Texas Wildfire Mitigation Project
Reducing the Risk of Wildfires Caused by Power Lines

Project Advisory Council Meeting
June 11, 2014, 2:00 – 3:30 p.m.
Via Webcast

Hosted by
Texas A&M Engineering Experiment Station

http://WildfireMitigation.tees.tamus.edu
Welcome

Representative John Otto
Chair, Wildfire Project Advisory Council
Texas Wildfire Mitigation Project
Reducing the Risk of Wildfires Caused by Power Lines

Agenda
Meeting of Project Advisory Council
Wednesday, June 11, 2014, via Webcast

Welcome by Rep. John Otto, Chair, Wildfire Project Advisory Council Chair

Project Refresher

Project Status

Discussion of Advisory Council Function

Open Discussion/Questions

Closing Remarks

Adjourn
Power line-caused wildfires 2005-2011

- Number of fires: 6,628 documented
- Acres burned: 2.3 million (3,528 square miles)
- Homes and other property lost: $947 million
- Costs associated with fire response and suppression, other emergency services, and loss of commerce are in addition to the figure shown above.

Source: Texas A&M Forest Service statistics
Vision Statement

To reduce wildfire risk and losses in Texas, using state-developed technologies to mitigate power line-caused wildfires.
How Do Power Lines Cause Fires?

- **Downed Conductors**
- **Clashing Conductors**
- **Vegetation**
- **Failing Apparatus**
TEES technology detects incipient failures and enables repairs before major events occur.
Power Line-Caused Wildfire Mitigation

From Failure to Fire – Timeline
(Example: Failing Clamp Causes Broken Line)

Normal       Incipient Failure                          Fire  Growth

Line Breaks  Fire Ignites  (arbitrarily long time)  First Responders Notified  Utility Notified Or Discovers

Detect Incipient Failure  Avoid Event  Respond Sooner  Limit Fire Spread

Mitigation Opportunities Provided by Situational Awareness
Power Line Incipient Failure Detection

Fundamental Principle

- Graph shows current during “normal” feeder operations.
- Analytics report this specifically as a failing clamp. Failing clamps can degrade service quality, drop hot metal particles, and in extreme cases burn down lines.
- Conventional technologies do not detect incipient failures such as this one.
Power Line Incipient Failure Detection

Signal Acquisition and Report Processing

Inputs: Substation CT and PT Waveforms

Waveform Analytics

On-Line Signal Processing and Pattern Recognition Analytics

(Performed by Device in Substation)

Outputs

Line recloser* tripped 8% of phase-A load twice, but reclosed and did not cause outage

Failing hot-line clamp on phase B*

Failed 1200 kVAR line capacitor* (phase B inoperable)

Breaker lockout caused by fault-induced conductor slap

*Analytics applied to high-fidelity substation waveforms report on hydraulic line reclosers, switched line capacitors, apparatus failures, etc, without requiring communications to line devices.
Incipient clamp failure causes minimal electrical variations, but waveform analytics diagnose the specific problem and enable targeted response.
Broader Benefits of Situational Awareness

(Partial List)

**Power quality and reliability**
- Avoid outages (improved SAIDI and SAIFI)
- Avoid momentary interruptions, sags, etc. (improved PQ)
- Improve customer satisfaction
- Better support of economic development

**System stresses and liability**
- Reduced stress on line equipment (e.g., transformers, lines, connectors, switches, reclosers)
- Reduced damage and liability from catastrophic failures (e.g., conductor burn-down, fire, transformer explosion)

**Operational efficiency and other labor impacts**
- Daylight, fair-weather, straight-time failure location and repairs
- Improved worker safety (fair-weather, daylight work)
- More efficient troubleshooting (e.g., fewer no-cause-found tickets)
Participant Status

- Bluebonnet EC (10) (reviewing PO contract)
- Mid-South Synergy (10) (executed)
- Pedernales EC (10) (awaiting execution)
- Sam Houston EC (10) (executed)
- United Cooperative Services EC (4) (awaiting BoD action 6/30)
- Austin Energy (6-8) (reviewing PO contract)
- CPS Energy (10) (reviewing PO contract)
- CenterPoint Energy (24 in 4Q2014, pending budget approval)
- AEP (19 anticipated) (reviewing PO contract)
- Entergy (# of feeders TBD) (reviewing PO contract)
- Xcel Energy (considering participation)
Status and Schedule

- Nine companies have submitted non-binding expressions of interest.
  - Additional utility companies and feeders can be accommodated.
- TEES sent purchase order agreements (for devices) on 5/23/2014.
  - TEES requests execution of purchase orders by 6/20/2014 (next Friday).
- Target Schedule:
  - 6/30/2014: Selection of feeders by utilities
  - 7/16/2014: GIS-based feeder maps/models to TEES
  - 8/29/2014: Substation make-ready work (wiring, communication, ...) complete
  - 10/01/2014: Delivery of devices
  - Full installation and commencement of monitoring within four weeks of delivery

Meeting this target schedule is desirable. TEES recognizes that not all participants will be able to do so, and accommodations will be made on a case-by-case basis.
Power Line-Caused Wildfire Mitigation
Mitigation Objectives

Identification
- Identify ongoing power line ignition events in regions of high fire risk

Utility Notification/Response
- Find and fix before ignition

Fire Response
- All-hands response, if fire occurs
Important Task for Advisory Council

• Assume we have identified an active ignition event in a high-risk region.
  – What factors will affect the priority, speed, and nature of response?
  – Who responds first?
  – How will communication be established with additional responders?
  – Other considerations?
Questions and Open Discussion

http://WildfireMitigation.tees.tamus.edu
Action Items

- Finish sign up process, including execution of purchase order agreement.
- Finalize selection of specific feeders.
  - Website has guidance on selection.
  - TEES personnel are available for consultation.
- Provide electronic GIS-based map/system model.
- Complete make-ready work. TEES will provide instructions.
- Get buy-in from operational personnel to track and document events with TEES on an ongoing basis.
- Consider issues related to responding to
  - incipient failures
  - active ignition events
- TEES will distribute a document discussing types of power line events and probability of ignition, to start the discussion.