

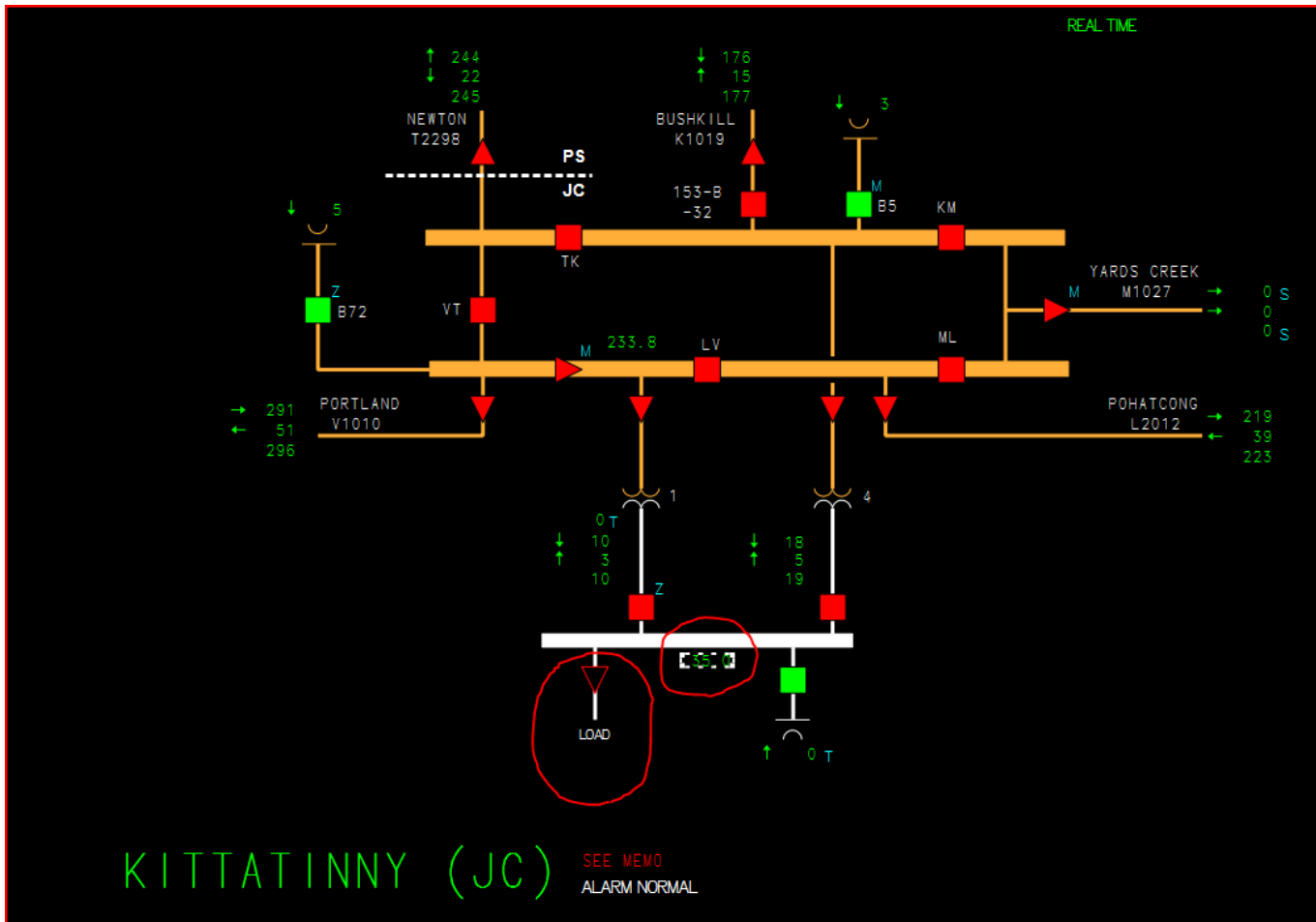


PJM Real-time Operations

PJM State & Member Training



PJM Models

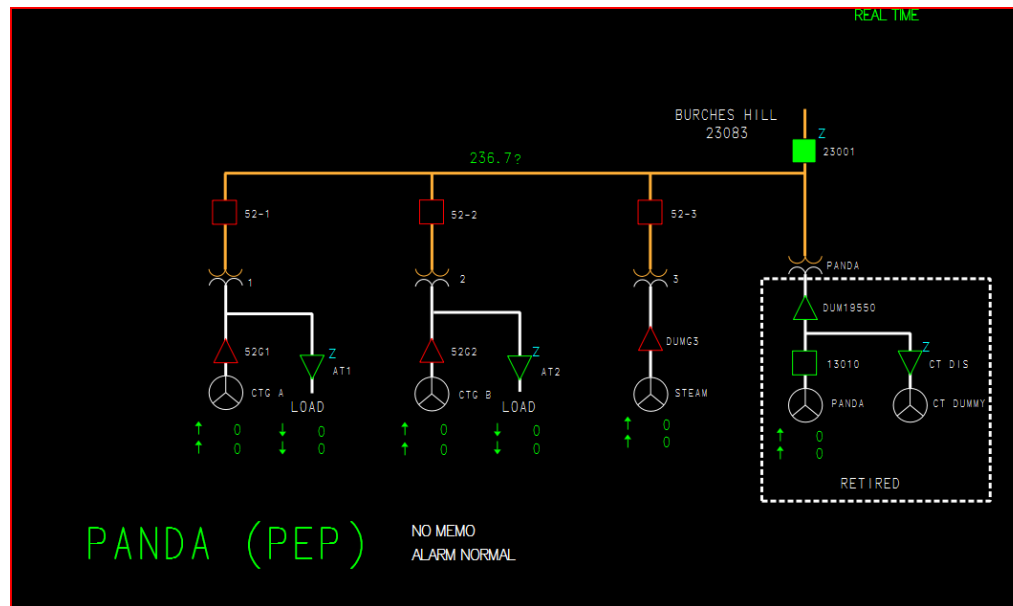


PJM Modeling of Distribution

- PJM models primarily focused on > 100 kV
- Goes as low as 35 kV only in certain instances
- Real-time data for loads taken from 100 kV to 35 kV and rarely goes into distribution levels
- Loads may or may not have real-time telemetry, depending on readily available data and requirements of the model

PJM Modeling of Generators

- Generators often tie in close to the transmission system through dedicated substations



PJM Modeling of Generators

- The real-time operations model of generators often has data ties to markets and settlements functions
- New generators go through a significant queue process before entering PJM markets
- Generators not 'sponsored' by an existing member must establish a data link directly to PJM
- Both the queue process and data links are optimized for standard generator applications

PJM SCADA Communication Tiers

	TOTAL CAPACITY	CONNECTING ASSET	PROTOCOL	COM DEVICE	NETWORK
Method 1	> 500 MW	 Control Center	ICCP	SCADA System	PJMnet (dual router)
Method 2		 Gen			
Method 3	100-500 MW	 Control Center	ICCP	SCADA System	PJMnet (single router)
Method 4		 Gen			
Method 5	< 100 MW Demand Response	 Gen	DNP3 Encrypted	Protocol Gateway w/ Encrypted DNP3 Support	Internet
Method 6		 Demand Response			

- **Maintain System Control**
