

# Resource Limitation Reporting

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- Many generation units in PJM have limitations on how many hours they are able to run in a given time period, related to factors like compliance with environmental permits, fuel availability, and demineralized water availability.
- Limitations are dynamic, and the hours a unit has left heavily depends upon how often a unit has been running, which schedule and fuel the unit is running on, and how often the unit is being cycled.
- Previous methods used to report & track resource limitations produced information for a snapshot in time and, importantly, are not linked to actual unit run time.
- In 2019, PJM made tool upgrades & related Manual updates **intended to provide more dynamic notice to dispatch if a unit is running close to its limitations**, and includes a calculation of estimated hours remaining using member-entered hours remaining due to a limitation and unit runtime.

- If a unit has less than 72 hours of run time at maximum capacity due to any resource limitation (primary or alternate onsite fuel, emissions, demineralized or cooling water, other consumables), it should be reported to PJM through the “Resource Limitations” page of Markets Gateway
- Any unit with less than 24 hours of run time remaining due to resource limitations should also update the Max Run fields in Markets Gateway
- Reporting of resource limitations is especially critical when PJM issues Conservative Operations or a Cold Weather/Hot Weather Alert.
- The information on the “Resource Limitations” page is **used for situational awareness and multi-day operations planning**. The parameters entered on this page **are not** utilized in the Day-Ahead or Real-Time Market clearing engines



# Resource Limitations & Max Emergency

In addition to the resource limitation reporting via Markets Gateway, members should also monitor resource limitations when they restrict unit run times below certain minimum level thresholds, and follow the specified ‘PJM Member Actions’, which include verbal notifications to the PJM Master Coordinator and placing the unit in Max Emergency category.

Resource Limited Unit (Type)	Resource Limitations					PJM Member Actions
	On-site Fuel Only	Emissions	Cooling Water	Demin. Water	Other	
CT					< 72 hours	Report as Resource Limited in Markets Gateway
					< 24 hours	Update Max Run fields in Markets Gateway
					< 16 hours	Verbally notify PJM Master Coordinator
					< 16 hours	Place in Max Emergency (if PJM issues Cons. Ops/Hot/Cold Weather Alert)
Steam					< 72 hours	Report as Resource Limited in Markets Gateway
					< 32 hours	Verbally notify PJM Master Coordinator
					< 32 hours	Place in Max Emergency (if PJM issues Cons. Ops/Hot/Cold Weather Alert)
					< 24 hours	Update Max Run fields in Markets Gateway

**Yellow Highlighting - Minimum Level Thresholds for Resource Limited Units**

**Gas-Only Units with Fuel Limitations:**

- 1) These are not considered Resource Limited Units, and should not be reported as Resource Limited in Markets Gateway.
- 2) These should not be placed in Max Emergency, following PJM Cons. Ops/Hot/Cold Weather Alerts, but remain Economic, unless directed otherwise by PJM.
- 3) Gas-Only Units with other Resource Limitations (emissions, etc) should report as indicated in the above table.

**Dual Fuel (Gas/Other) Units:**

- 1) These should report as Resource Limited for only on-site fuel restrictions or other Resource Limitations as indicated in the above table. They should not report natural gas fuel restrictions.
- 2) These may be placed in Max Emergency, following PJM Cons. Ops/Hot/Cold Weather Alerts, for only on-site fuel restrictions (when unavailable on natural gas and on-site fuel falls below Minimum Level Thresholds) or other Resource Limitations as indicated in the above table.

*Manual 13,  
Exhibit 5*

The information on the “Resource Limitations” page is **used for situational awareness and multi-day operations planning**. The parameters entered on this page **are not** utilized in the Day-Ahead or Real-Time Market clearing engines.

- Bilaterals
- Con Edison
- Demand
- Demand Response
- Generator
  - Unit
  - Schedules
  - Dispatch Lambda
  - Market Results
  - Regulation Market
  - Synchronized Reserve Mar
  - Day-Ahead Scheduling Res
  - Resource Limitations
- Interface Pricing
- Opportunity Cost Calculator
- Parameter Limits
- Price Responsive Demand
- Pseudo Tie Transaction
- Public
  - System Utilities
  - Up-To-Transaction
  - Virtual
  - Weather Forecast

Start Day  End Day  Portfolio  Location  Refresh  Save

Limitation ID	Location	Fuel Type	Limitation Type	Start Time	End Time	Hrs. Remaining at Full Load	Replenished Hrs. at Limit. End	Is Unlimited at Reduced Output	PJM Est. Hrs. Remaining
Show all	Show All	Show All	Show All	Show all	Show all	Show all	Show all	Show All	Show all
<input type="checkbox"/>									

- “Unit Level” Limitations**
- Limitation Type: Cooling Water, Demineralized Water, or Other Consumables
- “Fuel Level” Limitations**
- Select Fuel Type related to limitation
  - Limitation Type: Emissions, Onsite Fuel

Enter hours remaining at full load between limitation start and end times

Enter additional hours at full after end time (e.g. from fuel delivery or roll-over of emissions hours)

Yes or No

*Calculation* using actual on hours to count down Member-entered “Hrs. Remaining at Full Load” to create a dynamic estimate of runtime remaining due to a limitation

