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Title: Infrared Thermography Applications Presented to the MMWG Predictive Maintenance User's Group.

Author(s): Foster, Michelle Elizabeth

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Infrared Thermography Applications

Presented to the MMWG Predictive Maintenance User's Group.

Michelle Foster

Los Alamos National Laboratory

Maintenance Site Services – Maintenance Programs

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Infrared Thermography Applications

Infrared Thermography Applications

Infrared Thermography Applications

What is Infrared Radiation?

- The transfer of heat by wavelength (longer than visible light) of electromagnetic energy

What is Infrared Thermographic Analysis?

- An imaging technique that focuses on the infrared radiation that an object produces

Infrared Detector

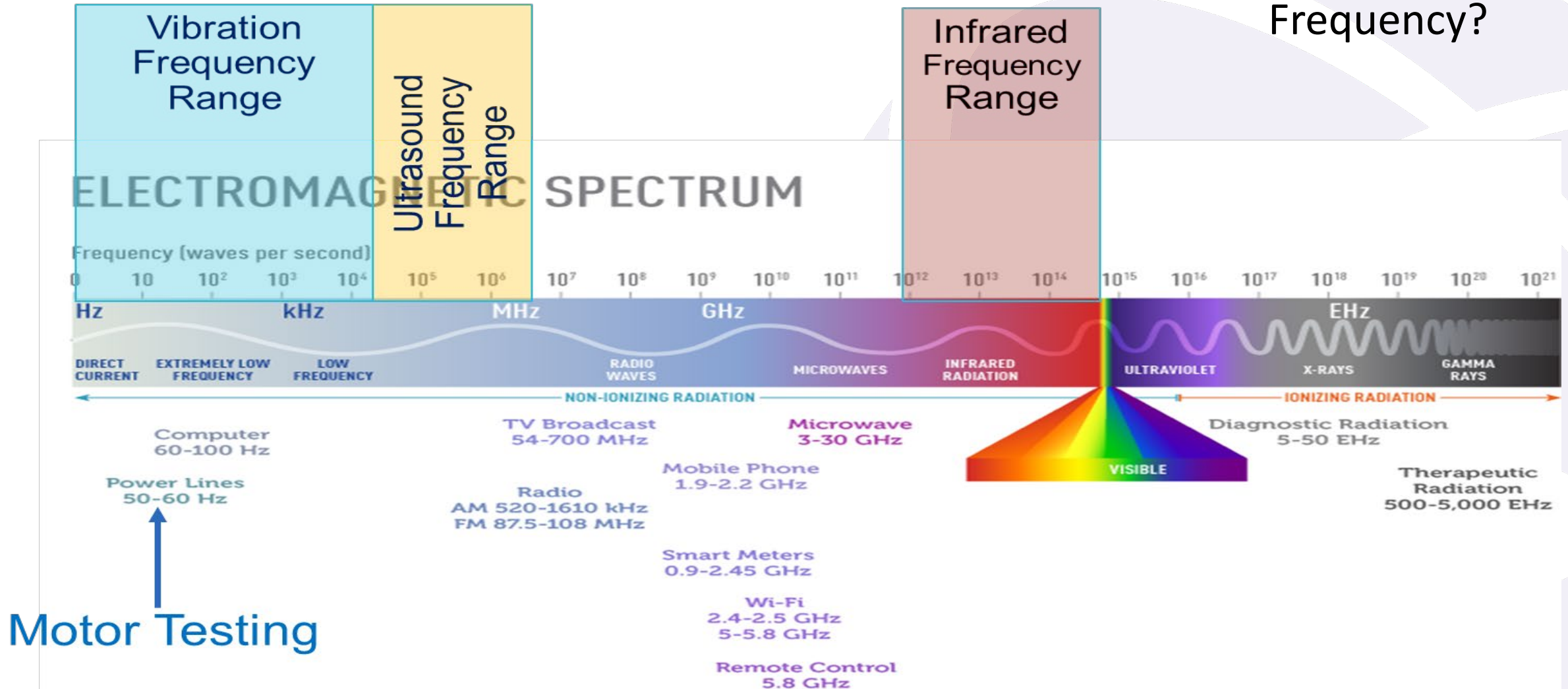
- A device that measures infrared radiation. Temperature can be determined from measured radiation.

Infrared Thermographic Imager

- Converts infrared radiation to the visible light spectrum and produces a visible image.

Infrared Thermography Applications

What's the Frequency?



