



Power System Testing & Service

# **Thermographic Study Report**

At

ABC Company  
123 Main Street  
Phoenix, Arizona

For

Facility Engineer

Of

ABC Company  
123 Main Street  
Phoenix, AZ 85009



April 3, 2009

ABC Company  
123 Main Street  
Phoenix, AZ 85009

**Subject: TR-9000**

## **Thermographic Study Report**

Site Location:

ABC Company  
123 Main Street  
Phoenix, Arizona

Attention: Facility Engineer

### **1.0 Summary:**

1.1 This project was initiated at the request of Facility Engineer of ABC Company. The work was performed under Quote Q09-1071. All work was performed on March 31st and April 1st 2009 by Jerry Lindley and Brad Davis of Arizona Electrical Testing. The equipment indicated in the scope was inspected and scanned. Two (2) thermographic anomalies were identified. No code compliance issues were identified.

### **2.0 Scope:**

2.1 Ninety Six (96) items scanned, as noted on the attached data sheets

### **3.0 Procedures:**

3.1 Thermographic Study

3.1.1 Scanned all equipment listed in the Scope of Work with an infrared camera. Captured thermographic and digital photographs of all problem areas. Inspected all equipment scanned for code compliance issues and recorded all violations.

#### 4.0 Results:

- 4.1 The equipment specified in Section Two of this report was inspected and no code compliance issues were identified.
- 4.2 The following thermal anomalies were identified during this project.
  - 4.2.1 At BLDG 1 SWBD DP-A Disconnect Switch PPL-2 had an elevated temperature on C Phase fuse Clip Holder. We recommend C Phase Fuse Clip holder should be tightened down or replaced. Further investigation should be done and corrective action be taken the next scheduled maintenance.
  - 4.2.2 At BLDG 2 MCC-1 Disconnect Switch Anodize Scrubber Fan had extreme elevated temperatures on B Phase Fuse Clip Holder. We recommend B Phase Fuse clip holder should be tightened down or replaced and B phase Fuse be replaced. Further investigation should be done and corrective action be taken immediately.

Sincerely,



Brad Davis

Enclosures: Six (6) Infrared Survey Data Sheets  
Two (2) Infrared Anomaly Data Sheets



## INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>31-Mar-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
Main SES								
Disconnect Switch DPH-1				Acceptable				
Disconnect Switch LP				Acceptable				
Disconnect Switch DPH-2				Acceptable				
Disconnect Switch 300KVA				Acceptable				
Panel D				Acceptable				
Panel HS				Acceptable				
Panel DPH-2				Acceptable				
Panel H3				Acceptable				
Panel LV-2				Acceptable				
Panel LV-1				Acceptable				
SWBD DPH-1				Acceptable				
SWBD DP-1				Acceptable				
Disconnect Switch PPL-2				Elevated Temperature	1	1	1	1

**Notes:** 1. In SWBD DP-1 Disconnect Switch PPL-2 had an Elevated Temperature On C Phase Fuse Clip Holder.



# INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>1-Apr-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
<b>Main SES</b>								
Main Circuit Breaker				Acceptable				
Disconnect Switch D.P.H				Acceptable				
Disconnect Switch Panel HA				Acceptable				
Disconnect Switch Panel HB				Acceptable				
Disconnect Switch TR-3				Acceptable				
Disconnect Switch TR-1				Acceptable				
Disconnect Switch HC				Acceptable				
Disconnect Switch MCC-1				Acceptable				
Disconnect Switch Main D.S 1 West Bldg				Acceptable				
Disconnect Switch MCC-2				Acceptable				
<b>SWBD D.P.L</b>								
Disconnect Switch 1				Acceptable				
Disconnect Switch 2				Acceptable				
Disconnect Switch 11				Acceptable				
Disconnect Switch 12				Acceptable				
Disconnect Switch 13				Acceptable				
Disconnect Switch 14				Acceptable				
Main Circuit Breaker				Acceptable				
Transformer TR-2				Acceptable				
Transformer TR-1				Acceptable				

**Notes:**

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## INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>31-Mar-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
Disconnect Switch Panel LA				Acceptable				
Panel B				Acceptable				
Panel A				Acceptable				
Panel HA				Acceptable				
Panel HB				Acceptable				
Panel HC				Acceptable				
<b>SWBD D.P.H</b>								
Disconnect Switch 1				Acceptable				
Disconnect Switch 2				Acceptable				
Disconnect Switch 3				Acceptable				
Disconnect Switch 4				Acceptable				
Disconnect Switch 5				Acceptable				
Disconnect Switch 6				Acceptable				
Disconnect Switch 7				Acceptable				
Disconnect Switch 8				Acceptable				
Disconnect Switch 9				Acceptable				
Disconnect Switch 10				Acceptable				
Disconnect Switch 11				Acceptable				
Disconnect Switch 12				Acceptable				
Disconnect Switch 13				Acceptable				
Disconnect Switch 14				Acceptable				

