

Outage Types and Entering Tickets

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- Students will be able to:
- Describe the outage reporting process and requirements



- eDART stands for Dispatcher Applications and Reporting Tool
- The eDART application provides communications with PJM Generation Operators regarding:
 - Unit outage requests
 - Updates to reactive capability curves (D-curves)
- Voltage regulator statuses among other generation and transmission functionalities





- PJM Members can request outages via the Gen.
 Ticket eDART tool
 - All outage requests are analyzed together, and PJM only rejects outage requests when they affect the reliability of the PJM RTO
 - It is the responsibility of each PJM Member to determine its own best outage schedule
 - Outage requests are honored by PJM on a first-come first-serve basis





- Where a user is required to give PJM verbal notification, the following PJM personnel should be contacted:
- Master Coordinator
 - All Outages
 - Clearing of Outage Tickets
- Generation Dispatcher
 - Outages of units on-line or scheduled to come on-line
- Generation Outages fall into the following categories:
- Forecasted Planned/ Planned
- Maintenance
- Unplanned



- The initial Planned outage request has to be submitted to PJM no later than 30 days prior to the Operating Day.
- If the Planned outage start date is greater than 31 days in the future, it is classified as a "Forecasted Planned" outage.
- Revisions to Forecasted Planned outage start/end dates and reductions can be submitted via eDART without PJM support.
- Every evening the eDART system will automatically change the status of all "Forecasted Planned" outages due to start in less than 31 days to "Planned" outages.



- Revisions to Planned outage reductions can be submitted in eDART without PJM support. Revisions to start early or end later requires PJM support.
- The approval process involves checking for conditions such as violation of Black Start power failure solution and Reliability scenarios, availability of adequate reserves and whether the outage is scheduled during the Peak Period Maintenance season, which occurs from the 24th Wednesday of the calendar year through the 36th Wednesday of the same year.



- A Planned outage is in Black Start Scenario violation if a station already has an outage for a critical Black Start unit during the same period. Some transmission zones may have other specific outage requirements that will be verified to prevent Black Start Scenario violations.
- If the request is denied, members re-evaluate their Planned outage schedule and submit a new outage request. This process is repeated until the request submitted is acceptable.
- PJM may withdraw its approval for a Planned outage by notifying members at least 24 hours in advance in order to ensure the adequacy of reserves or the reliability of the PJM RTO.



 Once a Planned Outage is active, it can be extended to complete the original scope of work. The M-10 rules allow GOs to request extensions via eDART if done greater than 48 hours before the original end date/time. Once within 48 hours of end, PJM assistance is required to extend the outage.



Maintenance Outages

- Maintenance outages may occur throughout the year, have flexible start dates, are much shorter than Planned outages, and have a predetermined duration established at the start of the outage.
- A Maintenance outage is an outage that may be deferred beyond the next weekend. In other words, it is an outage that can be postponed to the following Monday morning (0800 hrs).

*Peak Period Maintenance (PPM) shall be defined as those weeks containing the 24th through the 36th Wednesdays of a calendar year. Each such week shall begin on a Monday and end on the following Sunday, except for the week containing the 36th Wednesday, which shall end on the following Friday.



Maintenance Outages

- The duration of a Maintenance outage is generally unlimited except during the PJM Peak Period Maintenance *(PPM) Season during which approved Maintenance outages will be limited to a maximum duration of 9 consecutive days, 5 weekdays plus the included weekends. The Weekend Period is defined from Friday at 2200 hrs to Monday at 0800 hrs.
- A Maintenance Outage Extension is an extension beyond the originally estimated completion date which can only be used in instances when the original scope of work requires more time to complete than originally scheduled and not when unexpected problems or delays are encountered. The request for a Maintenance outage Extension must be submitted before the original end date.



Maintenance Outages

- If a Maintenance outage is extended beyond 9 days in PPM season, it becomes an "Unplanned" outage.
- If a company requests a Maintenance outage during the Peak Period Maintenance Season, and PJM denies the outage, and the company decides to take the outage anyway, the company has the option to enter the outage as an "Unplanned outage".

