

**Transmission Line Monitoring & Rating**  
**Dale Douglass, PDC**

**Friday, November 11, 2011**

Seminar Schedule

**9:00AM Introductions & Discussion**

Instructor background & experience

Student interest and experiences in Line Monitoring

**9:15AM Sag-tension-temperature-current**

- *The single dead-end span*
- *Temperature variation along the multi-span line*
- *Tension equalization for a multi-span line*
- *Average line section conductor temperature*

**9:45AM Variation along Lines**

- *Air temp*
- *Solar heating*
- *Wind speed and direction*
- *Axial Temperature Variation*

**10:15AM Break**

**10:30AM Static and Dynamic Line Ratings**

- *Static Ratings*
  - o *Continuous*
  - o *Emergency*
  - o *Transient (less than 30 min)*
- *Dynamic Ratings*
  - o *Comparison to Static*
  - o *Integration into Operations*
  - o *Prediction, volatility, and duration*

**11:15AM Calculating Dynamic Line Ratings from Field Monitors**

- *Weather instruments*
  - o *Solar Pyranometer*
  - o *Air Temp Sensor*
  - o *Anemometers*

- *Temperature Monitors*
  - o *Power donuts*
  - o *EPRI Monitor*
  - o *Vibrec & Micca*

**12:00PM Lunch**

**1:00PM Calculating Dynamic Line Ratings from Field Monitors (cont)**

- *Sag-tension Monitors*
  - o *CAT-1 Tension Monitors*
  - o *Sagometer*
  - o *Promethean B Field Senosrs*
- *Vibration Monitors*

**2:00PM Conductor Temp For LiDAR & Ground Survey**

- *Based on Weather Monitors*
- *Based on multiple anemometers*
- *Based on Conductor Temp Measurement*
  - *Position of conductor in space*
  - *Temperature for LiDAR*

**2:30PM Break**

**2:45PM Statistical Analysis of Static Ratings**

- *CIGRE TB 299*
- *Thermal elongation rate uncertainty*
  - o *Tension sharing between AL and ST strands in ACSR*
- *Weather conditions*
  - o *Low speed wind*
  - o *Solar heating*
- *OHLOAD Approach*

**4:00PM Future developments**

**4:30PM End of Seminar**