

SCORE 2003

Short Course On Reliability & Energy

Infrared Thermography & Switchgear Maintenance

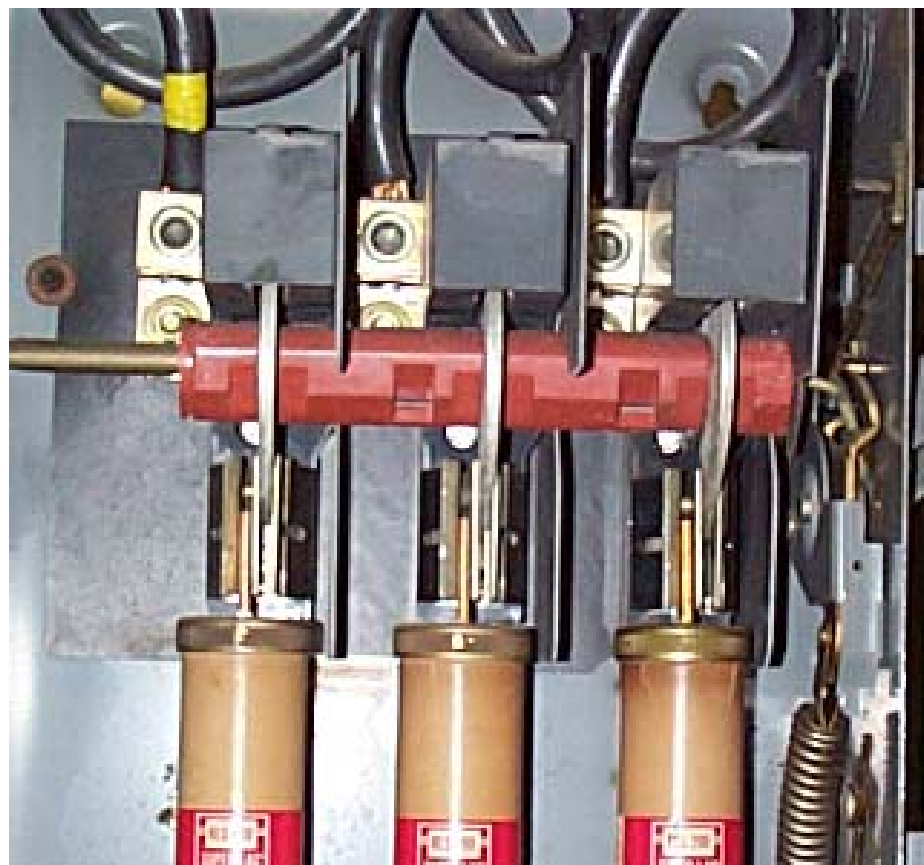
Infrared Thermography

Infrared thermography detects thermal radiation from electrical or mechanical systems, thus pinpointing problems before elevating temperatures cause outages or catastrophic failures.

