

Security of Supply II

Electric Transmission System Reliability

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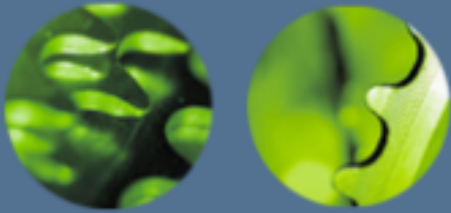
PPL Electric Utilities



T&D Operations



Who we are and what
we do



T&D Operations Staff

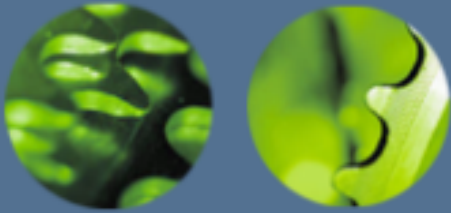
- T&D Operations – 2 components
 - 1) Transmission
 - 500 kV and above line, equipment and transformers
 - 6 **Power System Dispatchers** operating at the Transmission Control Center (LEHSC)
 - 3 shifts, 24x7 coverage 365 days a year.
 - Also responsible for PPL's interface with the PJM Interconnection and external agencies.



T&D Operations Staff

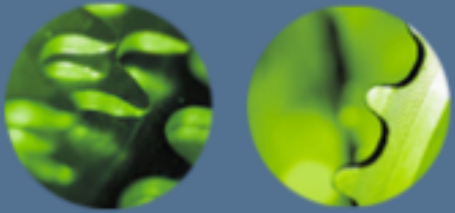
2) Distribution

- 230 kV lines and equipment and lower voltages.
- Divided into 5 Operating Regions
 - Harrisburg, Lancaster, Lehigh, Northeast, Susquehanna
- Each Region staffed by 6 **System Operators**
- 3 shifts, 24x7 coverage 365 days a year.
- We provide support for all prearranged jobs, emergency conditions, storms, etc



T&D Operations' Job

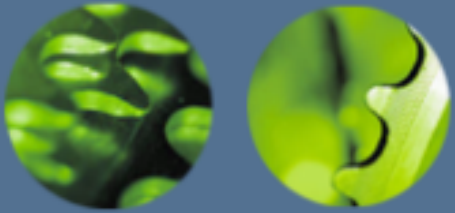
- Our Main Objectives;
 - Be Safe
 - Keep the lights on
 - Improve something every day
- Our function is to have the “big picture” and direct efforts of the field crews to keep them safe and keep as many customers in service as possible.



T&D Operations Tools

- Transmission Management System (TMS) Computers
- Better known as **SCADA**
- Allows remote control of devices.
- Provides device indication, alarming and data from substations

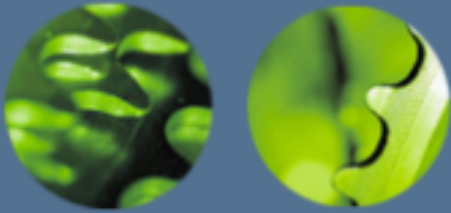




T&D Operations Tools

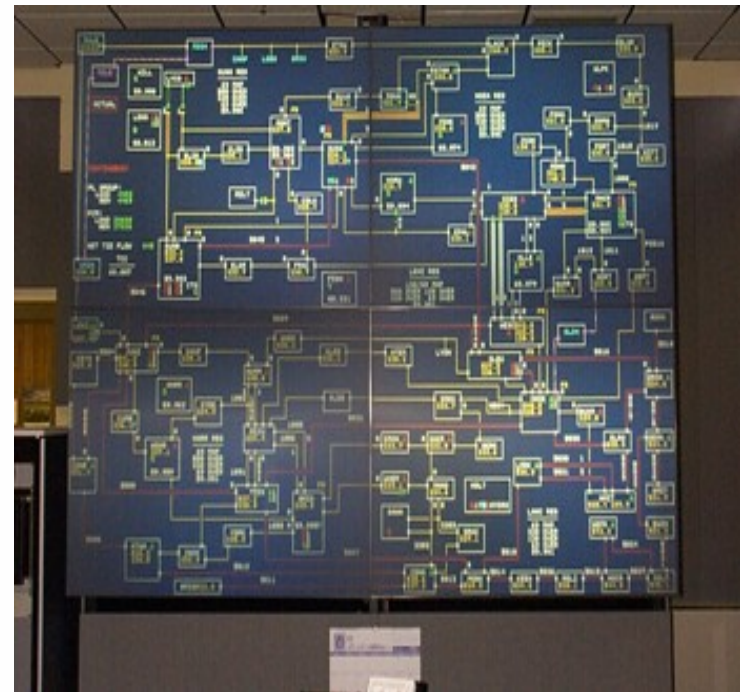
- Multi-screen computer with alarm function, station one-line displays, control functions
- Windows-based program. Just point and click

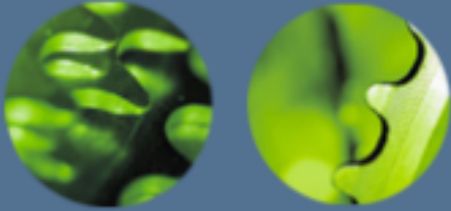




T&D Operations Tools

- Transmission Map board is a dynamic display system that constantly updates based on information from the TMS.

