Generation 201
Generation Reporting and eDART

State & Member Training

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Agenda

- Generation Outage Reporting
  - **Objectives and Key Concepts**
  - Types of Outages
    - Forecasted Planned
    - Maintenance
    - Unplanned/Forced
    - Partial or De-ratings
  - Outage Examples
  - Outage Reporting

Objectives

- Upon completion you should know:
  - The categories of unit outages
  - The reporting criteria for each category
  - The information needed to report to PJM
  - Parties to report to
  - Unit reactive outage reporting responsibilities
  - References -
    - PJM Pre-Scheduling Operations Manual - M-10
      - Section 2 (MW Outage Reporting)
    - PJM Generator Operational Requirements Manual – M-14D
      - Attachment D

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Key Concepts

- PJM does not “schedule” when outages should take place.
- PJM only accepts or rejects outage request.
- Generation owner determines its own best time to schedule an outage.
- PJM only rejects requests when the reliability of the PJM RTO is affected.
- All outage requests analyzed together.

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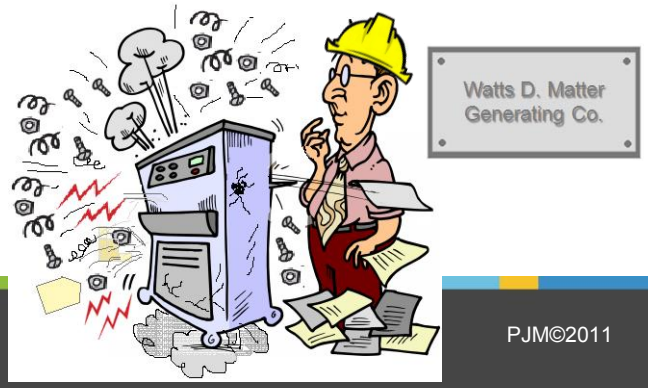
Outage Reporting

PJM is responsible for coordinating and approving requests for outages of generation and transmission facilities for the reliable operation of the RTO

The electronic Dispatcher Application and Reporting Tool (eDART) provides communications with PJM generation operators regarding unit outage requests, updates to reactive capability curves (D-curves), governor status, power system stabilizer status and AVR status.

Both capacity and energy only resources shall provide generator outage data to support PJM obligations as a Reliability Coordinator to report generator outage information required for reliability analysis (TOP-003 R1).



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- Generation Outage Reporting
  - Objectives and Key Concepts
  - **Types of Outages**
    - **Forecasted Planned**
    - Maintenance
    - Unplanned/Forced
    - Partial or De-ratings
  - Outage Examples
  - Outage Reporting

Forecasted Planned

- Scheduled well in advance
- Usually occur during lower load periods
- Have flexible start dates
- Pre-determined duration
- May last several weeks
  - Examples: Overhauls, Nuclear Refueling, Annual Inspections

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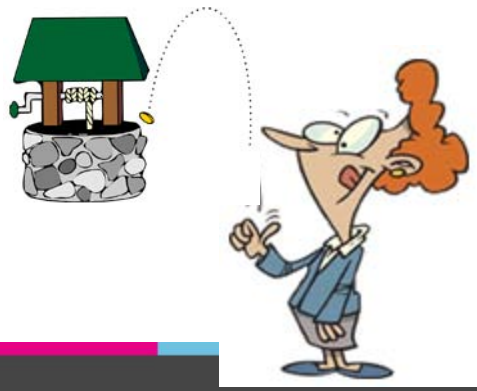
Forecasted Planned-Request Procedures

- Minimum of 30 days notice
  - Can be scheduled 3 years into future
- If outage denied, member re-submits
- Submitted through eDART
- Applies to MW Outages only
- Outage approval can be withdrawn with at least 24 hours notice
  - Only done for reserves or reliability
- Ed Hoey - 610-666-8844
  - FAX - 610-666-4282



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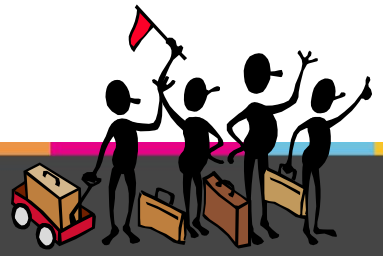
Business Rules – Forecast Planned Outages

- Generation owners submit MW outages of greater than 31 days in the future, and up to 3 years in the future as “Forecasted Planned.”
- Each evening the eDART system will automatically change to “Planned” all “Forecasted Planned” outage due to start in less than 31 days.
- Once ticket is changed to “Planned,” and has a status of approved, a reduction revision can be submitted, but only to decrease the amount of reduction.
- Start date can be increased only (no more than 30 days into the future)
- End date may be changed
- Other than cancellation, no other changes can be made.



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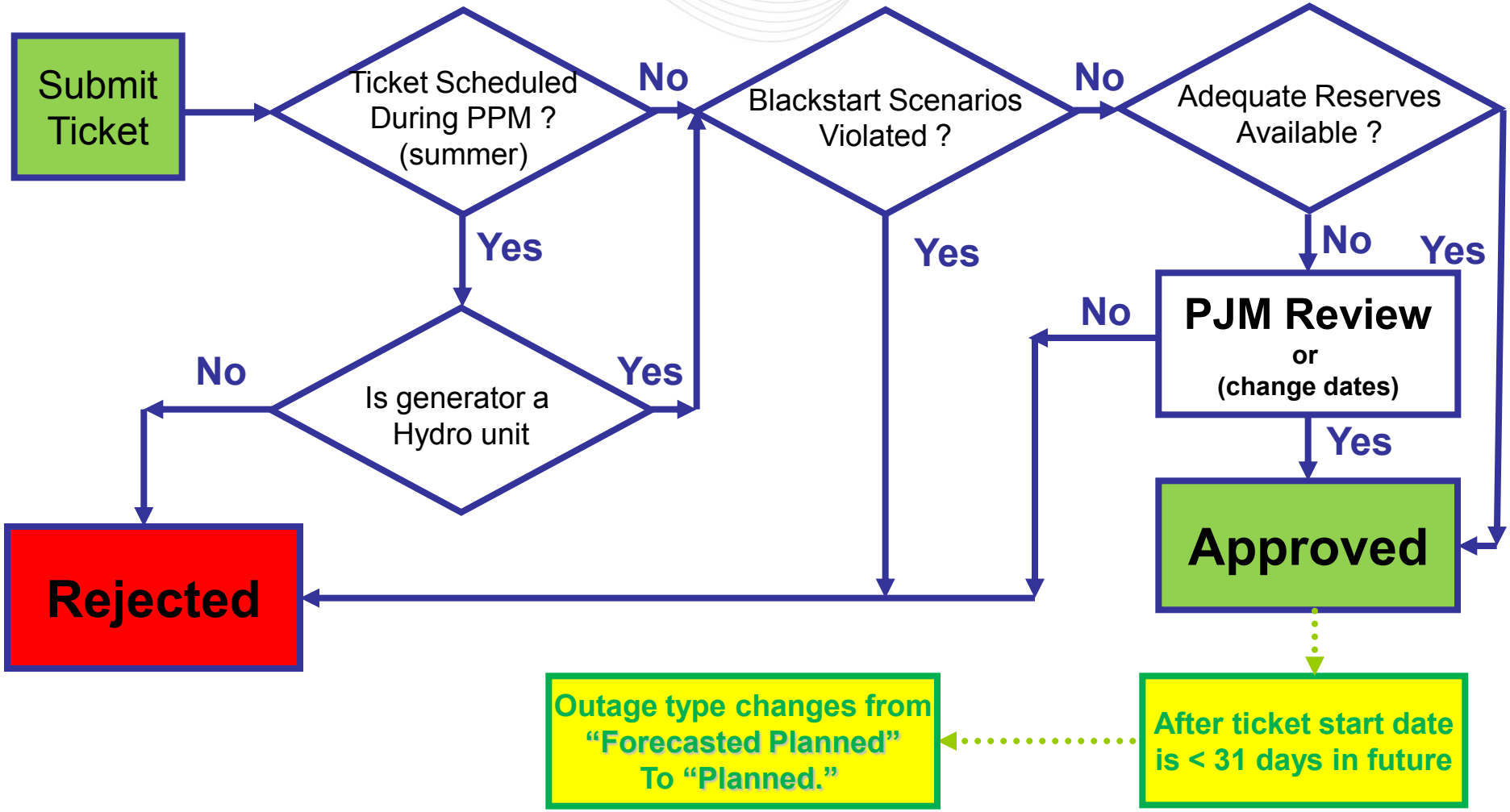
Approval Process – Forecast Planned Outages



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Approval Criteria – Forecast Planned Outages

- Ticket Scheduled During PPM?
  - Peak Period Maintenance (PPM) is defined as the weeks containing the 24th through the 36th Wednesdays of the calendar year with each week beginning on a Monday.
  - Usually from about Mid-June through Early September

{Typically Mid-June to Early/Mid September}

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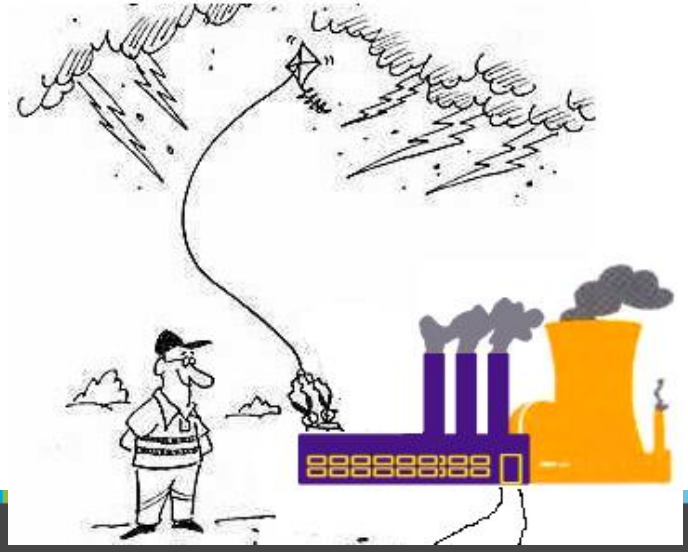
Approval Criteria – Forecast Planned Outages

- Blackstart Scenarios Violated?
  - In the simplest terms this means no more than one critical blackstart unit planned outage per station.
  - Some transmission zones have other specific outage requirements that will be verified.



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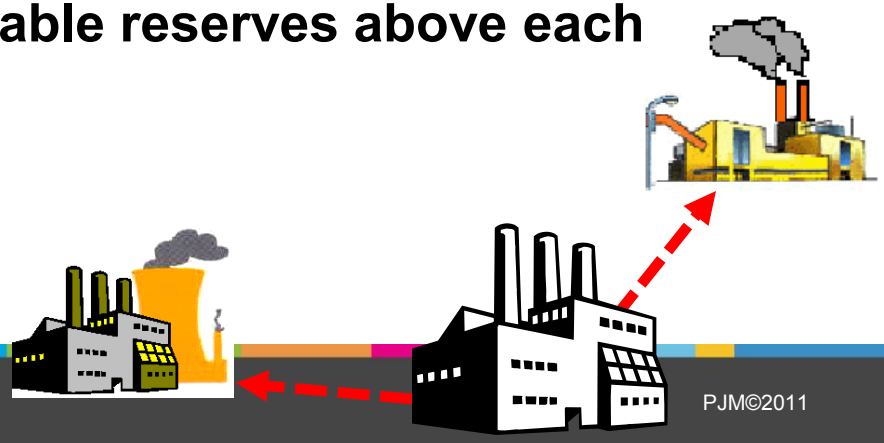
Approval Criteria – Forecast Planned Outages

Adequate Reserves Available?

- If Adequate Reserves are not available the generation owner may opt for PJM to review it, or they can make an adjustment to the ticket.

- In the Summer months, and the shoulder months of Spring and Fall, PJM maintains installed capacity reserves of 15.5% for 2011
  - PJM does not set a summer reserve target for outages
  - Financial incentives typically limit summer outages

- In the Winter months, after removing units on a planned outage, PJM maintains 26% available reserves above each winter week's peak.



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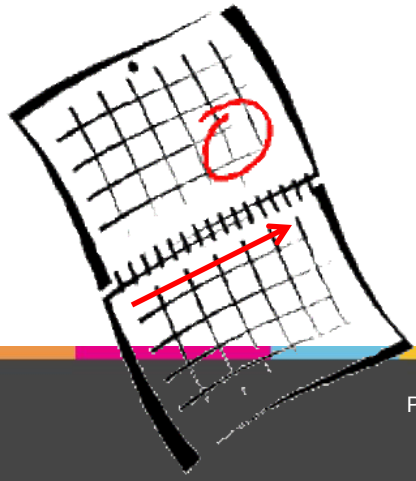
Planned Outage Extensions

- Extension begins same time planned outage ends
- Must be for original scope of work that is taking longer than anticipated
- Not for unexpected problems or delays
- Request must be submitted 48 hours prior to end of original planned outage
  - Through eDART



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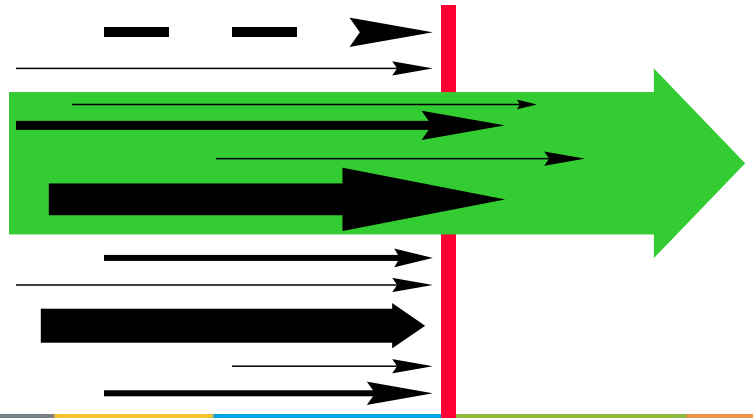
Planned Outage – Rescheduling

- Approved planned outage may be rescheduled to within the 30 day timeframe:
  - If approved by PJM
  - Cannot extend the “moved” planned outage
    - becomes Forced after original timeframe



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- Generation Outage Reporting
  - Objectives and Key Concepts
  - **Types of Outages**
    - Forecasted Planned
    - **Maintenance**
    - Unplanned/Forced
    - Partial or De-ratings
  - Outage Examples
  - Outage Reporting

Maintenance Outages

- Outages that may be deferred beyond the next weekend (Next Monday Morning, 0800hrs)
- Work has to be done before next planned outage
- Flexible dates
- Much shorter than planned outages
- Predetermined duration

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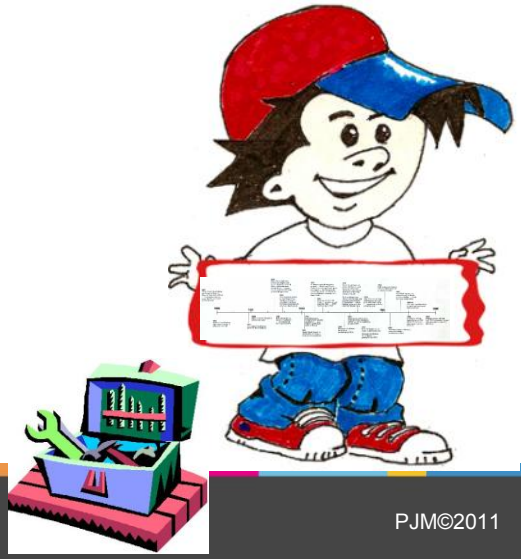
Maintenance Outages

- Timeline
  - Weekend Period - Friday at 2200 to Monday at 0800
- Limitations
  - Peak Period - 9 days
  - Non-Peak Period - Unlimited
- Peak Periods
  - 24th thru 36th Wed. of calendar year



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Maintenance Extensions

- Extension beyond its original end date
- Extension begins same time maintenance outage ends
- Must be for original scope of work that is taking longer than anticipated
- Not for unexpected problems or delays
- Must be submitted prior to original end date
- If extended beyond 9 days in PPM season, outage becomes Unplanned

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Peak Period Maintenance Penalty

- If a company requests a maintenance outage during the Peak Period Maintenance Season, PJM denies the outage, and the company takes the outage anyway…
  - The company has the option to enter the outage as a “forced outage” or a “maintenance outage”
  - If the company does not enter a “forced outage”, the “Peak Period Maintenance Compliance Penalty” will be assessed
  - If the company enters a “forced outage”, the “Peak Period Maintenance Compliance Penalty” will not be assessed but the forced outage will affect the units EFORd

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Peak Period Maintenance Penalty

- If the company takes an "unapproved" maintenance outage, then they are assessed this Peak Period Maintenance Penalty
- Formula for penalty:

Charge = Rate * MW Amount

Peak Season Maintenance Compliance Penalty Charge	=	**Weighted Average Resource Clearing Price + the higher of (.2 * Weighted Average Resource Clearing Price or $20/MW-day**	*	**Daily Peak Season Maintenance Shortfall for RPM Resource Commitments * (1- Effective EFORd)**

(most companies take a forced outage of short duration)

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Non-Compliance Charge Summary

	B	C	D	E	F	G	H	I	J	K
1										
2		Report Creation Timestamp (EPT):								
3		End Date:								
4	4000.02	4000.04	4001.21	4001.22	4001.24	3001.26	3001.34	3001.35	3001.28	4000.07
5	Customer Code	Date	Resource ID	Resource Name	Deficiency Type	Deficiency MW	Wtd-Avg Resource Clearing Price ($/MW)	Deficiency Rate ($/MW)	Deficiency Charge ($)	Version
6										
7										
8										

Deficiency Types:

Generation Resource Rating Test Failure
Capacity Resource Deficiency
Qualifying Transmission Upgrade Compliance Penalty
Peak Season Maintenance Compliance Penalty

Supporting Calculations

Deficiency Rate (3001.35) = Wtd-Avg Resource Clearing Price (3001.34) + MAX(0.2 * Wtd-Avg Resource Clearing Price, 20)

Deficiency Charge (3001.28) = Deficiency MW (3001.26) * Deficiency Rate (3001.35)

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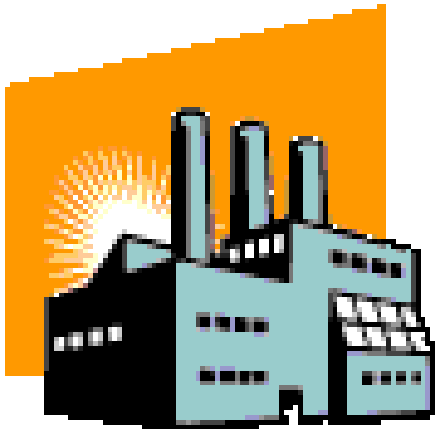
One Step Further… Peak Hour Availability

Peak-Hour Period Availability	Measures if generation resource was available during critical peak-hour periods during DY

- PJM will measure generation availability performance during peak load periods.
- The peak hour periods are defined based on summer and winter operating periods when high demand conditions are likely to occur.
- Defined Peak-Hour Periods:
  - Summer: June through August, hours ending 15:00 EPT through hour ending 19:00 EPT, on non-holiday weekdays
  - Winter: January and February, hours ending 8:00 EPT through 9:00 EPT and hours ending 19:00 EPT through 20:00 EPT, on non-holiday weekdays.
- Total number of hours is approximately 500 hours (can vary from year to year)



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Peak Hour Availability Charges

Peak-Hour Period Availability	Measures if generation resource was available during critical peak-hour periods during DY

Charge	Rate	MW Amount	Assessed	Billed	Allocated
Peak-Hour Period Availability Charge	Daily Peak-Hour Period Availability Charge Rate = Provider's Weighted Average RCP in LDA	Net Peak Period Capacity Shortfall for RPM Resource Commitments in LDA	Daily	Retroactively for entire DY in August bill (issued in September) after conclusion of DY	Resource providers that have negative Net Peak Period Capacity Shortfalls (capped at excess shortfall * Daily Peak-Hour Availability Charge Rate). Remaining Charges to LSEs based on their Daily UCAP Obligation
	Daily Peak-Hour Period Availability Charge Rate = Net CONE in LDA	Net Peak Period Capacity Shortfall for FRR Capacity Plan Commitments in LDA			

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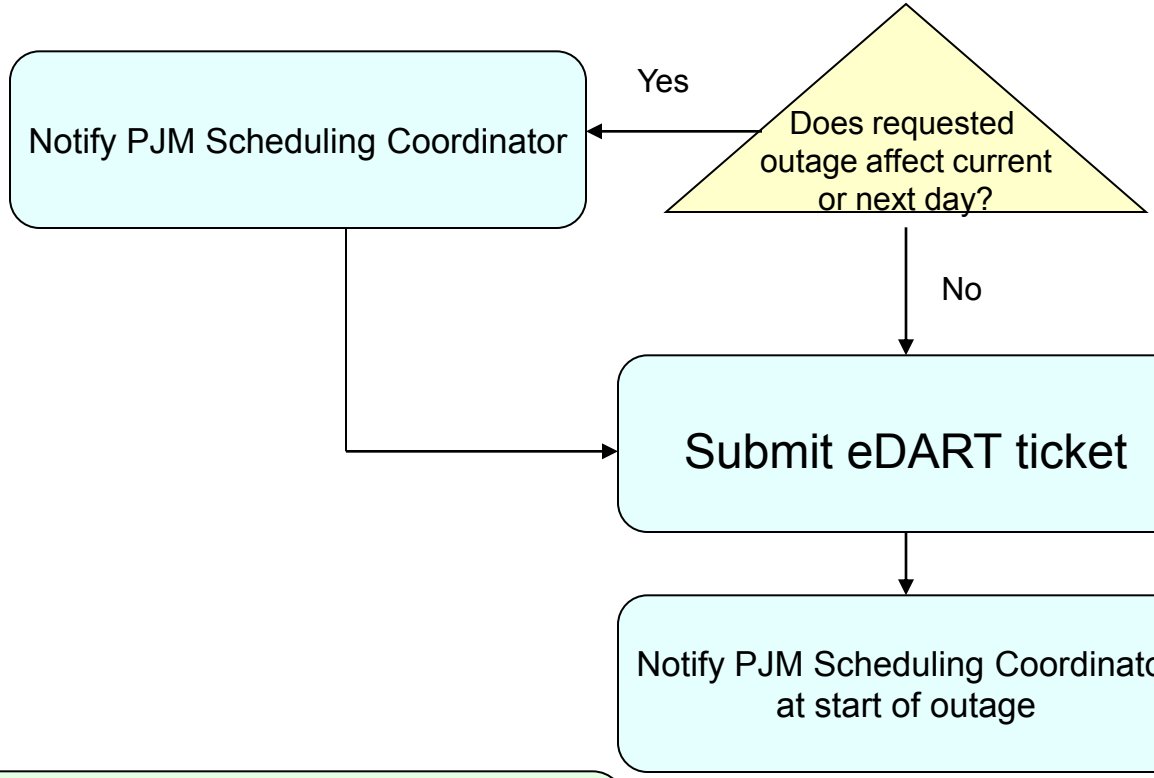
Summary - Process for Maintenance Outage



WIND AND SOLAR RESOURCES DO NOT REPORT GADS DATA.

Bid unit in eMKT as Unavailable as appropriate (Day-ahead)

Submit GADS data after the fact

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- Generation Outage Reporting
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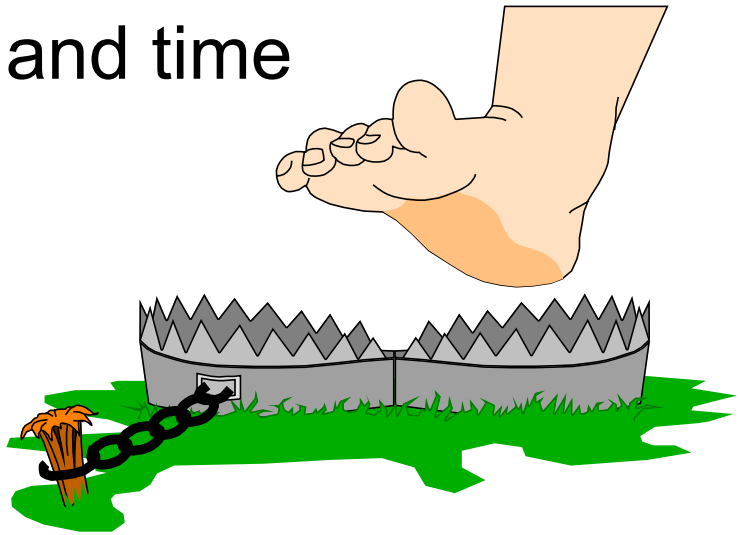
Unplanned Outages

- Immediate unit trip
- Unit tripped by plant operator
- Advise PJM of outage as promptly as possible
  - Verbal notification to PJM GD
- Provide expected return date and time
- Submit outage information



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- Responsibilities upon an Unplanned Outage:
  - Notify PJM Generation Operator
  - Update Unit Limits/Status in eMKT
    - Unit Hourly Update screen
      - More later!
  - Submit eDART ticket in timely manner
    - When unit status is known
  - Submit eGADS data
    - By 20th day of following month

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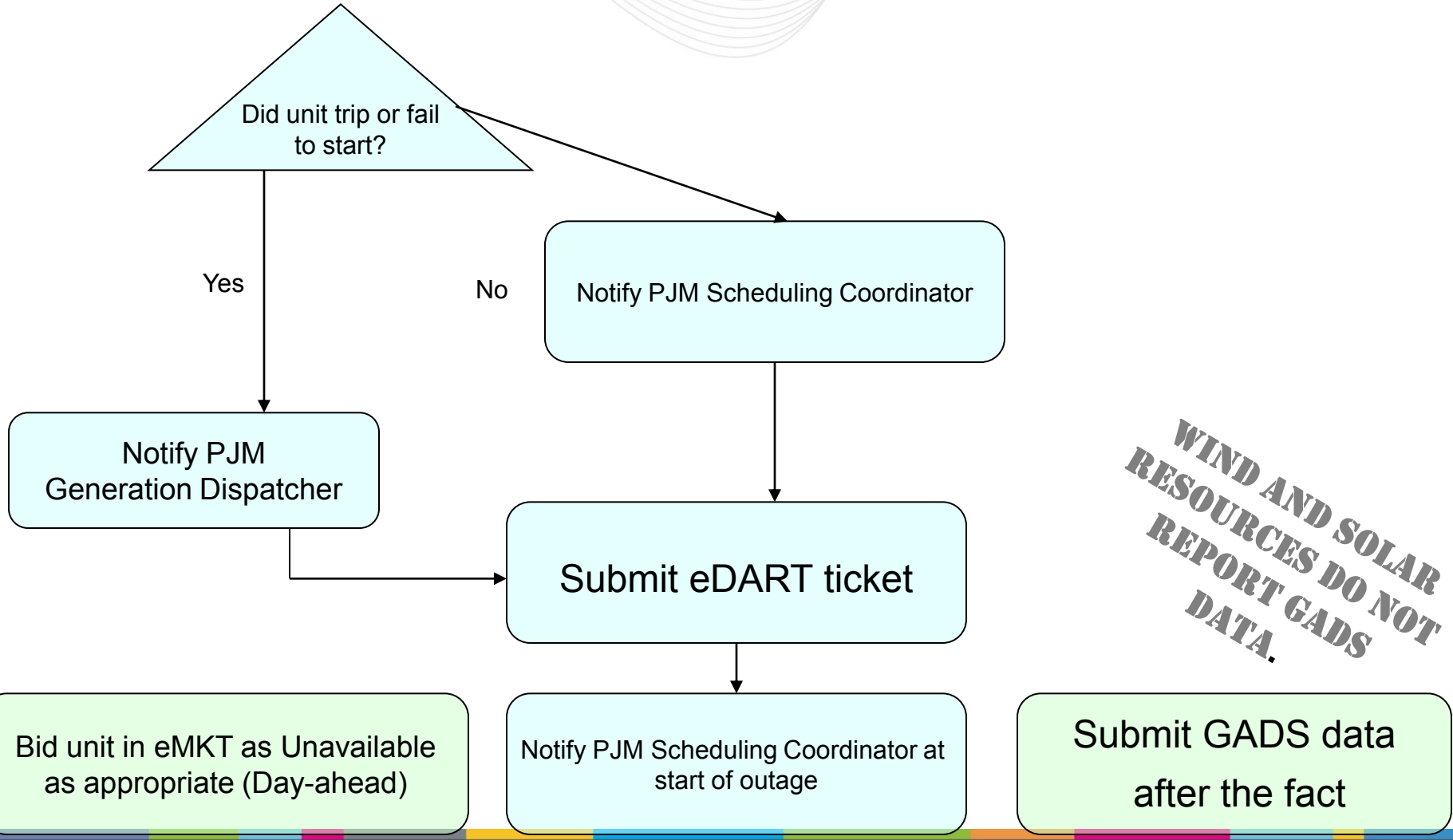
Summary - Process for Unplanned/Forced Outage



WIND AND SOLAR RESOURCES DO NOT REPORT GADS DATA.

