



PJM

Emergency Procedures

LCC / MOC / OPS 101

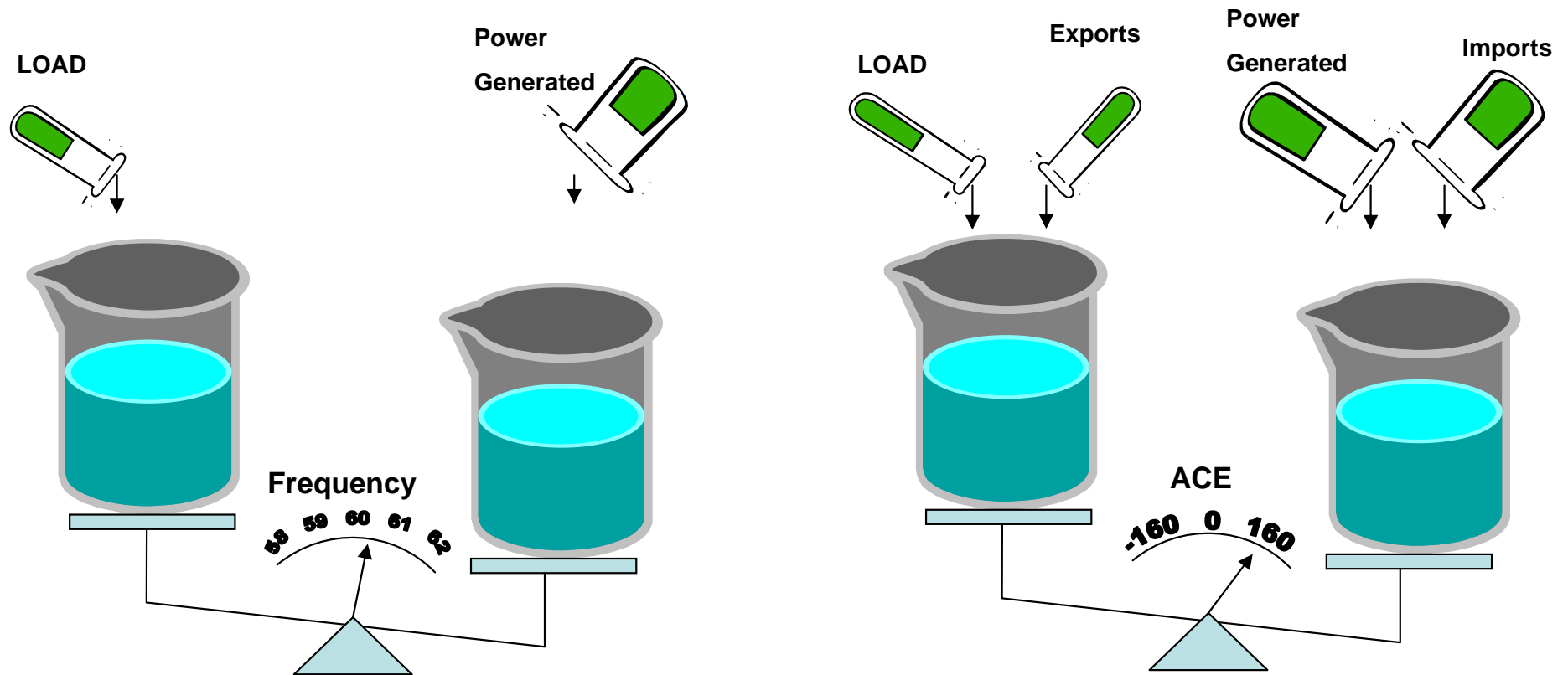
- Know where to find a copy of the procedures
 - PJM Manual References
 - M-13 - Emergency Operations
 - M-12 - Dispatching Operations
 - M-03 - Transmission Operations
- Have a good understanding and working knowledge of the procedures
- Know your responsibilities

