Voltage Limits

New eDART web-based functionality to allow Transmission Owners (TOs) to update and view current voltage limits on buses.

- Available via the TERM Main Menu.

- TOs submit changes to Voltage Limits: company defaults or per station/voltage combination with effective date.

- PJM approves changes to Voltage Limits.

- Tickets implemented in PJM's EMS by PJM or implemented without approval if limits already updated in PJM's EMS.

- Report for PJM & TOs to see effective voltage limits and PJM defaults.

- Initial Voltage Limits in eDART will be populated with data in PJM Manual 03.

- New stations will be assigned the company default limits as part of the model build.

- eDART Voltage Limits only includes companies and stations with PJM monitored equipment:
  - MP1: Reliability & Markets
  - MP2: Reliability BES
  - MP6: Reliability non-BES

- Company
  - Voltage Limits per Voltage level.
  - Company Voltage Limits will be applied to all Stations in the company per voltage level.
  - Station tickets can be created for exceptions.
  - Not needed if following PJM Defaults.
- Station
  - Voltage Limits per Station per Voltage level
  - Not needed if following Company defaults.

- Submitted
  - Ticket has been submitted to PJM
- Received
  - Acknowledgement that PJM received the ticket
  - Changes to Received ticket will result in status change to Submitted
- Approved
  - Ticket has been reviewed, accepted as valid & approved by PJM

- Implemented
  - Data from approved ticket has been reconciled in PJM EMS
  - Actual Start Date confirms that ticket is in use by EMS
- Implemented w/o Approval
  - Data from non-approved ticket has been reconciled in PJM EMS
  - Ticket was automatically generated based on PJM EMS data
  - Actual Start Date confirms that ticket is in use by PJM EMS
- Cancelled by Company/PJM Admin Closure
  - Ticket can be cancelled by PJM or TO for various reasons

- Restored

  – Station ticket status for restoring station limits to company limits

- Restored w/o approval

  – Station ticket status when station limits from PJM EMS matches company limits without ticket being approved.

- Completed

  – The ticket is completed due to a new implemented ticket

  – Actual End Date confirms that ticket is no longer in use by PJM EMS

- Retired
  - Ticket is for station that has been retired or company that is longer a part of Voltage Limits
  - PJM is no longer monitoring company or station
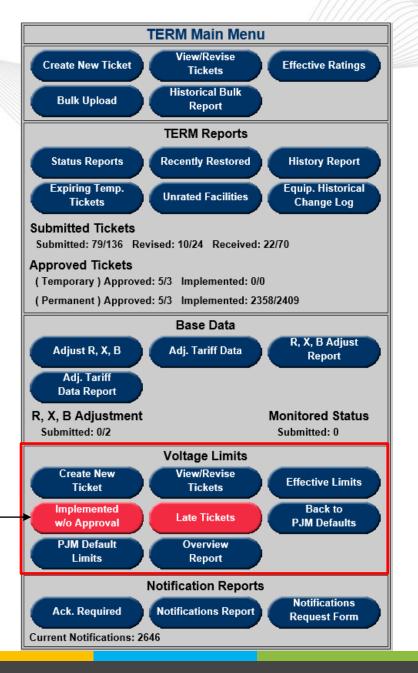
Yellow

- Indicates that Voltage Limit of current level is different from Voltage Limit of the next level up.

    – Company limit is different from PJM Default.

    – Station limit is different from Company default limit.

Red

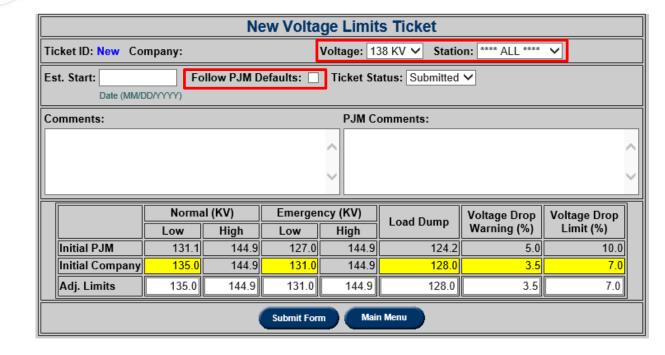- Indicates that Station Voltage Limit is different from Company default limit but the same as PJM Default.