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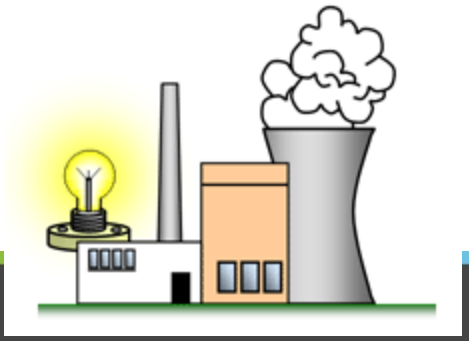
    - **Partial or De-ratings**
  - Outage Examples
  - Outage Reporting

Partial Outages

- Outages less than the full capacity
- Types
  - Planned
  - Maintenance
  - Unplanned
- Rules and Regulations are same as full outages
- Extensions fall under same criteria as full outages



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Wind Outage Reporting

Wind farms are modeled as a single unit in eDART with a capability equal to the sum of all turbines at full output.

Wind farm aggregate turbine outage/derate information is required to validate and enhance the accuracy of the PJM wind power forecast.

Generation owners should not provide outage tickets related to wind speed or lack of wind since specific turbine parameters will be modeled within the forecast tool.

Wind resources shall report any outage of one megawatt or more with a duration of one hour or longer.

Outages shall be submitted on aggregate plant capacity by outage type.

Details on generation outages can be located in PJM Manual M-10 Pre-Scheduling Operations

Details on the PJM eDART tool can be located at: http://www.pjm.com/markets-and-operations/etools/edart/edart-training-presentations.aspx

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Wind Outage Reporting - Example

- Wind Farm has 50 turbines and has an installed capacity of 50 MW at full load
  - Each turbine has an installed capacity of 1 MW
  - Capacity value for RPM is 7 MW
- If 10 turbines are out for maintenance, Wind Farm will submit an outage ticket for 10 MW
- Wind forecasting tool will now assume that Wind Farm is at 4/5 of it‟s capability and adjust forecast based on this and expected wind speed
- Correct outage data is critical to providing an accurate wind power forecast!

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  - **Outage Examples**
  - Outage Reporting

Examples

- A maintenance outage is submitted
- PJM determines outage should be postponed beyond weekend
- Unit fails before 0800 on Monday
- Outage is considered WHAT?

Unplanned/Forced Outage

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Examples

- A maintenance outage is submitted
- PJM determines outage can start
- Company decides to postpone outage
- Unit fails before new start time
- Outage is considered WHAT?

Unplanned/Forced Outage

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Examples

- A maintenance outage is submitted
- PJM determines outage should be postponed beyond weekend
- Generation Owner begins outage before Monday
- Outage is considered WHAT?

Depends.

Could be Unplanned/Forced Outage or Maintenance. (Depending if unit enters the outage as forced, if not the Peak Season Maintenance Compliance Penalty will be assessed.)

(Assuming this outage occurred during the Peak Period Maintenance Season)

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Examples

- A maintenance outage request is submitted during the Peak Period Maintenance season
- PJM approves the maintenance outage
- Generation Owner extends the maintenance outage beyond 9 days
- Outage is considered WHAT?

Maintenance Outage for 9 days then Unplanned/Forced for remainder of outage.

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Examples

- A unit is on a Planned outage for Annual Inspection
- Near completion of this outage, a problem with an ID fan is discovered which causes the unit to be unavailable for 5 days after the scheduled end of the Planned Outage
- Outage is considered WHAT?

Planned Outage. The 5 day extension would be Unplanned/Forced because it is for a different reason than the Planned outage

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Examples

- A wind unit is scheduled day-ahead to produce energy for a particular hour.
- Due to a change in atmospheric conditions there is no wind during that hour in real-time.
- There is no problem with the unit and it could be and would be producing energy were the winds present.
- Outage type would be what?

This should not be entered as an outage.

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  - **Outage Reporting**

Verbal Reporting

- **Dispatch**
  - Master Coordinator
    - 610-666-8809
    - All Outages
    - Clearing of outage tickets
  - Generation Dispatcher
    - 610-666-8807
    - Outages of units on- line or scheduled to come on- line

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Electronic Reporting

- **eDART**
  - Web based tool - MORE TO COME!
- **eMKT**
  - Unit modeled correctly - hourly updates
  - Used for Real-time Economic Dispatch limits/status
- **GADS** - **G**enerator **A**vailability **D**ata **S**ystem

NOTE: Each system is independent and does not share data between applications

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- **eDART**
  - Used for scheduling or reporting of generation and transmission outages
  - Used in real-time and near-term capacity analysis
  - Other Dispatcher applications and reports incorporated into eDART

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Differences in Electronic Reporting

- **eMKT**
  - Used for scheduling generation in the 2-Settlement market
  - Used to change unit limits or status in real-time in response to unit problems
    - Unit status changes in real-time must also be reported verbally to PJM GD
  - Feeds PJM SCED – **S**ecurity **C**onstrained **E**conomic **D**ispatch System
  - Ancillary Service markets
- **eGADS**
  - GADS = Generator Availability Data System
  - Generator outages reported AFTER the fact (by 20th day of the following month)
  - Must comply to GADS data standards (more detail)
  - Used in forced outage rate calculation and to send to NERC
  - CODA

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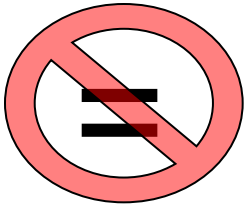
- **eDART GEN Checkout**
  - Used to compare generation availability in eMKT to eDART
  - Differences are displayed in Gen Checkout application
  - Differences must be rectified in either eMKT or eDART
  - Ensures consistency of data between applications
  - More information on GEN Checkout later in GEN-201 class

eDART

Unit A

Available generation = 100 MW



eMKT

Unit A

Available generation = 150 MW

Which system is correct?

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Why two similar systems?

eDART

VS.

e GADS

- **On-the-fact**
- **Operational Tool**
- Operating Capacity
- Forced Outage (FO)
- Planned Outage (PO)
- Maintenance Outage (MO)
- Outage Extensions
- Partial Outages
- Start Time
- Clear Ticket
- **Used for Operational Decisions**

- **After-the-Fact**
- **Database for Statistical Analysis**
- Installed Capacity
- Unplanned Outage (U1,U2,U3,U4)
- Planned Outage (PO)
- Maintenance Outage (MO)
- Outage Extensions
- Partial Outages
- Start Time/End Time
- **Used to determine unit performance (EFORd) and Reserve Requirement determination**.

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- **Monthly Performance Data:**
  - One record for each unit every month
  - MW Net Maximum and Dependable Capacity
  - MWH Net Generation
  - Number of Actual and Attempted Starts
  - Service Hours
  - Reserve Shutdown Hours
  - Pumping and Condensing Hrs (if applicable)
  - Loading Characteristics of Unit

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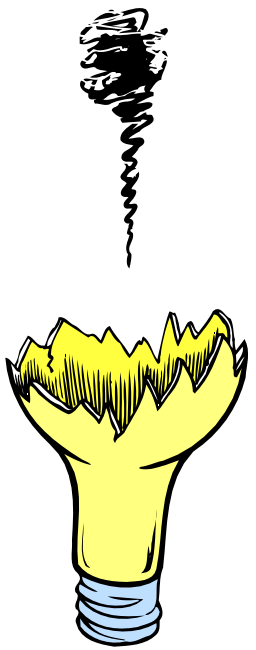
- **Event Data**
  - One record each time unit is unavailable or output is restricted (or on Reserve Shutdown for units reporting those events)
  - Type of Event
  - Start / End date and time of event
  - Available Capacity During Event
  - Cause Code - from NERC
  - Other Optional Data



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- Effective Forced Outage Rate (Demand) or $EFOR_d$
  - Provides the basis for Unforced Capacity
  - Requires reporting GADS data directly to PJM
    - Based on NERC / GADS reporting
    - Verification, Testing and Reporting Requirements (PJM Green Book)
    - Unit Performance Measurements
    - 12 Month Rolling Average Unit Performance
    - PJM web based GADS / GORP System
    - Substantial penalties for late / bad data
      - (up to $500 a day for data not submitted in accordance with published guidelines)
    - data required by the 20th day after proceeding month
    - IF data missing and NOT addressed, IT will be assumed as FORCED Outage

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• CODA: Cost Offer Data Application:

CODA replaces eFuel
September 15, 2010

• CODA is maintained by Monitoring Analytics and is used to fulfill the mission of PJM's Independent Market Monitor under PJM's Market Monitoring Plan (Attachment M of the PJM Open Access Transmission Tariff

• Data collected is similar to that of the EIA-923 form

• Monitoring Analytics will audit and enforce participation requirements.

• Monitoring Analytics will use the data for verification and analysis of generator costs.

• Monitoring Analytics treats all submitted data as confidential in accordance with the PJM Tariff.

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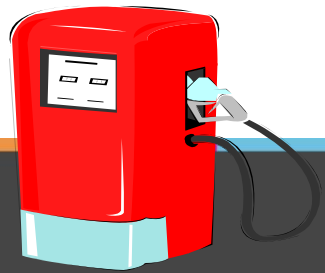
- **Fuel Policy**
  - Save and manage fuel policy documents for all your units.

- **Fuel Data**
  - Monthly entry of fuel delivery and consumption data.

- **Opportunity Cost Calculator**
  - For units with environmental run time restrictions, enter data by 6:00 PM, and have an opportunity cost calculated by 6:00 AM the next morning.

- Each company can have different users with access to each of the data screens
- Accounts can be set up to give access to one function, but restrict access to other functions.



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Fuel Policy

- Any PJM member with generating units that may be offer capped or that chooses to offer on a cost basis must submit a fuel cost policy to the PJM MMU for approval. (PJM Manual 15)
- All Fuel Policies will be required to be submitted through the CODA Fuel Policy screen.

- The MMU will use a unit's fuel policy to verify that costs are consistent with company/unit policy.

- Fuel policies assigned to units can only be changed after one year. Exceptions made by request to the MMU.

Fuel Policy Template

- A fuel policy document template is available on the Monitoring Analytics website:

http://www.monitoringanalytics.com/tools/tools.shtml

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Fuel Data

- Each company must review and document their fuel costs at minimum once per month (12 times per year).

- Each review must occur within forty (40) days of the preceding review.

- Review results will be used to determine whether or not a fuel cost update is necessary.

- The documentation of fuel costs must be filed via CODA . (PJM Manual 15)

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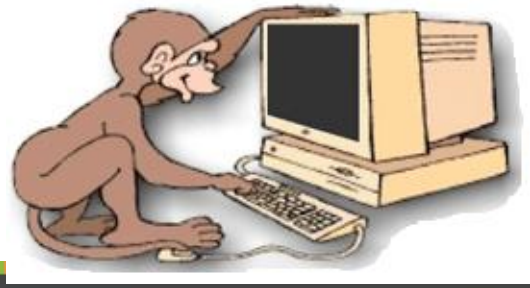
Data Submission Requirements By Unit Type

Unit Type	Fuel Policy	Sched 2	Sched 3	Sched 4	Sched 5	Sched 6	Sched 7	Sched 8	Sched 9	Unit Data
Fossil/Organic Plant >= 10 MW	A	M	M	M	M	S	S	A	NR	M
Fossil/Organic Plant < 10 MW	A	M	M	M	M	S	S	A	NR	M
Nuclear	A	NR	NR	NR	M	S	S	NR	NR	M
Hydro, Wind, Solar, Geothermal	NR	NR	NR	NR	M	S	S	NR	NR	M

Requirement	Monthly	Annual	Not Required	See Schedules for Detail
Abbreviation	M	A	NR	S (for Non-Utility Plants)



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CODA Schedules

Fuel Data Schedule 1:
Fuel Data Schedule 2: Cost and Quality of Fuel Receipts – Plant Level Contract Information, Receipts and Costs
Fuel Data Schedule 3: Boiler Information: Fuel Consumption
Fuel Data Schedule 4: Fossil/Organic Fuel Stocks
Fuel Data Schedule 5: Generator Information
Fuel Data Schedule 6: Source and Disposition of Electricity
Fuel Data Schedule 7: Annual Revenues from Sales for Resale
Fuel Data Schedule 8A: Environmental-Byproduct Disposition
Fuel Data Schedule 8B: Environmental-Financial Information
Fuel Data Schedule 8C: Environmental-Boiler NOx Controls
Fuel Data Schedule 8D: Environmental-Cooling System Info
Fuel Data Schedule 8E: Environmental-Flue Gas Particulate Collection
Fuel Data Schedule 8F: Environmental-Flue Gas Desulfurization
Fuel Data Schedule 9: Comments

- **Details for information entry available in CODA User Guide**

  http://www.monitoringanalytics.com/tools/docs/CODA_User_Guide_20100903.pdf

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CODA Data Entry Time Frames

- Schedules 1, 2, 3, 4, 5 and 9 must be filled in monthly.
  - Participants will report Monthly fuel delivery and consumption data into CODA by the end of the month following the data month.
  - **Example: July data must be reported by the end of August.**
- Schedules 6, 7 and 8 must be filled in annually.
  - Participants will report annual data requirements (for Schedule 6 through Schedule 8) no later than 45 days after the form opens for data entry – typically around March 31 following the end of the reporting year.

eGADS/CODA Additional Information

- eGADS/CODA Assistance
  - eGADS online help within the eGADS tool
  - CODA Training Presentation User Guide on MMU Website
    - http://www.monitoringanalytics.com/tools/tools.shtml

- Contacts
  - eGADS
    - gadssupport@pjm.com
  - CODA
    - coda@monitoringanalytics.com

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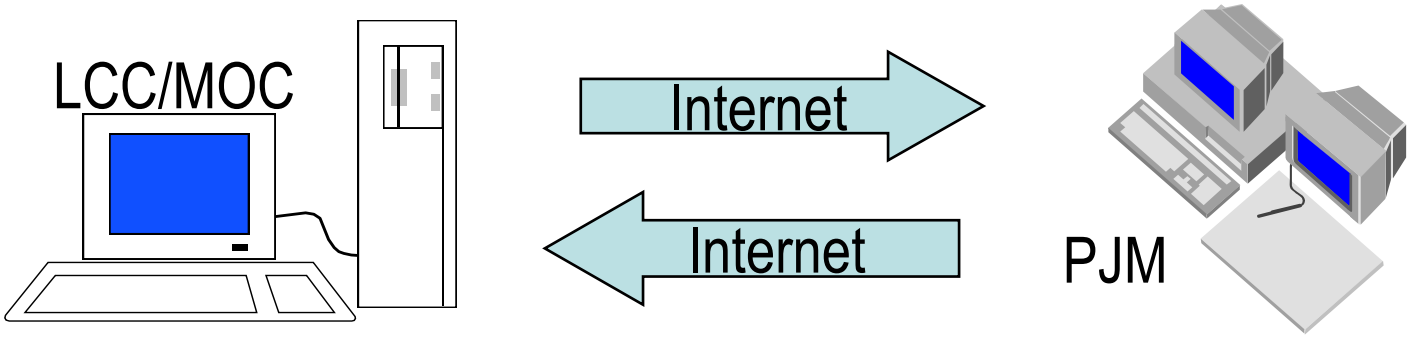
Agenda

- eDart
  - **General Overview**
  - How to Create a New Generation Outage Ticket
  - View, Revise, Cancel Generator Outage Ticket
  - Other Required Generation Unit Information Reporting Through eDART
  - eDart Generation Reports

What is eDART?

- **eDART** stands for **D**ispatcher **A**pplications and **R**eporting **T**ool
- eDART is an internet tool for submitting Generation and Transmission operations and planning data to PJM and retrieving operations data from PJM



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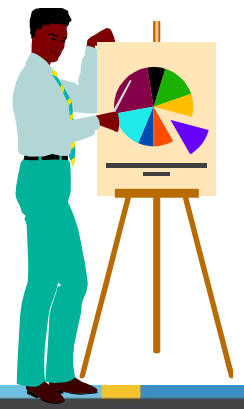
Benefits to Members

- Quicker outage submittal
  - Available 24/7
- More information about requested Generation and Transmission outages
- Better documentation and tracking of status and activity on outage ticket
- Electronic interface for data portability into other applications



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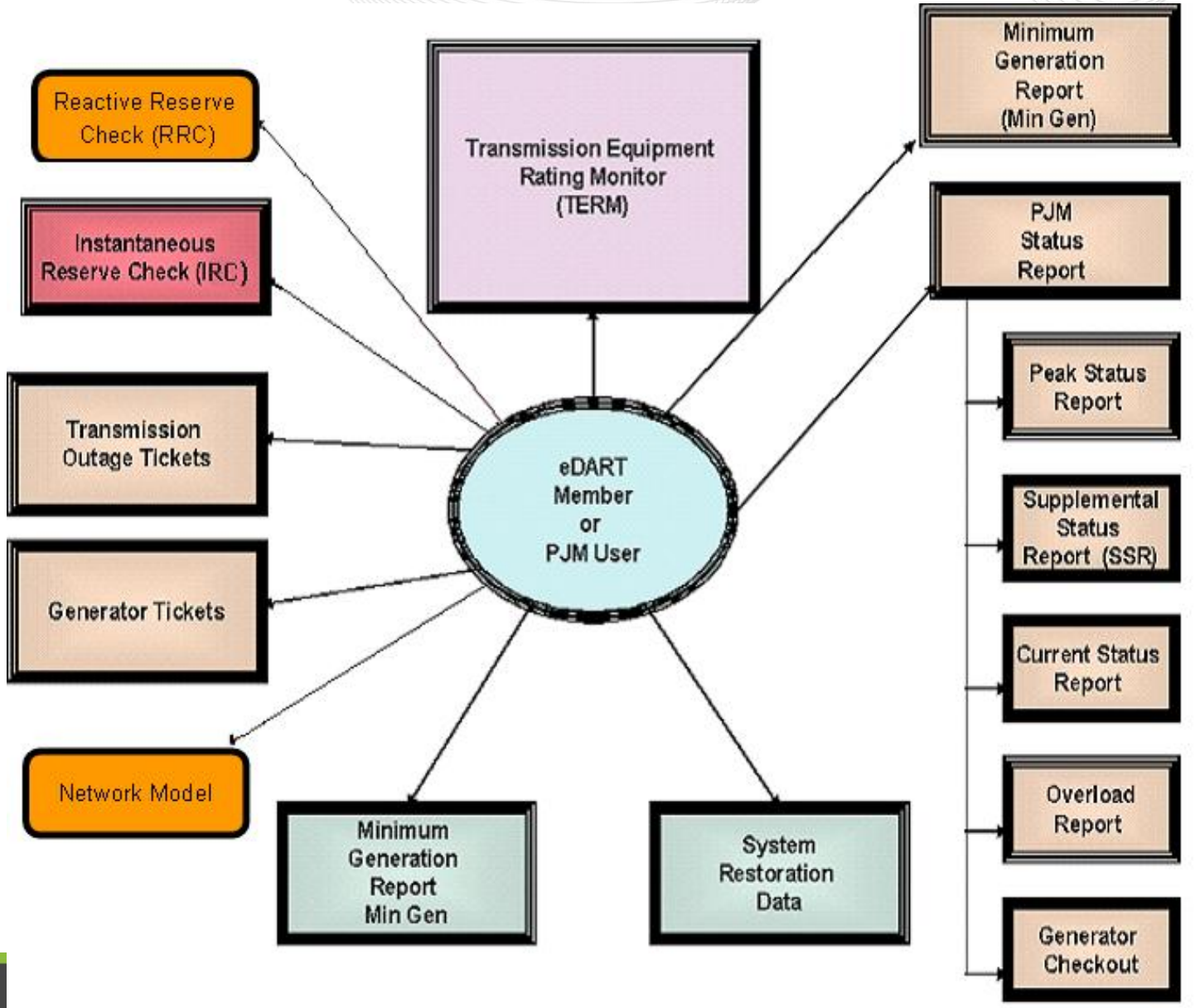
eDART System Overview



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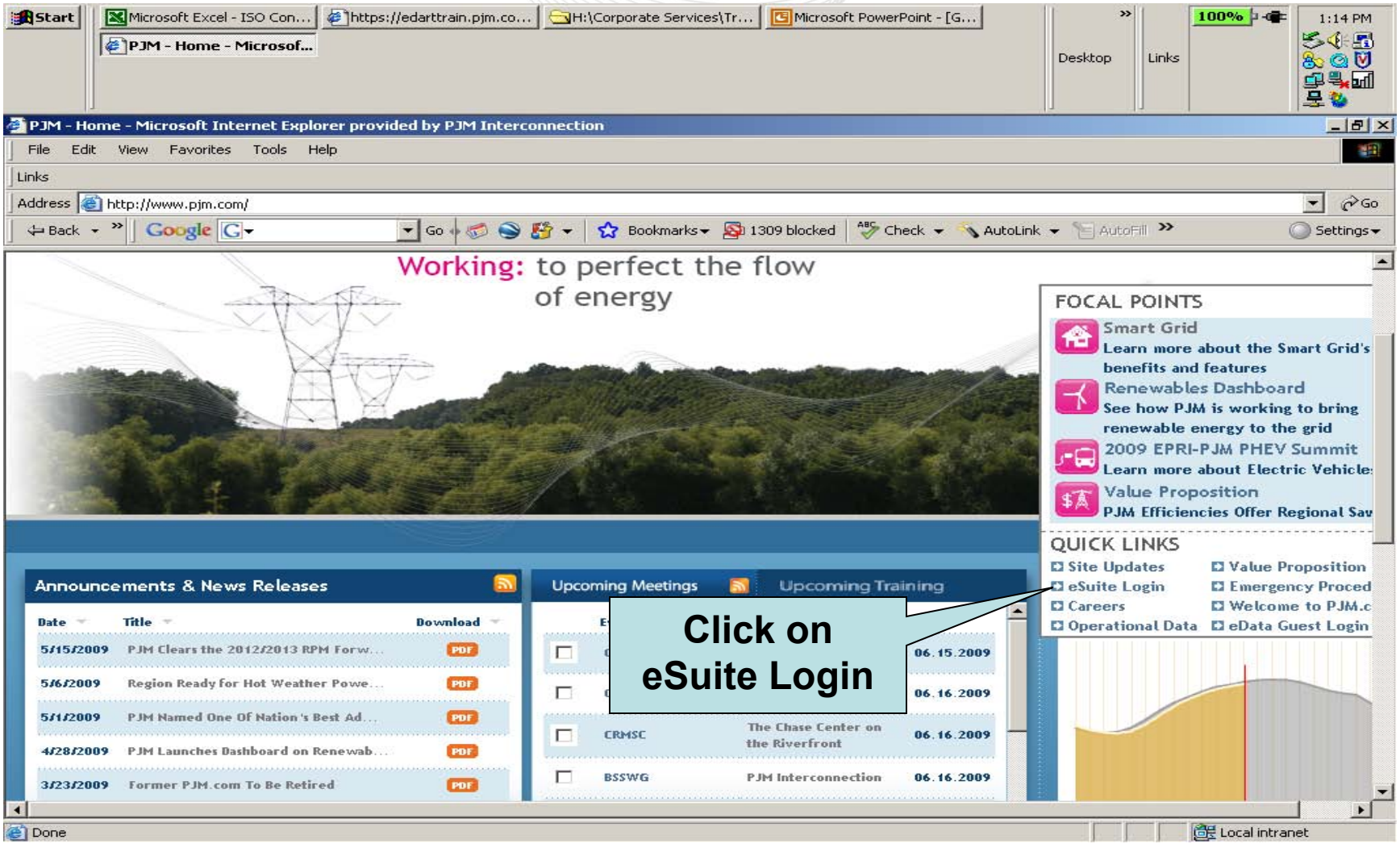
Agenda

- eDart
  - General Overview
  - **How to Create a New Generation Outage Ticket**
  - View, Revise, Cancel Generator Outage Ticket
  - Other Required Generation Unit Information Reporting Through eDART
  - eDart Generation Reports