Motor Testing

Infrared Thermography Applications

Infrared Thermography Applications

- ☺ Military/ Law Enforcement
- ☺ Remote sensing of Ecological Systems
- ☺ Product Testing and Promotion
- ☺ Non-Destructive Testing
- ☺ Medical
- ☺ **Predictive Maintenance/ Condition Monitoring**

Common Thermography Applications

- ☺ Roof Moisture Surveys
- ☺ Rotating Equipment Inspections
- ☺ Electrical Equipment Inspections
- ☺ Steam Traps

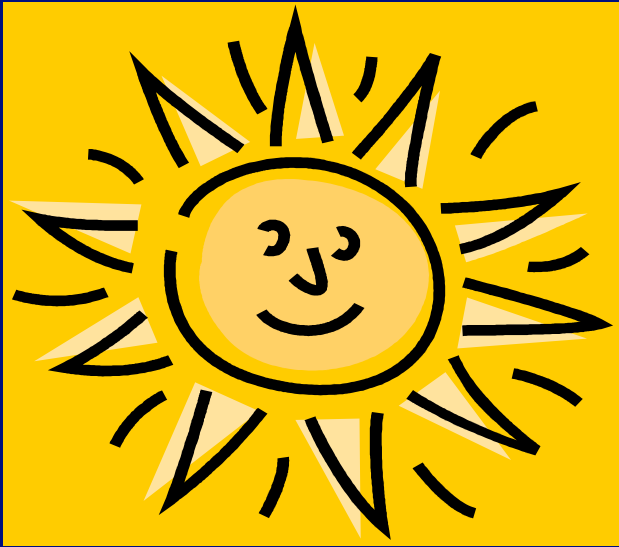
Suspected marijuana growing operation. More significant in some states than others.



Infrared Thermography Applications

Roof Moisture Surveys

- Can pinpoint areas of apparent moisture
- Weather Dependent



Wet Roofing
Insulation

Dry Roofing
Insulation

Wet Roofing
Insulation

Dry Roofing
Insulation

Image taken at 9:45PM

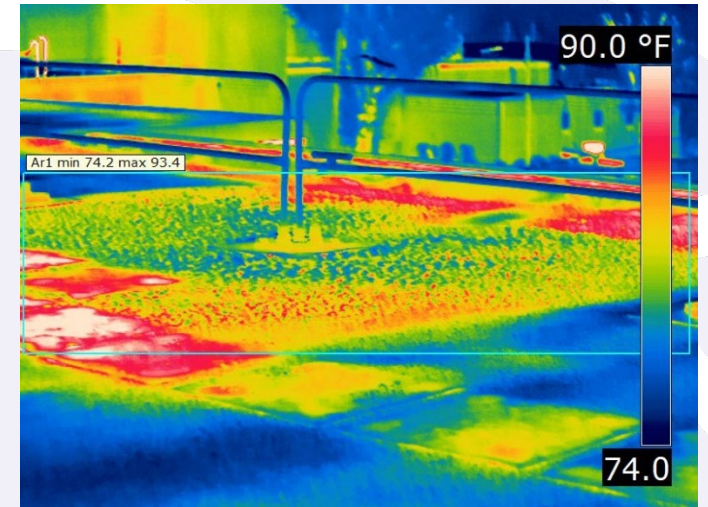
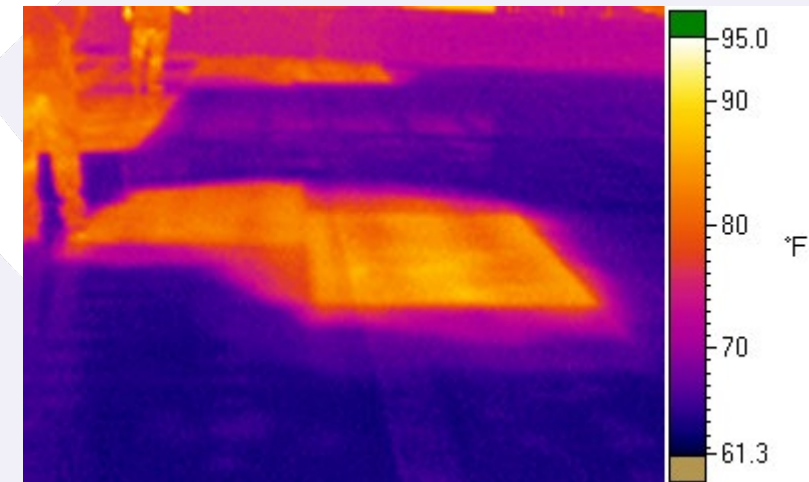