Red buttons indicate attention required

- To create a company limits ticket, select Voltage and leave station as **** ALL ****.
  - Adj. limits is prepopulated with Initial Company limits; user can edit fields as needed

- To follow PJM defaults, check the Follow PJM Defaults box.

New Voltage Limits Ticket

Ticket ID: **New**   Company: Voltage: [138 KV ∨]   Station: [**** ALL **** ∨]

Est. Start: [   ]   Follow PJM Defaults: ☐   Ticket Status: [Submitted ∨]
Date (MM/DD/YYYY)

Comments: PJM Comments:

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop Warning (%)	Voltage Drop Limit (%)
	Low	High	Low	High			
Initial PJM	131.1	144.9	127.0	144.9	124.2	5.0	10.0
Initial Company	135.0	144.9	131.0	144.9	128.0	3.5	7.0
Adj. Limits	135.0	144.9	131.0	144.9	128.0	3.5	7.0

Submit Form   Main Menu

- To create a station limits ticket, select Voltage and station.
  - Adj. limits is prepopulated with Initial Station limit; user can edit fields as needed
- To follow Company Limits, check the Follow Company Limits box.

New Voltage Limits Ticket

Ticket ID: **New**   Company: Voltage: 138 KV   Station: 1811288

Est. Start: ____   Follow Company Limits: ☐   Ticket Status: Submitted
Date (MM/DD/YYYY)

Comments: PJM Comments:

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop Warning (%)	Voltage Drop Limit (%)
	Low	High	Low	High			
Initial PJM	131.1	144.9	127.0	144.9	124.2	5.0	10.0
Initial Company	135.0	144.9	131.0	144.9	128.0	3.5	7.0
Initial Station	135.0	144.9	131.0	144.9	128.0	3.5	7.0
Adj. Limits	135.0	144.9	131.0	144.9	128.0	3.5	7.0

Submit Form   Main Menu

Voltage Limits View/Revise Reports Filter

Company	Voltage	Station	Voltage Limits Type
	[▾]	[▾]	[▾]

Ticket Status	Current/Historical	Revert to PJM / Company Level Only	Late Only
Approved Cancelled by Company Completed Denied Implemented Implemented w/o Approval PJM Admin Closure Received Restored Restored w/o Approval Retired	⦿ Current ○ Historical ○ Both Ticket ID: [ ]	☐	☐

Tickets Occurring (mm/dd/yyyy)	Start Date (mm/dd/yyyy)	End Date (mm/dd/yyyy)	Limit Details
From: [ ] To: [ ]	From: [ ] To: [ ]	From: [ ] To: [ ]	⦿ Adj. ○ Adj. + Initial ○ Adj. + Initial + Curr.

Apply Filter **Refresh** **Main Menu**
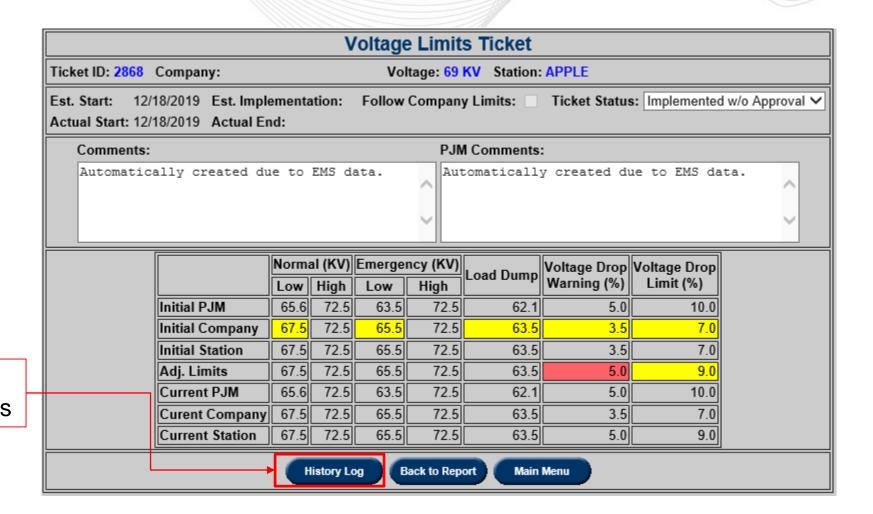
Select how much details will be displayed