**Notes:**

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# INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>31-Mar-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
SWBD D.P.H (Cont.)								
Disconnect Switch 15				Acceptable				
MCC-1								
D.S. Anodize Rectifier #1				Acceptable				
D.S. Auto Hoist Feeder				Acceptable				
D.S. Dryer Feeder				Acceptable				
D.S. Anodize Rectifier #2				Acceptable				
D.S. Air Make Up Unit				Acceptable				
D.S. R&D Tank Rectifier				Acceptable				
D.S. Ultrasonic Power Panel				Acceptable				
D.S. Anodize Rectifier #3				Acceptable				
D.S. Seal Exhaust Fan				Acceptable				
D.S. Cleaner Exhaust Fan				Acceptable				
D.S. Anodize Scrubber Fan				Extreme Elevated Temperature	2	2	2	1
D.S. Anodize Scrubber PMP				Acceptable				
D.S. ETCH/Deox Scrubber Fan				Acceptable				
D.S. ETCH/Deox Scrubber Fan Pump				Acceptable				
D.S. Air Agitation Blower				Acceptable				
D.S. Chilled Water Pump #1				Acceptable				
D.S. Chilled Water Pump #2				Acceptable				
D.S. Cooling Tower Pump #1				Acceptable				

**Notes:** 1. In MCC-1 Disconnect Switch Anodize Scrubber PMP had extreme elevated temperature on B phase fuse clip holder.



## INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>31-Mar-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
<b>MCC-1 (Cont.)</b>								
D.S. Anodize Eductor Pump								
D.S. Anodized Tank 37 Acid Cooling Pump								
D.S. Anodized Tank 37 Acid Filter Pump								
<b>MCC-2</b>								
D.S. Anodize Rectifier #4								
D.S. Cooling Tower Pump #2								
D.S. Anodize Acid Cooling Pump #1								
D.S. Chiller Feeder #1								
D.S. Anodize Acid Cooling Pump #2								
D.S. Cooling Tower Fan								
D.S. Rectifier Cooling Pump								
D.S. Chiller Feeder #2								
D.S. Ultrasonic Cleaner Filter								
D.S. Sock Clean Filter								
D.S. R&D Tank Cir Pump								
D.S. ETCH Filter								
D.S. Deox Filter								
D.S. Deox Rinse Filter								
D.S. Anodize Filter								
D.S. Anodize Rinse Filter								

**Notes:**

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## INFRARED SURVEY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Technician:</b>	<b>B Davis</b>
<b>Survey Date:</b>	<b>31-Mar-09</b>	<b>Equipment:</b>	<b>TH-7102</b>
		<b>Calibration Date:</b>	<b>Apr-08</b>

Switchboard Designation / Equipment Identification	Current			Comments	Anomaly Number	Picture I.D. #		Notes
	A	B	C			I.R.	Digital	
MCC-2 (Cont.)								
D.S. Hot Seal Filter #2				Acceptable				
D.S. Nickel Seal Filter #2				Acceptable				
D.S. Seal Rinse Filter				Acceptable				
D.S. WT Panel Feeder				Acceptable				
D.S. RO-DI System				Acceptable				
Panel LA				Acceptable				

**Notes:**

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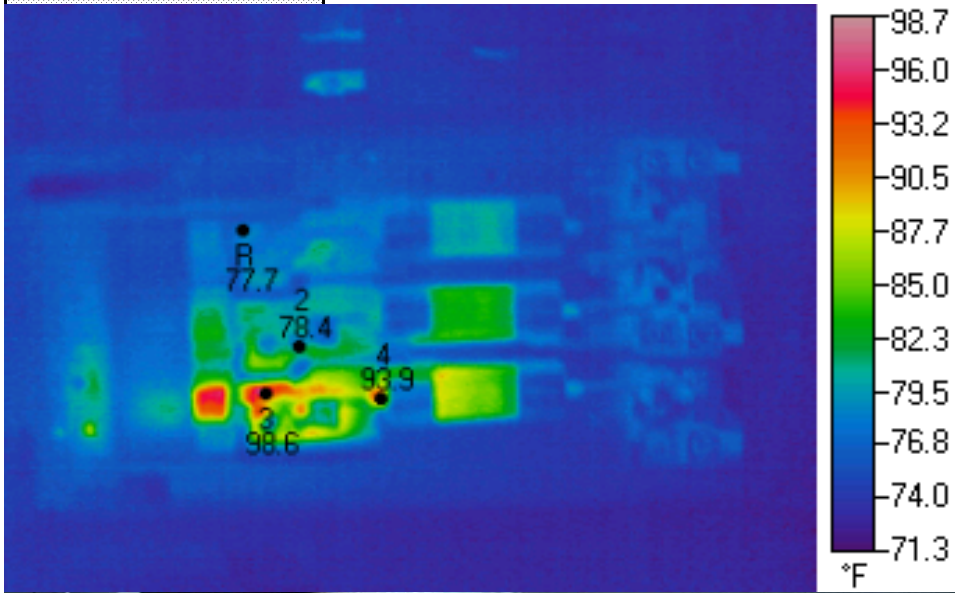