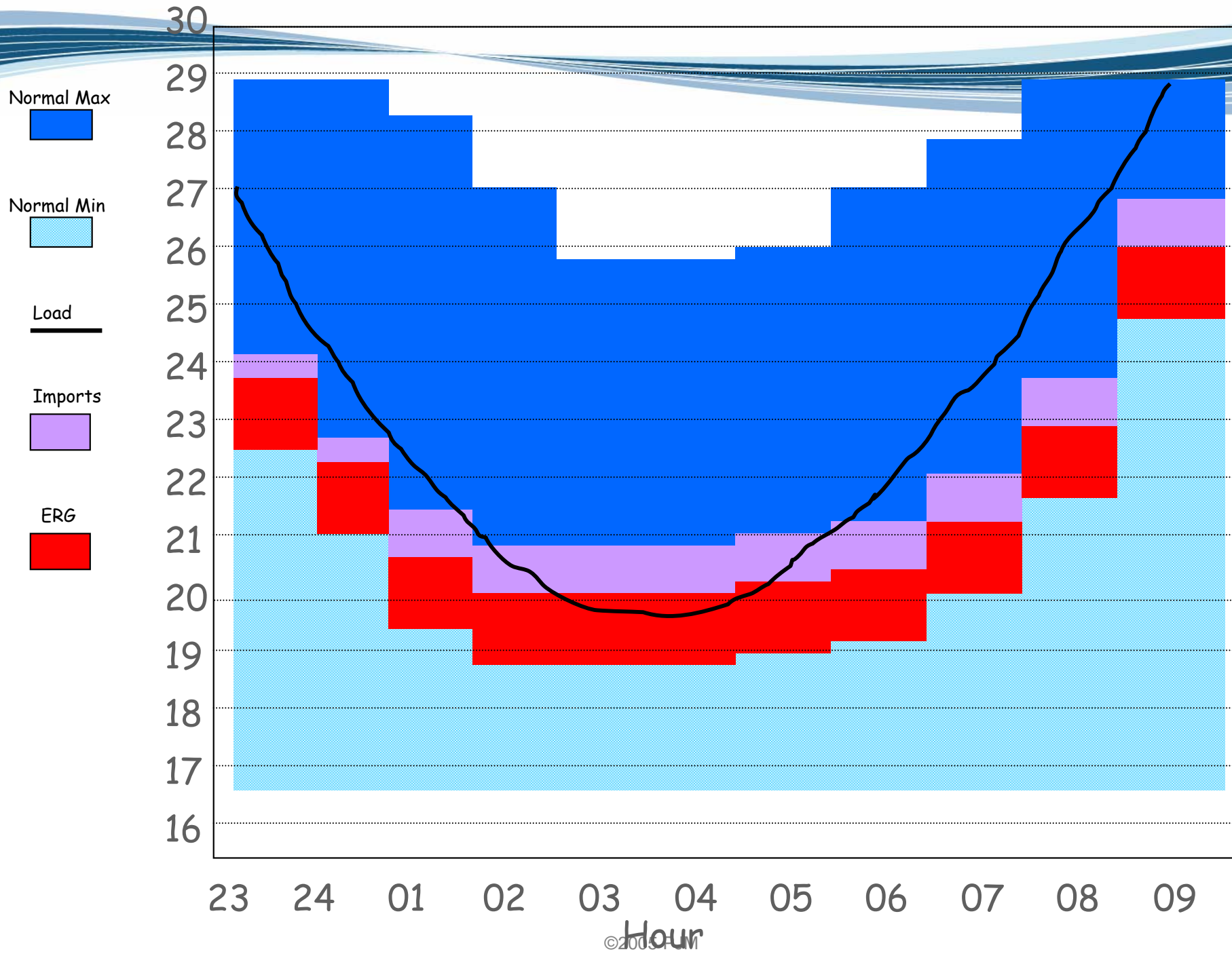
- To help MOC/LCC Dispatchers understand:
 - The types of Emergencies encountered by PJM
 - The actions required to alleviate the emergency conditions.
 - The information and reports required by PJM

Objectives:

- Understand Reason for Light Load Procedures
- List Procedures and General Sequence of Actions involved in Light Load Procedures
- Identify Appropriate Actions for PJM and Members

Light load operating problems tend to be characterized by Frequency and ACE running high





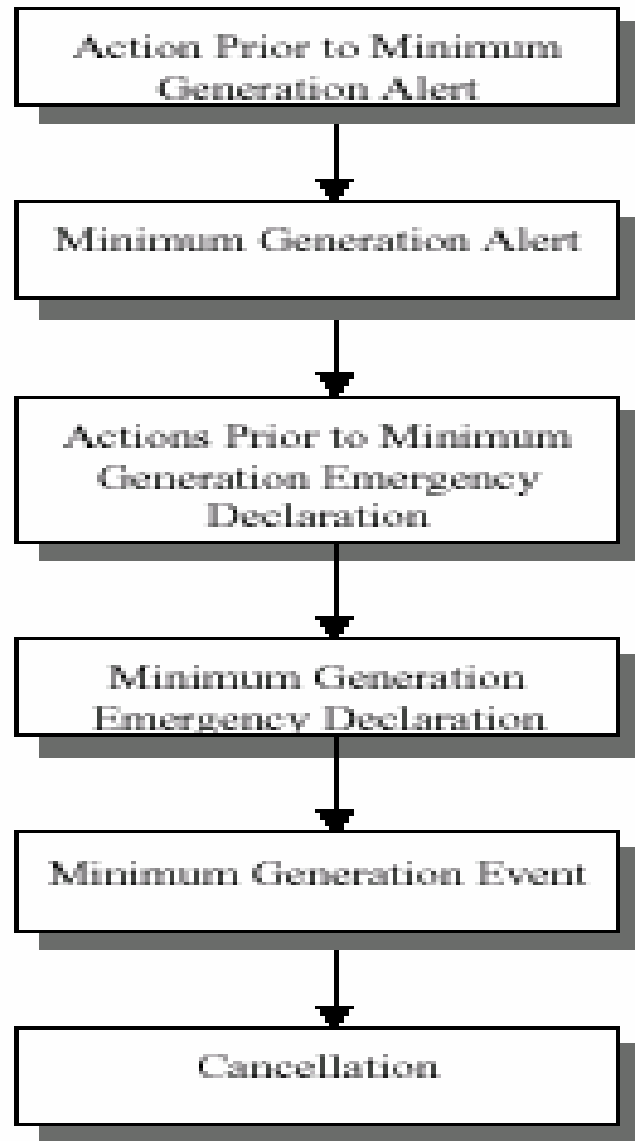
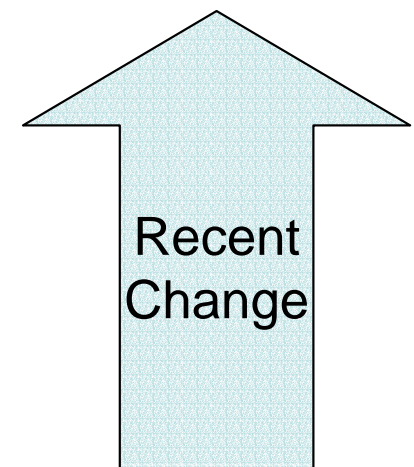