 - Generation / Demand Balance
- **Maintain Adequate Reserves**
 - Operate on Contingency Basis
- **Implement Emergency Procedures**
 - Whatever it takes to keep the lights on!
- **Synchronized Reserve/Regulation Market**
 - Clear Market
 - Administer real-time optimization



Generation Dispatcher Responsibilities

- Monitor PJM dispatch basepoints and regulation signal.
- Monitor generator metering, updating erroneous values and initiating meter failure corrective action.
- Designate assigned PJM regulation band to each market cleared generator.
- Maintain generator definitions and cost curves.
- Maintain generator operating parameters (regulation limits, ramp rates, etc.).
- Perform generator checkout as required.
- Implement Synchronous Reserve as required by PJM.
- Perform Regulation tests as required by PJM.
- Maintain, test and operate generating station emergency radio communication.
- Implement procedures as called for by PJM.



Disclaimer:

PJM has made all efforts possible to accurately document all information in this presentation. The information seen here does not supersede the PJM Operating Agreement or the PJM Tariff both of which can be found by accessing:

<http://www.pjm.com/documents/agreements/pjm-agreements.aspx>

For additional detailed information on any of the topics discussed, please refer to the appropriate PJM manual which can be found by accessing:

<http://www.pjm.com/documents/manuals.aspx>