Image taken at 9:30PM



Infrared Thermography Applications

Infrared Thermography

Electrical Equipment Inspections

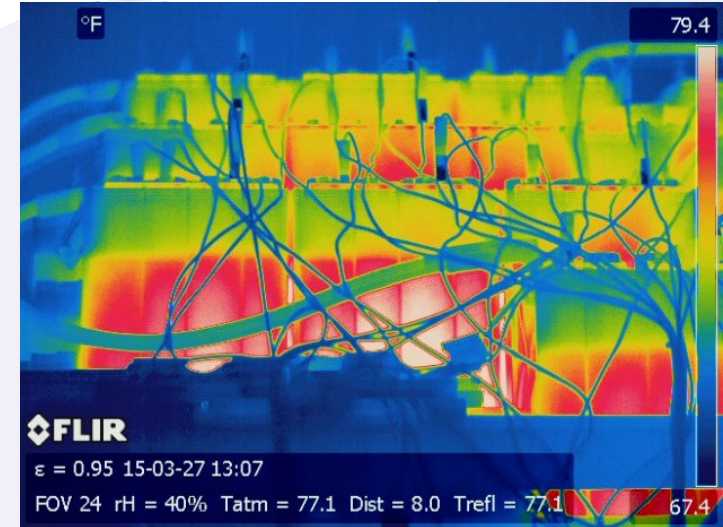
Infrared Technology can be used to check:

- Transformers
- Motor Control Centers
- Switchgear
- Circuit Boards
- Power Distribution System Components
- Bus Runs
- Control Cubicles

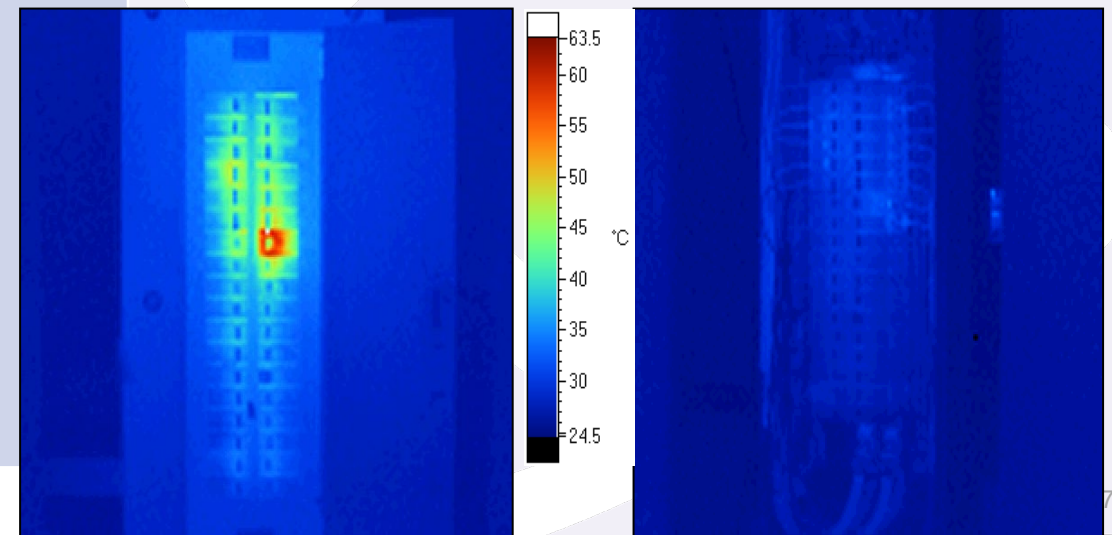
Infrared Technology can detect:

- Poor connections
- Overloads
- Shorts (high resistance connections)
- Inductive heating random pattern