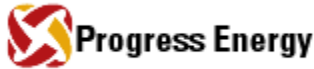
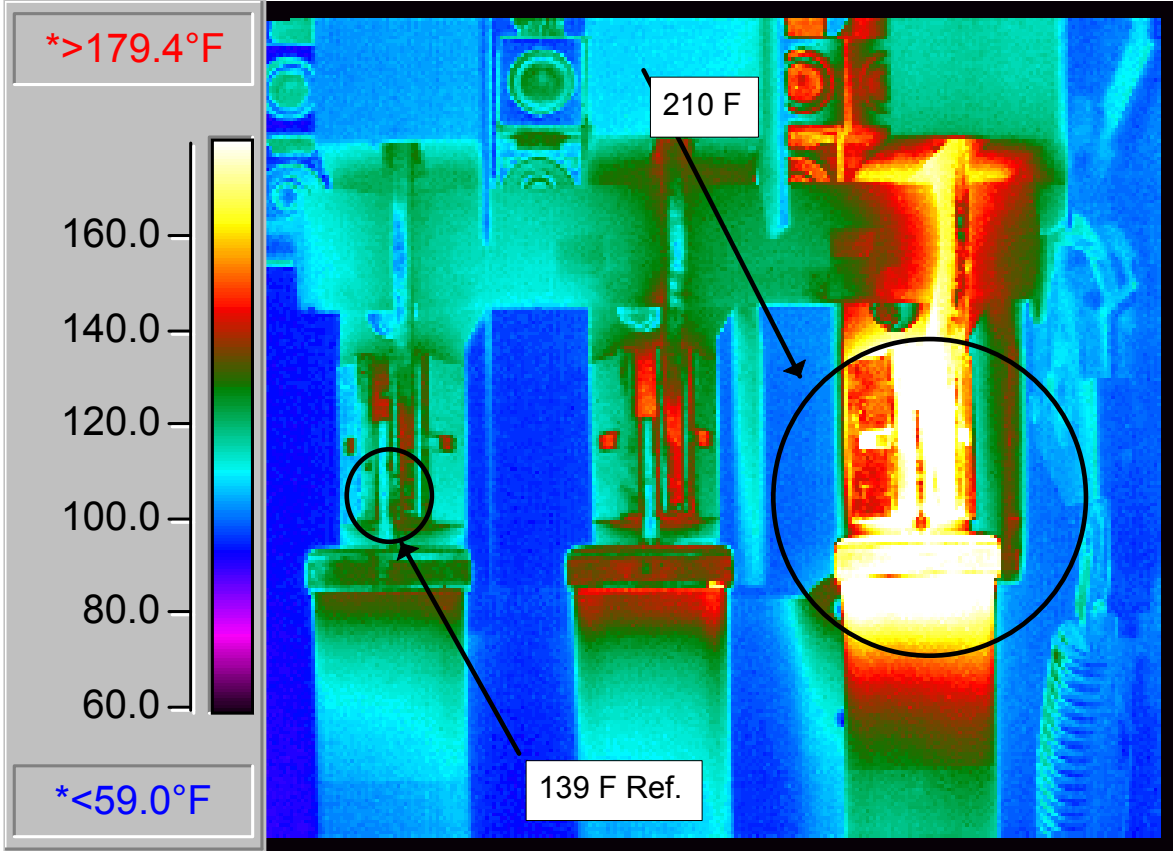
Applications

- Predictive maintenance inspections on electrical and mechanical equipment
- Pre-shutdown identification of maintenance needs
- Inspection on new equipment installations and repairs

Visual Image - All is Good??



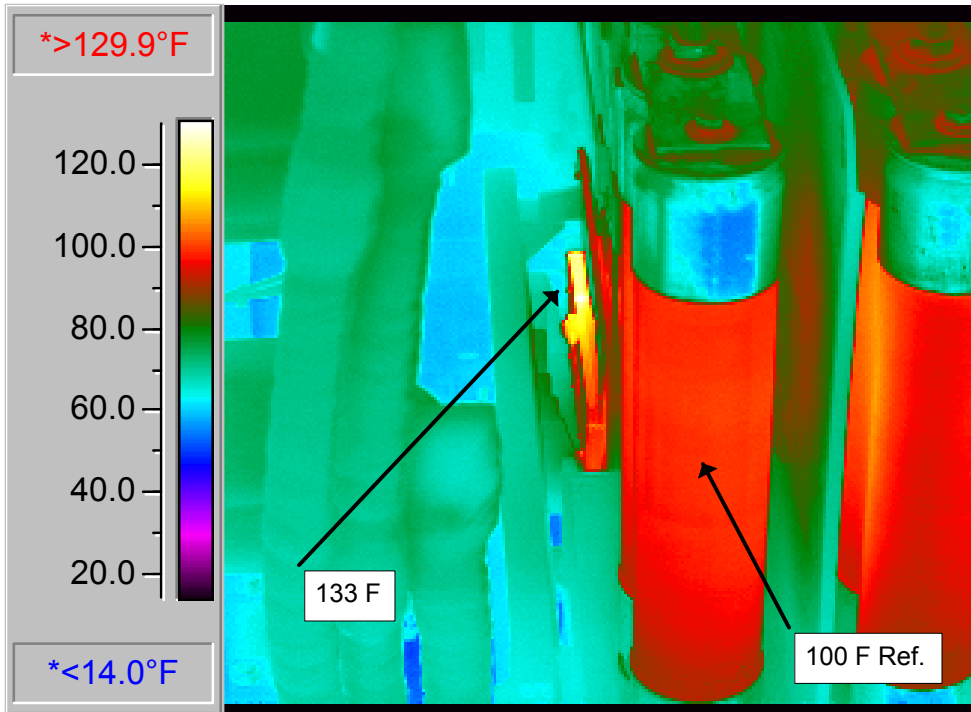
Infrared Image - Problem Revealed!