Login Procedure



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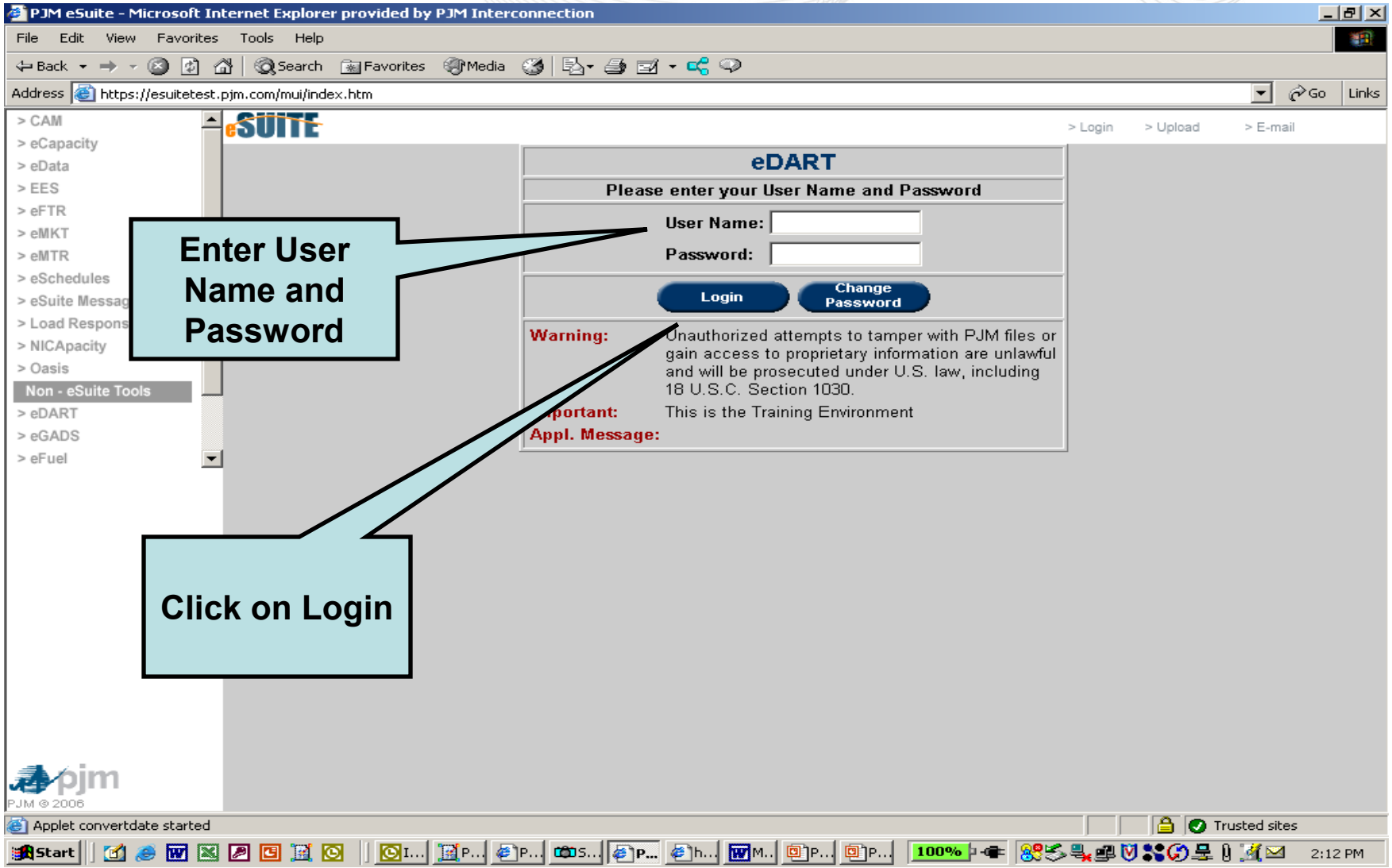
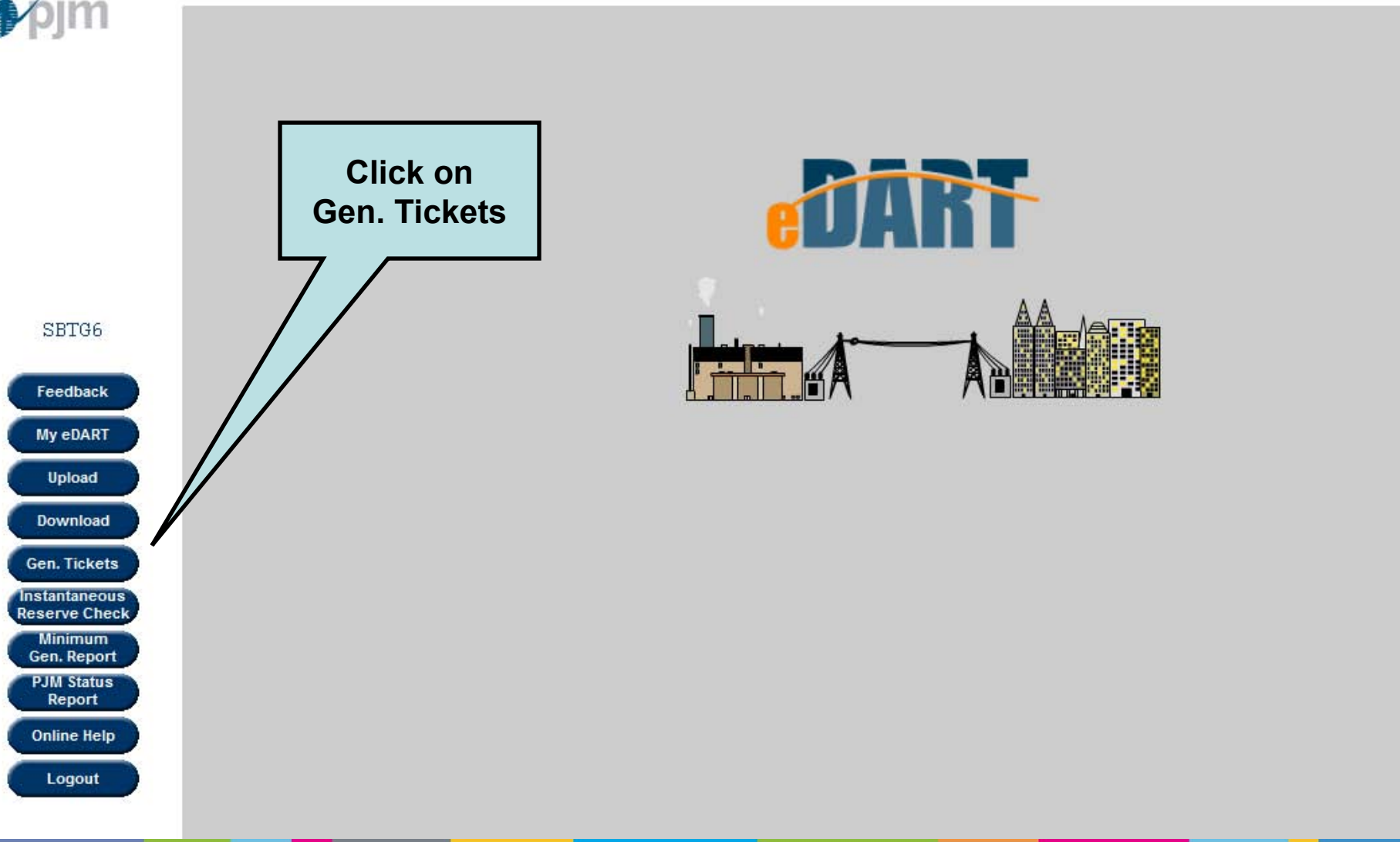
Login Procedure

PJM©2011

Login Procedure



Generation Ticket Creation



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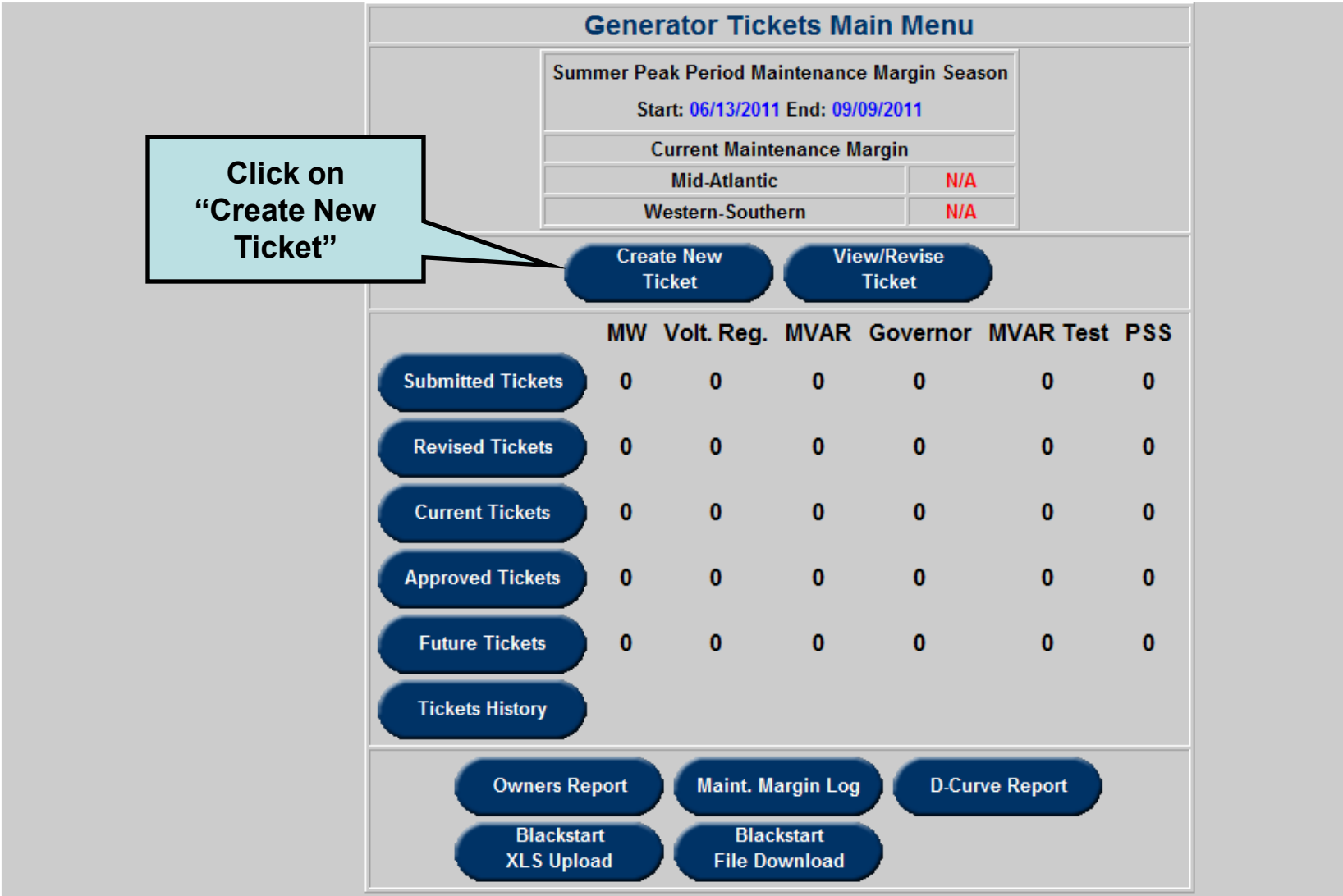
Create New Ticket



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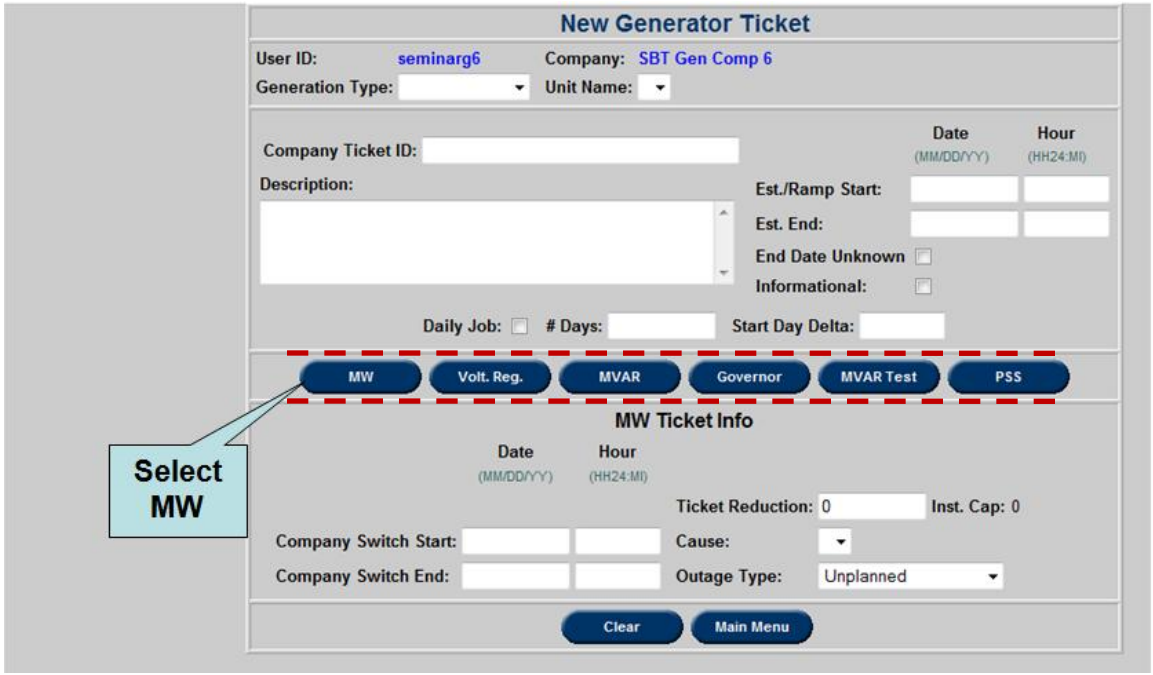
Generator Outage Ticket Sectioning

- General Section
  - Fields common to each ticket type



- Type Specific Section
  - Fields for specific ticket type

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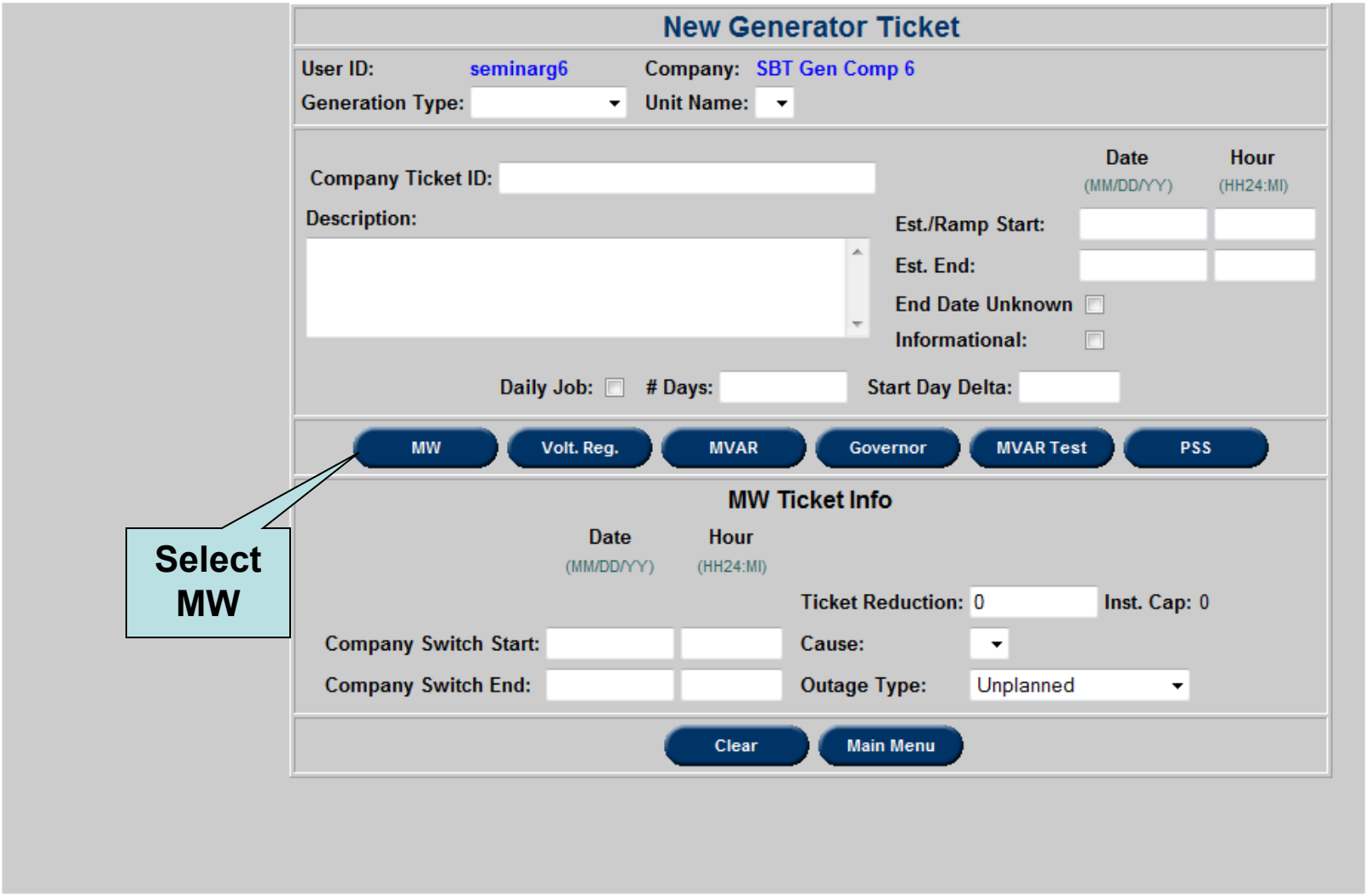
New Megawatt Ticket



Select MW

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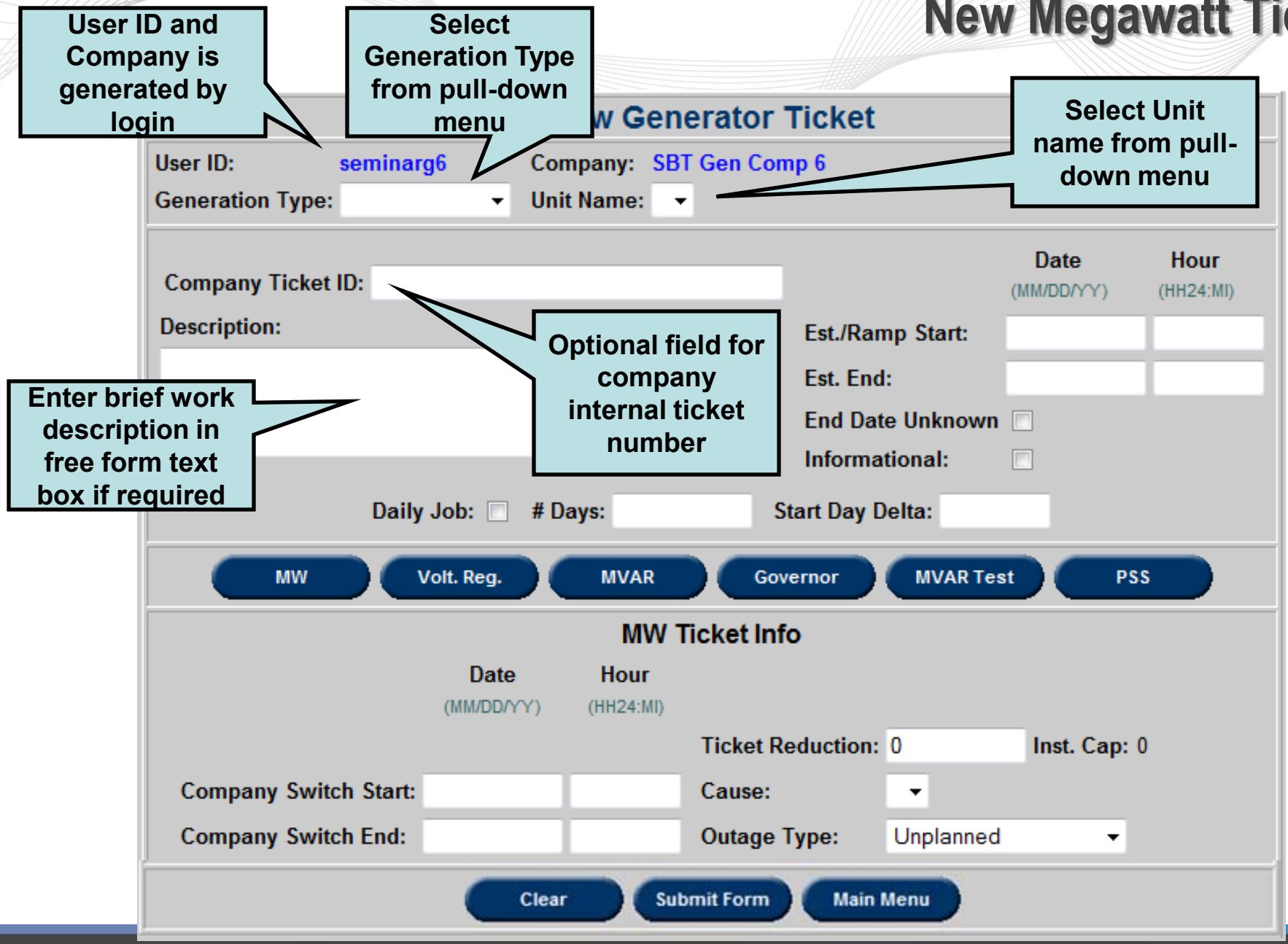
New Megawatt Ticket



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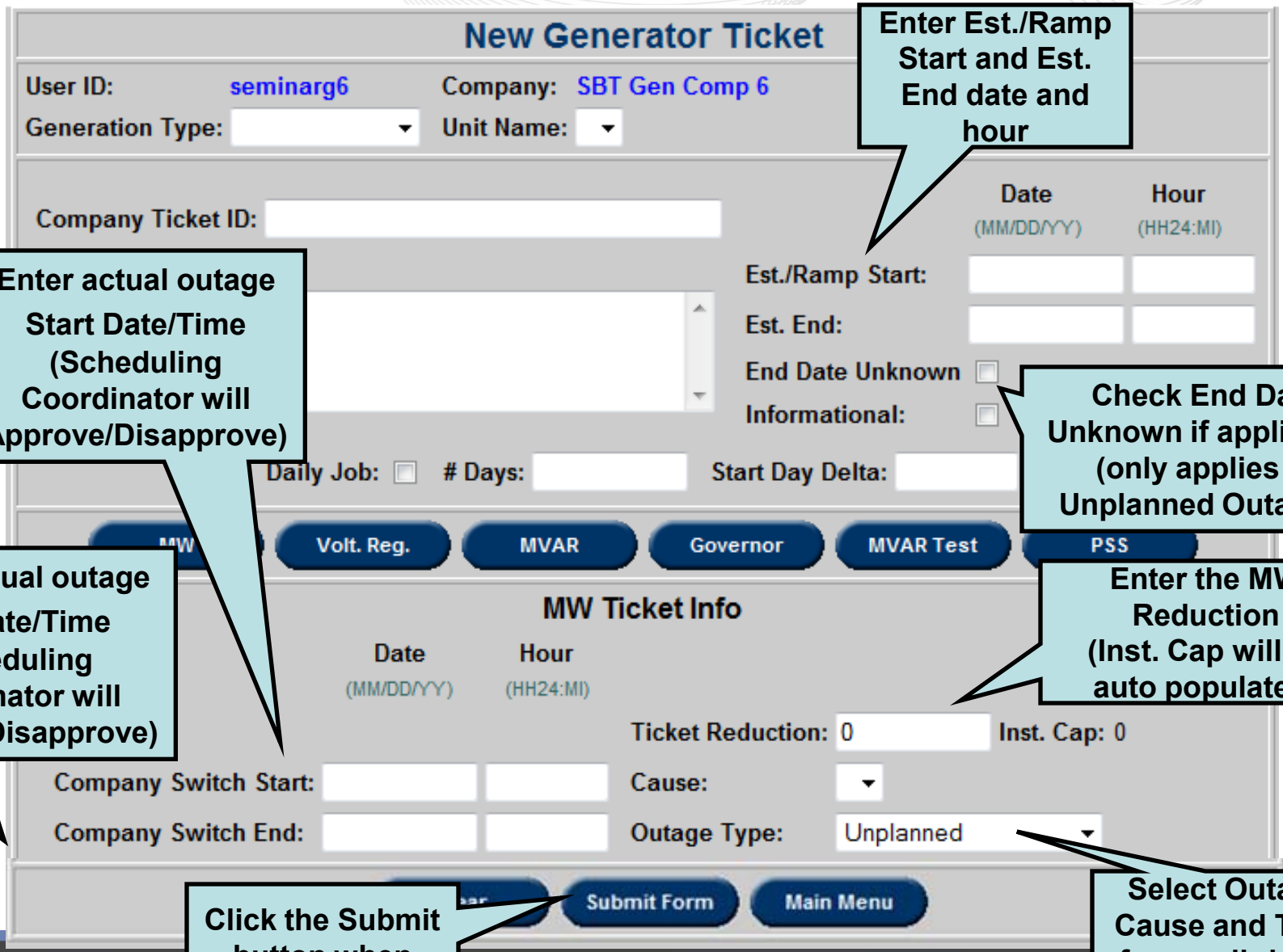
New Megawatt Ticket



Enter Est./Ramp Start and Est. End date and hour

Enter actual outage Start Date/Time (Scheduling Coordinator will Approve/Disapprove)

Check End Date Unknown if applicable (only applies to Unplanned Outages)

Enter actual outage End Date/Time (Scheduling Coordinator will Approve/Disapprove)

Enter the MW Reduction (Inst. Cap will be auto populated)

Click the Submit button when complete

Select Outage Cause and Type from pull-down menus

- **Entering a new megawatt ticket is a "Three Step Process"**

1) Ticket Creation

2) Switch (actual) Start Time Entry

3) Switch (actual) End Time Entry

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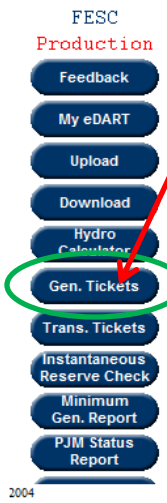
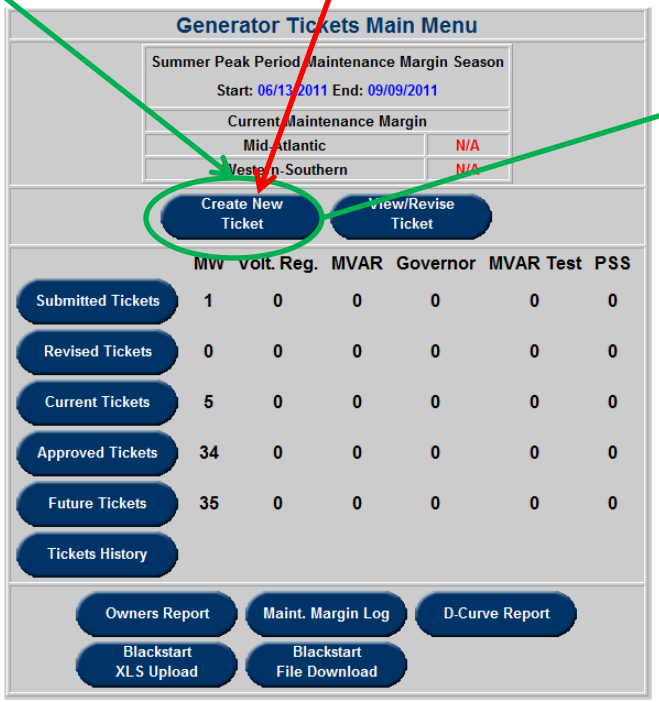
New Megawatt Ticket Process

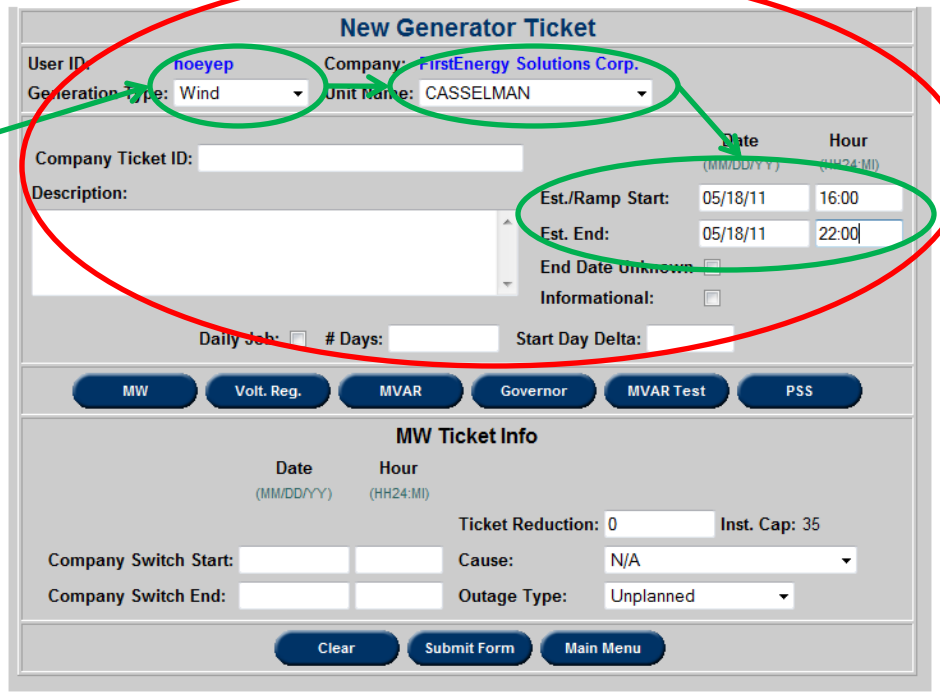
Select the Gen. Tickets Button. This will open the Generator Tickets Main Menu.

