

**MID  
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INFRARED**  
SERVICES, INC.

5309 Mohican Rd. Bethesda, Md. 20816 • 301-320-2870  
www.midatlanticinfrared.com • 301-320-2873 fax

# Predictive Testing Report

**CLIENT:** MAJOR WIDGETS

**ADDRESS:** 100 Main Street  
Washington, DC 20001

**DATE:** May 25, 2009

**SUBJECT:** Infrared, vibration and ultrasonic survey of electrical and mechanical equipment

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May 25, 2009

Fred Allen  
Major Widgets  
100 Main Street  
Washington, DC 20001

Dear Mr. Allen:

This document presents the results of our infrared, vibration and ultrasonic survey of electrical and mechanical equipment at your facility. Six problems are identified in this report.

We recommend that an annual infrared, vibration and ultrasonic inspection be conducted of electrical distribution, motor control and mechanical equipment.

Please call me if you have any questions concerning this report. We look forward to working with you in the future.

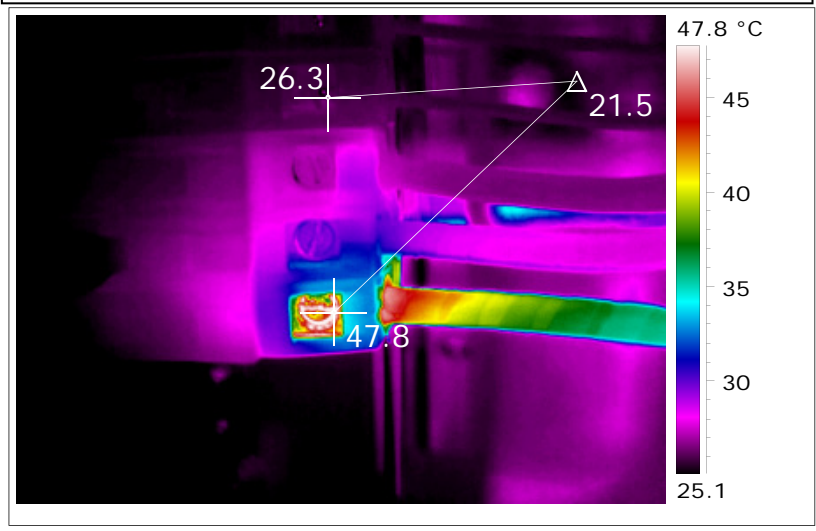
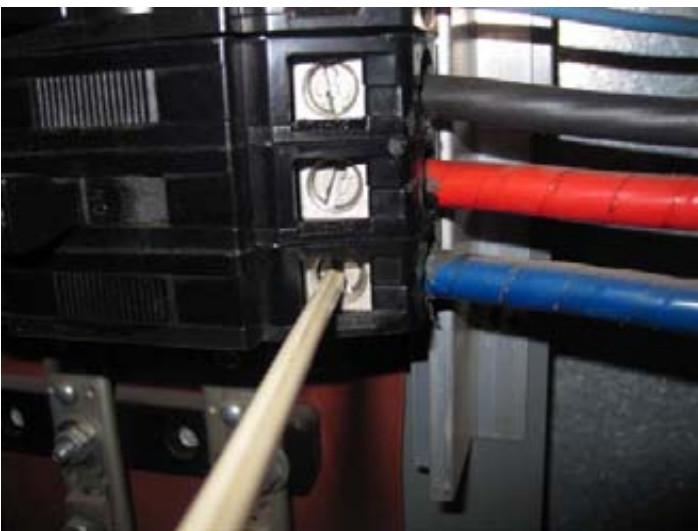
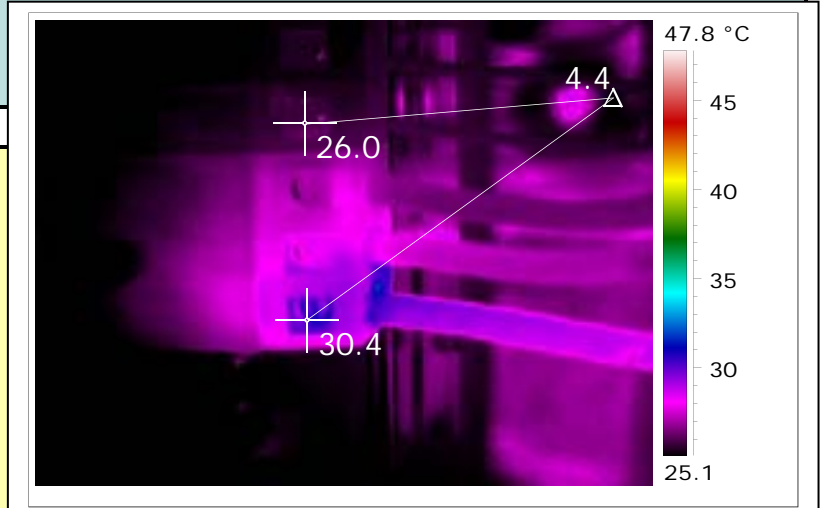
Very truly yours,