Main Cooling Pump Pony Motor Battery Bank

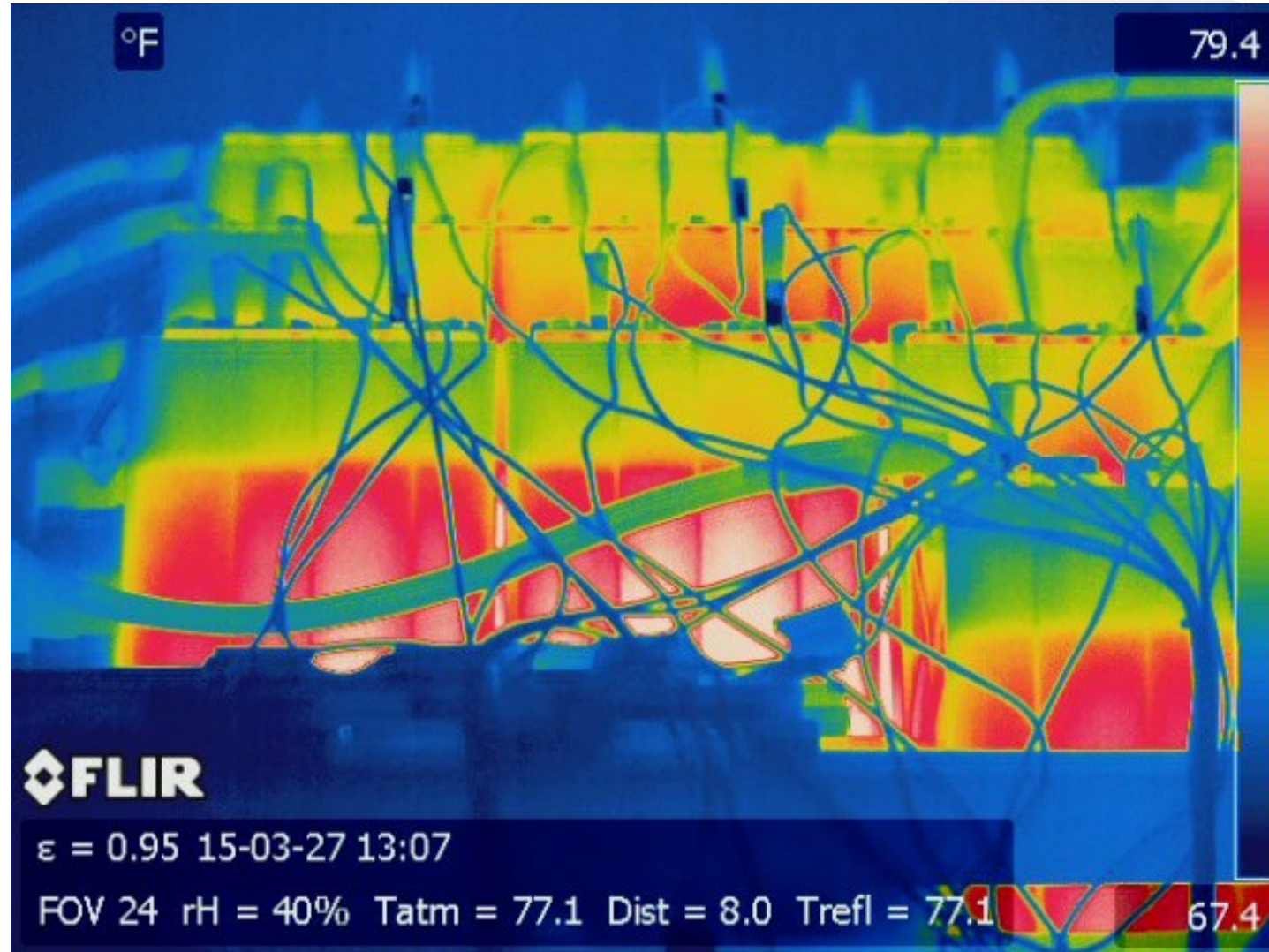


Electrical Panel at a Facility



Infrared Thermography Applications

Main Cooling Pump Pony Motor Battery Bank



Infrared Thermography Applications

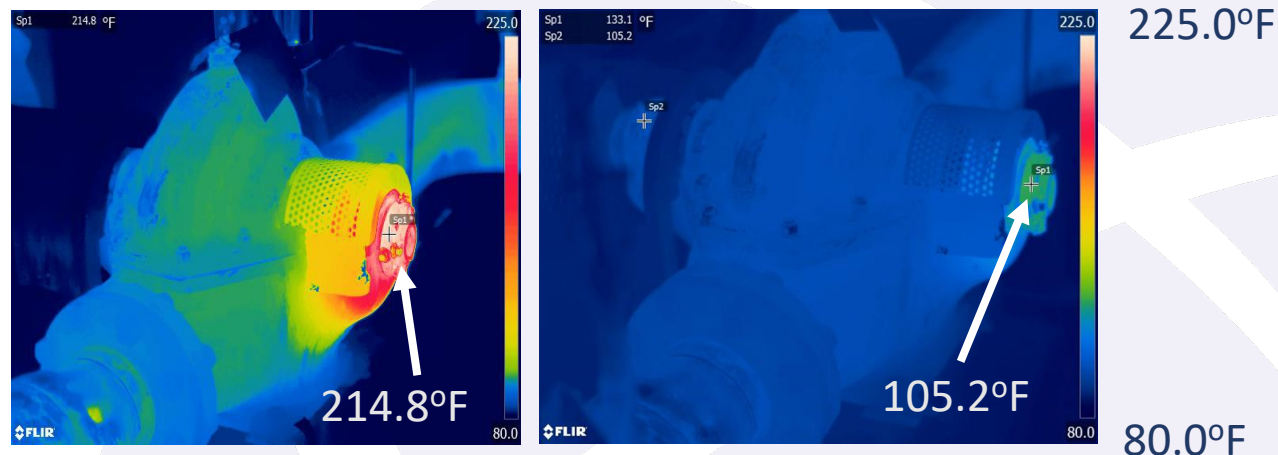