Select the Create New Ticket Button. This will open the New Generator Ticket form.

Enter the Generation Type, Unit Name, Est. / Ramp Start Time and Est. End Time







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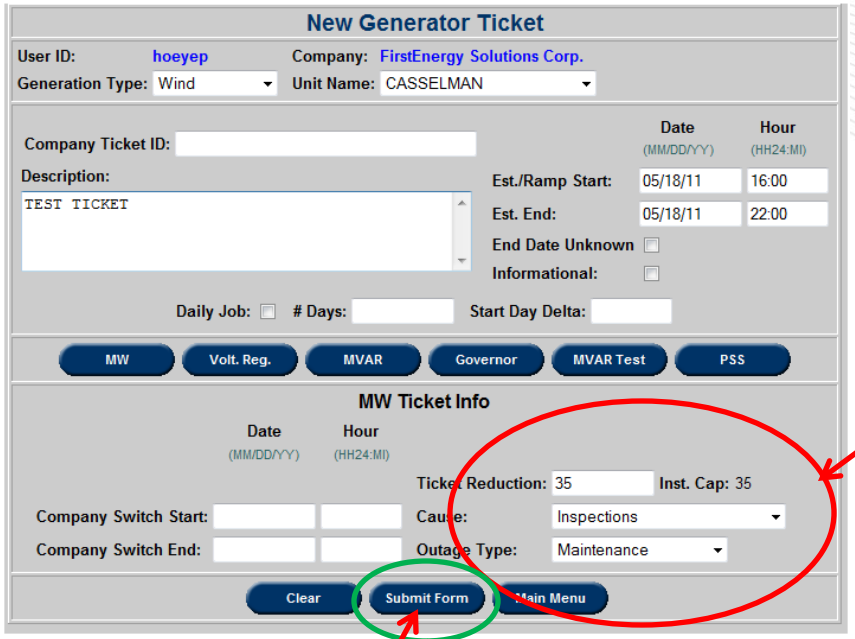
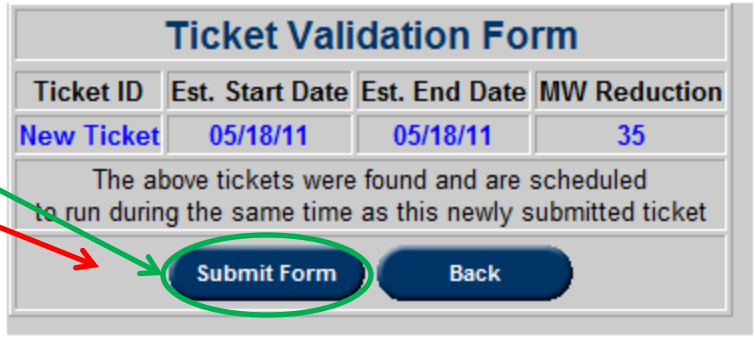
New Megawatt Ticket Process



Enter the Ticket Reduction (amount), Cause and Outage Type.

Click the Submit Form Button



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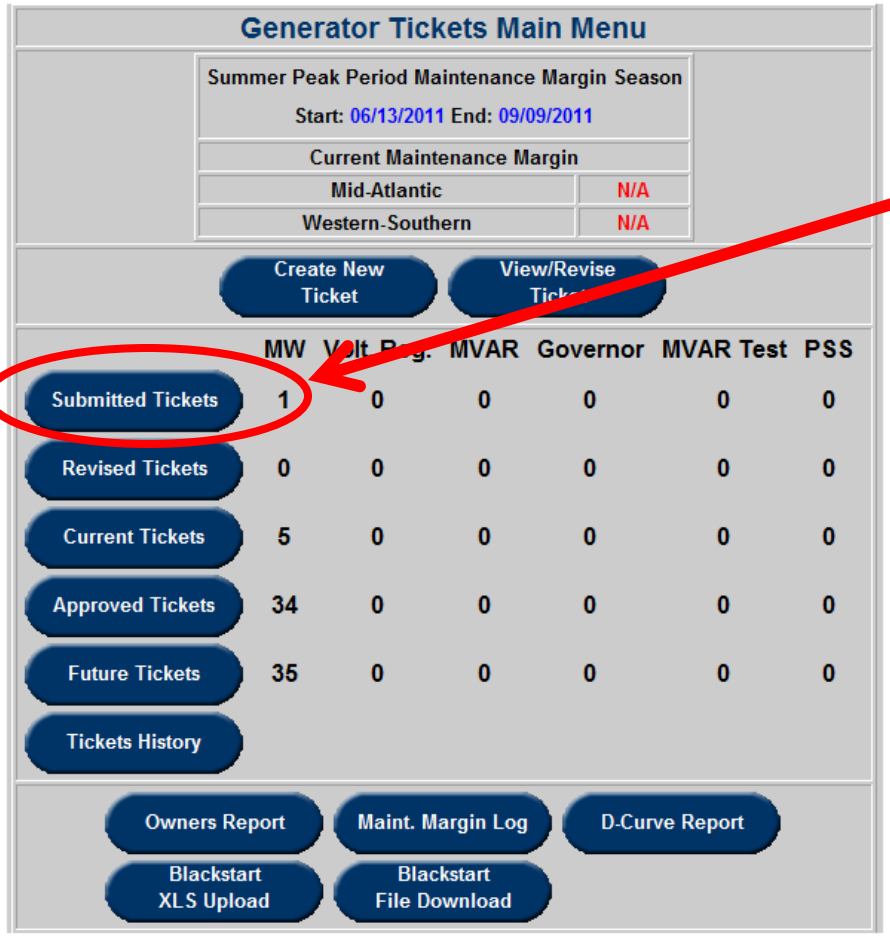
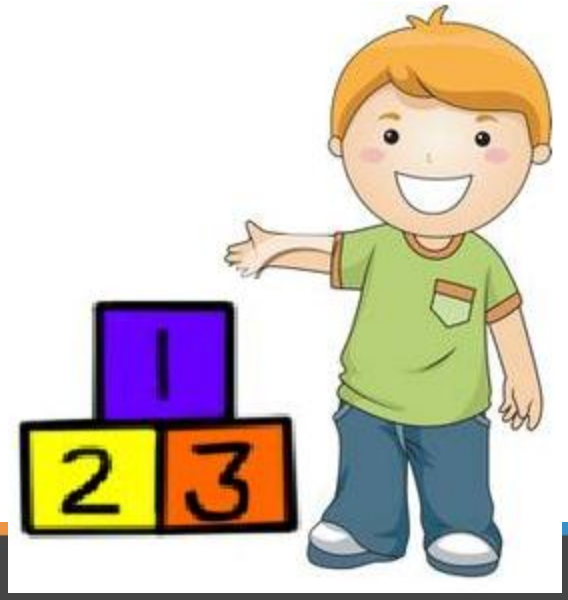
New Megawatt Ticket Process

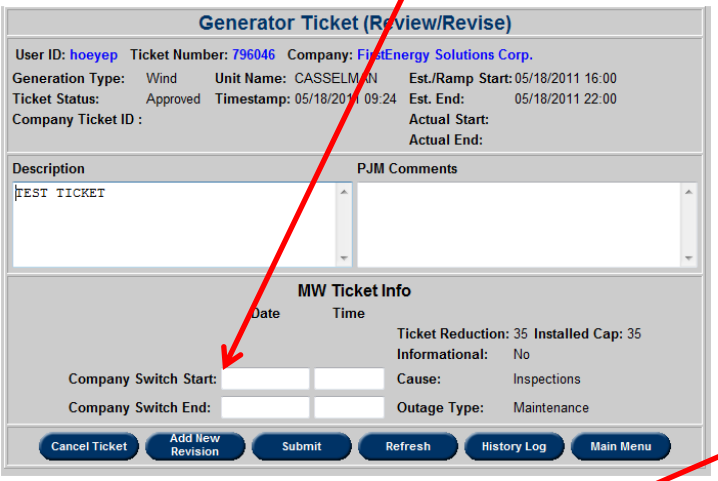


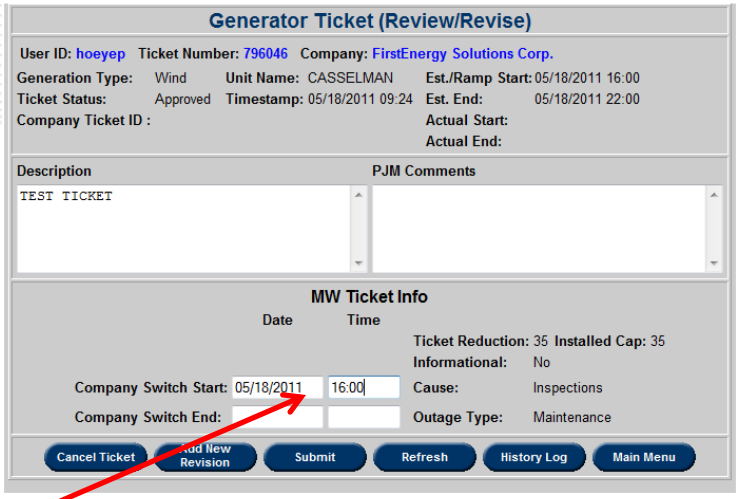
The new ticket will appear in the Submitted Tickets column.



New Megawatt Ticket Process

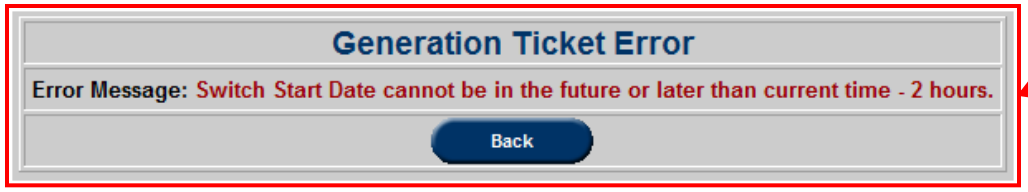
Enter the Company Switch Start Time after the work begins.





Actual time this entry was made was 5/18/2011 @ 09:48 – Over 6 hours before the Est. / Ramp Start time entered when the Ticket was created.

Entering a Company Switch Start Time before the "Actual" Est. / Ramp Start time will result in the error below. The Company Switch Start time must also be entered no later than 2 hours after the Est. / Ramp Start time.



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New Megawatt Ticket Process Summary

- 3 Steps

1) Creation
   - Entry of Est. / Ramp Start & Est. End Times

2) Start
   - Entry of Company Switch Start Time
     - Can not be entered before (early) the Est. / Ramp Start time
     - Must be entered no later than 2 hours after the Est. / Ramp Start time.

3) End
   - Entry of Company Switch End Time
     - Must be entered no later than 2 hours after the Est. End time.

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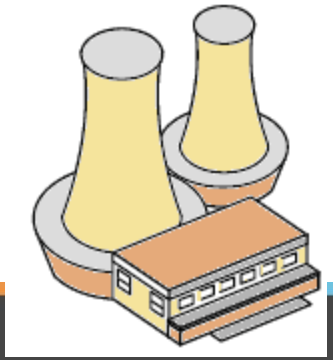
Ramp Start / Complete Times

- Designed mainly for larger units, which could take hours to come off line.
- For example:
  - A 1000 MW unit is generating at full load
    - Ramp Start
      - The time the unit starts down (from 1000 MW)



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Switch Start / End Times

- **Company Switch Start Date/Time**
  - Call up ticket and enter “Switch Start Date/Time.”
  - Scheduling Coordinator will then Approve/Disapprove
- **Company Switch End Date/Time**
  - Call up ticket and enter “Switch End Date/Time.”
  - Master Coordinator will then Approve/Disapprove
  - This enhancement will *not* eliminate a phone call to the Scheduling Coordinator at the actual Start/End times of an outage.
  - Verbal notifications of unit status changes must still be provided to PJM
    - Master Coordinator if just clearing ticket
    - Generation Dispatcher if clearing ticket and bringing unit online

- **NOTE: This is not meant to eliminate any verbal communications with the PJM Generation Dispatcher when a generating unit is coming On or Off-line for an outage.**

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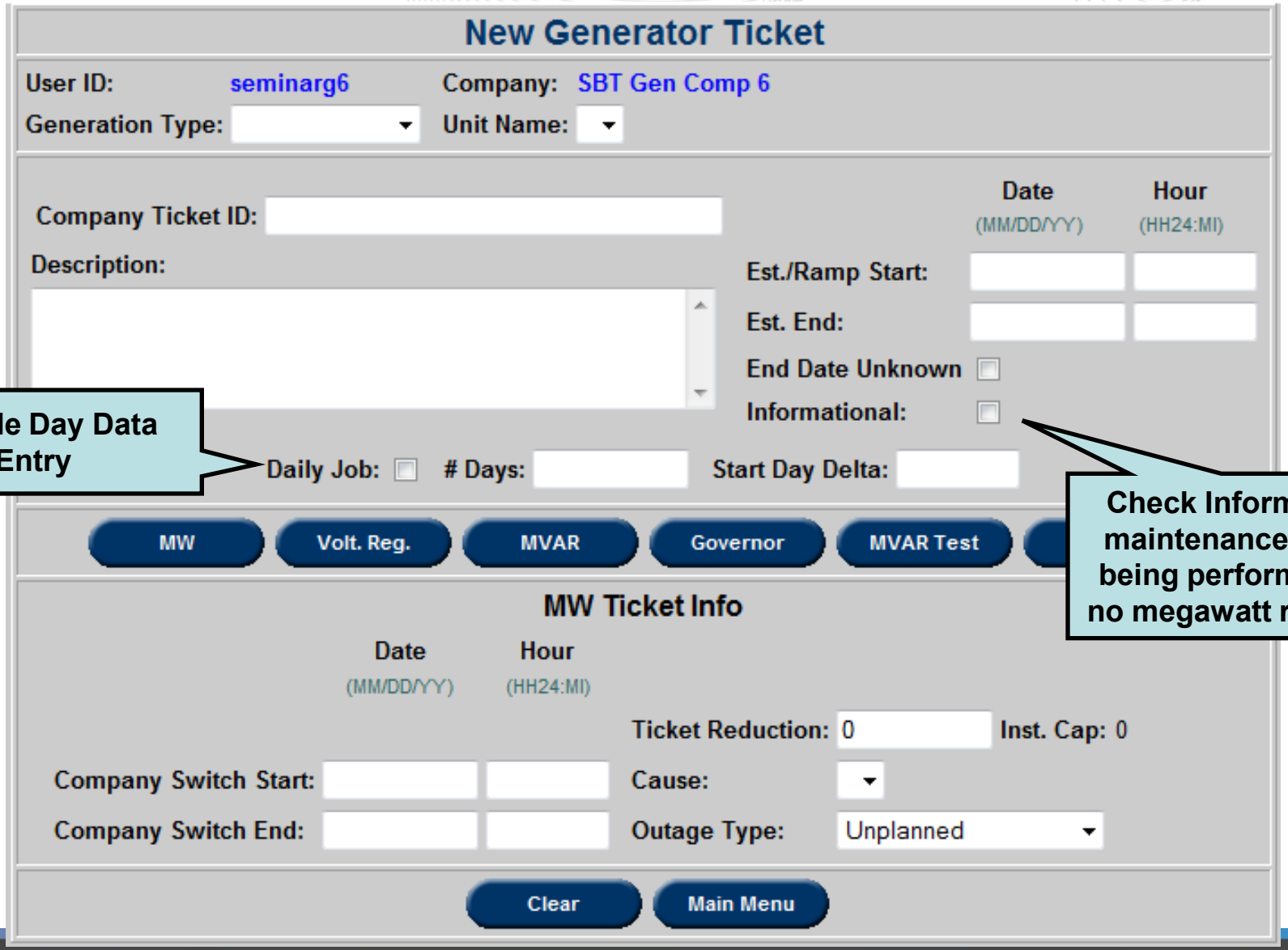
New Megawatt Ticket



Multiple Day Data Entry

Check Information if maintenance work is being performed with no megawatt reductio

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Informational Ticket

- New checkbox for MW tickets; „Informational" to flag Info only tickets.
- Requirements:
  - MW Reduction = 0
  - Outage Type = Maintenance
- For other non-Informational tickets, MW Reduction cannot be 0.
- Current ticket approval cycle applies to Informational tickets.

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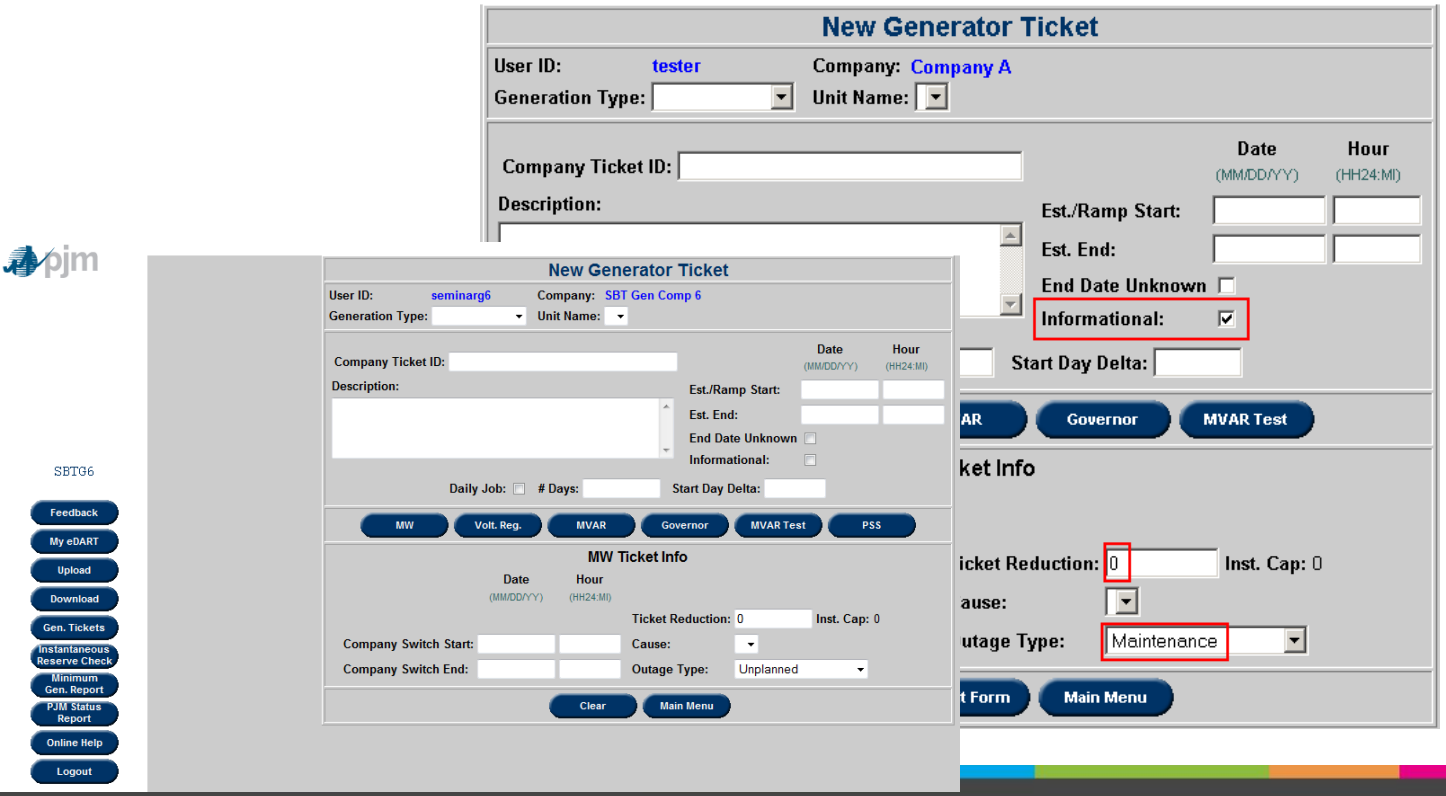
Informational Ticket-New

- When creating a new MW ticket and Informational is checked, reduction will automatically be populated with 0 and outage type changed to „Maintenance".



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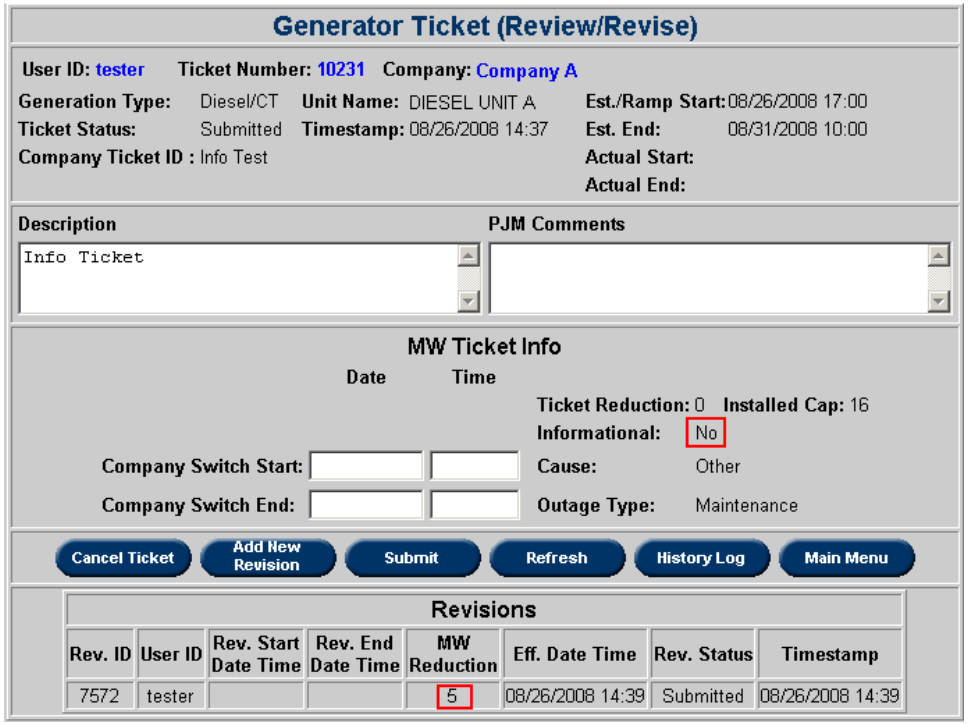
Informational Ticket-Revision

- When submitting a revision to an Informational ticket and the revision has a non-zero reduction, „Informational" will change to „No" but the outage type will remain as „Maintenance".



