

**Preventive Maintenance Inspection
Thermographic Survey
For**

Sample Customer # 1

Date of Scan:

June 13, 2002

This Service was performed by

***Electrical Technology Services, Inc.
262-250-9234
WWW.IRSCAN.com***

Operator: **ETS Scanner #2 - Equipment PM695**

Infrared Inspection Report

Inspection Completed

June 13, 2002

ETS Job Number

ETS C383

This Infrared inspection Report contains the thermal anomalies found in the electrical equipment that was scanned at the facility. A control photograph identifying the equipment and a thermograph of the components identifying the anomaly are included for each problem found. The arrows indicate the general area of the anomaly.

Temperature rise in like components is used to classify the severity of the anomaly. The data, reference temperature, highest and lowest temperature is indicated on each of the individual pages. If you are unable to correct these anomalies immediately, the following criteria is a recommended guideline to determine the priority of scheduling maintenance based on the temperature rise of the components.

Classification of Severity of Anomalies Identified

Classification	Temperature Rise	Remarks
<i>Minor</i>	0 to 10 Degree C rise	Repair during regular maintenance
<i>Intermediate</i>	10 - 20 degree C rise	Repair 10 - 14 days
<i>Serious</i>	20 - 30 degree C rise	Repair 1 - 2 days
<i>CRITICAL</i>	30 Degree C or above	Repair Immediately

Decisions on the priority, timing, and importance of repairing the thermal anomalies found in the equipment that was scanned is the responsibility of customer. It is recommended that not only the temperature rise be considered in determining the prioritization of repairing the thermal anomalies found but also the criticality of the equipment/process.

The reason for this is that hundreds of connections have shown that even though the temperature rise was 5 to 10 degrees centigrade, they were seriously deteriorated while components with higher temperature rises have shown little deterioration. The reason for this paradox is that excessive heating causes connections to arc and burn to the point where severe deterioration occurs. Arcing causes the connector to weld to the conductor, which forms a low resistance path for current flow. As a result, heating of the component drops and may cease entirely for a time. These unintentional welds are generally poor and are easily broken by mechanical stress, high loads or fault currents. Once such a weld separates, heating and arcing occurs again until the connector re-welds to the conductor. Meanwhile, deterioration continues, and if not detected by inspection, the equipment eventually fails.

GENERAL RECOMMENDATIONS AND COMMENTS

In general, the equipment that was scanned appears to be in good condition and good working order. The facility connections and components were scanned and only those pieces of equipment listed in the report were found to contain thermal anomalies.

The infrared inspection was performed with the electrical system in the "as found" condition. No attempt was made to verify that the system was under full load at the time of the infrared inspection.

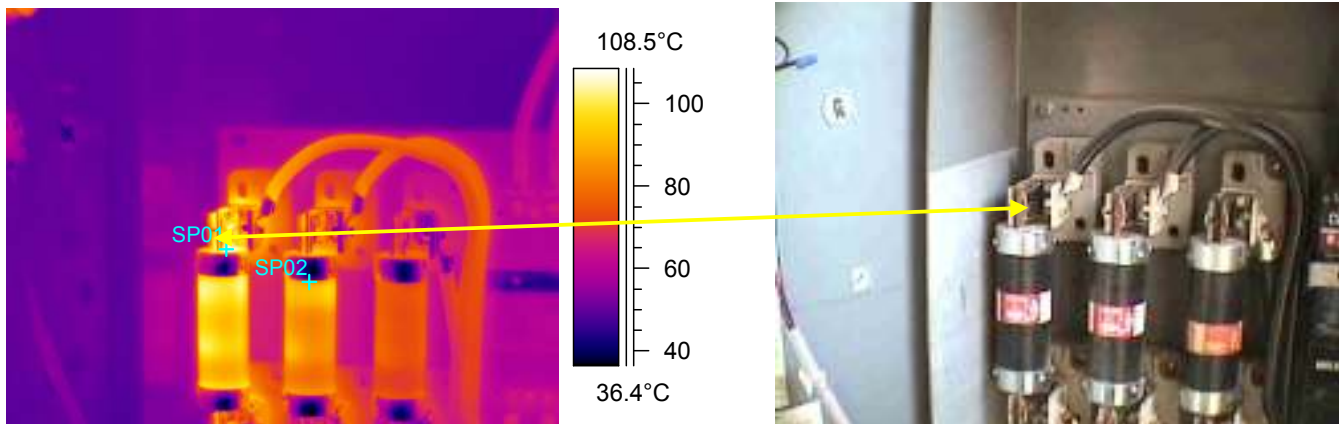
The infrared inspection was performed by our scanning technician. If there are any questions regarding the content of the Infrared Inspection Report, please contact Eric Hansen at (262) 250-9234.