Voltage Limits View/Revise

Ticket ID	Company	Voltage	Station	Voltage Limits Type	Status	Revert to PJM or Company level	Est. Start	Act. Start	Act. End	Limits						

Ticket 2816

2816		69 KV		Company	Implemented	No	12/13/2019	12/13/2019			Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
											Low	High	Low	High			
										PJM Default Initial	65.6	72.5	63.5	72.5	62.1	5.0	10.0
										Company Initial	65.6	72.5	63.5	72.5	62.1	5.0	10.0
										Adj.	67.5	72.5	65.5	72.5	63.5	3.5	7.0

Ticket 2868

2868		69 KV	APPLE	Station	Implemented w/o Approval	No	12/18/2019	12/18/2019			Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
											Low	High	Low	High			
										PJM Default Initial	65.6	72.5	63.5	72.5	62.1	5.0	10.0
										Company Initial	67.5	72.5	65.5	72.5	63.5	3.5	7.0
										Station Initial	67.5	72.5	65.5	72.5	63.5	3.5	7.0
										Adj.	67.5	72.5	65.5	72.5	63.5	5.0	9.0

Ticket 2867

2867		69 KV	ORANGE	Station	Restored w/o Approval	Yes	12/18/2019				Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
											Low	High	Low	High			
										PJM Default Initial	65.6	72.5	63.5	72.5	62.1	5.0	10.0
										Company Initial	67.5	72.5	65.5	72.5	63.5	3.5	7.0
										Station Initial	68.5	73.5	66.5	73.5	64.5	4.5	8.0
										Adj.	67.5	72.5	65.5	72.5	63.5	3.5	7.0

Refresh   Download   Back to Filter   Main Menu

Voltage Limits Ticket

Ticket ID: 2868   Company: Voltage: 69 KV   Station: APPLE

Est. Start: 12/18/2019   Est. Implementation: Follow Company Limits: ☐   Ticket Status: [Implemented w/o Approval ▾]
Actual Start: 12/18/2019   Actual End:

Comments:
Automatically created due to EMS data.

PJM Comments:
Automatically created due to EMS data.

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop Warning (%)	Voltage Drop Limit (%)
	Low	High	Low	High			
Initial PJM	65.6	72.5	63.5	72.5	62.1	5.0	10.0
Initial Company	67.5	72.5	65.5	72.5	63.5	3.5	7.0
Initial Station	67.5	72.5	65.5	72.5	63.5	3.5	7.0
Adj. Limits	67.5	72.5	65.5	72.5	63.5	5.0	9.0
Current PJM	65.6	72.5	63.5	72.5	62.1	5.0	10.0
Curent Company	67.5	72.5	65.5	72.5	63.5	3.5	7.0
Current Station	67.5	72.5	65.5	72.5	63.5	5.0	9.0

History Log   Back to Report   Main Menu

Log of ticket status changes

- Report of Voltage Limits effective on selected dates

- TOs can view effective limits of other TOs.