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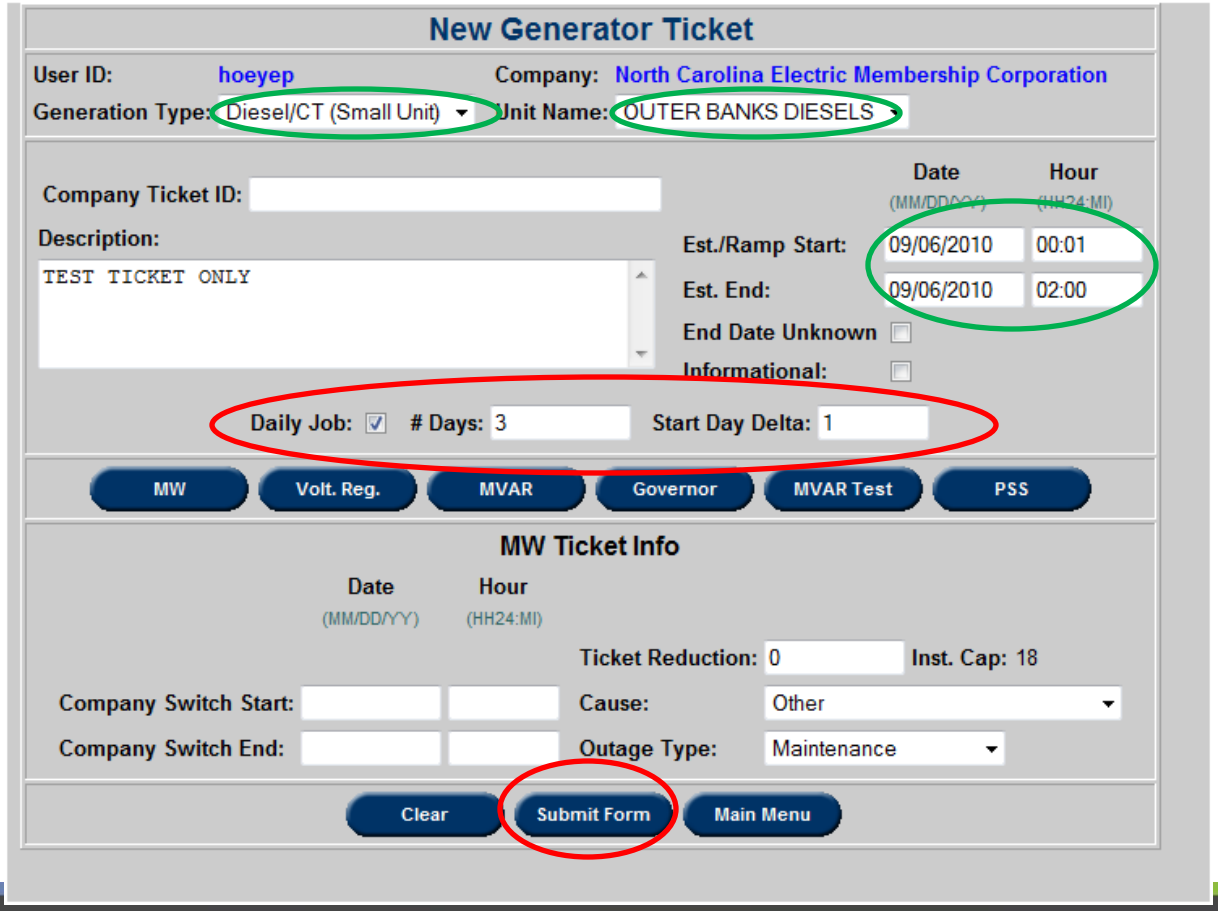
Multiple day outage entry example. This example is for 3 days.

Enter unit data and start date / time and end date / time for first day.



Multiple day data entry.
Check "Daily Job" button.
Enter number of days (3 in this example).
Enter "Start Day Delta" of 1. Each Ticket will then be created 1 day apart.
Click the "Submit Form" button.

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Multiple Day Outage

Ticket Validation Form

Ticket ID	Est. Start Date	Est. End Date	MW Reduction
New Ticket	09/06/2010 00:01	09/06/2010 02:00	0
New Ticket	09/07/2010 00:01	09/07/2010 02:00	0
New Ticket	09/08/2010 00:01	09/08/2010 02:00	0

The above tickets were found and are scheduled to run during the same time as this newly submitted ticket

Submit Form | Back

The ticket validation form will open listing the tickets that will be created. If the list is correct, click the "Submit Form" button.

Generator Tickets Main Menu

Summer Peak Period Maintenance Margin Season
Start: 06/14/2010 End: 09/10/2010

Current Maintenance Margin
Western-Southern N/A

Create New Ticket | View/Revise Ticket

	MW	Volt. Reg.	MVAR	Governor	MVAR Test	PSS
Submitted Tickets	3	0	0	0	0	0
Revised Tickets	0	0	0	0	0	0
Current Tickets	0	0	0	0	0	0
Approved Tickets	0	0	0	0	0	0
Future Tickets	3	0	0	0	0	0
Tickets History						

Owners Report | Maint. Margin Log | D-Curve Report | Blackstart XLS Upload

Returning to the "Generator Tickets Main Menu shows there are now 3 tickets in the submitted queue.
Clicking the "Submitted Tickets" button opens the Submitted Tickets Form.

Submitted Tickets

This does not automatically contain Forecast Planning Tickets. If you want to include them, please change your selection by clicking Go to Filter.

Apply Sorting | Go to Filter

Ticket ID	Comp. Ticket ID	Submission Date/Time	Ticket Type	Unit Type	Outage Type	Unit Name	Installed Capacity	Reduction	Est. Start Date/Time	Cause
762405		09/02/2010 14:57	MW	Diesel/CT (Small Unit)	Maintenance	OUTER BANKS DIESELS	18	0	09/06/2010 00:01	Other
762406		09/02/2010 14:57	MW	Diesel/CT (Small Unit)	Maintenance	OUTER BANKS DIESELS	18	0	09/07/2010 00:01	Other
762407		09/02/2010 14:57	MW	Diesel/CT (Small Unit)	Maintenance	OUTER BANKS DIESELS	18	0	09/08/2010 00:01	Other
Total								0		

Go to Filter | Main Menu

Click the link to open the ticket.

Generator Ticket (Review/Revise)

User ID: hoeyep Ticket Number: 762405 Company: North Carolina Electric Membership Corporation
Generation Type: Diesel/CT (Small Unit) Unit Name: OUTER BANKS DIESELS Est./Ramp Start: 09/06/2010 00:01
Ticket Status: Submitted Timestamp: 09/02/2010 14:57 Est. End: 09/06/2010 02:00
Company Ticket ID : Actual Start:
Actual End:

Description: TEST TICKET ONLY

PJM Comments:

MW Ticket Info

Date Time

Ticket Reduction: 0 Installed Cap: 18
Informational: Yes
Company Switch Start: Cause: Other
Company Switch End: Outage Type: Maintenance

Cancel Ticket | Add New Revision | Submit | Refresh | History Log | Main Menu

Agenda

- eDart
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  - How to Create a New Generation Outage Ticket
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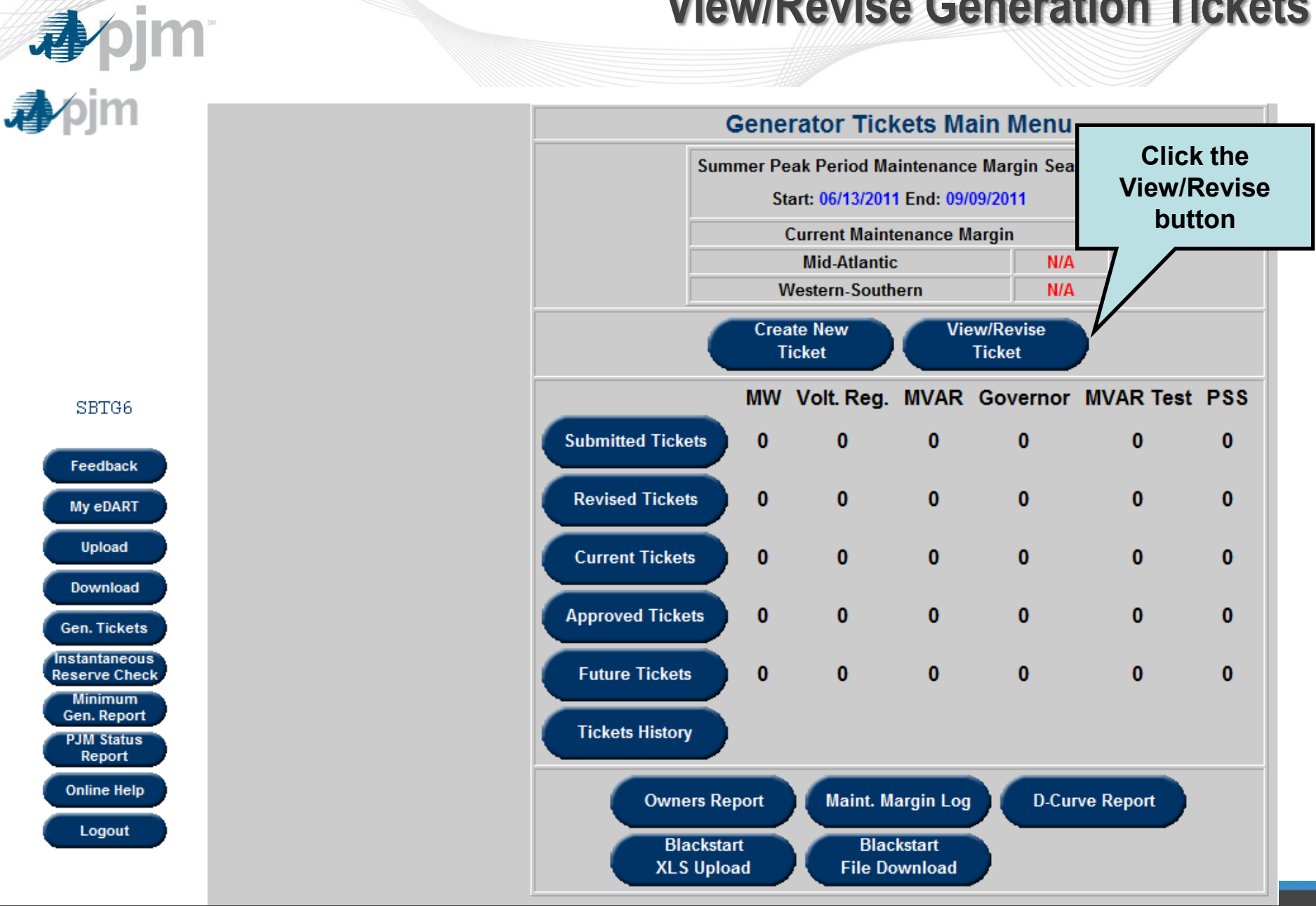
View/Revise Generation Tickets



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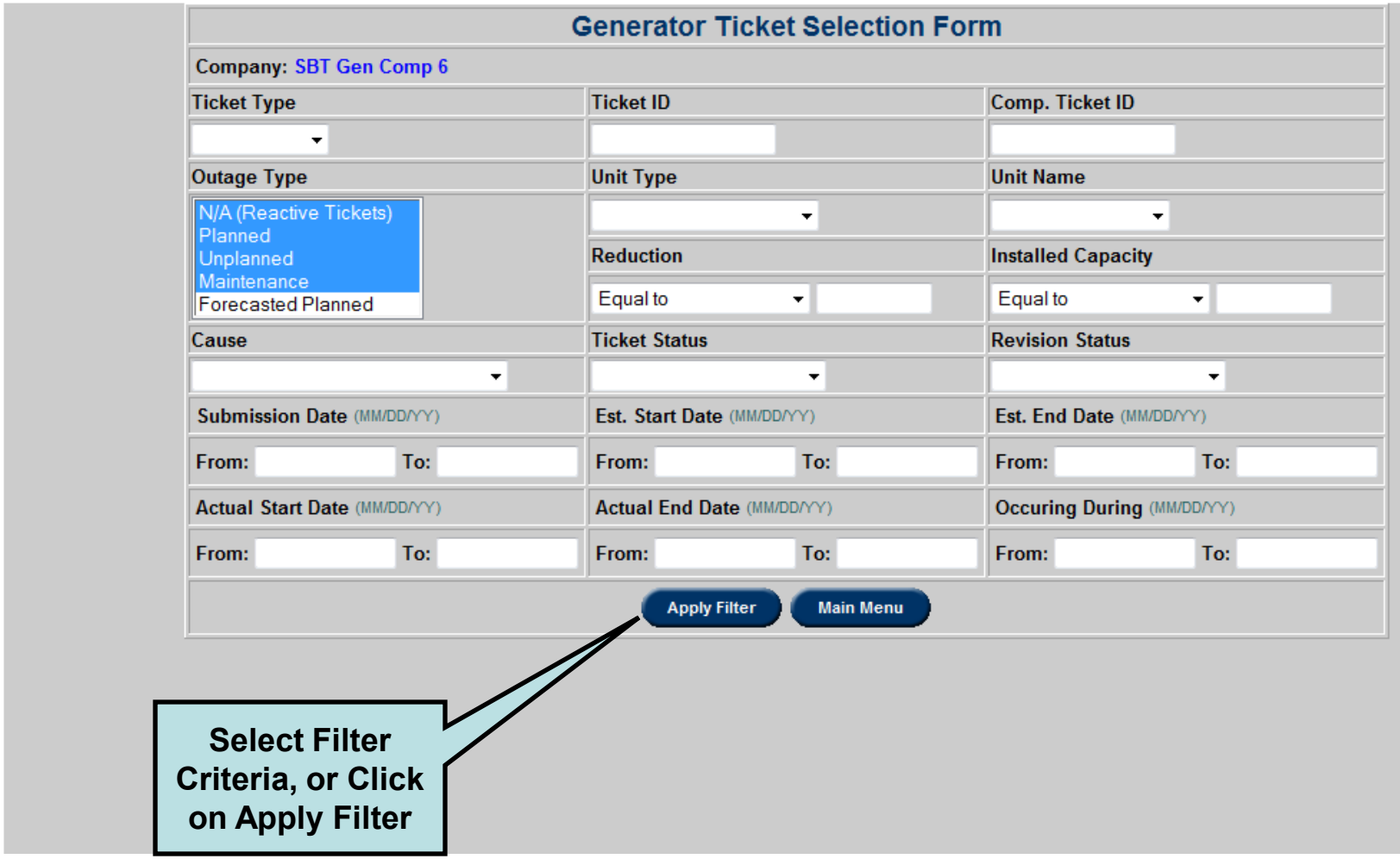
View/Revise Generation Tickets



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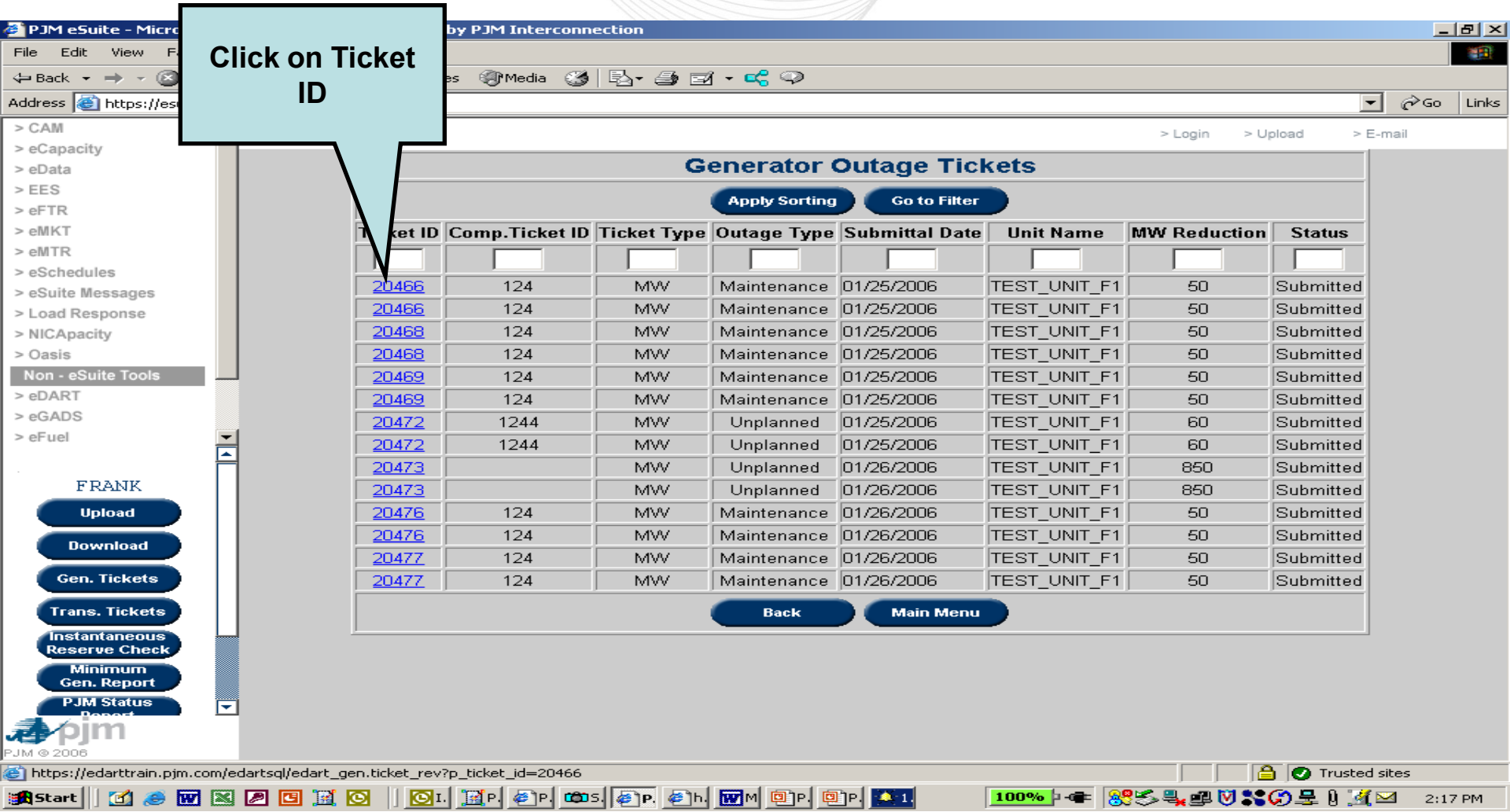
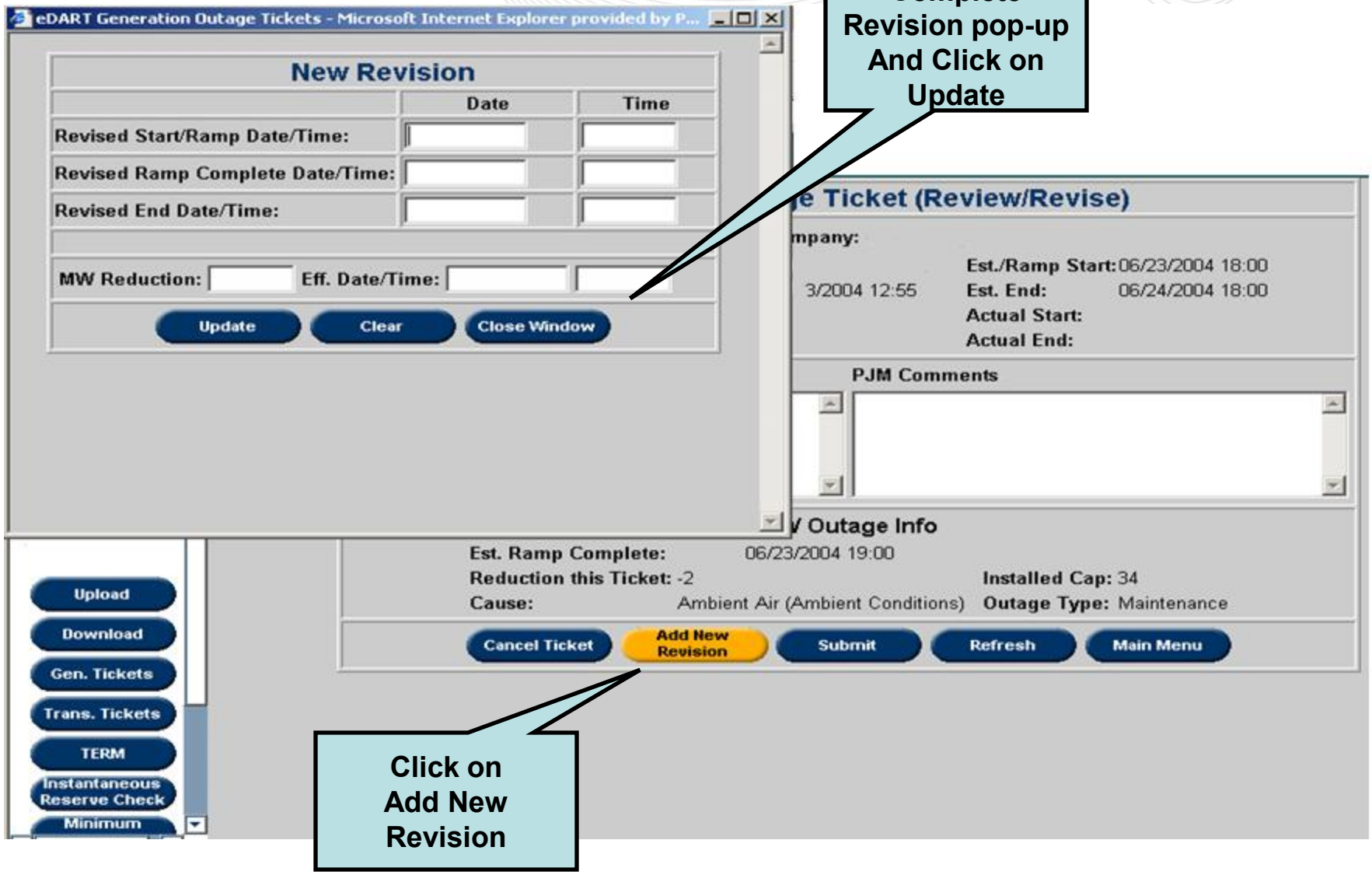
View/Revise Generation Tickets



ket ID	Comp.Ticket ID	Ticket Type	Outage Type	Submittal Date	Unit Name	MW Reduction	Status
20466	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20466	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20468	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20468	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20469	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20469	124	MW	Maintenance	01/25/2006	TEST_UNIT_F1	50	Submitted
20472	1244	MW	Unplanned	01/25/2006	TEST_UNIT_F1	60	Submitted
20472	1244	MW	Unplanned	01/25/2006	TEST_UNIT_F1	60	Submitted
20473		MW	Unplanned	01/26/2006	TEST_UNIT_F1	850	Submitted
20473		MW	Unplanned	01/26/2006	TEST_UNIT_F1	850	Submitted
20476	124	MW	Maintenance	01/26/2006	TEST_UNIT_F1	50	Submitted
20476	124	MW	Maintenance	01/26/2006	TEST_UNIT_F1	50	Submitted
20477	124	MW	Maintenance	01/26/2006	TEST_UNIT_F1	50	Submitted
20477	124	MW	Maintenance	01/26/2006	TEST_UNIT_F1	50	Submitted

View/Revise Generation Tickets



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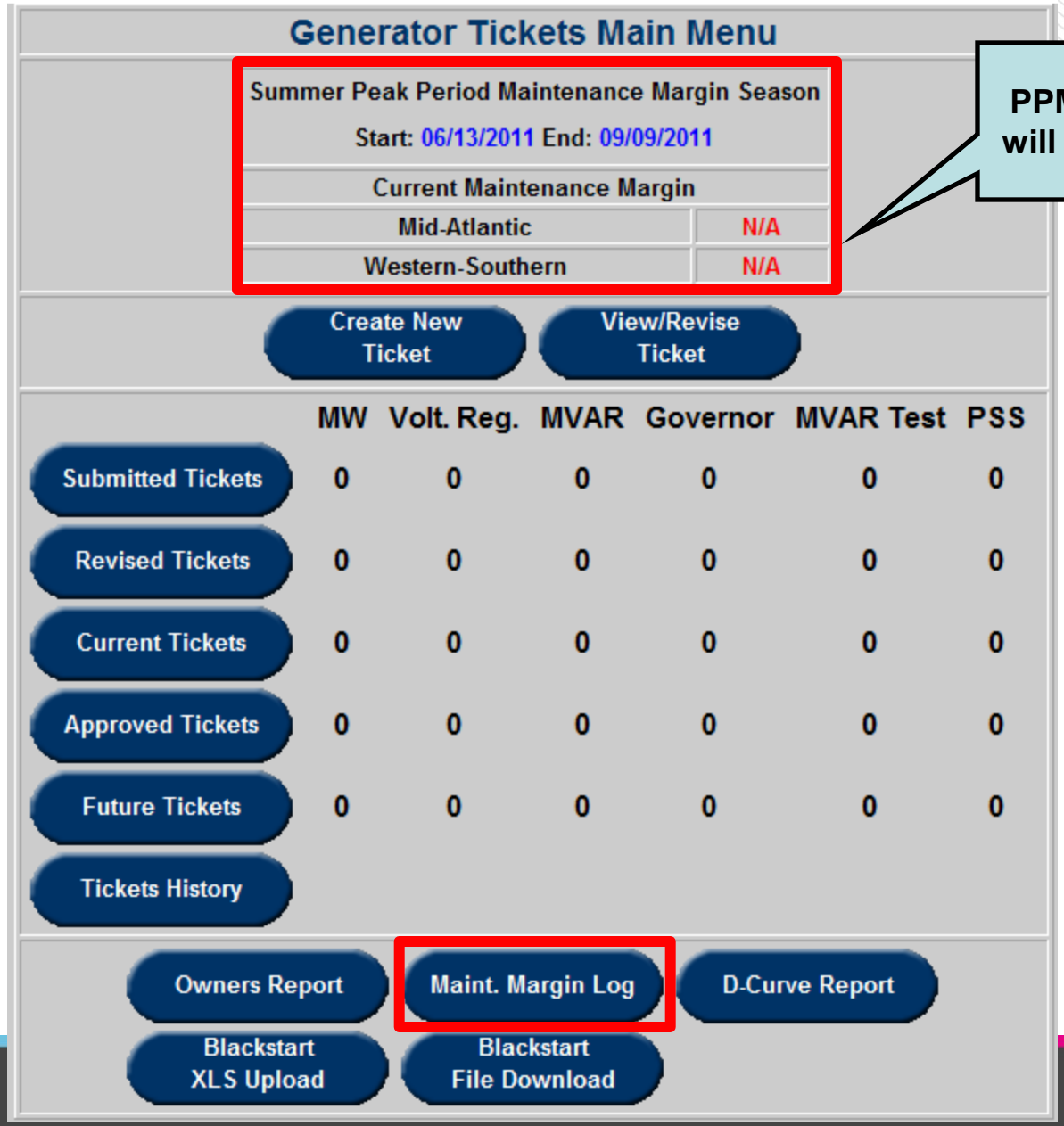
Generator Tickets Main Menu

- The process to calculate maintenance margins will be automated.
- The Maintenance Margin will be analyzed through out the year and not just during peak periods.
- The PPMM Start and End Dates will be displayed under “Summer Peak Period Maintenance Margin Season” on the main menu.
- Based on the results of the margin calculations, user will see 0, N/A or the PPMM value under “Current Maintenance Margin”.