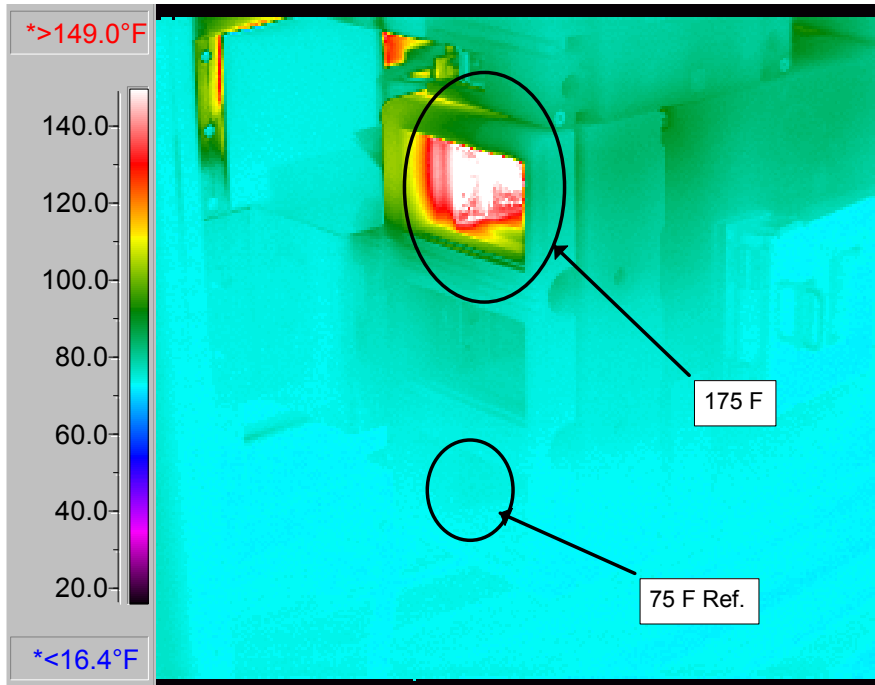
Equipment Examples

- switchgear
- transformers
- overhead and underground cables/wiring
- disconnect switches
- buss work
- motors