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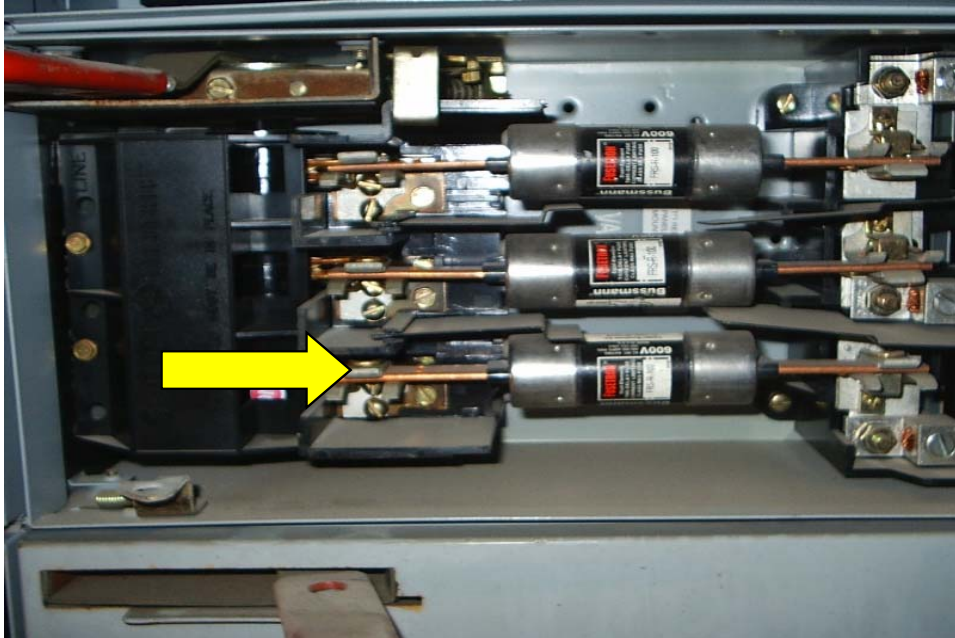


# INFRARED ANOMALY DATA SHEET

<b>Client:</b>	<b>ABC Company</b>	<b>Job #</b>	<b>T-9000</b>
<b>Location:</b>	<b>123 Main Street</b>	<b>Anomaly Number:</b>	<b>1</b>
<b>Equipment:</b>	<b>SWBD DP-A</b>	<b>Component:</b>	<b>D.S. PPL-2</b>



Measurements			
Phase:	A	B	C
Current	--	--	--
mv drop	--	--	--
IR #	1	Digital #	1
Temperatures			
Ref:	77.7	Spot 3	98.6
Spot 2	78.4	Spot 4	93.9
Spot 2 $\Delta$ T		0.7	
Spot 3 $\Delta$ T		20.9	
Spot 4 $\Delta$ T		16.2	
Thermal Category:	Routine		



**Comments**

C Phase Fuse Clip holder had an elevated temperature.

**Recommendations**

We recommend C Phase Fuse Clip holder should be tightened down or replaced. Further investigation should be done and corrective action be taken the next scheduled maintenance.

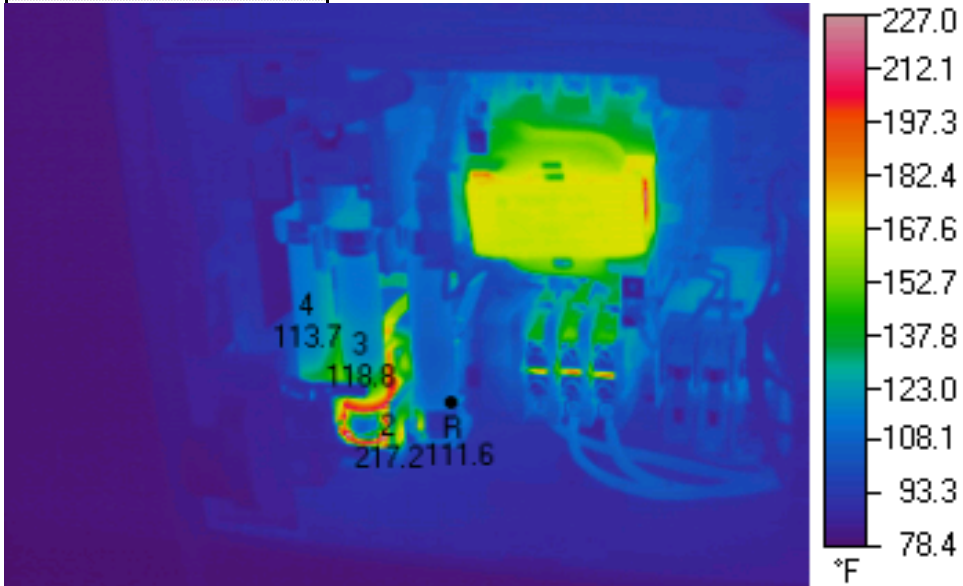
Priority	Temperature Rise	Recommended Time Till Correction
Routine	1-10 Degrees Celsius / 34-50 Degrees Fahrenheit	Next Scheduled Maintenance
Intermediate	11-20 Degrees Celsius / 50-68 Degrees Fahrenheit	Within a few weeks
Serious	21-40 Degrees Celsius / 69-104 Degrees Fahrenheit	Two or Three Days
Emergency	>40 Degrees Celsius / >104 Degrees Fahrenheit	Immediately