- Report types
  - All

  - Follow PJM Defaults

  - Not Following PJM Defaults

  - Exceptions

  - Non-Exceptions

  - Overview Report : Company Version of Manual 03 Report

Defaults to user's company
User can pick other TOs from the Company list

Effective Voltage Limits

Company	Voltage	Station	Voltage Limits Type
Company ▾	▾	▾	▾
Eff. Date (mm/dd/yyyy)		Sort by	Report type
		⦿ Comp./Voltage ○ Voltage/Comp.	All ▾

Apply Filter   **Refresh**   **Main Menu**

Defaults to today if left blank

Check to display all stations - stations following company limits are hidden by default

Check to display all limit levels – if limits match only the lowest level is displayed by default

Effective Voltage Limits for 01/13/2020 (All)

Show Duplicates ☐ Show Details ☐

Equip ID	Company	Voltage	Station	Voltage Limits Type	Follow PJM Default	Eff. Date	Term. Date	Limits							Action
									Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit	
									Low	High	Low	High				
102682	Company	500 KV		Company	Yes	12/13/2019		Company	500.0	550.0	485.0	550.0	475.0	2.5	5.0	
102673	Company	69 KV		Company	No	12/13/2019		Company	67.5	72.5	65.5	72.5	63.5	3.5	7.0	Revert to PJM Defaults
102787	Company	69 KV	APPLE	Station	No	12/13/2019		Station	67.5	72.5	65.5	72.5	63.5	5.0	9.0	Revert to Company Limits

Refresh   Download   Back to Filter   Main Menu

Download CSV export of the report

Click on the Action to open a new, prepopulated ticket

Report of tickets in Implemented w/o Approval and Restored w/o Approval status.

Download CSV export of the report

Tickets that have not been implemented and the Est. Start date is in the past.

Report of Company tickets created to follow PJM Defaults.

Report of Voltage Levels that PJM is monitoring and the corresponding PJM Default limits

PJM Default Voltage Limits

User: Company: ☐ Show Archived

Voltage	Normal (KV)		Emergency (KV)		Load Dump (KV)	Voltage Drop Warning	Voltage Drop Limit	Delete/ Archive	Last Modified
	Low	High	Low	High					
69 KV	65.6	72.5	63.5	72.5	62.1	5%	10%	☐	11/12/2019 16:02
115 KV	109.3	120.8	105.8	120.8	103.5	5%	10%	☐	11/12/2019 16:02
138 KV	131.1	144.9	127.0	144.9	124.2	5%	10%	☐	11/12/2019 16:02
161 KV	153.0	169.1	148.1	169.1	144.9	5%	10%	☐	11/12/2019 16:02
230 KV	218.5	241.5	211.6	241.5	207.0	5%	8%	☐	11/12/2019 16:02
345 KV	327.8	362.3	317.4	362.3	310.5	5%	8%	☐	11/12/2019 16:02
500 KV	500.0	550.0	485.0	550.0	475.0	2.5%	5%	☐	11/12/2019 16:02
765 KV	726.8	803.3	703.8	803.3	688.5	5%	8%	☐	11/12/2019 16:02

Refresh   History Log   Main Menu

Check to display data that was deleted or archived by PJM

Company Version of PJM Manual 03 Report
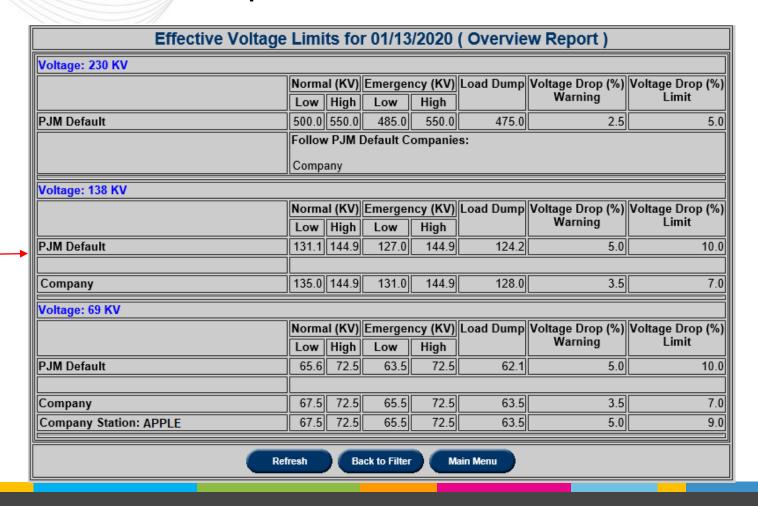
230 KV:
Company is following PJM Default