Infrared Thermography

Rotating Equipment Inspections

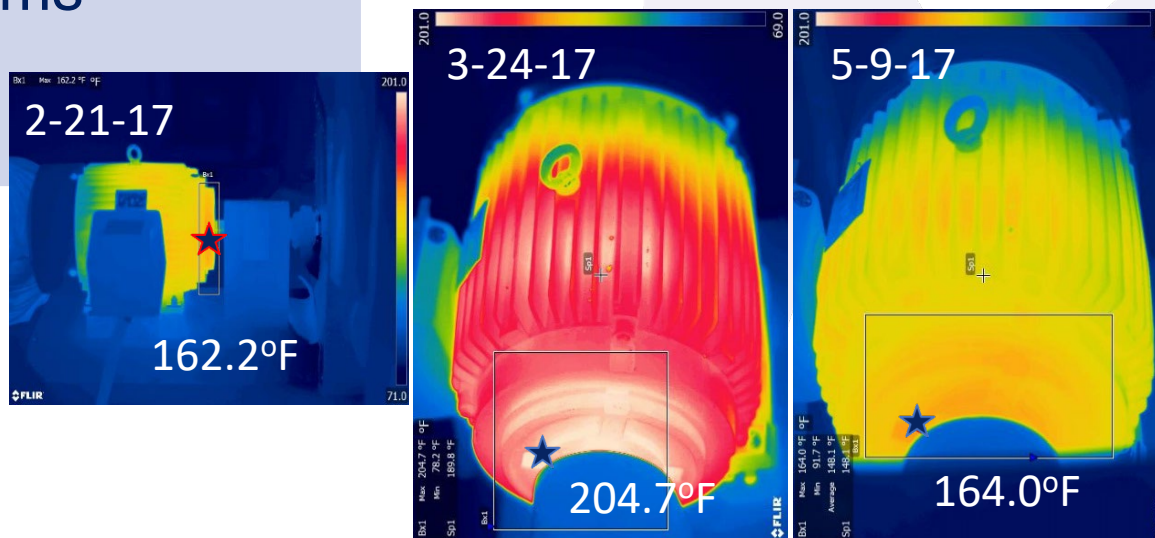
Infrared Technology can detect:

- ☺ Electrical problems
- ☺ Ventilation problems
- ☺ Casing problems
- ☺ Bearing problems
- ☺ Coupling problems
- ☺ Belt problems
- ☺ Misalignment