Unplanned Outages

- In case of an Unplanned Outage, members are expected to do the following:
 - Advise PJM of the Unplanned Outage suffered or anticipated as promptly as possible, provide a verbal notification to the PJM Generation Dispatcher
 - Provide PJM with the expected date and time that the resource will be made available
 - Make and submit to PJM a record of the events and circumstances giving rise to the Unplanned outage using eDART
 - Cannot be submitted longer then 72 hours in advance
- An unplanned outage will also affect the EFORd



Forced Outage Rate Calculation

The Equivalent Demand Forced Outage Rate ("EFORD") shall be calculated as follows:

```
EFORD (%) = \{(ff * FOH + fp * EFPOH) / (SH + ff * FOH)\} * 100
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Where

ff = full outage factor fp =

partial outage factor

FOH = full forced outage hours

EFPOH = equivalent forced partial outage hours SH = service hours



M Value of Generation Resource

Calculated Based on Unforced Capacity (UCAP)



SUMMER

Installed Capacity (ICAP) Rating

For Example:

96 MW

=

100 MW

***** (1 - .04)

Unforced Capacity Value For Unit X = 96 MW

*EFORd = Equivalent Forced Outage Rate



Entering Tickets

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Creating a Generation Ticket

PJM Members can request outages via the Gen. Ticket eDART tool

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My eDART

Upload

Download

Gen. Tickets

Trans. Tickets

Instantaneous Reserve Check

Minimum Gen. Report

PJM Status Report

NERC Data

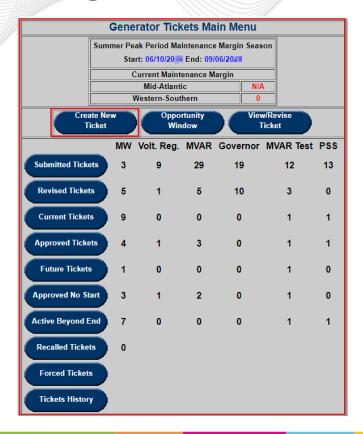
Online Help

Feedback



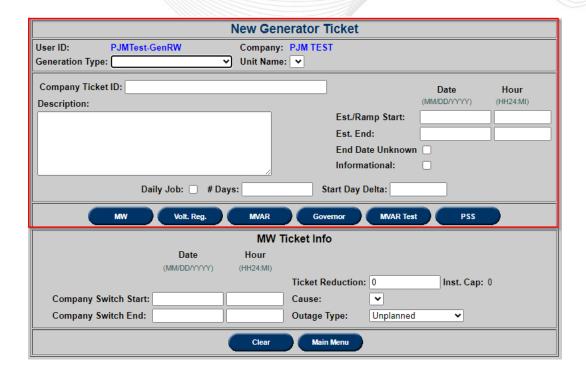
Creating a Generation Ticket

- Tickets can be created for 6 types of Generator outages:
 - Generator Megawatt (MW) Outages
 - Voltage Regulator Outages
 - MVAR Capability Changes
 - Governor Outages
 - MVAR Test
 - Power System Stabilizer (PSS)Outages





Creating a Generation Ticket





- The User and Company Fields are system generated tags identifying the ticket's submitter and which company the user represents
- Generation Type: The generation type includes the options Combined Cycle, Diesel/CT, Diesel/CT (small unit), Geothermal, Hydro, Hydro – pumped storage, Nuclear, Nug, Solar, Battery, Fossil/Steam and Wind and refers to the method of generation the unit uses



- Unit Name: Select unit from the drop-down menu based on the type already selected
- Company Ticket ID: Optional field for the company's internal application ticket number, the ticket's submitter should review their own company policy to see if they should utilize this field