Exhibit 2.5: Sequence of Actions

**Manual
Reference for
Light Load
Procedures:
M-13, Emergency
Operations
Manual
Pages 2-22 through 2-
27 and Attachment F**

- Purpose
 - To provide alert that system conditions may require the use of emergency procedures
- Trigger
 - When expected generation levels are within 2,500 mw of normal minimum generation limits



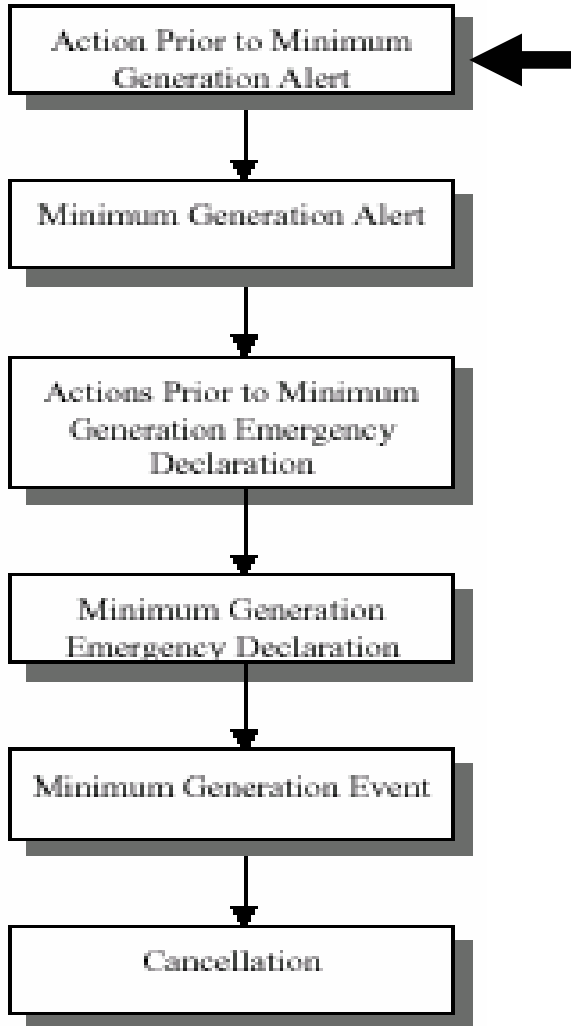


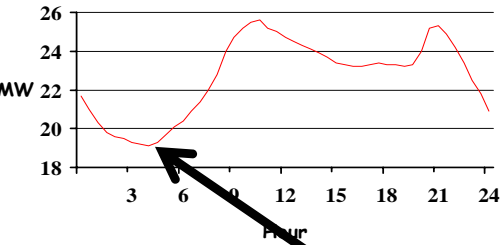
Exhibit 2.3: Sequence of Actions

Minimum Generation Worksheet – Midnight Period			
Day of Week: SATURDAY		Date:	
Date			
Time	1800		
Initials			
Normal Min Generation	# 20,021		
Yards Creek Pumps	- 420		
Muddy Run Pumps	- 660		
Conowingo	+ 65		
Safe Harbor / Holtwood	+ 122		
Net Interchange	+ 1125		
OECAP (PEPCO)	- 225		
Spot Market	- 350		
R.E.C.'s	+ 45		
Adjusted Min Generation	19,723		
Valley Load Estimate	# 19,000		
Margin	723		
Minimum Generation Alert Needed			