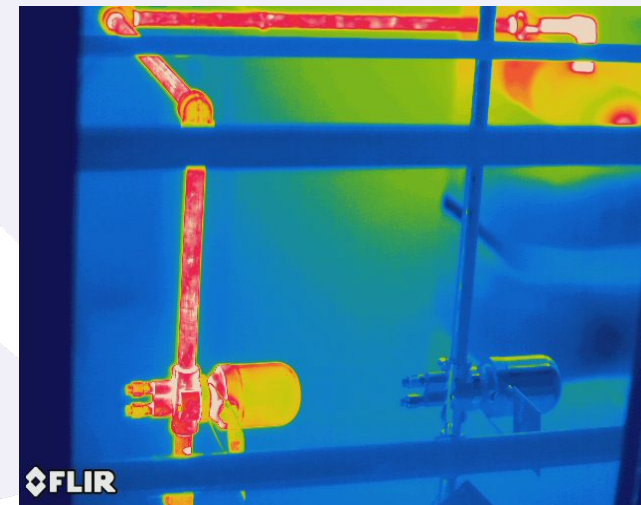
Pool Cooling Pump



Chilled Water Pump



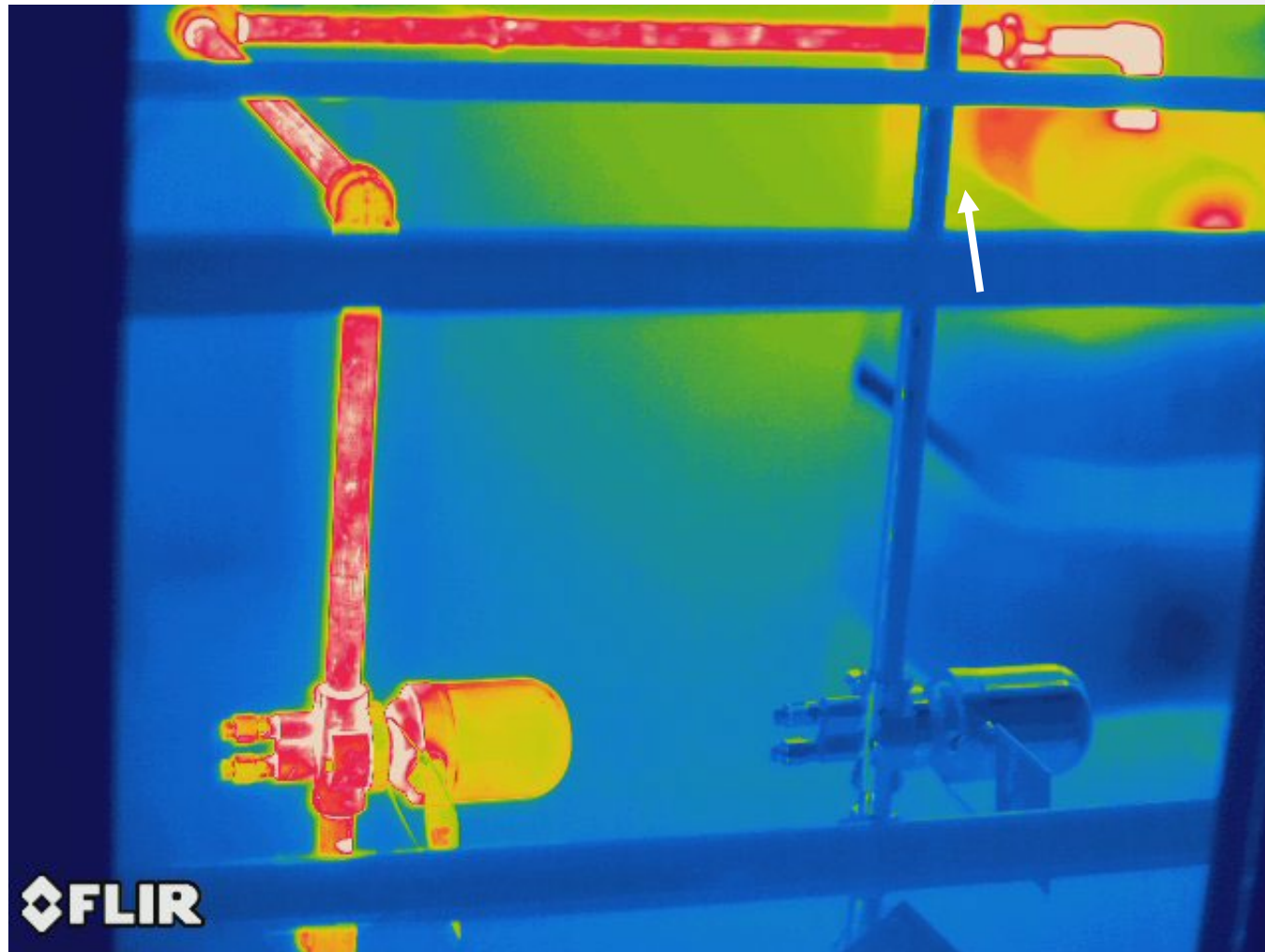
Steam Traps



