Updates
- At COB That Day, Database Relocked & VEE Re-Performed

# VEE of Hourly Tie-Line & Gen Metering

- Further Data Updates Accommodated Up To 3 Days Prior to Initial Invoice, With Updates Within 3 Days Prior to Invoice at Manager's Discretion
- Tie-line & Generator Metering Data May Be Challenged Up To 55 Days After Initial Invoice Issued & Revised Up To 60 Days After Initial Invoice Issued
- Marketplace Noticed Via Listserver E-mailings No Less Than Weekly Regarding Time Remaining to Challenge & Revise Data
  - ✓ *Notices Posted to Customer Settlements, Billing Contact, & Meter Task Force Listservers – Contact CRD for Inclusion on Contact List*

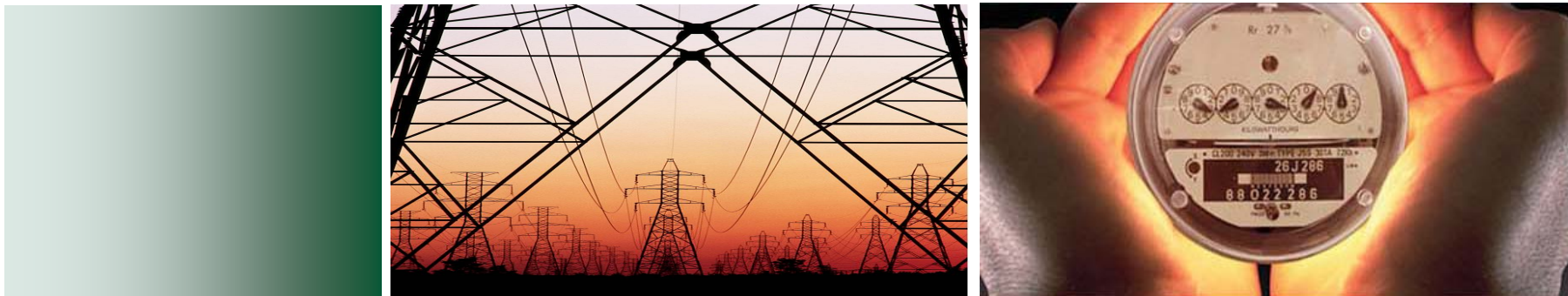
# VEE of Hourly Tie-Line & Gen Metering

- Schedule Also Posted at :

*[http://www.nyiso.com/public/webdocs/services/financial\\_services/customer\\_settlements/meter\\_data\\_review/2008\\_Metering\\_Review-Revision-and-Lockdown\\_Schedule\\_11\\_08\\_2007.pdf](http://www.nyiso.com/public/webdocs/services/financial_services/customer_settlements/meter_data_review/2008_Metering_Review-Revision-and-Lockdown_Schedule_11_08_2007.pdf)*

- Database Remains Locked, Except for Tie-line Updates During Inadvertent Interchange Tie-Out With Neighboring Control Area
- At COB 1<sup>st</sup> Business Day After 19<sup>th</sup>, Database Unlocked Enabling Further Metering Updates
- Database Relocked ~3 Weeks Later & VEE Re-Performed
- Marketplace E-mailed Notice of Beginning of Written Challenge Period
  - ✓ *Further Updates Only Upon Written Challenges*
- Marketplace E-mailed Reminder at Two Business Days Prior to Day-55 Expiration of Challenge Period

# VEE Protocols



Hourly Billing Quality Load Serving Entity (LSE) Metering Data

# VEE of Hourly Revenue Quality Data

- Submission, Review, Challenge, & Correction Period for Hourly Billing Quality LSE Metering Data is Specified in the Tariff
- NYISO Staff Administer Review, Challenge, & Update Process Per Tariff (Schedule Posted on Website)
- E-mailed Weekly Notifications to Marketplace Maintaining Visibility of Review, Challenge & Correction Period Time Frames
- VEE Re-Performed After Each Opportunity for Meter Authorities to Update Data

# VEE of Hourly Billing Quality LSE Data

- Meter Authorities Required to Submit Hourly LSE Load Data by Day-70 After the Issuance of Initial Invoice
- Files With Variances Exceeding 0.001 MWh Between Hourly LSE Load Totals & NYISO's Computed Hourly Sub-Zonal Loads are Rejected & Meter Authorities are Prompted to Resubmit Compliant Data
- Challenge Period Expires at Day-145 After Initial Invoice & No Further Revisions Permitted Beyond Day-150
- Revisions Beyond Tariff-Specified Periods Only Allowed Through an Order of the FERC or a Court of Competent Jurisdiction