Routine calculation performed as part of the scheduling process by PJM IO Scheduling Coordinator

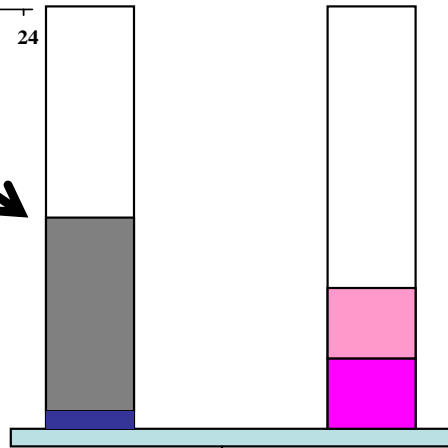
Criteria is margin of -2500 or greater

Daily Load Curve



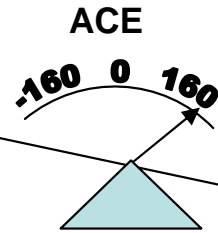
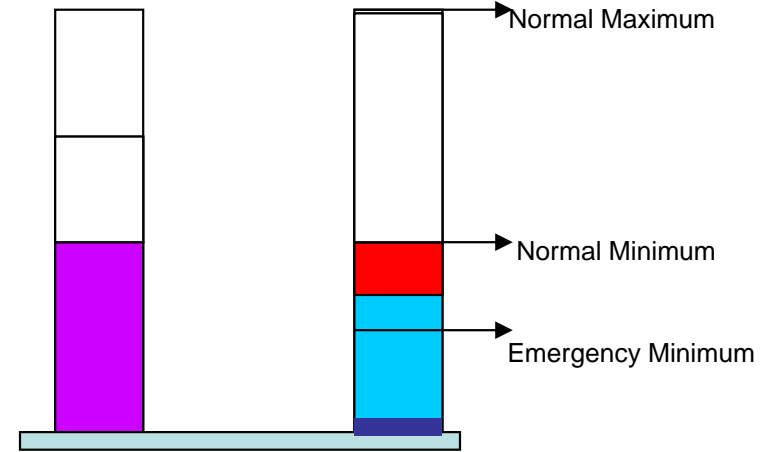
Load
Pumps

Spot Exports
Bilateral Exports

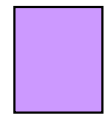


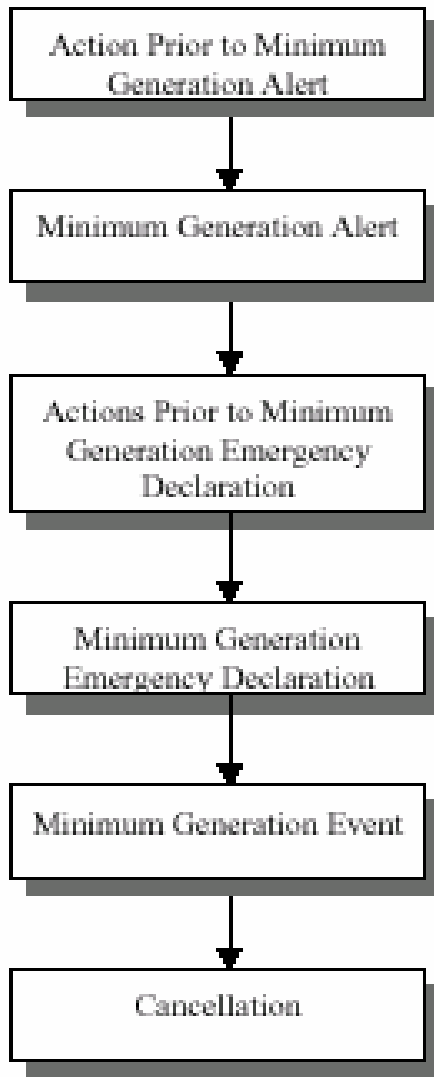
Bilateral Imports

Generation



Spot Imports





- **PJM Actions**

- Evaluate schedules (including hydro) to verify generation will be minimized (and any pumping maximized) during light load period
- Issue Alert giving adjusted min gen, valley load estimate, and margin to LCC's

- **Prior to Light Load Period**

- Compile Report of Emergency Reducible Generation (ERG) available

- **Member Actions**

- Check and update unit data in PJM computer systems
- Check if unit maintenance could be scheduled over light load period
- **Prior to Light Load Period**
 - Update PJM dispatch lambda program with proper unit limits
 - Review with station personnel unit limits, including normal and emergency minimums
 - **Report amount of Emergency Reducible Generation to PJM Scheduling Coordinator**