Infrared Thermography Applications

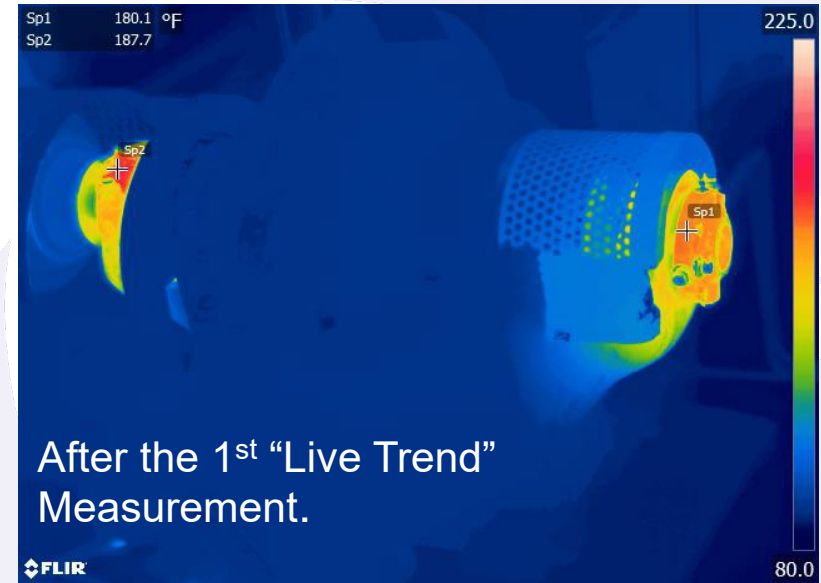
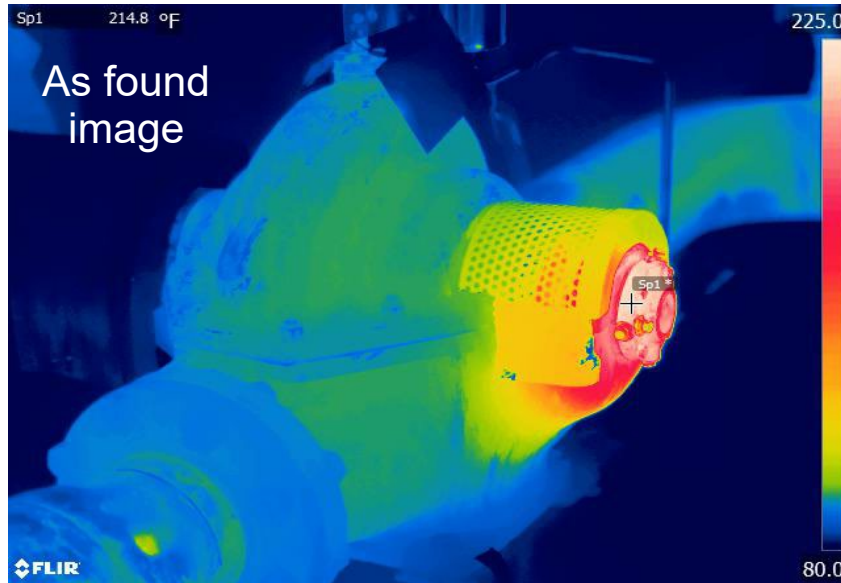
Infrared Thermography