- **Description:** Brief work description. In Unplanned outages and Emergency cases, this field should always provide information on the circumstance resulting in the outage



- Est. /Ramp Start: Proposed ticket start date and time. All times should be entered in MM/DD/YY and HH24:MI (or 24 hour "military" style time). Ramp Start times are designed mainly for larger units, which could take hours to come off line
- Est. End: Proposed ticket end date and time.
 Mandatory for "Forecasted Planned" and "Maintenance" outages
- End Date Unknown: Can only be selected for "Unplanned"
 MW outages, or for MVAR "New Default" tickets



Informational: Indicates that outage is "Info-only" (MW Reduction = 0)

Only valid for Maintenance outages

Daily Job: Check this box to designate whether a ticket will be a multiple day, multiple ticket outage

Days: Enter the total number of days of labor require for the job

Start Day Delta: Enter the number of days separating each day of labor. If the job will occur on consecutive days, enter "1"

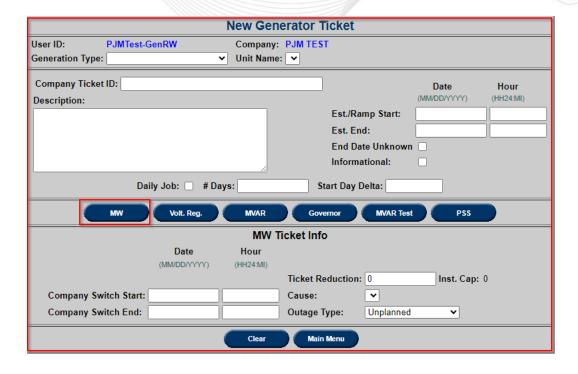


Outage Ticket Types

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Creating a MW (Real Power) Ticket





- Company Switch Start Date and Hour: Actual outage start date and time. Cannot be before the Est./Ramp Start time or 1 hours later than the Est./Ramp Start time
- Company Switch End Date and Hour: Actual outage End date and time. Must be entered no later than 1 hours after the Est. End time
- Ticket Reduction: MW Reduction value. Cannot be zero for non-Informational tickets. Can be negative only if the "Cause" is Ambient Air and the "Outage Type" is Maintenance
- Inst. Cap.: Installed capacity for the unit selected on the ticket
- Cause: Reason for outage. Cannot be "Not Applicable." If cause is "Other," it is necessary to provide more information in the Description
- Outage Type: Unplanned, Maintenance or Forecasted Planned



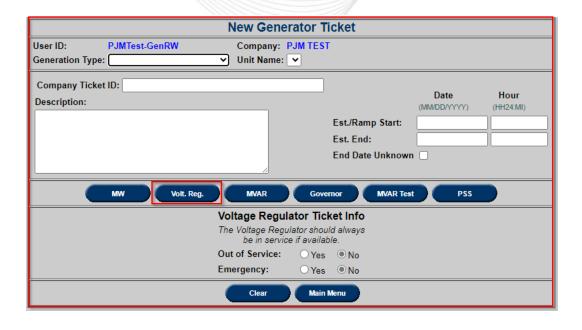
The following cause types are available for Generator MW tickets:

Voltage Regulator, MVAR, Governor, MVAR Test, and PSS tickets do not have a corresponding cause type

Cause ID Description					
-1	N/A	22	Fuel System	46	Tube Leak
1	Air Heater	23	General Maintenance	47	Turbine Repair
2	Annual Inspections	24	Ground Problem	48	Turning Gear
3	Annual Inspections/Refuel	25	Inspections	49	Unit Trip
4	Boiler Feed Pumps	26	Mill Problem	50	Unknown
5	Boiler Work	27	Mill Work	51	Vibrations