It is recommended that an annual infrared scan be performed as part of an ongoing predictive maintenance program.

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	7:10:45 AM
IR Scan Image File:	C0613-01.img
Location:	#4 Tape Wall
Equipment	Fuse Array
Component:	Fuse Clip
Maximum Temperature:	114.3°C
Minimum Temperature:	33.9°C
Differential Temperature:	64.3°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Clean Fuse Clip connections and fuse ends and reinstall fuses.

Repair Action Taken:

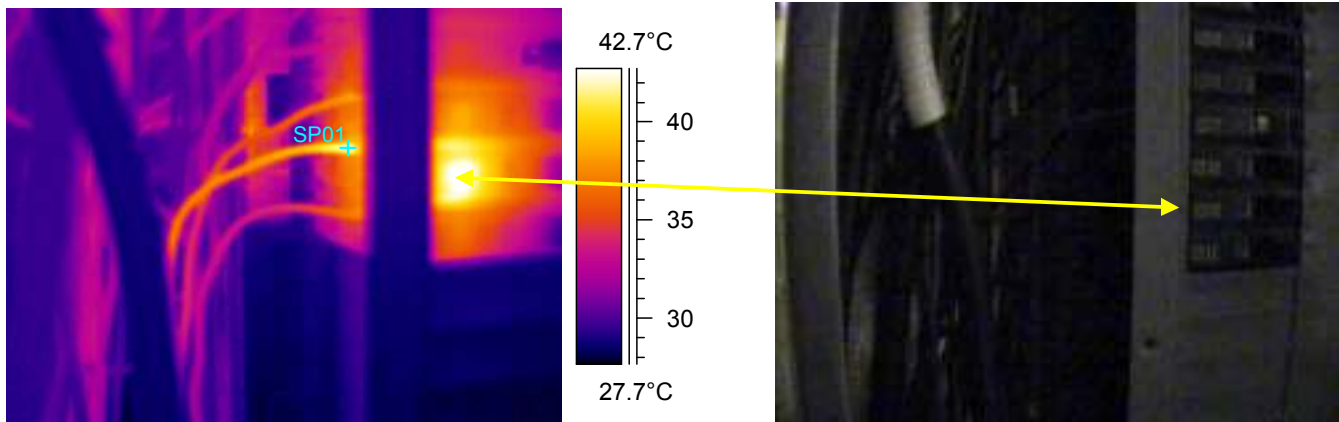
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	7:26:17 AM
IR Scan Image File:	C0613-03.img
Location:	Warehouse
Equipment	200 amp panel
Component:	20 amp circuit breaker #12
Maximum Temperature:	44.0°C
Minimum Temperature:	27.4°C
Differential Temperature:	22.1°C
Probable Cause:	Overloaded circuit
*	*
Recommended Action:	Check loading and split load as needed



Repair Action Taken:

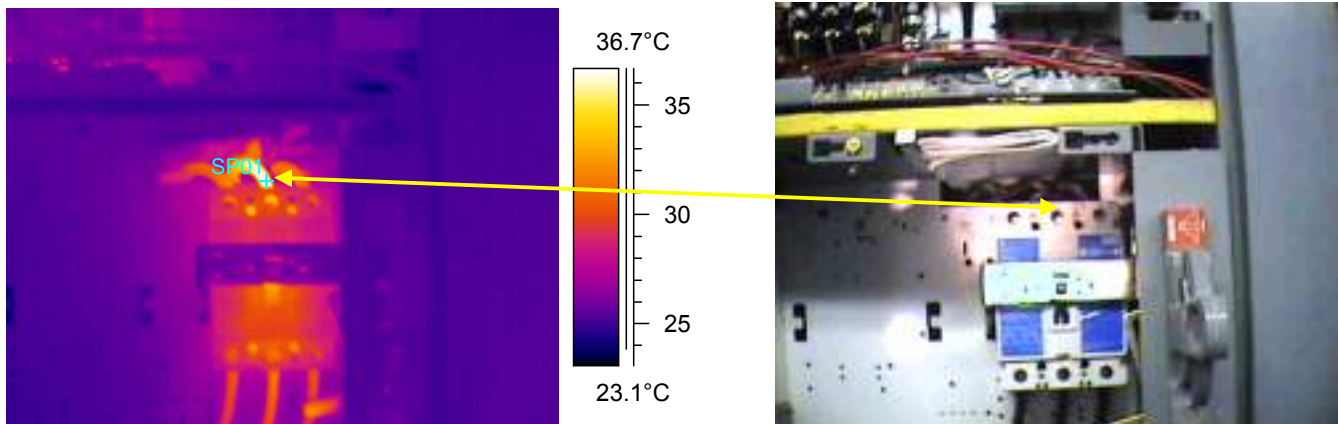
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	8:48:19 AM
IR Scan Image File:	C0613-05.img
Location:	MCC 7300
Equipment	South Room MCC 7314
Component:	100 amp circuit breaker
Maximum Temperature:	37.5°C
Minimum Temperature:	23.7°C
Differential Temperature:	16.6°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Repair Action Taken:

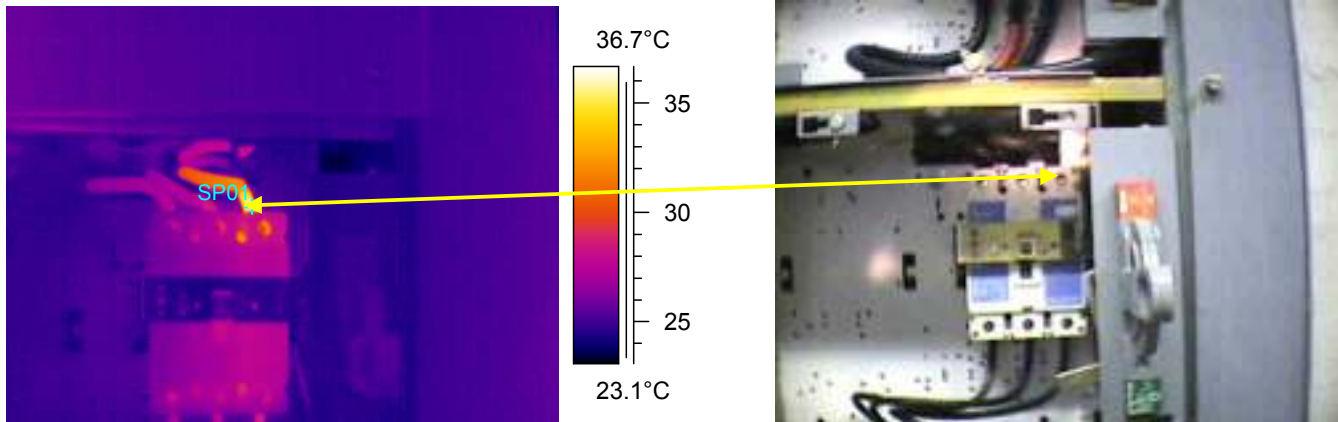
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	8:50:55 AM
IR Scan Image File:	C0613-07.img
Location:	MCC 7300
Equipment	#2 Rewinder MCC 7316
Component:	100 amp breaker connection
Maximum Temperature:	36.5°C
Minimum Temperature:	23.3°C
Differential Temperature:	15.7°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Repair Action Taken:

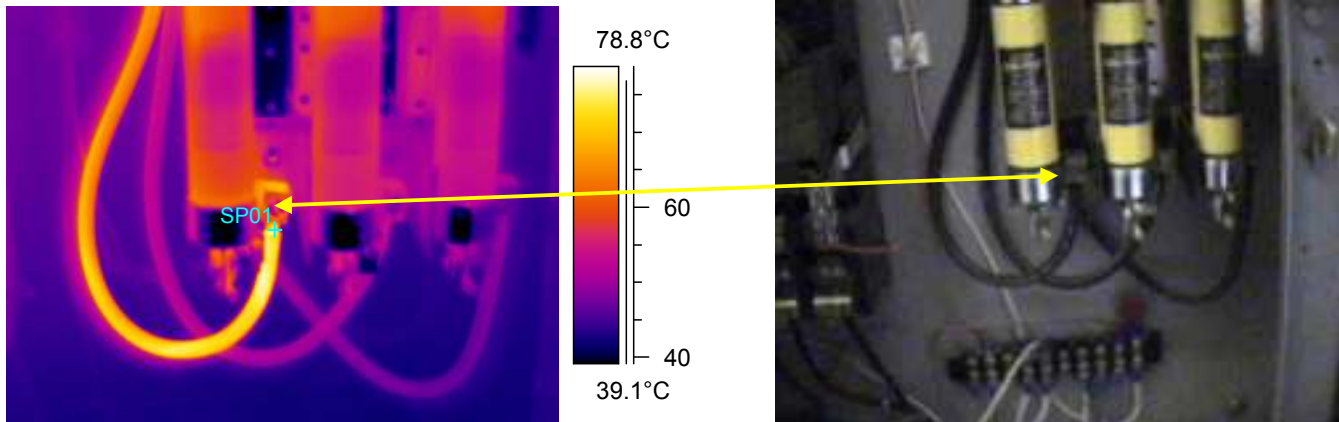
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	9:15:48 AM
IR Scan Image File:	C0613-09.img
Location:	North MCC Room
Equipment	#2 Waxer Disconnect
Component:	Load side fuse cable connection
Maximum Temperature:	77.5°C
Minimum Temperature:	36.9°C
Differential Temperature:	56.7°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Repair Action Taken:

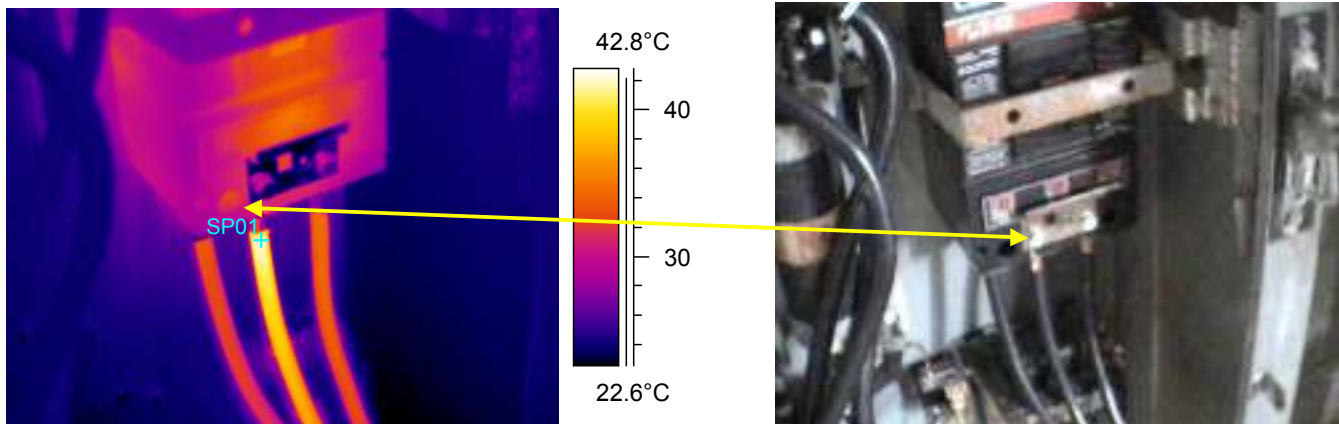
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	11:53:55 AM
IR Scan Image File:	C0613-13.img
Location:	Feed Pump House
Equipment	400 amp main disconnect
Component:	Load side cable connection
Maximum Temperature:	42.4°C
Minimum Temperature:	21.9°C
Differential Temperature:	21.6°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Repair Action Taken:

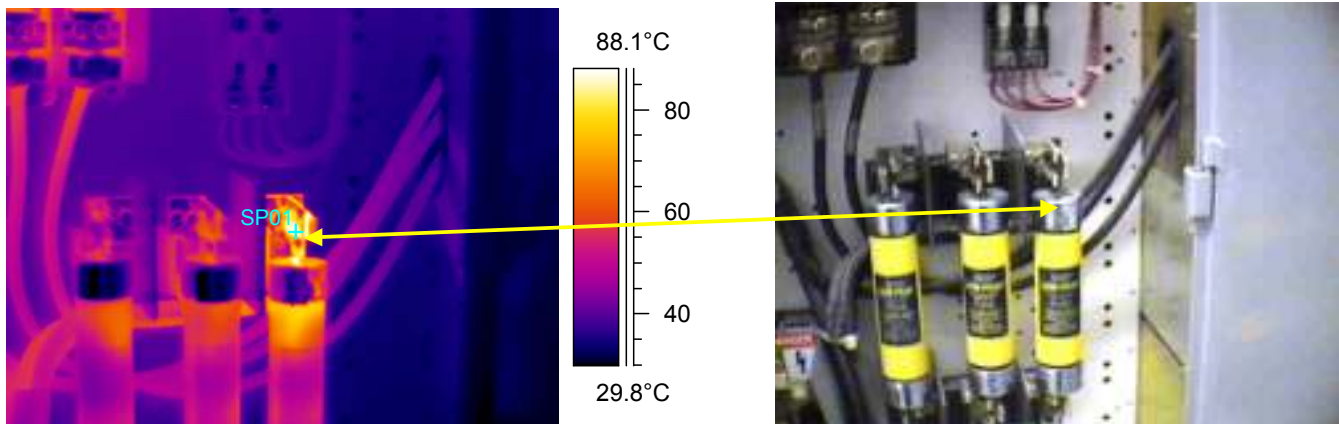
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/13/2002
Time:	12:27:54 PM
IR Scan Image File:	C0613-19.img
Location:	MCC 45
Equipment	80 amp fused disconnect
Component:	Fuse clip connection
Maximum Temperature:	93.6°C
Minimum Temperature:	28.1°C
Differential Temperature:	72.8°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Clean Fuse Clip connections and fuse ends and reinstall fuses.

