GROWING UP IN OPERATIONS
SANS 2013 SCADA Summit
OPERATIONS TOPICS

- Culture
- Training
- Planning
- System Operations
CULTURE

- You are either in operations or you are not
OT IMPLEMENTATION

- Operations Technology groups have their own culture you need to manage it
CULTURE

- Mission Focused
**OT IMPLEMENTATION**

- Leverage the processes in place that built the safety and reliability culture across operations and expand them to drive a security and compliance culture across OT. Map key components of OT work to the larger operations mission.
CULTURE

- Management of a Complex Real Time System
OT IMPLEMENTATION

- Management of a complex real time system needs operators
TRAINING
OPERATIONS TRAINING HISTORY
(THE GOOD OLD DAYS)

Hire

Listen & Learn

Operate
OPERATOR TRAINING NOW - INITIAL

Evaluate Candidates 3 – 4 Months
Hire 1 Month
Achieve NERC Cert/Initial Training 3 - 9 Months
Shadow multiple shifts 1 – 2 Months
Pass Board Qualification 1 Month

Range = 3 – 17 months
Average = 12 months
OPERATOR TRAINING NOW - ONGOING

CEH’s = 200 every 36 months
CBT/INSTRUCTOR LED/HANDS-ON

67 Hours 67 Hours 67 Hours

EOPS = 32 hours every 12 months
DRILLS/EXERCISES/SIMULATION

32 Hours 32 Hours 32 Hours
OT Training (The Old Days ~ 5 yrs ago)

Hire

Listen & Learn

Support
OT Training Today

Evaluate Candidates

3 - 12 Months

Hire

1 Month

Role Based Technology Training

Job Performance Evaluation

6 - 12 Months

Range = 3 - 24 month
Average = 12 month
OT ONGOING TRAINING COMPONENTS

Operations

Compliance & Security

Role Specific
WHERE OT SHOULD BE

Simulators

Certification

Schedules
TRAINING EXERCISES

Stakeholders ➔ Training Event

Independent Training ➔ Integrated Training
PLANNING
System Analysis

NERC TPL-001 through TPL-004
Studies system performance after the loss of multiple elements
OT MODELS

- Develop an analysis tool that maps and models cyber devices in a manner similar to electric devices.
SYSTEM OPERATIONS
COMMUNICATIONS

- Required 3 way communication
ALERTING

- Watch for variations and exceptions. Monitor the Monitor!

Watch for Alerts

Take Action

Avoid Failure
OT LEARNING'S

Communications

- Need for OT Communications Training

Alerting

- Develop monitoring and alerting capabilities that are actionable
LOAD SHEDDING

[Image of a neon sign that says "LOAD SHEDDING"]

[Image of a sign that reads:

CLOSED

OUR POWER IS OUT

WE WILL RE-OPEN

WHEN IT HAS RETURNED

SORRY FOR THE INCONVENIENCE]
Black Start

Mutual Aid
OT LEARNING'S

Load Shed
- Identify
- Plan
- Build
- Enable

Black Start
- Identify
- Plan
- Maintain
- Exercise

Mutual Aid
- Identify
- Plan
- Agree
- Utilize
ACTIONS
**ACTIONS**

**Asset Owners**
- Leverage Safety Culture for Security & Compliance
- Participate in Joint exercises
- Pursue Training & certification for your OT Teams
- Engage your OT teams
- Develop and test black start and load shed OT plans

**Smart People**
- Build a training curriculum and certification path
- Develop Cyber simulators for OT active training and exercises
- Develop cyber modeling & contingency analysis software for OT environments
WHAT DOES “OPERATIONALIZED” OT LOOK LIKE?

- Fully Integrated into Operations, work together, train together, respond together
- The tools and technology that operations relies on are managed in the same way as the electric system itself
- System modifications and upgrades are modeled and planned, then integrated into the larger electric system model
- Emergency response is a managed process with fully engaged operators who have ultimate authority to preserve the OT system and ensure reliability of the Bulk Electric system
QUESTIONS