Generator Tickets Main Menu



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PPMM Log

Maintenance Margin Log

From Date: 05/30/2011 To Date: 06/03/2011

Region: Mid-Atlantic, Western-Southern Last 30 Days:

Submit Form Main Menu

Region	Date	Margin	Timestamp
Mid-Atlantic	06/03/2011	N/A	05/29/2011 05:12
Western-Southern	06/03/2011	N/A	05/29/2011 05:12
Mid-Atlantic	06/02/2011	N/A	05/27/2011 08:12
Western-Southern	06/02/2011	N/A	05/27/2011 08:12
Mid-Atlantic	06/01/2011	N/A	05/27/2011 08:12
Western-Southern	06/01/2011	N/A	05/27/2011 08:12
Mid-Atlantic	05/31/2011	4290.7937	05/29/2011 05:12
Mid-Atlantic	05/31/2011	7300.9431	05/27/2011 08:12
Western-Southern	05/31/2011	N/A	05/27/2011 08:12
Mid-Atlantic	05/30/2011	7353.4902	05/29/2011 05:12
Mid-Atlantic	05/30/2011	N/A	05/27/2011 08:12
Western-Southern	05/30/2011	N/A	05/27/2011 08:12

Main Menu

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eDART Ticket Status

- Submitted
- Approved
  - MW Ticket
  - Reactive Ticket
    - Received
- Active
- Complete

- Denied
  - MW Ticket
  - Reactive Ticket
- Cancelled by Company
- Cancelled by PJM

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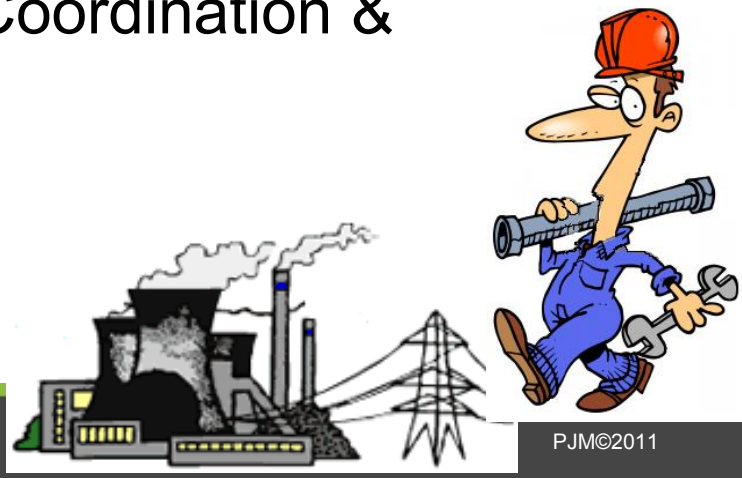
Generator Outage Ticket Adjusted Status

- **Submitted**
  - Original status of ticket upon submittal
- **Approved**
  - MW Ticket - Ticket status changed to Approved by PJM upon review and approval
  - Reactive Ticket - Ticket status changed to Received by PJM upon receipt of ticket by PD (MVAR & VR) or Interregional Coordination & Compliance Dept. (Gov.)
    - Displayed as Approved on Menu



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Generator Outage Ticket Adjusted Status

- **Denied**
  - MW Ticket - Ticket status changed to Denied by PJM upon review and denial
  - Reactive Ticket - Tickets status can not be changed to Denied

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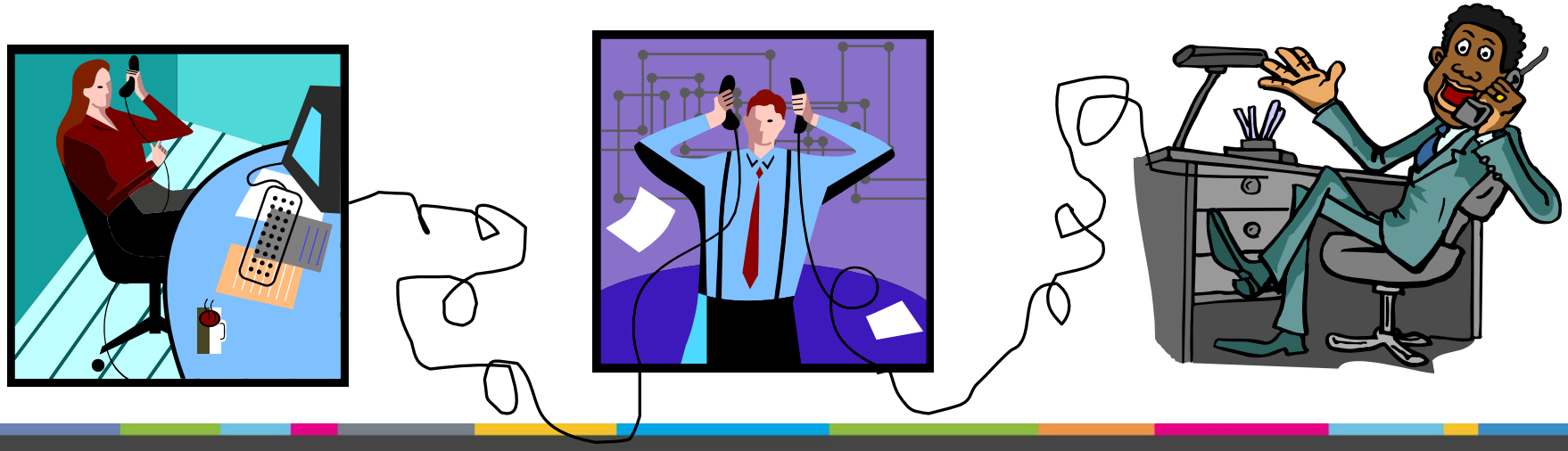
Generator Outage Ticket Status

- **Active**
  - Ticket status changed to Active upon input of an actual outage start date by PJM
- **Complete**
  - Ticket status changed to Complete upon input of an actual end date by PJM



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- **Cancelled by Company**
  - Ticket status changed to Cancelled by Company if company initiates cancellation of ticket
    - Verbal notification required to PJM if change affects current or next operating day!

- **Cancelled by PJM**
  - Ticket status changed to Cancelled by PJM if PJM initiates cancellation of ticket
    - Verbal notification given to company

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Agenda

- eDart
  - General Overview
  - How to Create a New Generation Outage Ticket
  - View, Revise, Cancel Generator Outage Ticket
  - **Other Required Generation Unit Information Reporting Through eDART**
  - eDart Generation Reports

- Generation Owners required to report through eDART
  - MW Outages (just described)
  - Unit MVAR Capability changes
  - Voltage Regulator Outages
  - Unit Governor Outages
  - Power System Stabilizer
  - MVAR Testing Ticket

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Reactive Generator Outage Ticket Business Rules

- Estimated Start Date/Time must be prior to Estimated End Date/Time
- Estimated End Date/Time can only be Unknown for Emergency Tickets
- MVAR Ticket Only
  - MVAR Max values must decrease or stay constant as MW Point value increases
  - MVAR Min values must increase or stay constant as MW Point value increases

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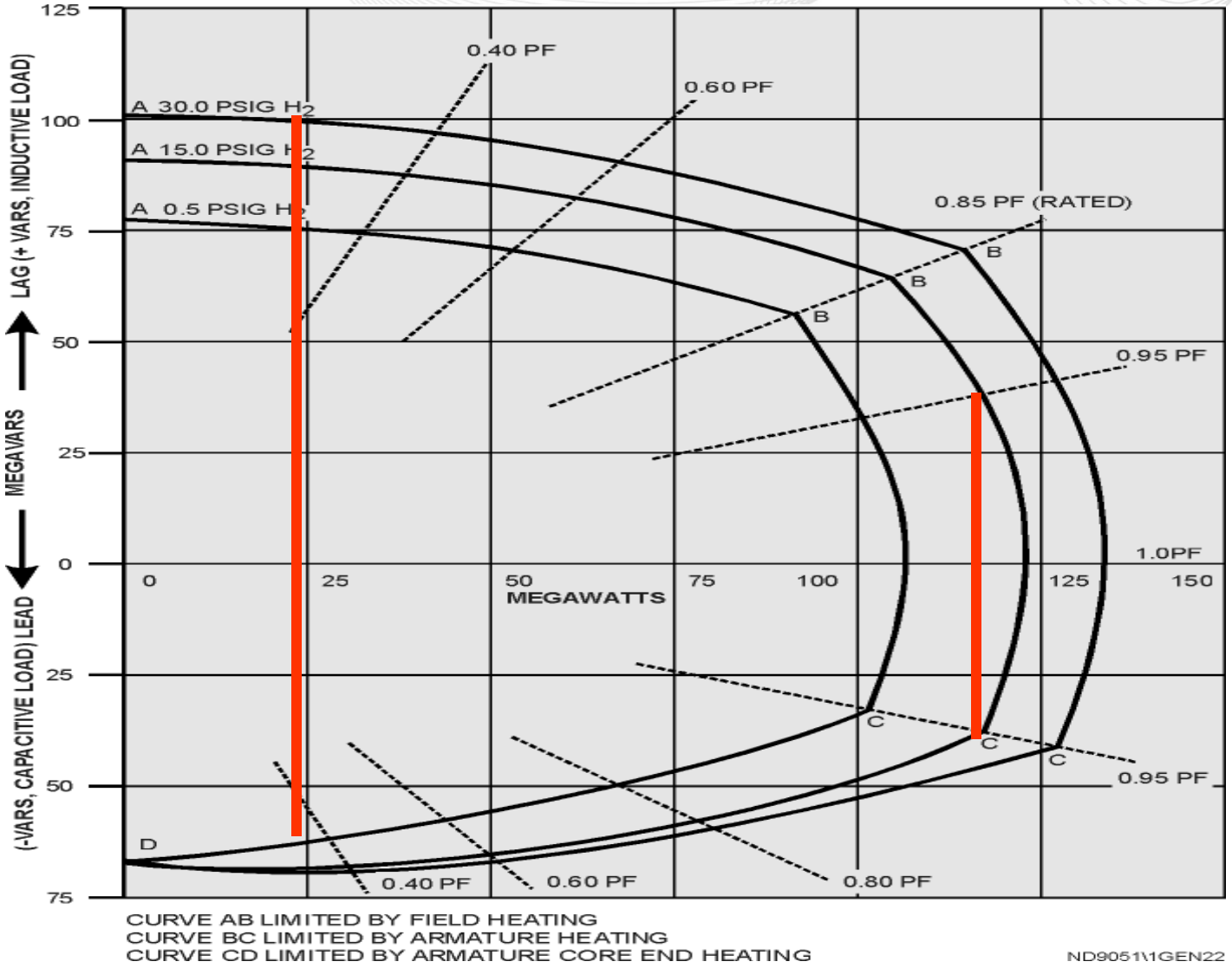
Generator Capability Curve

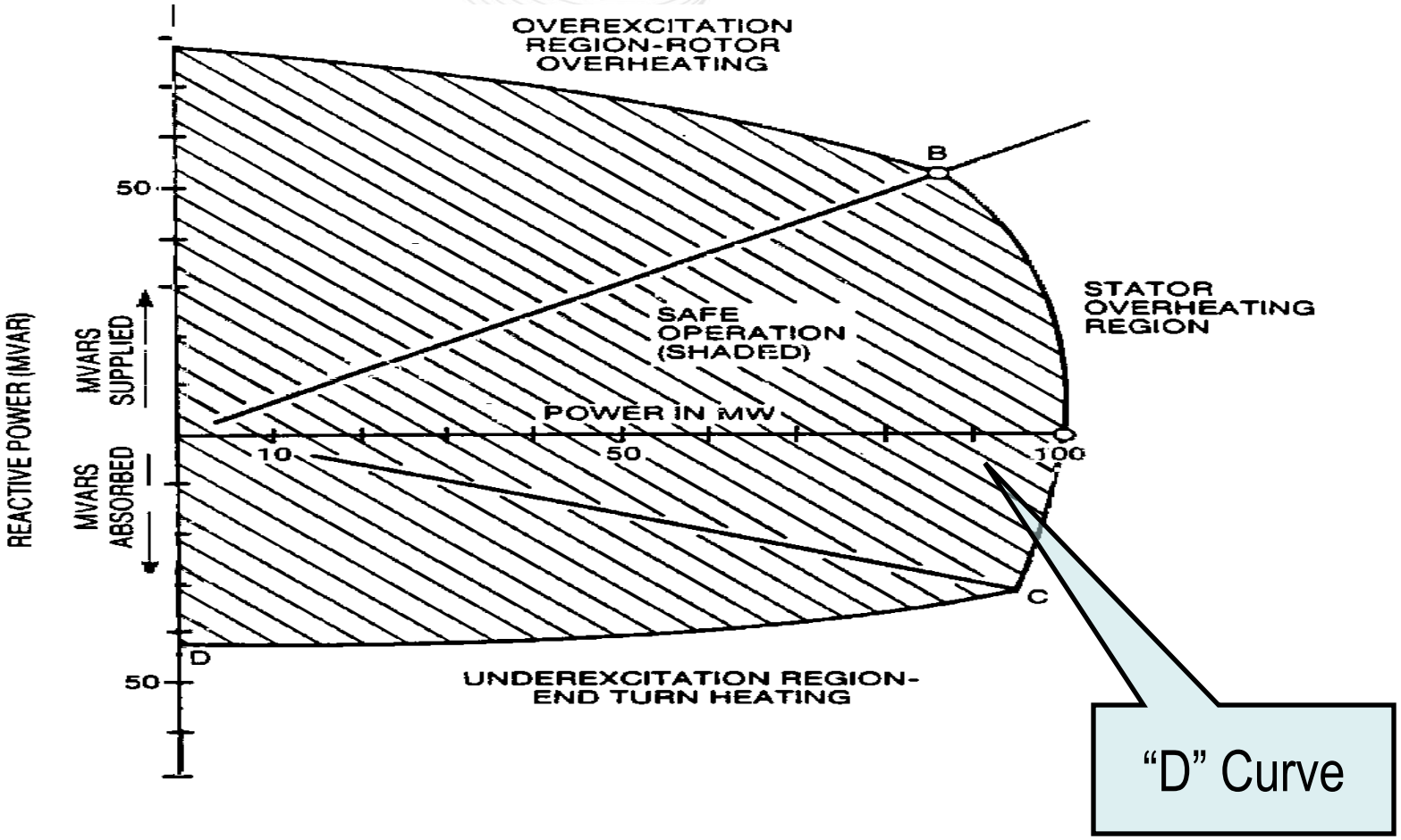


CURVE AB LIMITED BY FIELD HEATING
CURVE BC LIMITED BY ARMATURE HEATING
CURVE CD LIMITED BY ARMATURE CORE END HEATING

ND9051\1GEN22

PJM©2011

Unit Reactive Capability Data



GENERATOR CAPABILITY CURVE

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Unit Reactive Capability Data

- Data to be reported for each unit:
  1) **Continuous Unit Reactive Capability Curve**
     - Required
     - Realistic usable reactive output
     - Sustainable over the operating range of unit
       - Temperature restrictions (>95 degrees) accounted for
     - Used in PJM EMS
     - Report through eDART
  2) **Design Unit Reactive Capability Curve**
     - Provide if available
     - Theoretical reactive output of unit
     - Used to validate other reactive data that is reported
     - Forward to PJM Generation Dept (not through eDART)

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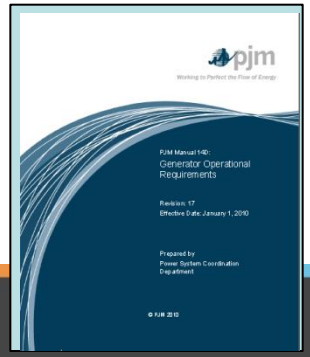
Unit Reactive Capability Data

- Rules listed in Attachment D of Generator Operational Requirements – Manual M14D
  - MW and MVAR are NET at the LOW side of the unit step up transformer
    - excluding station service load
  - Minimum of 2 points MUST be provided
  - Maximum of 8 points MAY be provided
  - Must maintain “shape” of Reactive Capability Curve



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Unit Reactive Capability Data

- Real-Time Unit Reactive Capability Reporting Process
- Generation Owner/operator must report the following information immediately to PJM Power Dispatcher and the respective LCC
  - Whenever a unit's reactive capability is reduced or planned to be reduced
  - Whenever a unit's actual reactive output has reached a limit that is less than the unit's normal specified capability
  - Whenever a unit's automatic voltage regulation is off or planned to be off

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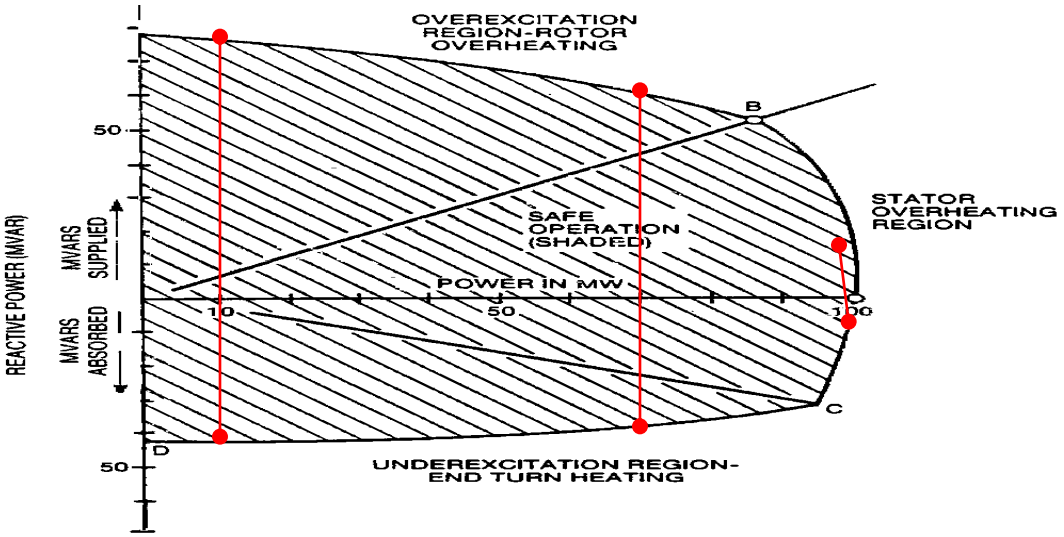
Unit Reactive Capability Data

- **Data Format**

	MW	Minimum MVAR	Maximum MVAR
Point 1	10	-50	80
Point 2	70	-45	75
Point 3	100	-10	20
Point 4			
Point 5			
Point 6			
Point 7			
Point 8			



GENERATOR CAPABILITY CURVE

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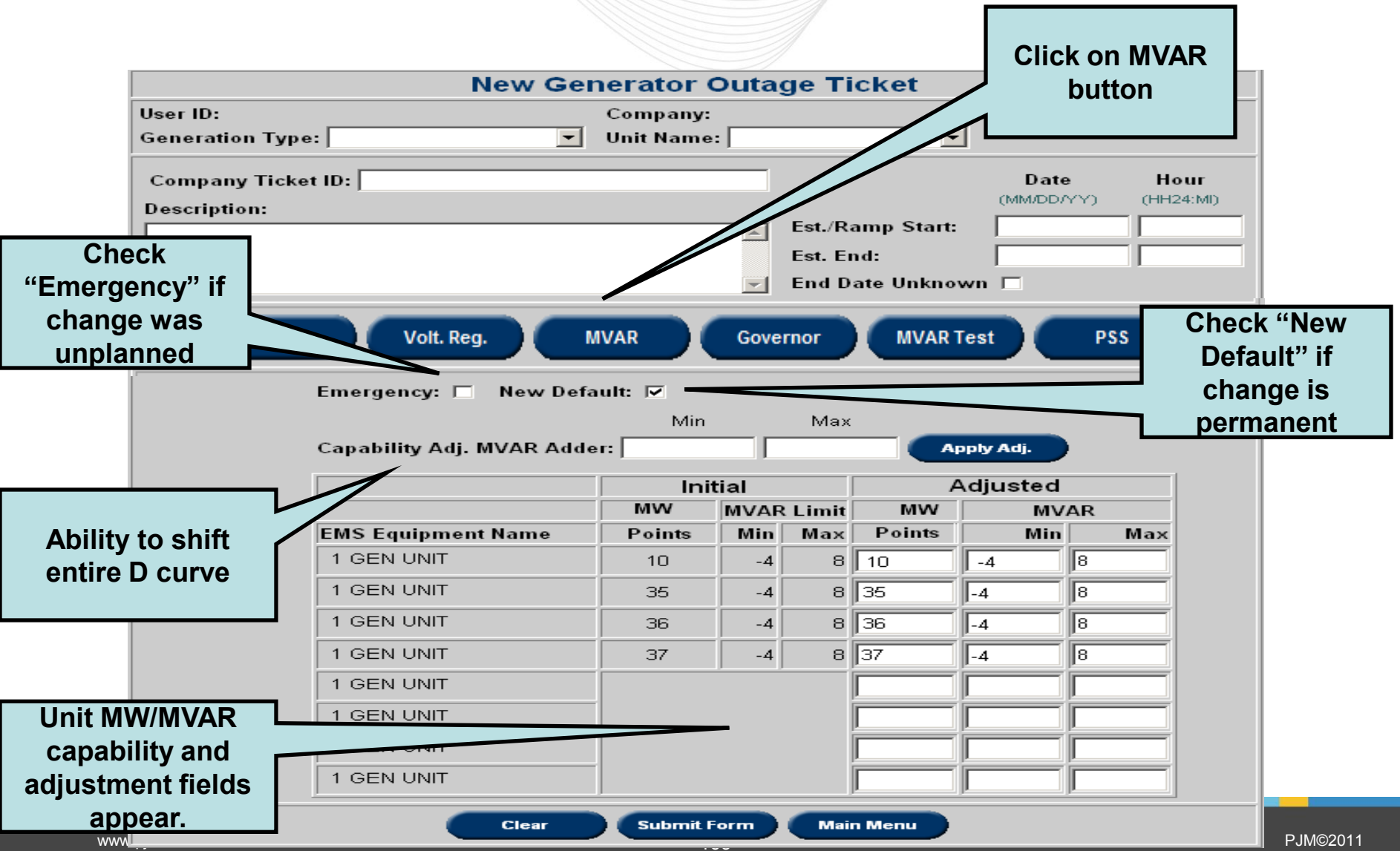
MVAR Adjustment



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Other Generation Reporting

- Generation Owners required to report through eDART
  - MW Outages (previously described)
  - Unit MVAR Capability changes (just described)
  - Voltage Regulator Outages
  - Unit Governor Outages
  - Power System Stabilizer
  - MVAR Testing Ticket

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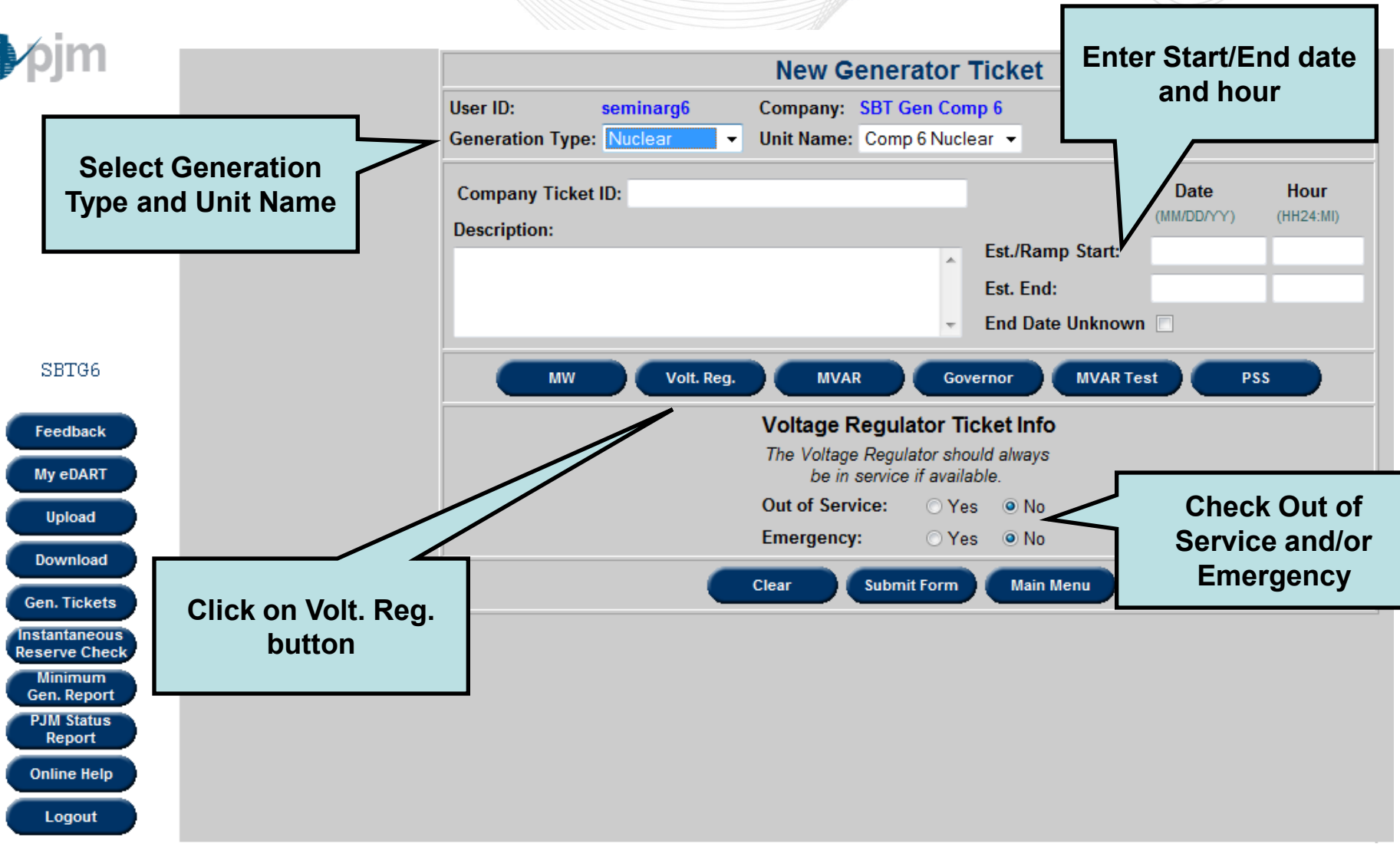
Voltage Regulator Ticket