Exhibit 2.5: Sequence of Actions



Minimum Generation Information For:	Date: _____	Period: _____	
Minimum Generation Alert Issued	Hours	Cancelled	Hours
Minimum Declaration Declared	Hours	Cancelled	Hours
Regulation removed from Units	Hours	Cancelled	Hours
Lambda Signal to Zero	Hours	Cancelled	Hours
Reduce Emergency Reducible Generation	Hours	Cancelled	Hours
Request Companies to Reduce Generation to match Internal Load (Proportionately)	Hours	Cancelled	Hours

CO	FOSSIL	NUCLEAR	NUGS	TOTAL	REDUCIBLE ON DECLARATION
PS					
PE					
PL					
WPS					
BC					
GPU					
Sithe					
EMMT					
PEP					
AE					
DPL					
Key #1					
Key #2					
Con #1					
Con #2					
TOTAL					

Emergency Reducible Generation				
Time Issued	% Reduced	MW Reduced	Key/Con MW	Time Cancelled

Generation Reduced to Match Load					
CO	Over Generation MW	Reduced MW	CO	Over Generation MW	Reduced MW
PS			Sithe		
PE			EMMT		
PL			PEP		
WPS			AE		
BC			DPL		
GPU					

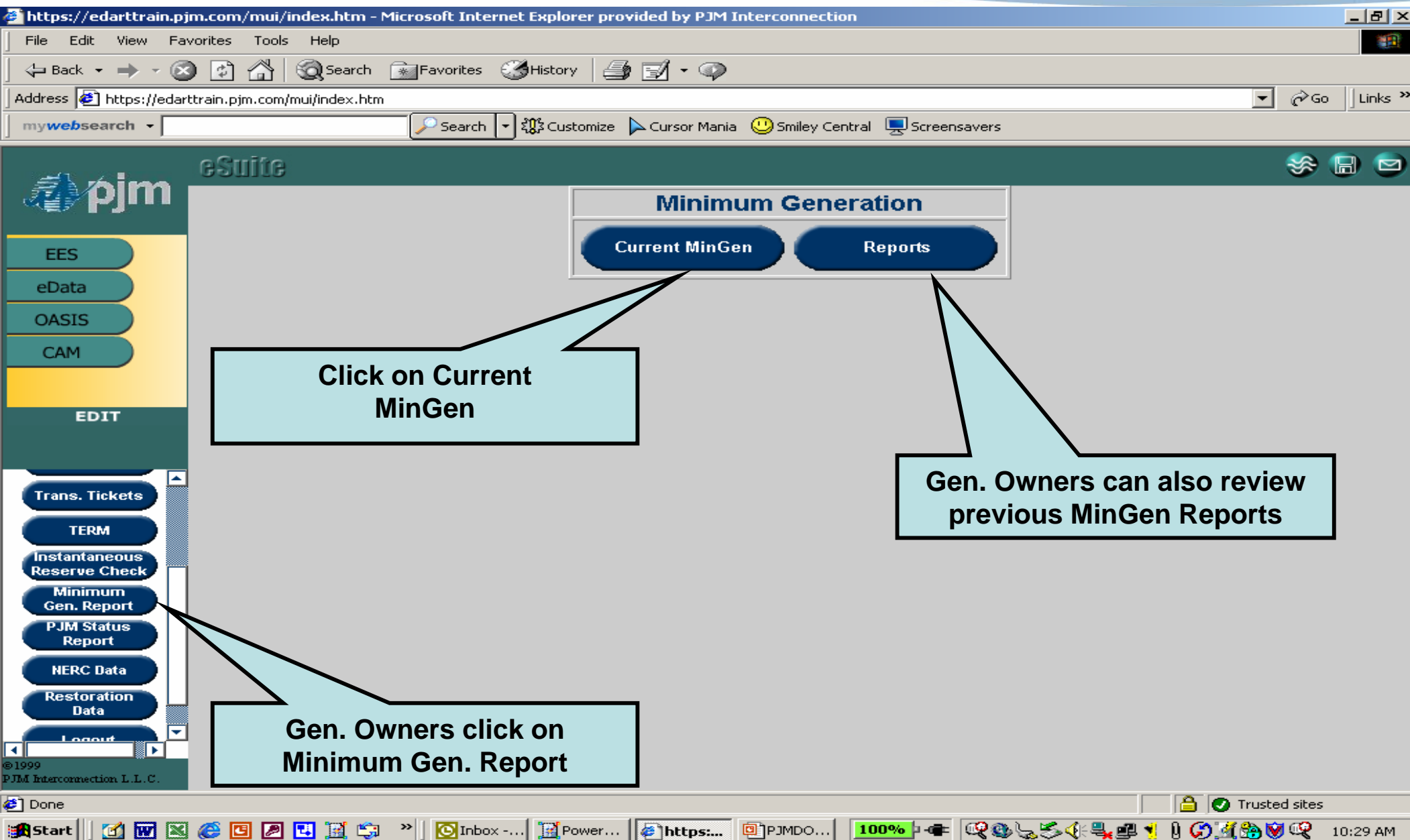
Reporting Emergency Reducibles

(Difference between units normal minimum and emergency minimum)