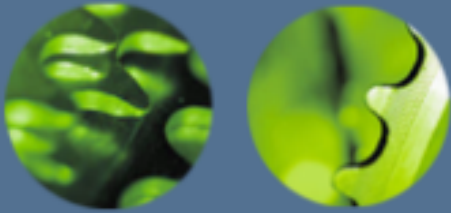




T&D Operations Tools

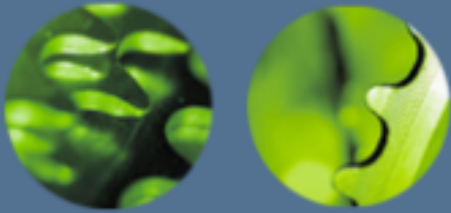
- System Operators use a static map wall to represent the 12 kV system.
- Colored pins represent the status of field devices.
- Board is manually updated whenever a field move is issued.





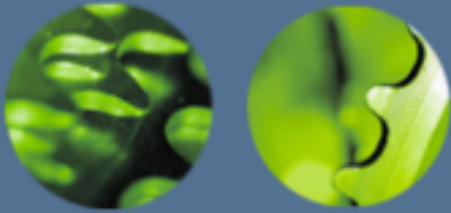
Operator Credentials

- Power System Dispatchers are required to obtain and maintain the following certifications;
 - NERC System Operator Certification
 - PJM Transmission Operator Certification
 - PJM Generation Operator Certification
- Many System Operators have some of the same Certifications, but they are not mandatory for SO's.



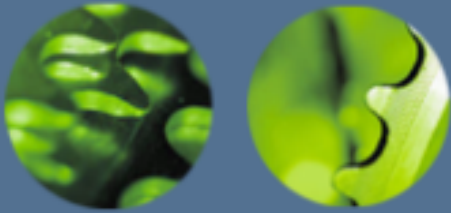
Operator Training

- All PSD's / SO's are sent to annual spring training sponsored by PJM. The location and content vary from year to year.
- All PSD's / SO's attend an annual fall ppl training seminar here at the Lehigh SC.
- 2 annual Emergency Load Control Procedure Drills with PJM
- 2 annual Black Start Restoration Drills with PJM.



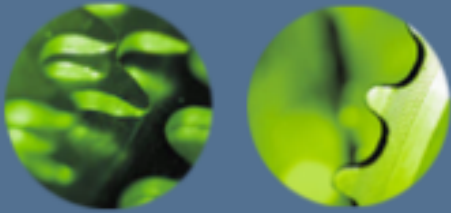
Operator Training

- 3 person training staff to provide initial and on-going training for PSD's, SO's, and Supervisors, as well as other departments and companies
 - Classroom Training
 - Simulator Training
 - External Training
- In addition, T&D Ops provides SME support to administer annual Permit & Tag training sessions to MWF personnel.



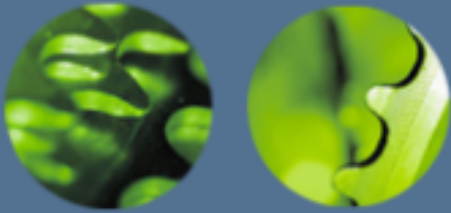
T&D Ops and you..

- While the operators try to keep track of the big picture, you folks are our eyes and ears in the field.
- Most times we will rely on you to tell us the location and extent of the problem.
- Our job is to determine how the problem can be safely isolated, and how the maximum amount of customers can be returned to service.



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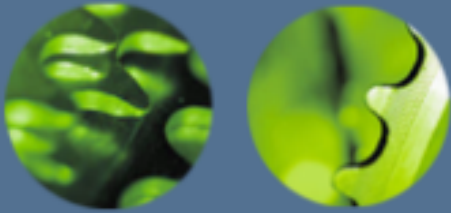
T&D Ops and you..

- Relay interrogation (where available) can be used to help the operator determine the type, and approximate location of a fault.
- Reliable fault location data can help reduce the length of customer outages and improve our CAIDI numbers.



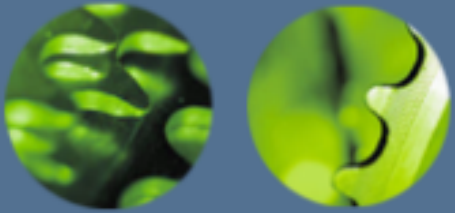
T&D Ops and you..

- Relay & Test are the most involved with Operations during the following evolutions;
 - SCADA installations or replacements at Substations.
 - Testing of new equipment.
 - Failures (mostly phone line problems) on relay circuits.
 - Relay testing (RFC compliance)



T&D Ops and you..

- Relay & Test Technicians are given a great deal of latitude on the re-configuration of devices they maintain in substations.
- Generally you know better than we do what the “safest” status is for your equipment during testing.
- Operators simply need to know the risks involved.



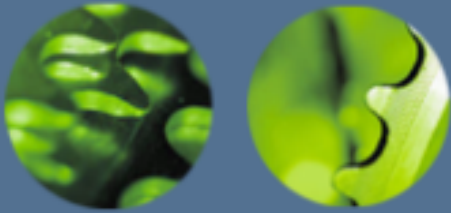
T&D Ops and you..

- Job scheduling –
 - Arrange testing or installation work through the PSD or regional SO, via the Automated Work Request System (AWR)
 - Some requests also need to be reported to PJM, and their approval is required.
 - Any 500 kV relay testing
 - Any major equipment required out of service
 - “live” trip tests to be performed on monitored equipment



T&D Ops and you..

- PJM requests may required lengthy notification times, but the Operator will generally not know if the request is approved until 1 or 2 days prior to the job.
- For details – go to T&D Operations website, then “toolbox”, then “PJM Outage requirements”



T&D Ops and you..

- We MUST work together as a team to meet the company's goals for CAIDI and SAIFI.
- Safety – that of our workers and the public - will ALWAYS come first.
- Learn the Permit & Tag system. Ask questions if you don't understand or are unsure. Tell us if you disagree !!!



Last Slide....

- Questions or Comments ??