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Other Generation Reporting

- Generation Owners required to report through eDART
  - MW Outages (previously described)
  - Unit MVAR Capability changes (previously described)
  - Voltage Regulator Outages (just described)
  - Unit Governor Outages
  - Power System Stabilizer
  - MVAR Testing Ticket

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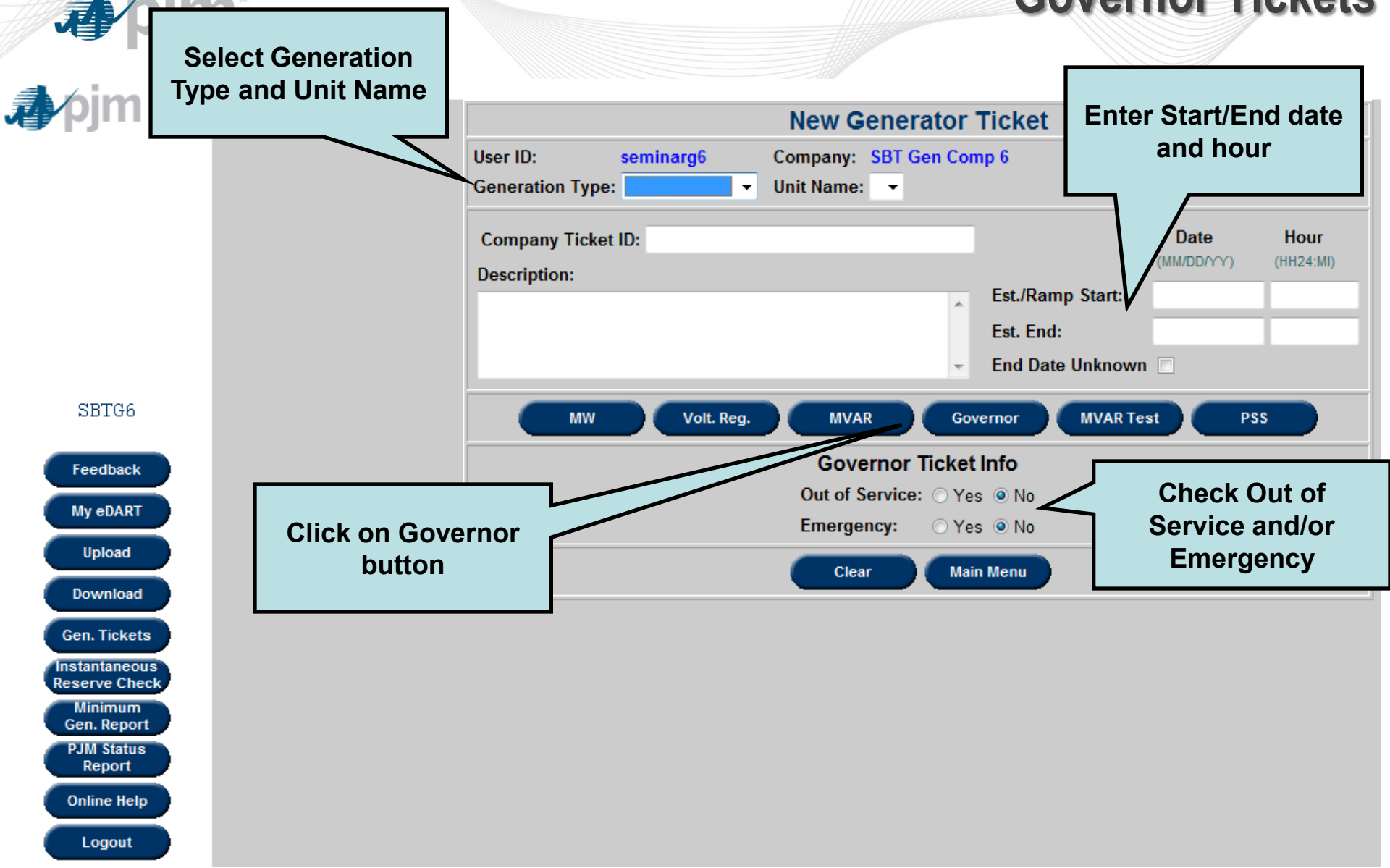
Governor Tickets



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Other Generation Reporting

- Generation Owners required to report through eDART
  - MW Outages (previously described)
  - Unit MVAR Capability changes (previously described)
  - Voltage Regulator Outages (just described)
  - Unit Governor Outages
  - Power System Stabilizer
  - MVAR Testing Ticket

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PSS Background

- Capture of PSS Outages NERC Requirement
- Currently in certain cases PJM notified over the phone
  - More audit ability necessary

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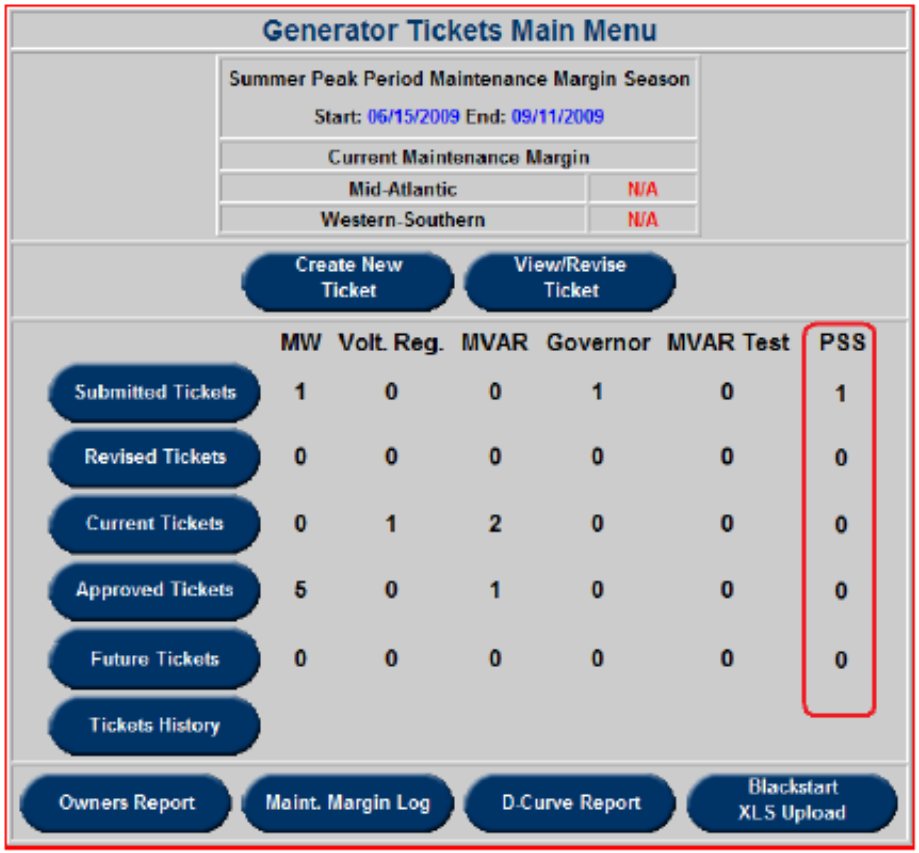
Solution



- New generator ticket type to be added called PSS
  - *Note: Only units with PSS will have ability to enter tickets of this type.*
- A new column will be added to the ticket counts in the Generation Menu for PSS tickets.

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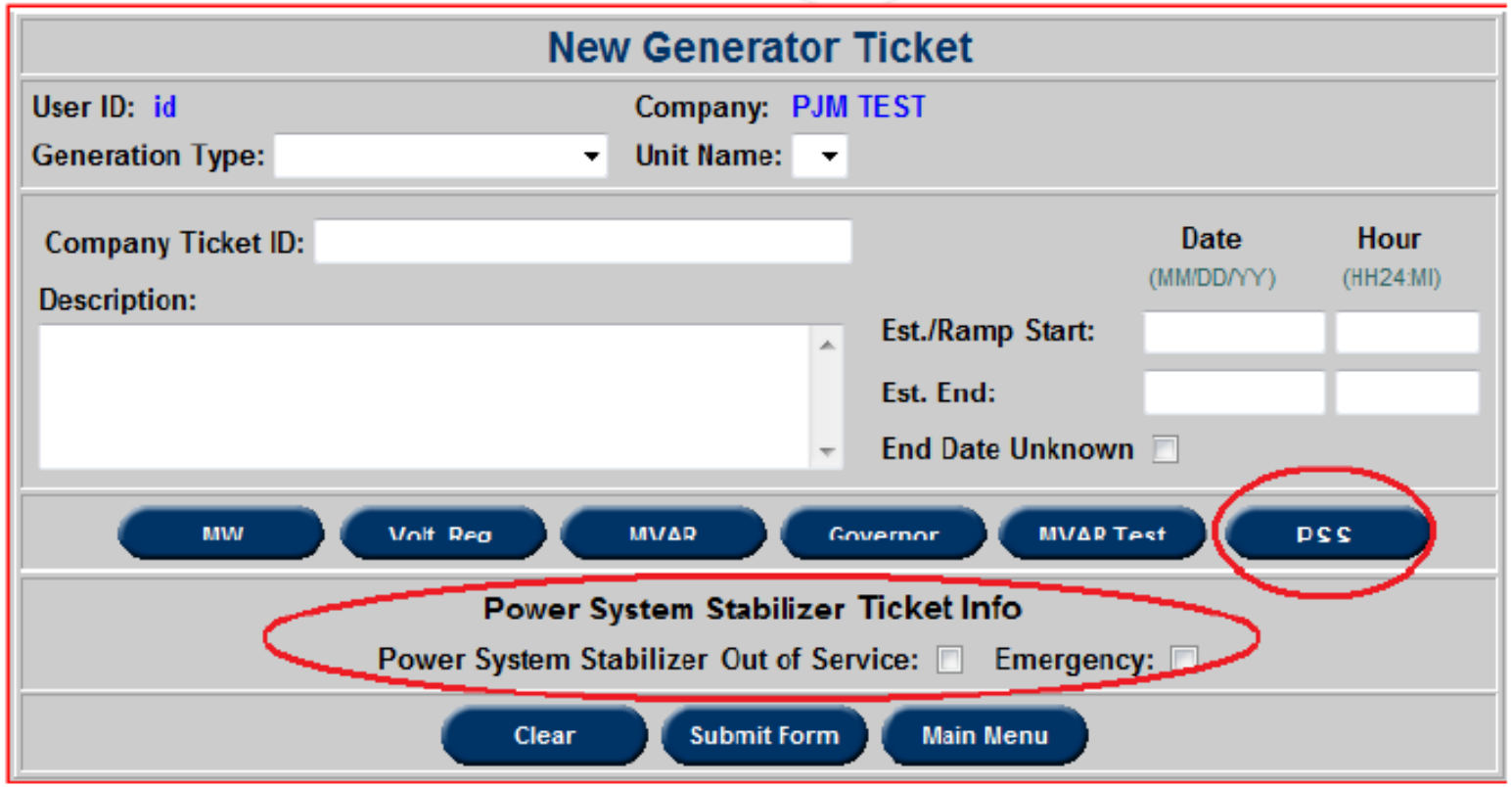
eDART PSS Ticket



- New PSS Outage ticket type similar to Governor Outage ticket type.
- Checkboxes available for Out of Service and Emergency.
- *Note: PSS button only available for units with PSS.*

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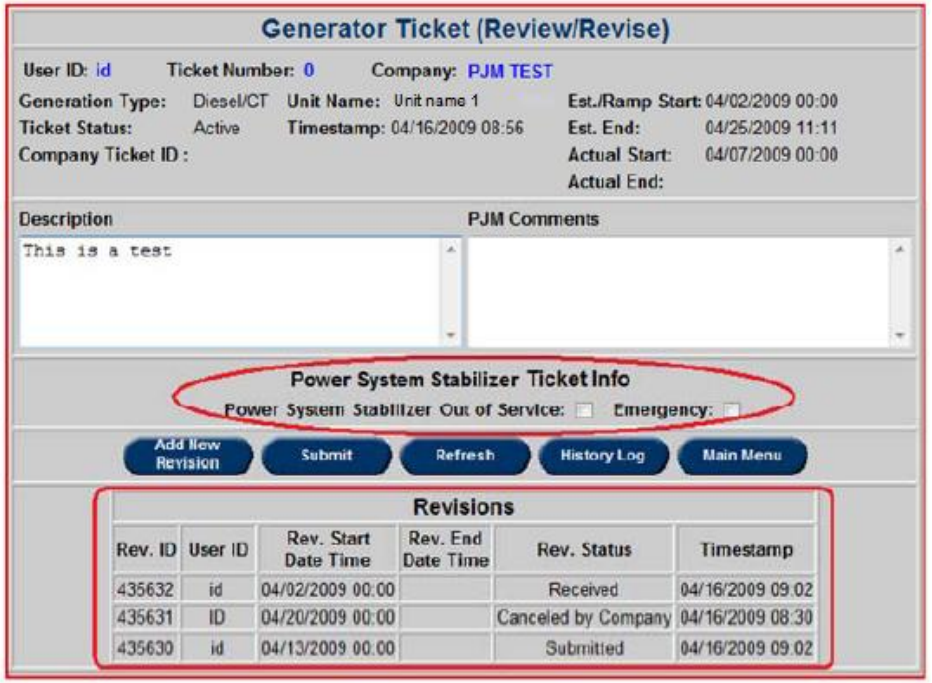
PSS Review and Revise



- PSS Outage revision ticket similar to Governer Outage revision ticket.
- Same date revision and log availability as Governer Outage revision ticket.

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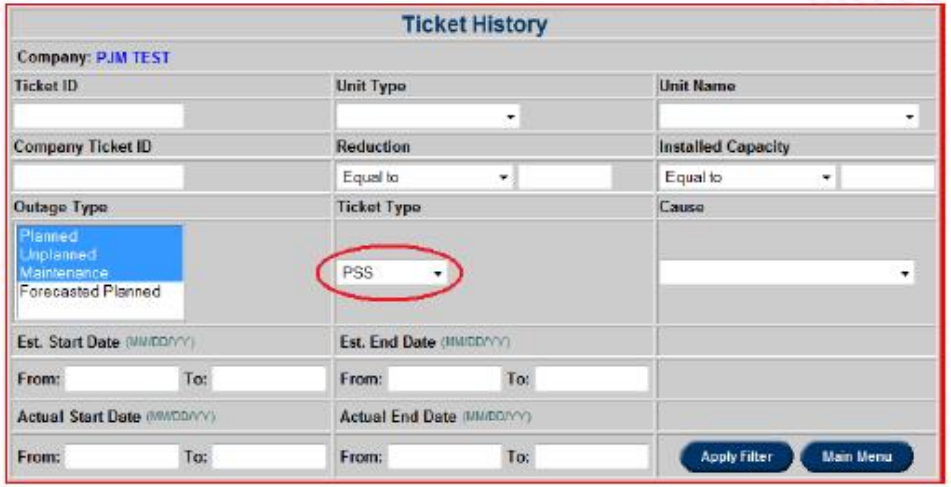
Report Filtering



- PSS ticket type to be added to all ticket type report filters.
- Report data display to be similar to Governor Outage ticket type.

Ticket History

Apply Filter | Go to Filter

Ticket ID	Comp. Ticket ID	Unit Name	Emergency	PSS Out of Service	Est. Start Date/Time	Est. End Date/Time	Actual Start Date/Time	Actual End Date/Time	Status
294258	mw volt. test1	Unit XXXXXX	No	No	01/05/2009 12:00	02/05/2009 12:00	11/02/2008 00:00		Active
294259	mw volt test2	Unit YYYYYY	No	Yes	01/05/2009 12:00	02/05/2009 12:00			Canceled by PJM
294290		Unit ZZZZZZZ	No	No	04/02/2009 00:00	04/25/2009 11:11	04/07/2009 00:00		Active
294291	VoltReg Test	Unit 1111111	No	Yes	04/20/2009 00:00	04/25/2009 11:11	04/14/2009 00:00		Active
294292	VoltReg Test2	Unit 222222	No	No	04/20/2009 01:23	05/20/2009 01:23			Canceled by PJM

Back

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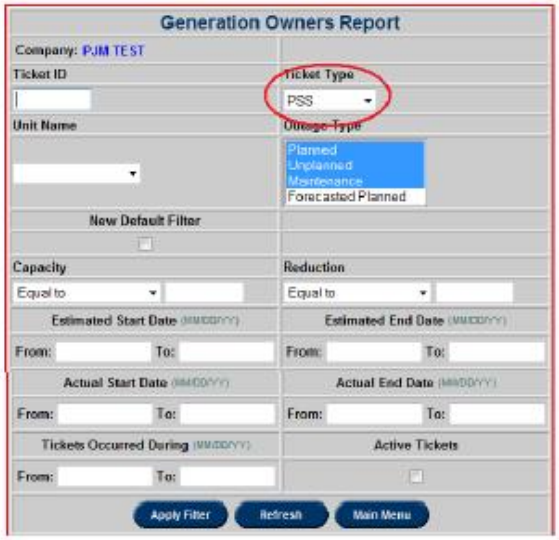
Report Filtering



- This includes the Generator and Transmission Owners Reports.

Generation Owners Report

This report does not automatically contain Forecast Planning Tickets. If you want to include them, please change your selection by clicking Go to Filter.

Apply Filter | Go to Filter

Ticket ID	Comp. Ticket ID	Unit Name	Emergency	PSS Out of Service	Est. Start Date/Time	Est. End Date/Time	Actual Start Date/Time	Actual End Date/Time	Status
32981		Unit 1	No	No	12/12/2005 12:00	12/12/2007 12:00			Canceled by Company

Back

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D-Curve Report

D-Curve Report

Unit Name	Unit Type	Installed Capacity	Voltage Control Philosophy	Metered MVAR Value	Power System Stabilizer	EMS Equipment Name	MW Point	MVAR Min	MVAR Max
Unit 1	Diesel/CT	34	TBD	TBD	No	OYSTERCR FR 1 GEN UNIT	10	-4	-4
						OYSTERCR FR 1 GEN UNIT	35	-4	-4
						OYSTERCR FR 1 GEN UNIT	36	-4	-4
						OYSTERCR FR 1 GEN UNIT	37	-4	-4
						OYSTERCR FR 1 GEN UNIT	38	-4	-4
						OYSTERCR FR 1 GEN UNIT	39	-4	-4
						OYSTERCR FR 1 GEN UNIT	40	-4	-4
						OYSTERCR FR 1 GEN UNIT	41	-4	-4
Unit 1	Diesel/CT	32	TBD	TBD	Yes	OYSTERCR FR 2 GEN UNIT	10	-4	-4
						OYSTERCR FR 2 GEN UNIT	35	-4	-4
						OYSTERCR FR 2 GEN UNIT	36	-4	-4
						OYSTERCR FR 2 GEN UNIT	37	-4	-4
						OYSTERCR FR 2 GEN UNIT	38	-4	-4
						OYSTERCR FR 2 GEN UNIT	39	-4	-4
						OYSTERCR FR 2 GEN UNIT	40	-4	-4
						OYSTERCR FR 2 GEN UNIT	41	-4	-4

Back

- Identification of units having Power System Stabilizer will be added to both the generator and transmission versions of the D-Curve Report.

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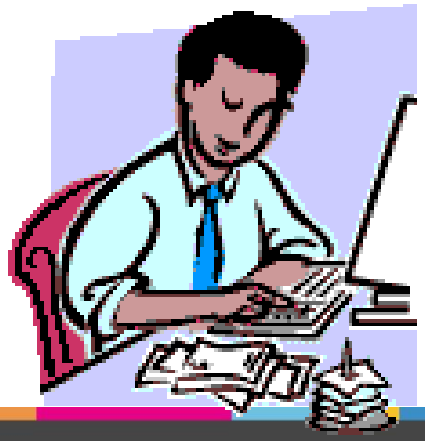
Other Generation Reporting

- Generation Owners required to report through eDART:
  - MW Outages (previously described)
  - Unit MVAR Capability changes (previously described)
  - Voltage Regulator Outages (previously described)
  - Unit Governor Outages (just described)
  - MVAR Testing Ticket



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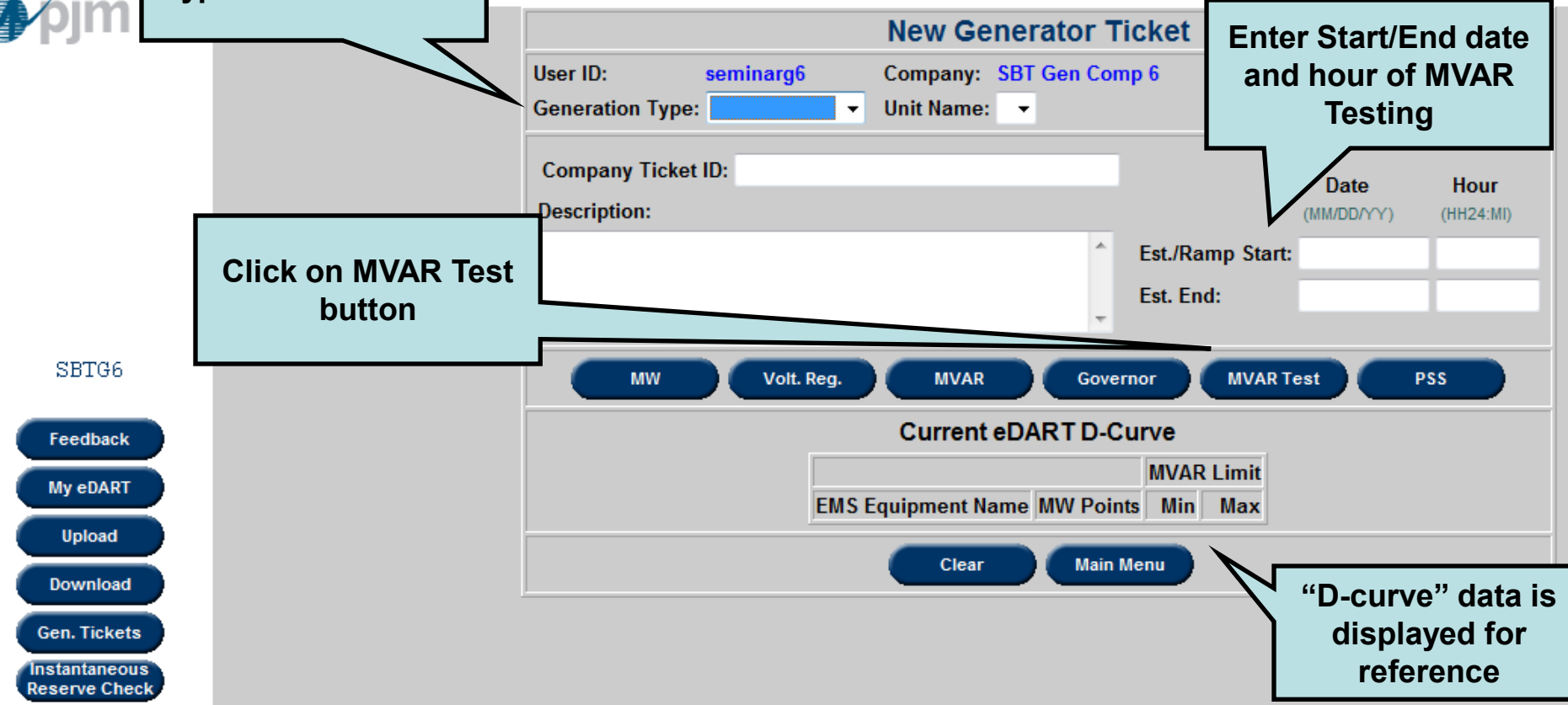
MVAR Testing Tickets

Select Generation Type and Unit Name

Enter Start/End date and hour of MVAR Testing

Click on MVAR Test button



"D-curve" data is displayed for reference

Changes to MVAR Capability as result of test must be submitted through a MVAR ticket (previously described.