Repair Action Taken:

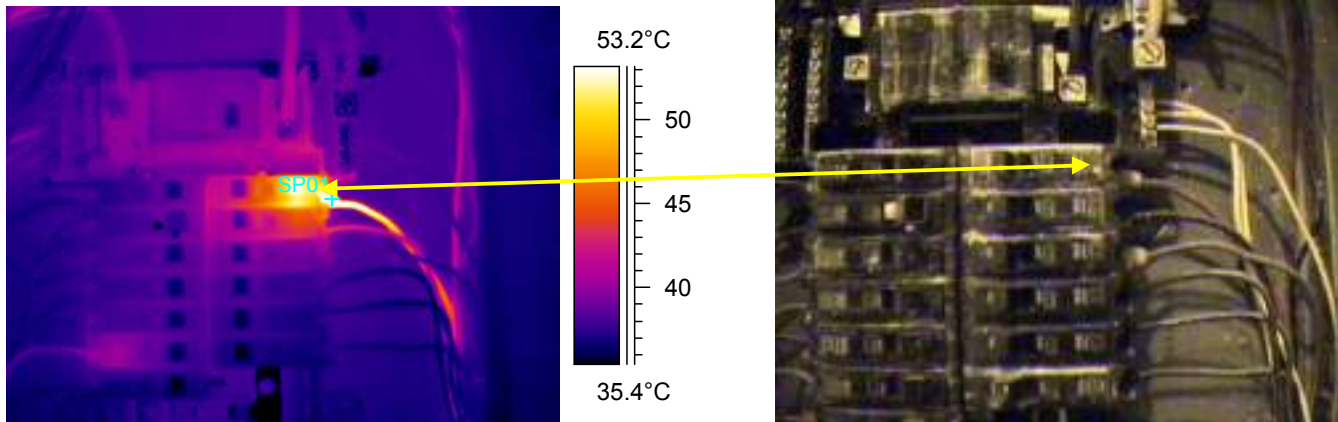
Repaired by Who:

Date Repaired:

INFRARED INSPECTION REPORT

Sample Customer # 1

Date:	6/14/2002
Time:	12:43:16 PM
IR Scan Image File:	C0614-47.img
Location:	South Wall Box 20
Equipment	#20 computer room
Component:	20 amp circuit breaker
Maximum Temperature:	62.2°C
Minimum Temperature:	33.6°C
Differential Temperature:	41.4°C
Probable Cause:	Loose / dirty connection
*	*
Recommended Action:	Clean Connection and torque to proper specifications.



Repair Action Taken:

Repaired by Who:

Date Repaired:

Summary of Problems Identified

For

Sample Customer # 1

Location	Equipment	Hot Spot Temp	Diff Temp	Severity
#4 Tape Wall	Fuse Array	114.3°C	64.3°C	Intermediate
Warehouse	200 amp panel	42.9°C	22.1°C	Minor
MCC 7300	South Room MCC 7314	37.5°C	16.6°C	Intermediate
MCC 7300	#2 Rewinder MCC 7316	36.5°C	15.7°C	Minor
North MCC Room	#2 Waxer Disconnect	77.5°C	56.7°C	Intermediate
Feed Pump House	400 amp main disconnect	42.4°C	21.6°C	Intermediate
MCC 45	80 amp fused disconnect	93.6°C	72.8°C	Critical
South Wall Box 20	#20 computer room	62.2°C	41.4°C	Critical