6	Breaker Problems	28	No Fuel	52	Water Chemistry
7	Breaker Work (Maintenance)	29	Opacity	53	Wicket Gate
8	Chemistry Problem	30	Other	54	Ambient Air (Ambient Conditions)
9	Clean Intakes	31	Precipitator	55	Brush Inspection
10	Coal Feeder	32	Pump Work/Problem	56	Deslag
11	Condenser System	33	Rampdown	60	Ambient Conditions (Auto App.)
12	Diver Safety	34	Rod Pattern Adjustments	61	Turbine Deposits
13	Electrical	35	Rod Swap	62	Intake Screens
14	Emissions	36	SCRAM Test	63	High Pressure Heaters
15	Engine Repair	37	Start Failure	64	Valve Test/Work
16	Engine Work	38	Substation/Yard	65	Cranking Diesel
17	Environmental	39	Testing	66	Black Start Auxiliary Equipment
18	Fan Problem	41	Transformer Problems	67	Cold Weather Preparation Exercise
19	Fan Work	42	Transformer Work	68	Black Start Testing
20	Feed Pump	44	Transmission Line	69	Emissions-CEJA
21	Fuel Problem	45	Transmission Problem		



Creating a Voltage Regulator Ticket





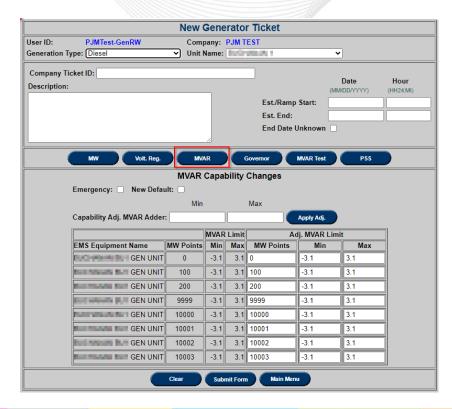
Voltage Regulator Ticket Fields

 Out of Service: Indicates if the Voltage Regulator is Out of Service

• Emergency: Indicates if it is an Emergency outage



Creating a MVAR (Reactive Power) Ticket







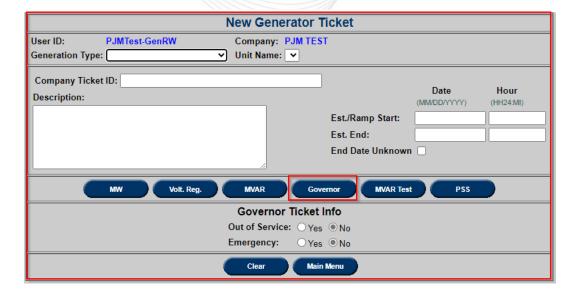
- **Emergency:** Indicates if it is an Emergency outage. Only applies if the change was unplanned
- New Default: Indicates that the change to the D-curve is permanent and will be used as the default going forward
- Capability Adj. MVAR Adder: Add or subtract a value from all entries at once rather than changing values individually to shift the entire D-curve
- Max: MVAR Max values should decrease or stay constant as MW Point value increases
- Min: MVAR Min values should increase or stay constant as MW Point value increases



- Apply Adj.: Apply adder value to MVAR values
- MVAR Limit: The Min and Max columns under MVAR Limit display the existing minimum and maximum values respectively
- Adjusted MVAR Limit: The MW points and the Min and Max columns under the Adjusted MVAR Limit field display the new values after the adder is applied



Creating a Governor Ticket





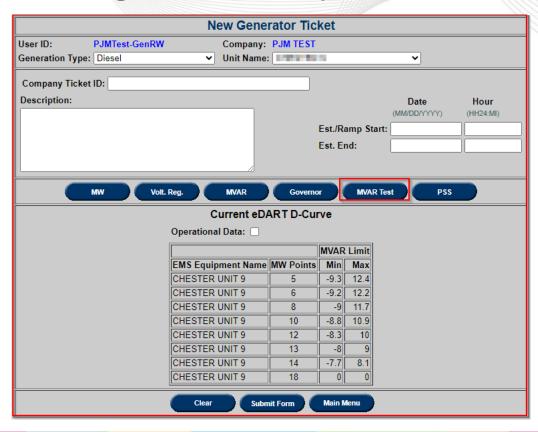


 Out of Service: Use this field to indicate if the governor is Out of Service

 Emergency: Use this field to indicate if it is an Emergency outage



Creating a MVAR Test (Reactive Power Test) Ticket



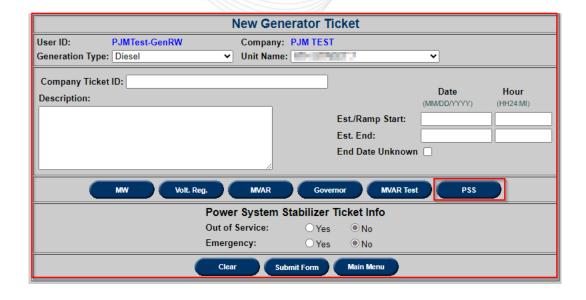




 Current eDART D-curve: This table displays the current D-Curve data for reference



Creating a Power System Stabilizer (PSS) Ticket