Example

- Economic Maximum = 250 MW
- Current Output = 200 MW
- Economic Minimum = 125 MW
- Emergency Minimum = 100 MW

Emergency Reducibles Reported to PJM = 25 MW



The screenshot shows the PJM eSuite web application interface. The browser address bar displays <https://edarttrain.pjm.com/mui/index.htm>. The application header includes the PJM logo and the text "eSuite". A left-hand navigation menu contains buttons for "EES", "eData", "OASIS", "CAM", "EDIT", "Trans. Tickets", "TERM", "Instantaneous Reserve Check", "Minimum Gen. Report", "PJM Status Report", "NERC Data", "Restoration Data", and "Logout". The main content area features a "Minimum Generation" section with two buttons: "Current MinGen" and "Reports".

Callout 1: Click on Current MinGen

Callout 2: Gen. Owners can also review previous MinGen Reports

Callout 3: Gen. Owners click on Minimum Gen. Report

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Microsoft Internet Explorer provided by PJM Interconnection

Address: https://edatrain.pjm.com/mui/index.htm

eSuite

Emergency Reducible Generation

User Name: **supertrain** Company: **GPU Energy**
 Request ID: 12231 Timestamp: 11/03/2004 13:06
 Date: 11/03/2004 Period: MIDNIGHT

Control Area	Reported		Actual	
	Total Reducible Generation	Reducible on Declaration	Declaration	Event
Mid Atl	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Control Area	MinGen Alert		Lambda Signal to Zero		MinGen Declaration	
	Issued	Cancelled	Issued	Cancelled	Issued	Cancelled
Mid Atl	11/03/2004 13:06					

Minimum Generation Event Log

% Reduced	Issued	Cancelled

Mid Atl

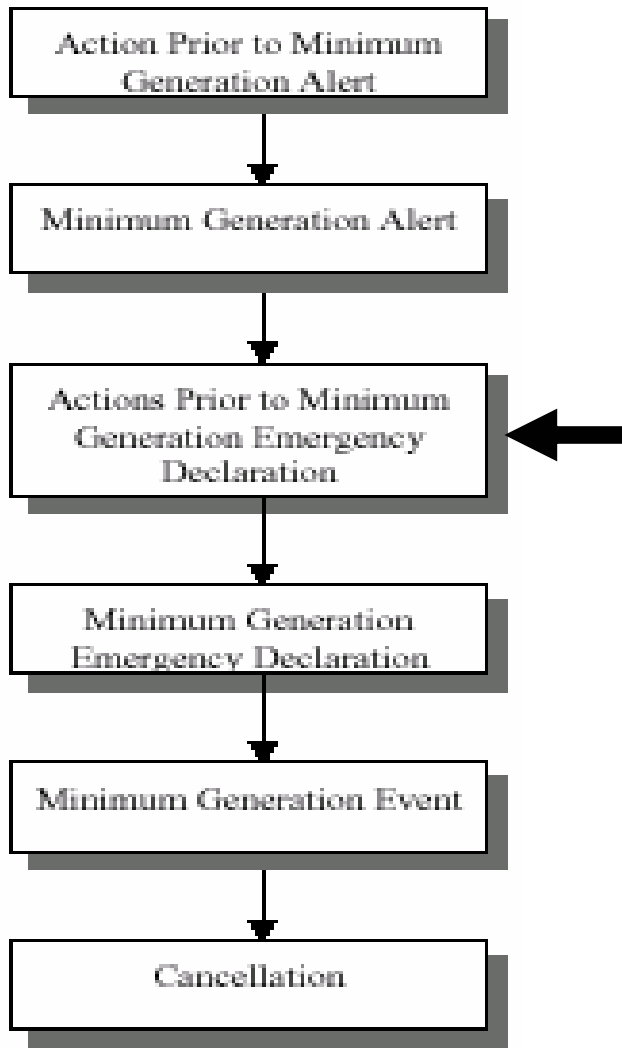
Buttons: Submit Form, Refresh, Main M...

Gen. Owners enter Total Reducible Generation and Reducible on Declaration if any prior to the Min Gen

Gen. Owners enter Actual generation reduced at Declaration and Event after the fact