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Agenda

- eDart
  - General Overview
  - How to Create a New Generation Outage Ticket
  - View, Revise, Cancel Generator Outage Ticket
  - Other Required Generation Unit Information Reporting Through eDART
  - eDart Generation Report
  - Updates to eDART

Generator Outage Tickets Reports

Click on Submitted Tickets

SBTG6

- Feedback
- My eDART
- Upload
- Download
- Gen. Tickets
- Instantaneous Reserve Check
- Minimum Gen. Report
- PJM Status Report
- Online Help
- Logout

Generator Tickets Main Menu

Summer Peak Period Maintenance Margin Season

Start: 06/13/2011 End: 09/09/2011

Current Maintenance Margin	
Mid-Atlantic	N/A
Western-Southern	N/A

Create New Ticket | View/Revise Ticket

	MW	Volt. Reg.	MVAR	Governor	MVAR Test	PSS
Submitted Tickets	0	0	0	0	0	0
Revised Tickets	0	0	0	0	0	0
Current Tickets	0	0	0	0	0	0
Approved Tickets	0	0	0	0	0	0
Future Tickets	0	0	0	0	0	0

Tickets History

Owners Report | Maint. Margin Log | D-Curve Report

Blackstart XLS Upload | Blackstart File Download

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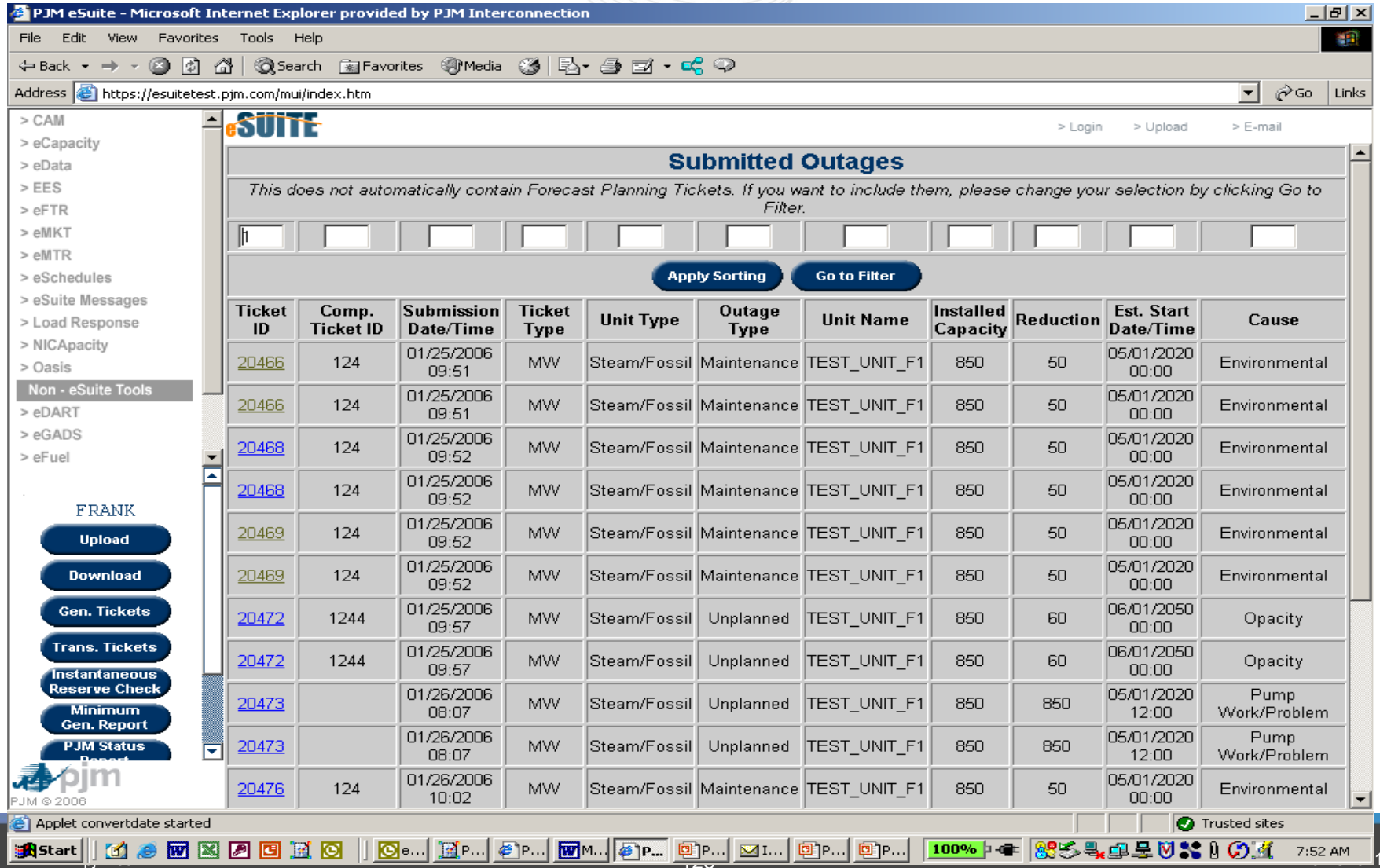
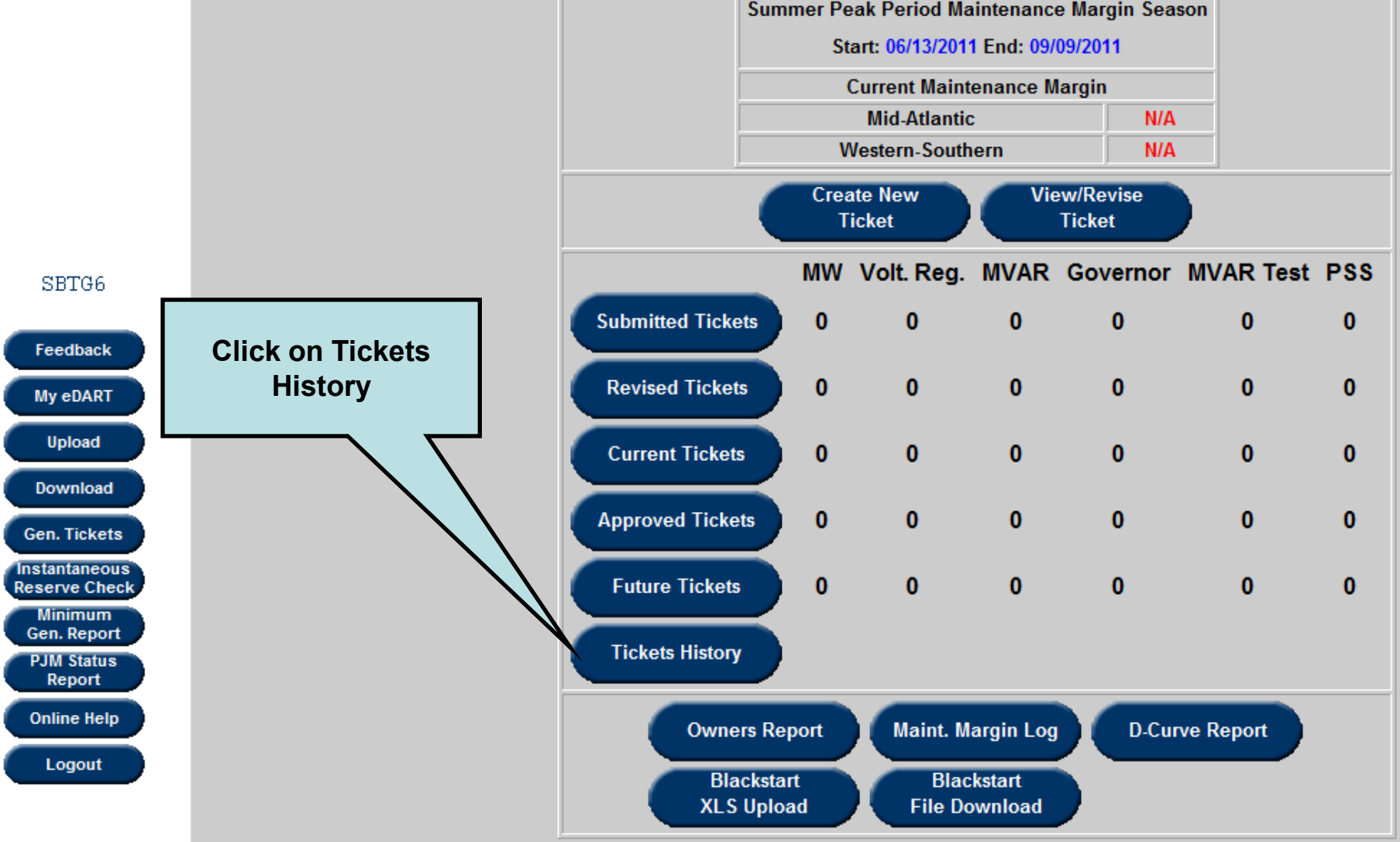
Generator Outage Ticket Report Filters

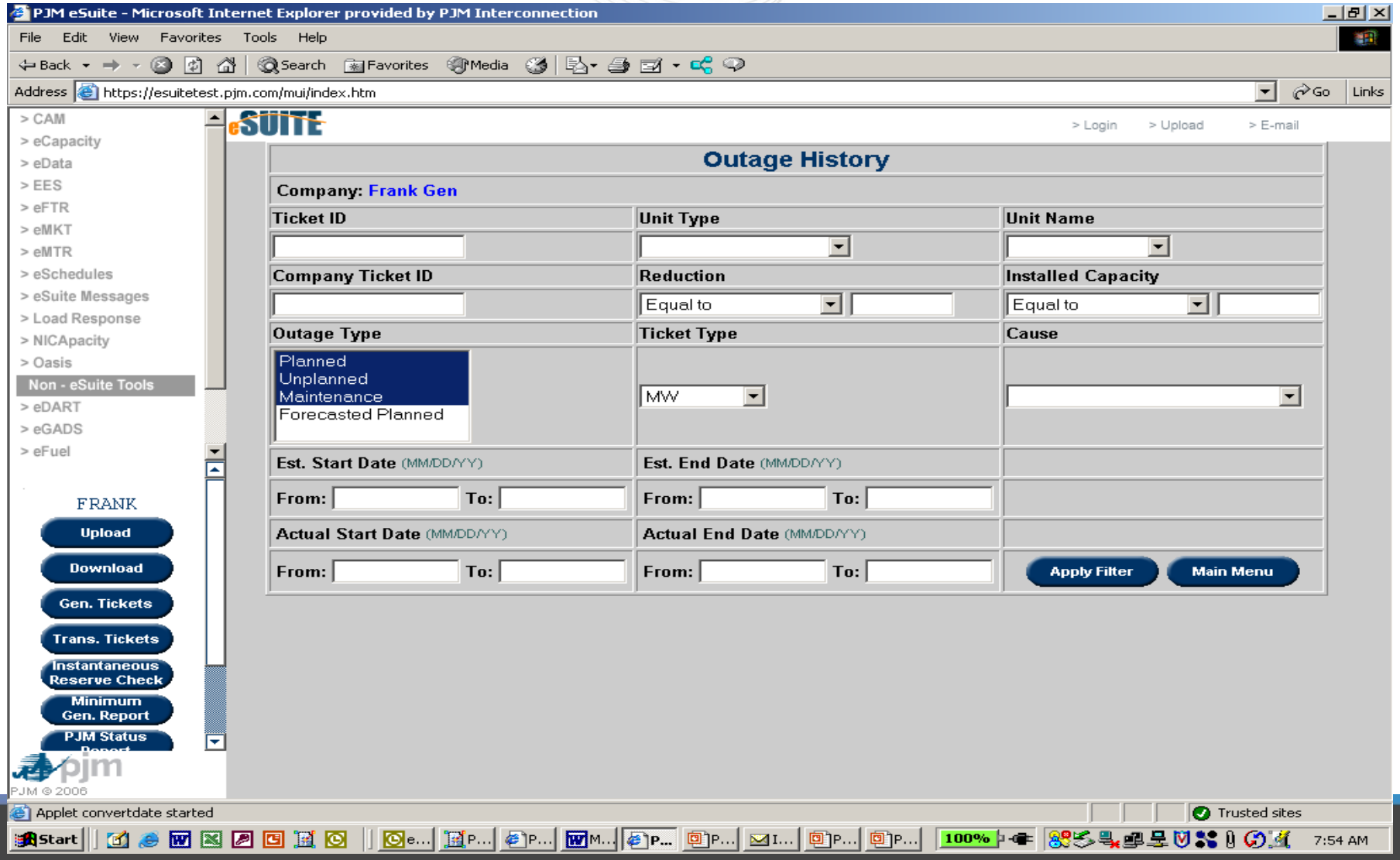


Ticket ID	Comp. Ticket ID	Submission Date/Time	Ticket Type	Unit Type	Outage Type	Unit Name	Installed Capacity	Reduction	Est. Start Date/Time	Cause
20466	124	01/25/2006 09:51	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20466	124	01/25/2006 09:51	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20468	124	01/25/2006 09:52	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20468	124	01/25/2006 09:52	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20469	124	01/25/2006 09:52	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20469	124	01/25/2006 09:52	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental
20472	1244	01/25/2006 09:57	MW	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	60	06/01/2050 00:00	Opacity
20472	1244	01/25/2006 09:57	MW	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	60	06/01/2050 00:00	Opacity
20473		01/26/2006 08:07	MW	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	850	05/01/2020 12:00	Pump Work/Problem
20473		01/26/2006 08:07	MW	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	850	05/01/2020 12:00	Pump Work/Problem
20476	124	01/26/2006 10:02	MW	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	Environmental

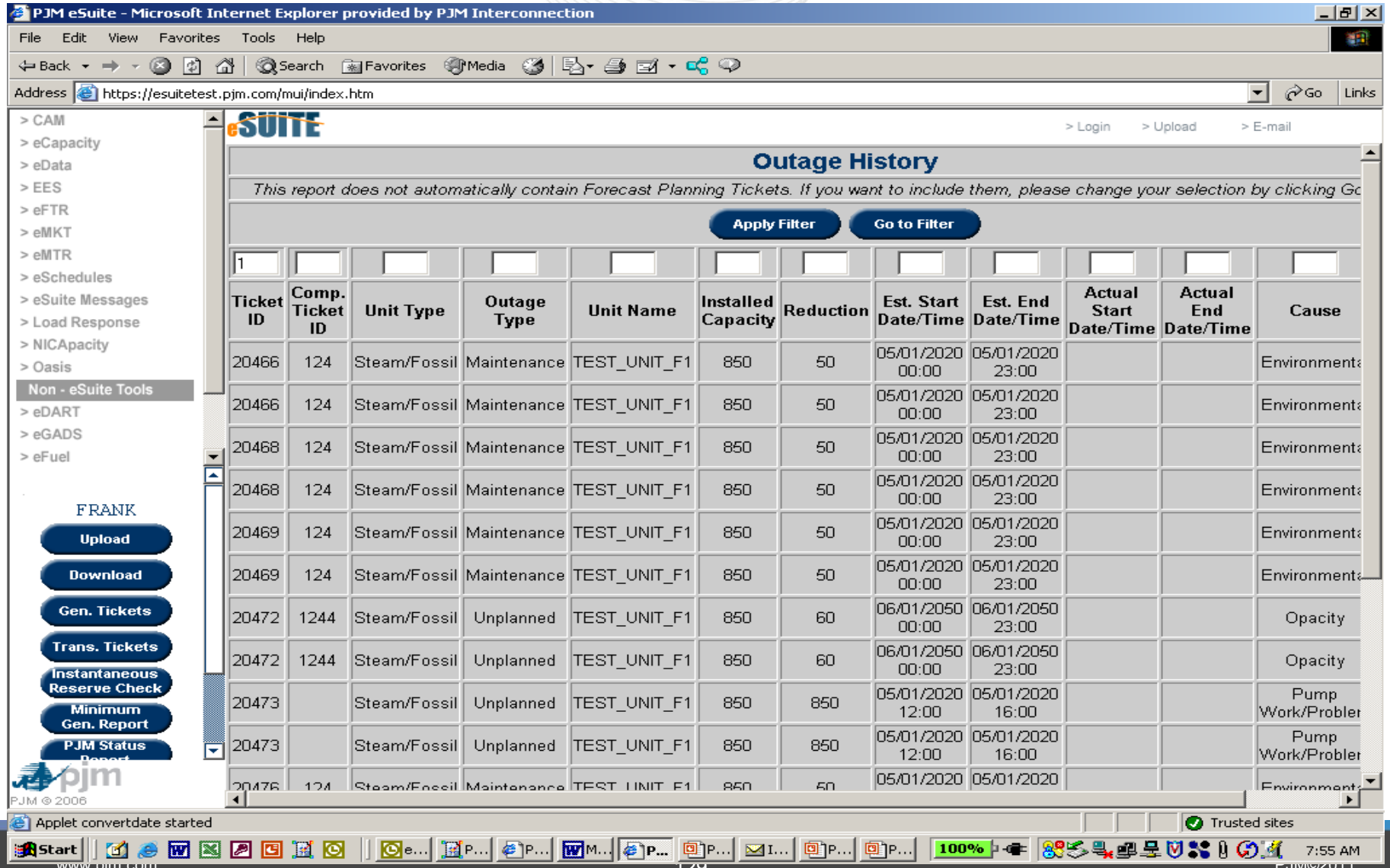
Outage History Report



Generator Outage Ticket History Report Filter

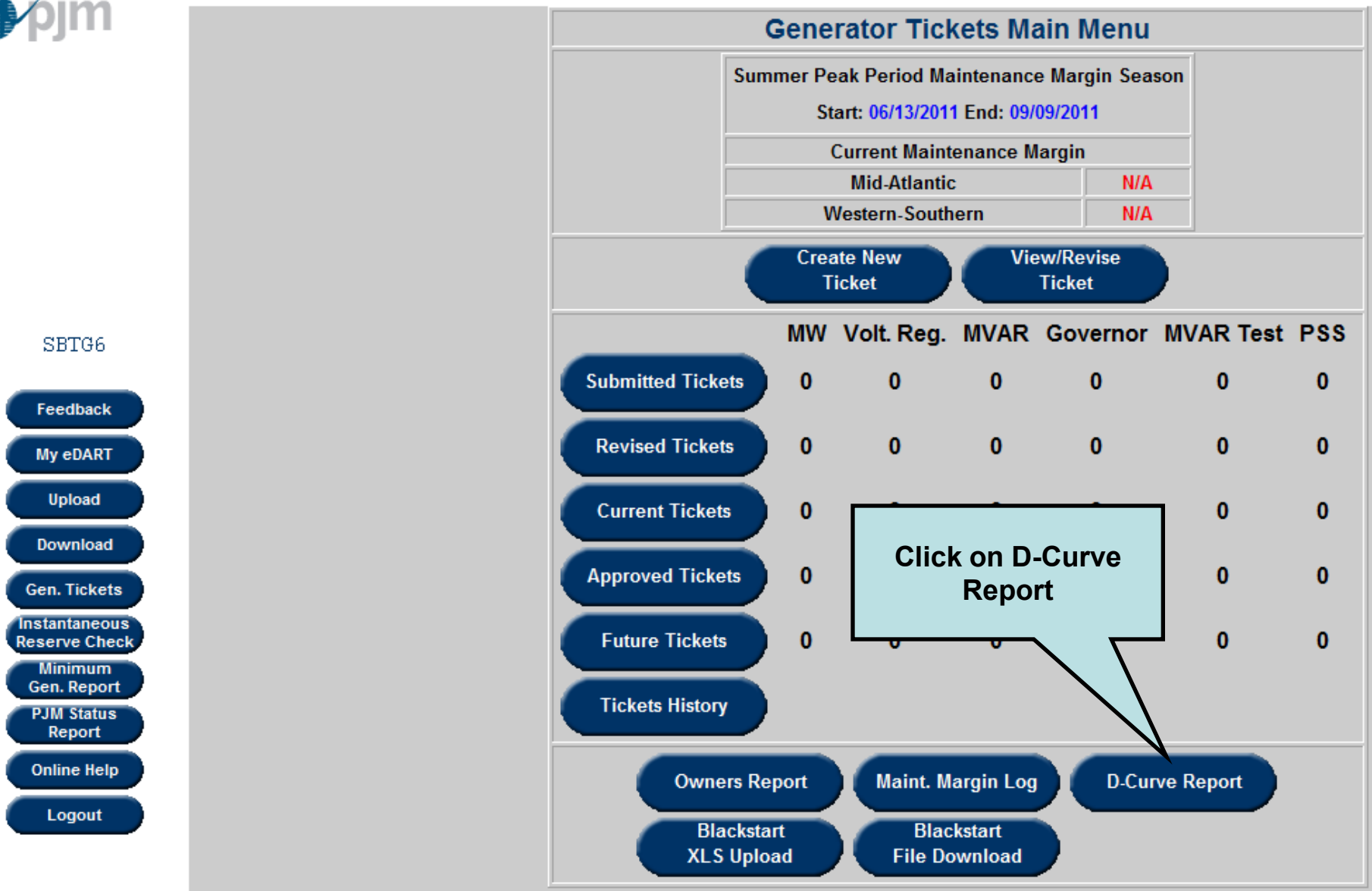


Generator Outage Ticket History - MW Report

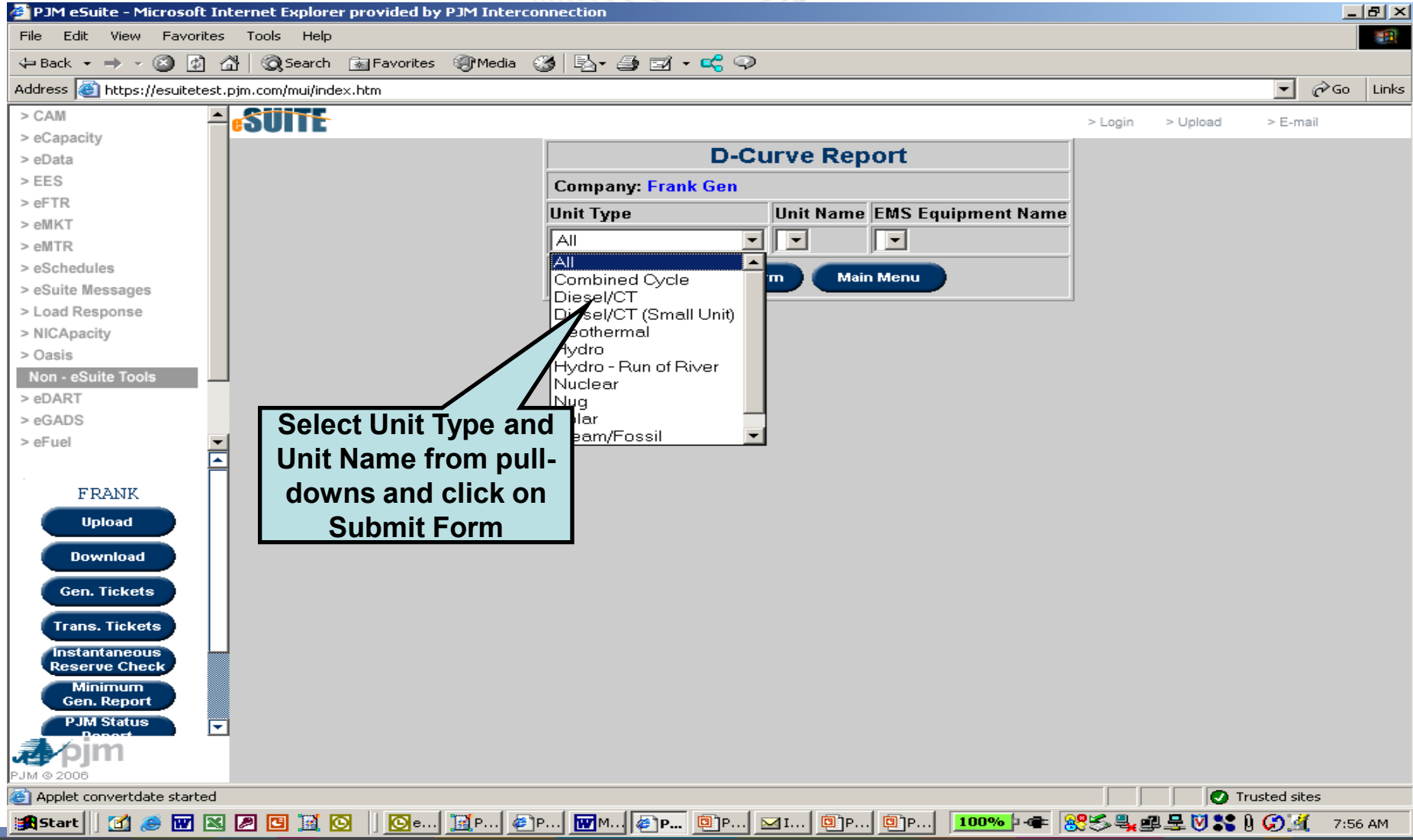


Ticket ID	Comp. Ticket ID	Unit Type	Outage Type	Unit Name	Installed Capacity	Reduction	Est. Start Date/Time	Est. End Date/Time	Actual Start Date/Time	Actual End Date/Time	Cause
20466	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20466	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20468	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20468	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20469	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20469	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020 00:00	05/01/2020 23:00			Environmenta
20472	1244	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	60	06/01/2050 00:00	06/01/2050 23:00			Opacity
20472	1244	Steam/Fossil	Unplanned	TEST_UNIT_F1	850	60	06/01/2050 00:00	06/01/2050 23:00			Opacity
20473		Steam/Fossil	Unplanned	TEST_UNIT_F1	850	850	05/01/2020 12:00	05/01/2020 16:00			Pump Work/Proble
20473		Steam/Fossil	Unplanned	TEST_UNIT_F1	850	850	05/01/2020 12:00	05/01/2020 16:00			Pump Work/Proble
20476	124	Steam/Fossil	Maintenance	TEST_UNIT_F1	850	50	05/01/2020	05/01/2020			Environmenta

D-Curve Report



D-Curve Report Filter



Agenda

- eDart
  - General Overview
  - How to Create a New Generation Outage Ticket
  - View, Revise, Cancel Generator Outage Ticket
  - Other Required Generation Unit Information Reporting Through eDART
  - eDart Generation Report
  - Updates to eDART

D-Curve Report Acknowledgement Process

- This process was added to coordinate the overall review of the Reactive Capability Curves in order to keep all Generation Operators, Transmission Operators and PJM Dispatch in sync with the reactive capability of the system

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D-Curve Report Acknowledgement Process

- Automated process for coordination of bi-annual D-Curve Review Process
- When a Generation Operator is asked to review capability curves, a notification message will be posted to the log-in screen labeled, “Application Message”
- Generation Operators will update D-Curve information in their systems
- D-Curve button will change to RED on the Generation Menu and remain so until company completes the review process by updating the information in their system

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D-Curve Report Acknowledgement Process

- Once the information is entered for all units, the Generation Operator can acknowledge the report by clicking the “Acknowledge” button on the D-Curve Report
- The D-Curve button will then return to its BLUE color

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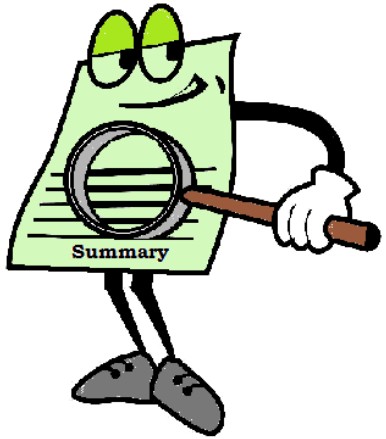
Summary

- Generator Outage Types
  - Forecasted Planned, Maintenance, Unplanned
- Reporting methods for outages
  - eDART, eMKT, eGADS, Verbal
- eDART Functionality
  - MW Outages, MVAR Capability changes, Voltage Regulator Outages, Governor Outages, MVAR Testing



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PJM Contacts

- MW Tickets
  - 610-666-8809 (PJM)
- MVAR and VR Tickets
  - 610-666-8808 (PJM)
- Governor Tickets - 610-666-8924
- Technical Support - 610-666-8886

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