138 KV:
Company is not following PJM Default

69kV:
Company is not following PJM Default
APPLE station is not following
Company Default

Effective Voltage Limits for 01/13/2020 (Overview Report)

Voltage: 230 KV

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
	Low	High	Low	High			
PJM Default	500.0	550.0	485.0	550.0	475.0	2.5	5.0

Follow PJM Default Companies:

Company

Voltage: 138 KV

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
	Low	High	Low	High			
PJM Default	131.1	144.9	127.0	144.9	124.2	5.0	10.0
Company	135.0	144.9	131.0	144.9	128.0	3.5	7.0

Voltage: 69 KV

	Normal (KV)		Emergency (KV)		Load Dump	Voltage Drop (%) Warning	Voltage Drop (%) Limit
	Low	High	Low	High			
PJM Default	65.6	72.5	63.5	72.5	62.1	5.0	10.0
Company	67.5	72.5	65.5	72.5	63.5	3.5	7.0
Company Station: APPLE	67.5	72.5	65.5	72.5	63.5	5.0	9.0

Refresh   Back to Filter   Main Menu

The Overview Report will also be available on PJM.com.

It is a reflection of the current PJM EMS voltage limits, updated daily.

It provides PJM Default Voltage and Voltage Stability Limits by voltage class.

In addition, any Equipment Owner (Company) or Station deviations by voltage class can be identified where the 'Follow PJM' column is set to 'No'. Companies only have a line entry for voltage classes for which that have that voltage level of equipment under the control of PJM. (i.e., Only those companies that have a given level of equipment under PJM control are listed.)

	A	B	C	D	E	F	G	H	I	J	K
1	TIMESTAMP: 02-04-2020 00:05:00										
2	The table below is a reflection of the current PJM EMS voltage limits, updated daily. It provides PJM Default Voltage and Voltage Stability Limits by voltage class. In addition, any Equipment Owner (Company) or Station deviations by voltage class can be identified where the 'Follow PJM' column is set to 'No'. Companies only have a line entry for voltage classes for which that have that voltage level of equipment under the control of PJM. (i.e., Only those companies that have a given level of equipment under PJM control are listed.)										
3											
4	Company	Voltage	Follow PJM	Station	Load Dump	Emergency Low(KV)	Normal Low(KV	Normal High(K	Emergency High(KV)	Voltage Drop Warning(%)	Voltage Drop Limit(%)
5	PJM Default	765 KV			688.5	703.8	726.8	803.3	803.3	5	8
6	Allegheny Power Control Area	765 KV	No		688.5	703.8	726.8	803.3	803.3	5	10
7	PJM Default	500 KV			475	485	500	550	550	2.5	5
8	Baltimore Gas and Electric Company	500 KV	Yes		475	485	500	550	550	2.5	5
9	GPU Energy	500 KV	Yes		475	485	500	550	550	2.5	5
10	PECO Energy Company	500 KV	Yes		475	485	500	550	550	2.5	5
11	PPL Electric Utilities Corp. dba PPL Utilities (LSE)	500 KV	Yes		475	485	500	550	550	2.5	5
12	Public Service Electric & Gas Company	500 KV	Yes		475	485	500	550	550	2.5	5
13	Allegheny Power Control Area	500 KV	No		475	485	500	542.5	542.5	2.5	5
14	Dominion Virginia Power (EDC)	500 KV	No		475	485	505	540	540	3	6
15	PJM Default	345 KV			310.5	317.4	327.8	362.3	362.3	5	8
16	Allegheny Power Control Area	345 KV	Yes		310.5	317.4	327.8	362.3	362.3	5	8
17	GPU Energy	345 KV	Yes		310.5	317.4	327.8	362.3	362.3	5	8
18	Public Service Electric & Gas Company	345 KV	Yes		310.5	317.4	327.8	362.3	362.3	5	8
19	FirstEnergy Control Area	345 KV	No		310.5	317.4	327.8	362.3	377	6	16