Stephen A. Seeber

<b>CLIENT</b>	Major Widgets
<b>PROBLEM NUMBER</b>	1
<b>EQUIPMENT</b>	Main electric room, emergency lighting panel

**PROBLEM DESCRIPTION** 3 pole breaker 20-24, #24, load side, shows excessive heat. FOP test shows a loose connection.

**RECOMMENDATION** Problem repaired  
No further action required.



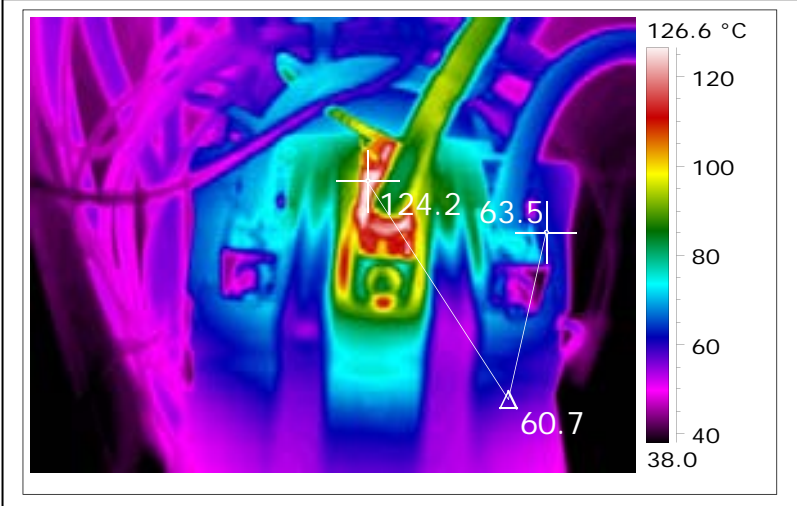
Repaired by: \_\_\_\_\_ Date: \_\_\_\_\_

<b>CLIENT</b>	MAJOR WIDGETS
<b>PROBLEM NUMBER</b>	2
<b>EQUIPMENT</b>	Penthouse, pump 2 contactor

**PROBLEM DESCRIPTION** Contactor, line side, B phase, shows excessive heat. FOP test shows poor internal contact. Feed is damaged from heating.

**RECOMMENDATION** Open contactor. Check internal connections. Check contact surfaces. Reassemble, using FOP test to ensure proper operation. Repair damaged feeder.