Steam Traps



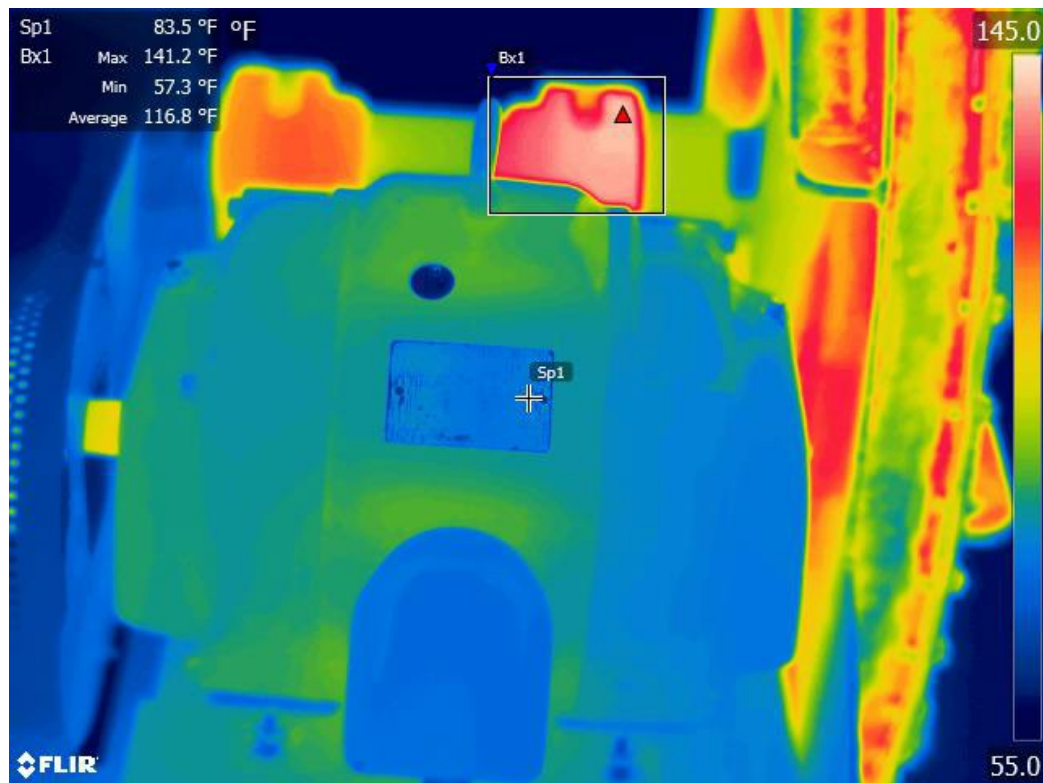
Infrared Thermography Examples

Side by side comparison of the thermal images.



Infrared Thermography Examples

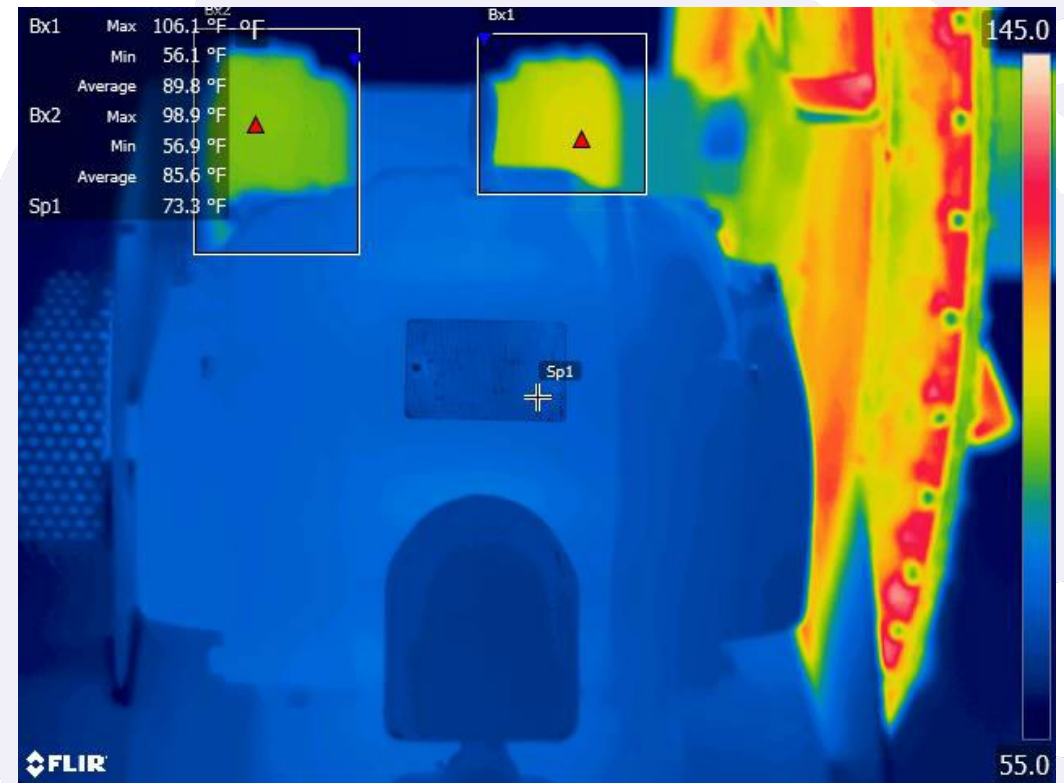
Elevated Fan bearing Temperature



HOG Fan 5
Max Temperature 141.2°F

145°F

55°F



HOG Fan 3
Max Temperature 106.1°F

Infrared Thermography Examples

Potable Water Case Study



Infrared Thermography Examples