 Out of Service: Use this field to indicate if the PSS is Out of Service

• Emergency: Use this field to indicate if it is an Emergency outage

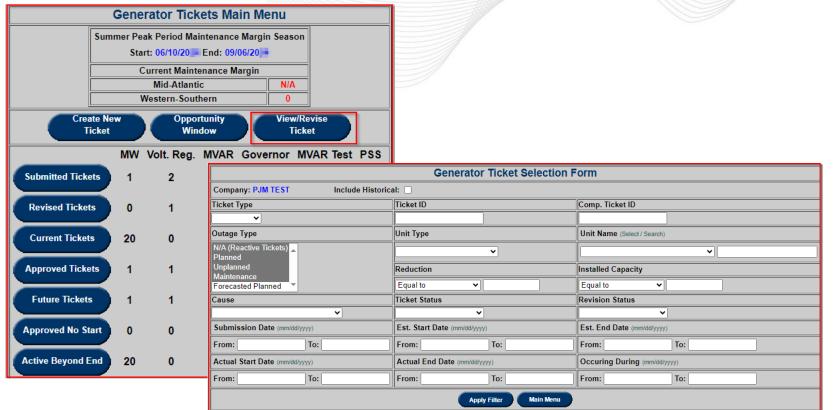


Revising Tickets and Ticket Status

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View/Revise a Generation Ticket



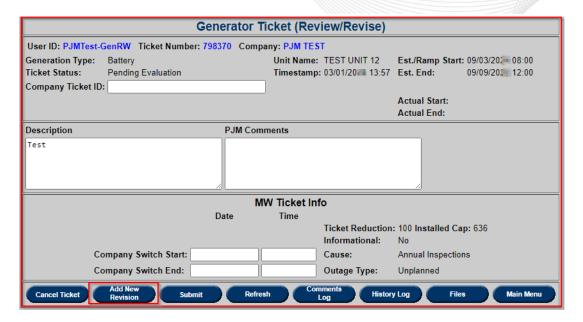


View/Revise a Generation Ticket

Generator Tickets									
Apply Sorting Back to Filter									
Ticket ID	Comp.Ticket ID	Ticket Type	Outage Type	Submittal Date	Unit Name	MW Reduction	Status		
1									
<u>796935</u>	pjm_testing_796935	MW	Planned	12/02/20	TEST UNIT 2	129	Active		
796939	pjm_testing_796939	MW	Unplanned	12/02/20	TEST UNIT 6	6	Active		
796942	pjm_testing_796942	MW	Unplanned	12/02/20	TEST UNIT 9	227	Active		
796943	pjm_testing_796943	MW	Unplanned	12/02/20	TEST UNIT 10	267	Active		
796944	pjm_testing_796944	MW	Unplanned	12/02/20	TEST UNIT 11	44	Active		
796946	pjm_testing_796946	MW	Unplanned	12/02/20	TEST UNIT 13	132	Active		
<u>796951</u>	pjm_testing_796951	MW	Unplanned	12/02/20	TEST UNIT 18	141	Active		
<u>796957</u>	pjm_testing_796957	MW	Maintenance	12/02/20	TEST UNIT 24	200	Active		
796959	pjm_testing_796959	MW	Maintenance	12/02/20	TEST UNIT 26	175	Active		
796967	pjm_testing_796967	MW	Maintenance	12/02/20	TEST UNIT 28	59	Active		
796972	pjm_testing_796972	MW	Maintenance	12/02/20	TEST UNIT 27	30	Active		
Back to Filter Main Menu									



View/Revising a MW (Real Power) Ticket







View/Revising a MW (Real Power) Ticket

Generator Ticket (Review/Revise)									
User ID: PJMTest-GenRW Ticket Number: 798370 Company: PJM TEST									
Generation Type: Battery	Unit Name	e: TEST UNIT 12 Est./Ramp Start: 03/11/20	08:00						
Ticket Status: Pending Evaluation	Timestam	p: 03/01/20 13:57 Est. End: 03/19/20	12:00						
Company Ticket ID:									
		Actual Start:							
		Actual End:							
Description PJM Comments									
Test									
	/								
MW Ticket Info									
	Date Time								
		Ticket Reduction: 100 Installed Cap: 636							
		Informational: No							
Company Switch Start:		Cause: Annual Inspections							
Company Switch End:		Outage Type: Unplanned							
Cancel Ticket Add New Submit Refresh Comments History Log Files Main Menu									
Cancel licket Revision Submit Relies Log Inistry Log Files Main Mettu									
Revisions									
Rev. ID User ID Rev. Start Date Time	Rev. End MW Date Time Reduction	Eff. Date Time Rev. Status Tim	nestamp						
436806 PJMTest-GenRW 03/11/20 08:00			20 14:05						
436805 PJMTest-GenRW 09/03/20 1 08:00		Canceled by Company 03/01/							