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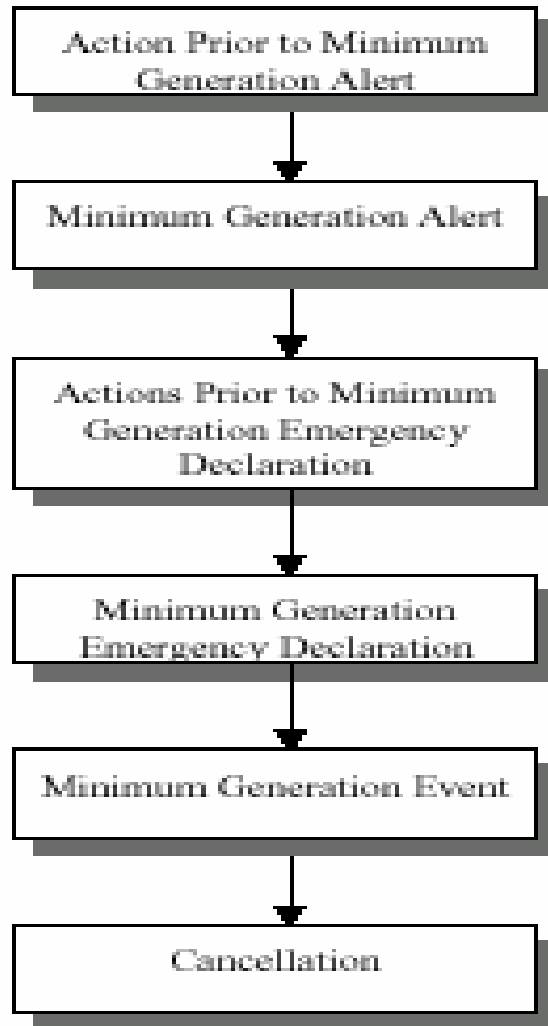
Done Trusted sites 10:33 AM



- Reduce ALL units to normal minimum generation.
- Reduce Lambda to “0” and reduce Spot in contracts as required to maintain system control

Note: Other system conditions may at times require the reducing of Lambda to “0”. The implementation of any steps under the Light Load Procedures are NOT a pre-requisite to moving Lambda to “0”.

Exhibit 2.5: Sequence of Actions



- Purpose

- To notify members further generation reductions are needed to meet the minimum load during the valley period

- Trigger

- At determination of PJM dispatcher

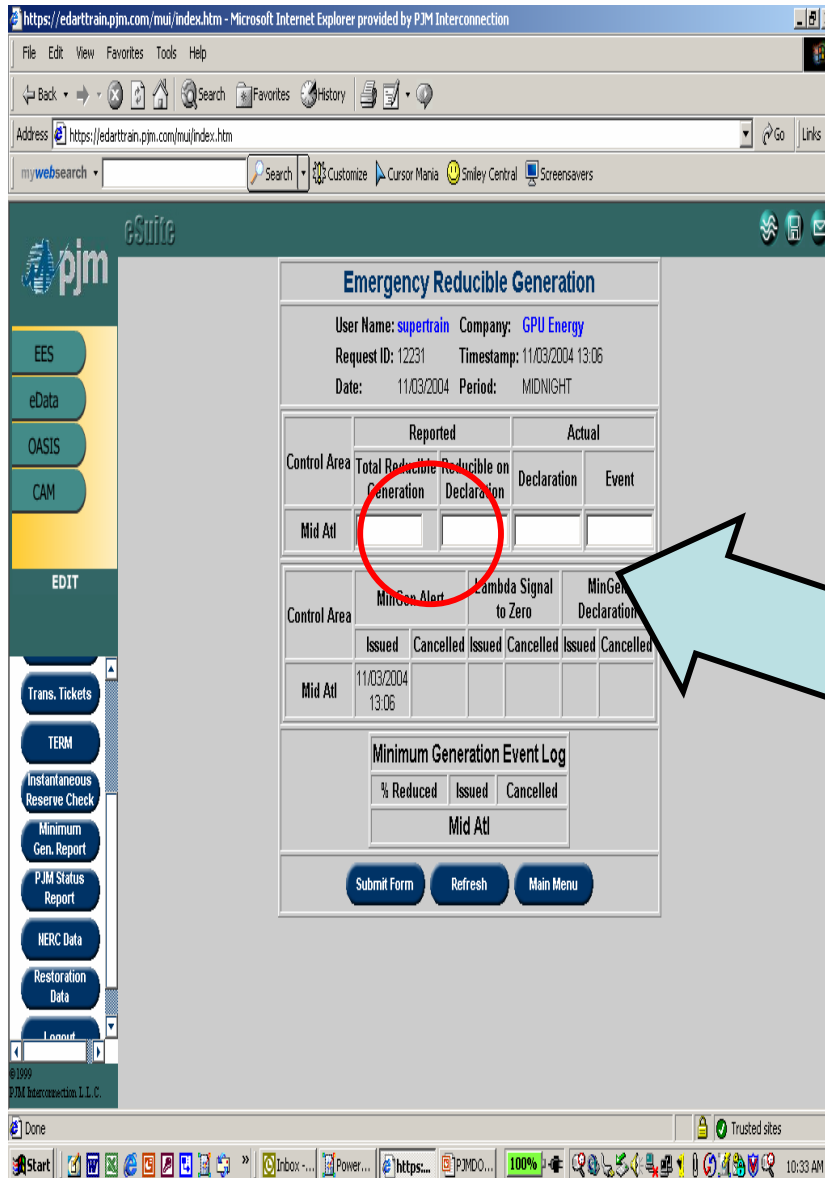
Exhibit 2.5: Sequence of Actions

- **PJM Actions**

- Evaluate hydro schedules and where possible, adjust to maximize pumping and limit run of river without spilling or violating elevation limits
- Develop strategy of amount and timing of Emergency Reducible Generation (ERG) that will be needed
- Notify Members of strategy

