Cold Weather Critical Component Monitoring Strategy

Andrew Valencia, PE
Senior Vice President of Generation
Agenda

• Review LCRA’s cold weather preparation and after-action process

• Discuss LCRA’s Monitoring Strategy

• Discuss LCRA Data Evolution
LCRA Cold Weather Preparation Process
Site Procedures

• **Written procedure and checklists for each site**
  – Required supply inventories and equipment checks
  – Location, type of temporary measures

• **Plant directors affirm execution of site procedures**
  – By early November
  – Documentation for all checks performed

• **Senior manager tours each site to verify preparations**

• **Also follow site procedures and checklists for actions while temperatures below freezing**
Preparation Meeting – Early November

• Includes staff from generation, plant management, qualified scheduling entity operations, meteorology

• Discuss:
  – Expected weather patterns
  – Expected real-time market conditions
  – Preparation status
  – Questions, concerns, needed resources

• Document action items
LCRA Monitoring Strategy
LCRA Monitoring Strategy

- Strategy is dependent on severity of event, Levels 1 - 4
- Additional equipment surveillance by operations personnel
- Additional staffing brought in to help with further surveillance
- Battle stations staffing
- Generation Emergency Command Center
LCRA Monitoring Strategy

• Battle Stations staffing involves every employee in Generation

• Every employee is assigned a task and a location

• Put in place for a Level 3 event or sooner depending on the situation
LCRA Monitoring Strategy

<table>
<thead>
<tr>
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<th>Role</th>
<th>Initials</th>
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LCRA Monitoring Strategy

- Plant, QSE and meteorology staff hold daily calls to discuss:
  - Plant status and known risk
  - Market/ERCOT status
  - Weather issues – severity, duration, timing
  - Offline units
  - Fuel supply needs
- Depending on severity of event, hold additional calls with managers on duty, risk staff
- For Level 4 event, may activate Generation Emergency Command Center
LCRA Monitoring Strategy

Generation Emergency Center – L215

- Computer Monitor
- Marker Board
- Computer Monitor
- TV Monitor

- Existing Table
- Computer Monitor
- Marker Board
- Computer Monitor

- Generation Management
- Generation Support
- Environmental Affairs
- Communications
- Supply Chain
- Telecom
- Incident Commander
- Market Operations Management
- Hydro Management
- Regulatory Advocacy
- Market Compliance
- Digital Services
- Cyber Security

Team members use their laptop
LCRA Data Evolution
LCRA Data Evolution

• Prior to 2016 plant data resided at the site

• In 2016, LCRA set up a Fleetwide Enterprise Historian (EdNA/PODS)

• Data from each site was viewable from any network computer

• LCRA was data-rich
LCRA Data Evolution

• We have over 55k points in our historian

• In 2019, we began evaluating a Data Analytics solution

• HanPHI for HanAra was selected and implemented in Dec 2019

• Installed on 100+ PCs, including in our control rooms
LCRA Data Evolution

• Plant models were built and tuned using a year’s worth of data

• Near real-time data flows from historian to HanPHI and is compared to predicted values

• Deviations are graded and alarmed if they meet definable criteria
LCRA Data Evolution

PODS Overview Screen

Lost Pines Overview

CTA
99 % Load
156 Net MW
-7 MVAR
3599 RPM

HRSG A

STG
183 Net MW
-8 MVAR
3600 RPM

Total Plant
493 Net Power (MW)
7184 Net Heat Rate (BTU/KW-hr)
22 Ramp Rate (KW/Khade)
N/A AGC Status

CTB
97 % Load
154 Net MW
-8 MVAR
3599 RPM

HRSG B
LCRA Data Evolution

- HanPHI Fleet Dashboard
**LCRA Data Evolution**

- **HanPHI Plant Index Screen**

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LCRA Data Evolution

- HanPHI Success Tree
LCRA Data Evolution

LP1 Intermediate Pressure Drum Pressure Sensing Line Freeze

Very good agreement between the black (model predicted value) and the green (actual tag value).

Deviation from the model predicted value and the actual tag value when sensing line froze.