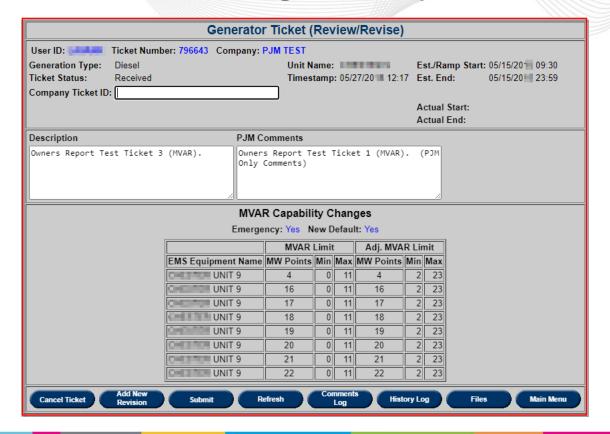


View/Revising a Voltage Regulator Ticket

Generator Ticket (Review/Revise)								
User ID: PJMTest-GenRW Ticket Number: 798369 Company: PJM TEST								
Generation Type:	Battery	Unit Name: TEST UNIT 20	Est./Ramp Start: 03/10/20 08:00					
Ticket Status:	Submitted	Timestamp: 03/01/20 13:30	Est. End: 03/12/20 11 12:00					
Company Ticket ID	:							
			Actual Start:					
			Actual End:					
Description PJM Comments								
Test	4		A					
Voltage Regulator Ticket Info								
The Voltage Regulator should always be in service if available.								
Out of Service: Yes Emergency: Yes								
Cancel Ticket Add New Revision Submit Refresh Log History Log Files Main Menu								



View/Revising a MVAR (Reactive Power) Ticket



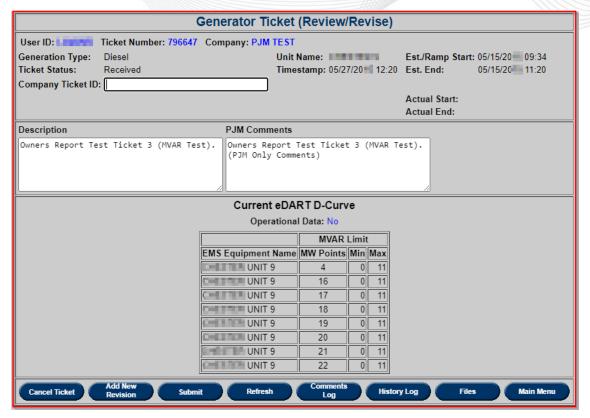


View/Revising a Governor Ticket



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View/Revising a Power System Stabilizer (PSS) Ticket





eDART Ticket Status

- Submitted: This is the original status of the ticket upon submittal
- Approved:
 - MW Ticket The ticket status is changed to Approved by PJM upon review and approval
- Reactive Ticket The ticket status is changed to Received by PJM upon receipt of this type of ticket by PJM PD. The status is displayed as Approved on the menu
- Active: The ticket status is changed to Active upon input of an actual outage "start" date by PJM
- Complete: The ticket status is changed to Complete upon input of an actual outage "end" date by PJM
- Initially Denied: does not mean outage is denied it means outage is under evaluation, in order to confirm reserve maintenance margins, and evaluate local reliability issues



• Denied:

- MW Ticket The ticket status is changed to Denied by PJM upon review and denial
- Reactive Ticket The ticket status cannot be changed to Denied
- Cancelled by Company: The ticket status is changed to Cancelled by Company if the company initiates cancellation of the ticket.

Note: A verbal notification to PJM is required if the change affects current or the next operating day

 Cancelled by PJM: The ticket status is changed to Cancelled by PJM if PJM initiates cancellation of the ticket. A verbal notification is given to the company



Questions?

PJM Client Management & Services

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Website: www.pjm.com



The Member Community is PJM's self-service portal for members to search for answers to their questions or to track and/or open cases with Client Management & Services