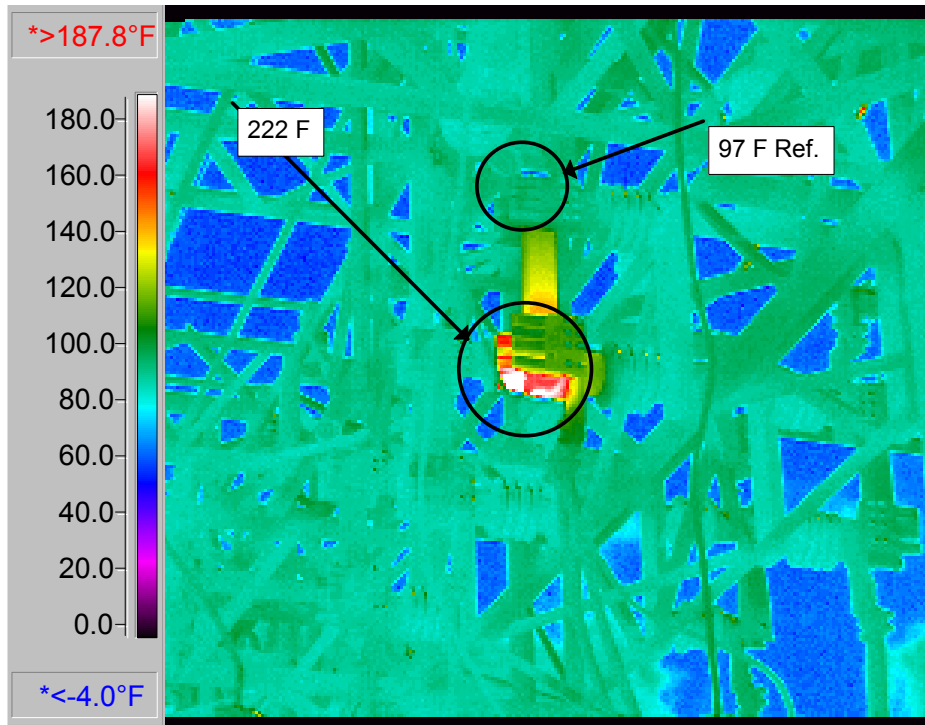
4,160 volt Switchgear Hotspot



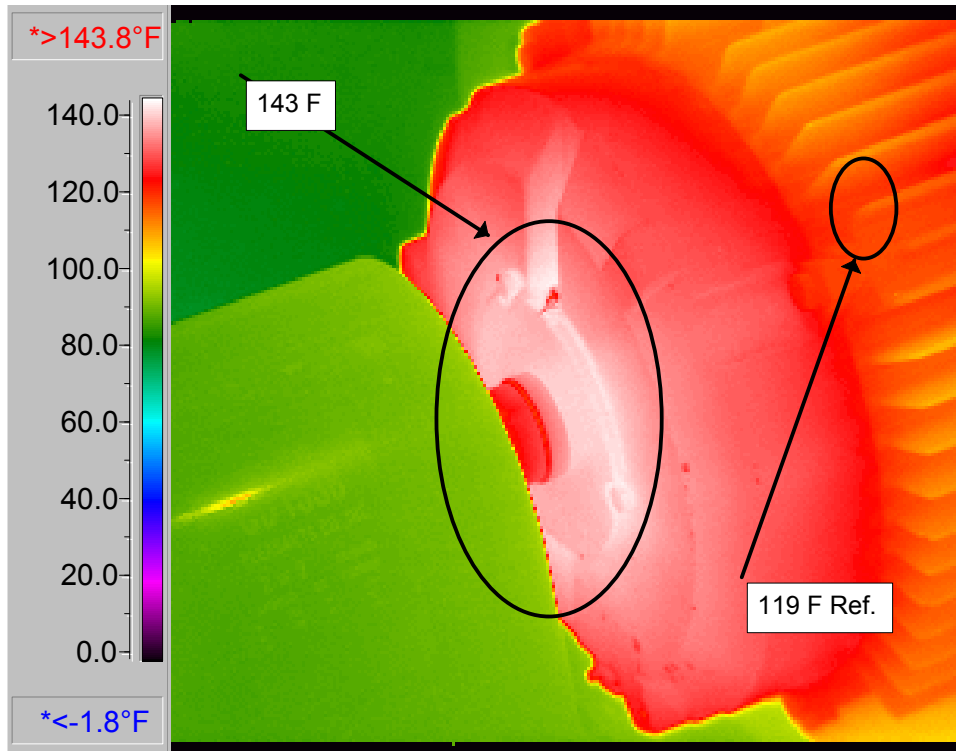
Breaker Connection Overheating



Substation Disconnect Overheating



Motor Bearing Overheating



Benefits

- Equipment outage prevention
- Nondestructive
- Cost effective compared to equipment damage and outages
- Performed during normal operations - shutdown not required
- Enhances asset management

Infrared Support Resources

- Progress Energy provides Infrared Services
 - ▶ Contact Progress Energy Account Manager
 - ▶ Determine work scope
 - ▶ Contract and schedule infrared scan date
- FLIR Systems
 - ▶ Website: www.flirthermography.com

Switchgear Maintenance

Do I Need a Maintenance Program?

- Can Production be Stopped Any Day, Any Time?
- Is Sleep Really Necessary?
- Are Safety and Equipment Life Non-Issues?
- Do I Have Money to Burn?

Switchgear Maintenance

Workscopes and Standard Intervals for Common Equipment

- Drawout Breakers
- Bolt-Lock, Pressure Switches
- Molded Case Breakers
- Switchgear Structures and Cell Assemblies

Switchgear Maintenance

Regularly Scheduled vs. Condition Based Maintenance

- Required Outage Time
- Insurance Requirements
- Money

Arc Flash Hazard Analysis

- NFPA 70E
- Why is This Important?
- Arc Flash Study Requirements