**General Note:** The priority rating is based on other factors as well as temperature rise.

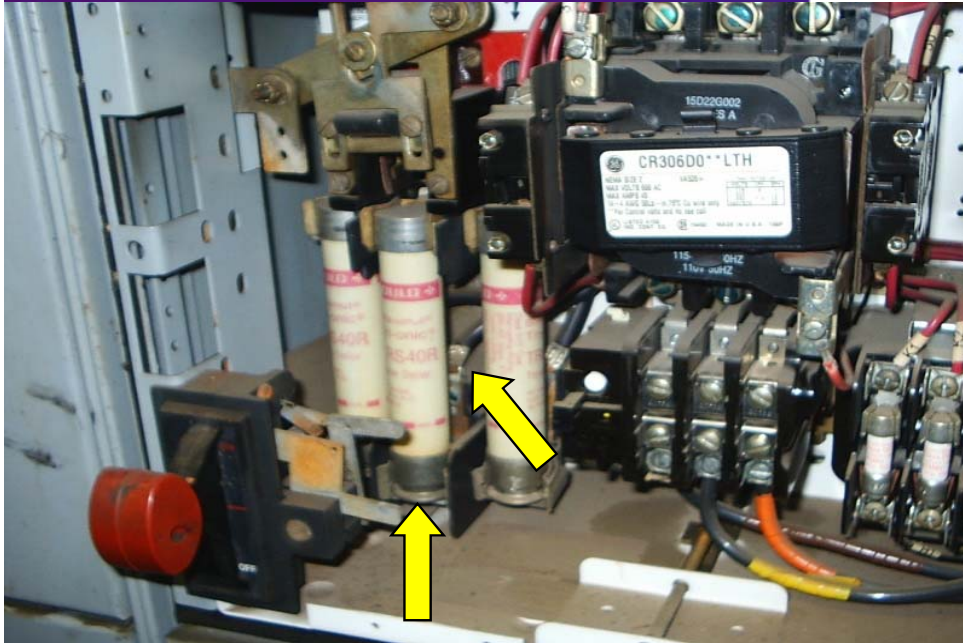


# INFRARED ANOMALY DATA SHEET

Client:	<b>ABC Company</b>	Job #	<b>T-9000</b>
Location:	<b>123 Main Street</b>	Anomaly Number:	<b>2</b>
Equipment:	<b>MCC-1</b>	Component:	D.S. Anodize Scrubber Fan



Measurements			
Phase:	A	B	C
Current	18.7	18.5	18.2
mv drop	--	--	--
IR #	2	Digital #	2
Temperatures			
Ref:	111.6	Spot 3	118.8
Spot 2	217.2	Spot 4	113.7
Spot 2 $\Delta$ T		105.6	
Spot 3 $\Delta$ T		7.2	
Spot 4 $\Delta$ T		2.1	
Thermal Category:	Emergency		



**Comments**  
 B Phase Fuse and Fuse holder had extreme elevated temperature.

**Recommendations**  
 We recommend B Phase Fuse clip holder should be tightened down or replaced. B Phase Fuse should be replaced. Further investigation should be done and corrective action be taken **Immediately**.

Priority	Temperature Rise	Recommended Time Till Correction
Routine	1-10 Degrees Celsius / 34-50 Degrees Fahrenheit	Next Scheduled Maintenance
Intermediate	11-20 Degrees Celsius / 50-68 Degrees Fahrenheit	Within a few weeks
Serious	21-40 Degrees Celsius / 69-104 Degrees Fahrenheit	Two or Three Days
Emergency	>40 Degrees Celsius / >104 Degrees Fahrenheit	Immediately

**General Note:** The priority rating is based on other factors as well as temperature rise.