- XYZ Unit 1 CT is an oil CT with demineralized water and onsite fuel supply restrictions
- Current Datetime: 10/1/2019 08:00:00
- XYZ Unit 1 CT has been on since (for 2 hours) 10/1/2019 06:00:00

Limitation ID	Location	Fuel Type	Limitation Type	Start Time	End Time	Hrs. Remaining at Full Load	Replenished Hrs. at Limit. End	IsUnlimited at Reduced Output	PJM Est. Hrs. Remaining	Date Entered
#####	XYZ Unit 1 CT	Petroleum   Kero...	Demin. Water	10/1 00:00	10/7 23:59	16	168	No	14.00	9/29/2019 08:00
#####	XYZ Unit 1 CT	Petroleum   Kero...	Onsite Fuel	10/1 00:00	10/15 13:00	40	720	No	38.00	9/29/2019 08:00

User Entered
Populated by System

- XYZ Unit 2 CT is a dual-fuel CT with onsite fuel supply and emissions restrictions
- Current Datetime: 10/1/2019 08:00:00
- *“PJM Est. Hrs Remaining” calculation for fuel dependent restrictions will use hours associated with fuel related to current schedule*
  - XYZ Unit 2 CT has been on for 2 hours and is running on Natural Gas schedule. Emissions restriction hours for Natural Gas are counted down. If Unit B switches to an oil schedule, countdown for Natural Gas hours will pause and countdown for Oil hours will begin

Limitation ID	Location	Fuel Type	Limitation Type	Start Time	End Time	Hrs. Remaining at Full Load	Replenished Hrs. at Limit. End	Is Unlimited at Reduced Output	PJM Est. Hrs. Remaining	Date Entered
#####	XYZ Unit 2 CT	Gas   Natural Gas	Emissions	10/1 00:00	10/31 23:59	60	720	Yes	58.00	9/29/2019 08:00
#####	XYZ Unit 2 CT	Petroleum   Kero...	Emissions	10/1 00:00	10/31 23:59	20	720	Yes	20.00	9/29/2019 08:00
#####	XYZ Unit 2 CT	Petroleum   Kero...	Onsite Fuel	10/1 00:00	10/31 13:00	40	720	No	40.00	9/29/2019 08:00

Member Entered
Populated by System

## Example 3: Multiple Units at Station

- *If multiple units at a station share restriction hours, “Hours Remaining at Full Load” should be divided up and entered on a unit basis. The hours remaining for the station should not be entered for each unit – this would overestimate the hours remaining.*
  - Station with units C, D, and E share a fuel supply. With current inventory, the station has 200 hours remaining at full load. Based on unit availability and other operating conditions, this 200 hours is divided up and allocated to each unit. Next fuel delivery will provide an additional 720 hours.

Limitation ID	Location	Fuel Type	Limitation Type	Start Time	End Time	Hrs. Remaining at Full Load	Replenished Hrs. at Limit. End	Is Unlimited at Reduced Output	PJM Est. Hrs. Remaining	Date Entered
#####	UVW Unit 1 CT	Petroleum   Kero...	Onsite Fuel	10/1 00:00	10/15 09:00	100	240	No	98.00	9/29/2019 08:00
#####	UVW Unit 2 CT	Petroleum   Kero...	Onsite Fuel	10/1 00:00	10/15 09:00	50	240	No	48.00	9/29/2019 08:00
#####	UVW Unit 3 CT	Petroleum   Kero...	Onsite Fuel	10/1 00:00	10/15 09:00	50	240	No	48.00	9/29/2019 08:00

Member Entered

Populated by System

- Bilaterals
- Con Edison
- Demand
- ▶ Demand Response
- ▼ Generator
  - Unit
  - Schedules**
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- Price Responsive Demand
- Pseudo Tie Transaction
- ▶ Public
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  - Up-To-Transaction
  - Virtual
  - Weather Forecast

Market Day  Portfolio  Location  Schedule

Refresh  
Save

- Offers
- Offer Updates
- Detail
- Detail Updates
- Manager
- Selection
- Availability Update
- Restriction Information**
- TPS Schedule Switch

**Operational Restrictions**

Operational Restriction Other

“Schedules > Restriction Information > Operational Restrictions Other” field was left in place for submission of Real Time Values. Resource Limited Units should be reported to PJM through the “Resource Limitations” page of the PJM Markets Gateway, as specified in M13.

**Dual Fuel**

Dual Fuel Availability  MW's to Transition

Time to Transition (mins)

**Pipeline Switching**

Pipeline A <input type="text"/>	A to B Transition Time (mins) <input type="text"/>
Pipeline B <input type="text"/>	A to B Transition MW <input type="text"/>
Pipeline C <input type="text"/>	A to C Transition Time (mins) <input type="text"/>
Pipeline D <input type="text"/>	A to C Transition MW <input type="text"/>
	A to D Transition Time (mins) <input type="text"/>
	A to D Transition MW <input type="text"/>

Gas Day Nominations (Beginning 10:00AM of Market Day)

Pipeline/LDC Name	Type	Current Firm Nomination (Dths)	Current Total Nomination (Dths)	No Nomination Reason
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## Resource Limitation Reporting



### Member Hotline

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