- **Member Actions**

- Determine the emergency reducible generation that will be reduced and the sequence and timing of reduction
- Some members elect to begin reducing units that require long lead times



Emergency Reducible Generation

User Name: **supertrain** Company: **GPU Energy**
 Request ID: 12231 Timestamp: 11/03/2004 13:06
 Date: 11/03/2004 Period: MIDNIGHT

Control Area	Reported		Actual	
	Total Reducible Generation	Reducible on Declaration	Declaration	Event
Mid At				

Control Area	Min Gen Alert		Lambda Signal to Zero		Min Gen Declaration	
	Issued	Cancelled	Issued	Cancelled	Issued	Cancelled
Mid At	11/03/2004 13:06					

Minimum Generation Event Log

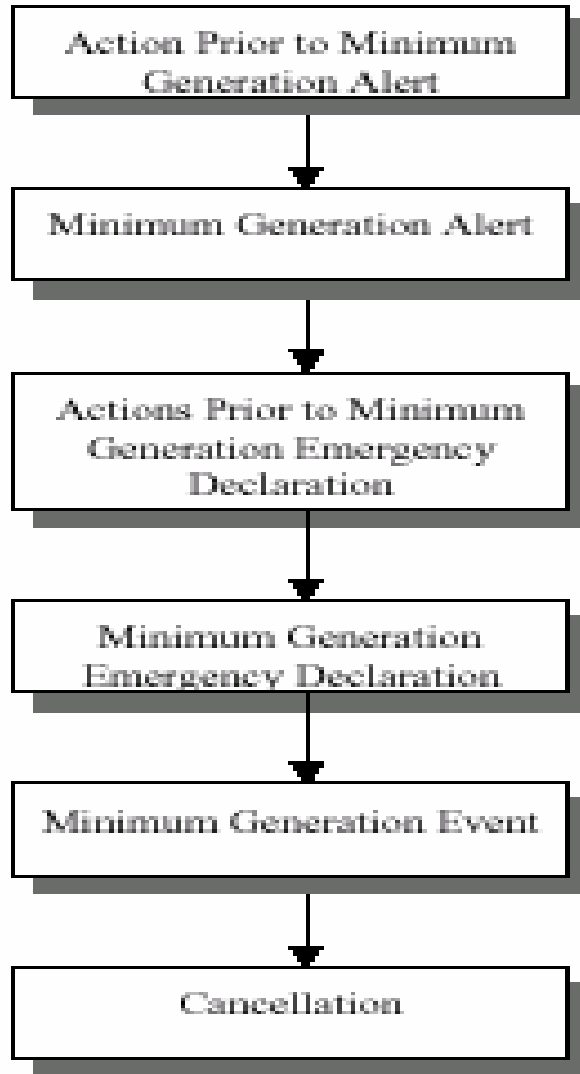
% Reduced	Issued	Cancelled

Mid At

Submit Form Refresh Main Menu

Member Actions

- Determine the emergency reducible generation that will be reduced and the sequence and timing of reduction
- Some members elect to begin reducing units that require long lead times



- Purpose
 - To maintain system control
- Trigger
 - When utilization of emergency reducible generation is necessary to match the decreasing load

Exhibit 2.5: Sequence of Actions

- **PJM Actions**

- Declare Event and request percentage of EGR as needed (stepped process)
- Attempt to sell Emergency Energy to external systems
- In concert with individual members, investigate and recommend the shut down of specific units that are not required for area protection during the current load period or the subsequent on-peak period

- **Member Actions**

- follow the direction of the PJM OI dispatcher.

- Takes place in the reverse order of implementation as PJM load begins to exceed generation.
- PJM cancels Min Generation Emergency when actions taken are no longer necessary.
- Member notifies PJM of actual ERG that was reduced

- PJM can issue Minimum Generation Event in a local area due to a stability issue or constrained operations
- Generation would be reduced to economic minimums and dispatchable and Spot Market Imports curtailed (as applicable) prior to issuance of this procedure

•PJM Actions

- Request local Generation dispatchers to reduce Emergency Reducible Generation
- Attempt to sell Emergency Energy (as applicable)
- After 100% Reducible Generation, reduce Network External Designated purchases
- Direct shutdown of effective units not required for area protection

•Member Actions

- Follow direction of PJM dispatcher

Light Load Emergency Procedure Activation