**HIGH PRIORITY: Yes**



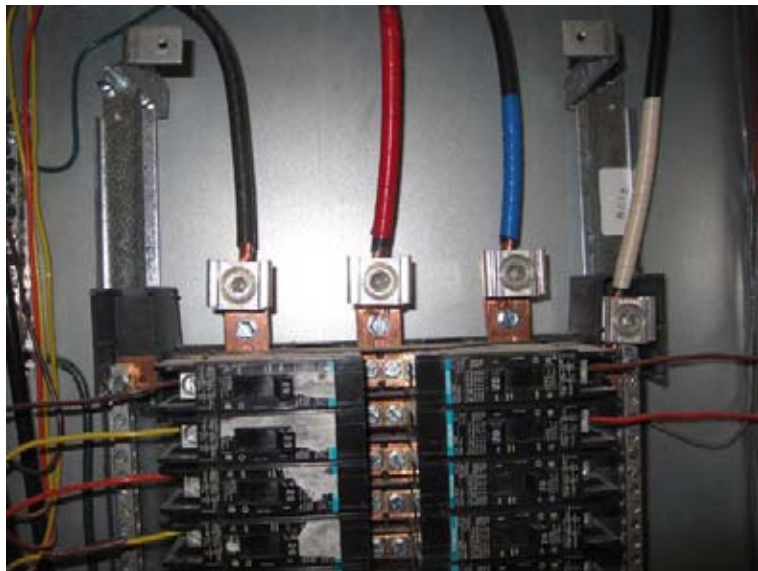
Repaired by: \_\_\_\_\_ Date: \_\_\_\_\_

<b>CLIENT</b>	MAJOR WIDGETS
<b>PROBLEM NUMBER</b>	3
<b>EQUIPMENT</b>	15059, 5th floor, west electric room, Panel EH5

**PROBLEM DESCRIPTION** Main feeds In 480V panel are color coded for 208V. This is a code violation.

**RECOMMENDATION** Install proper phase/voltage colors on the feeders.

**HIGH PRIORITY: No**



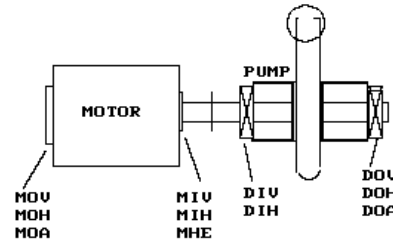
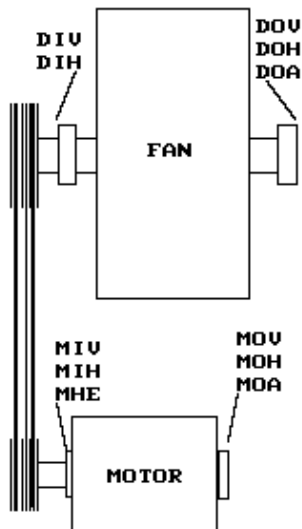
Repaired by: \_\_\_\_\_ Date: \_\_\_\_\_

## VIBRATION TESTING REPORT

Vibration analysis was conducted on rotating equipment. A brief discussion of each machine exhibiting high vibration levels, along with suggested repairs, is presented on the following pages. Illustrative spectral data for each problem are included. Measurement points are as follow and are illustrated below:

**MOV**--Motor outboard vertical  
**MOH**--Motor outboard horizontal  
**MOA**--Motor outboard axial  
**MIV**--Motor inboard vertical  
**MIH**--Motor inboard horizontal  
**MEH**--Motor high resolution for electrical faults or high frequency resolution

**DIV**--Driven machine inboard vertical  
**DIH**--Driven machine inboard horizontal  
**DOV**--Driven machine outboard vertical  
**DOH**--Driven machine outboard horizontal  
**DOA**--Driven machine outboard axial



Note that vibration patterns can often be produced by more than one type of mechanical deficiency. Our evaluations present the most likely solution for each vibration problem. However, precise diagnoses often require more detailed machine testing that is beyond the scope of the present survey. We are available to provide such detailed testing and additional services such as multi-plane balancing or reverse dial indicator machine alignment. Please give us a call if further assistance or information is required.

Last Monitored Machine List  
 \*\*\*\*\*

Database: Major Widgets  
 Station: MACHINES  
 Report Date: 30-Mar-10 18:46  
 Report Interval: 28-Feb-10 To 30-Mar-10

PERIODIC VIBRATION TECHNOLOGY

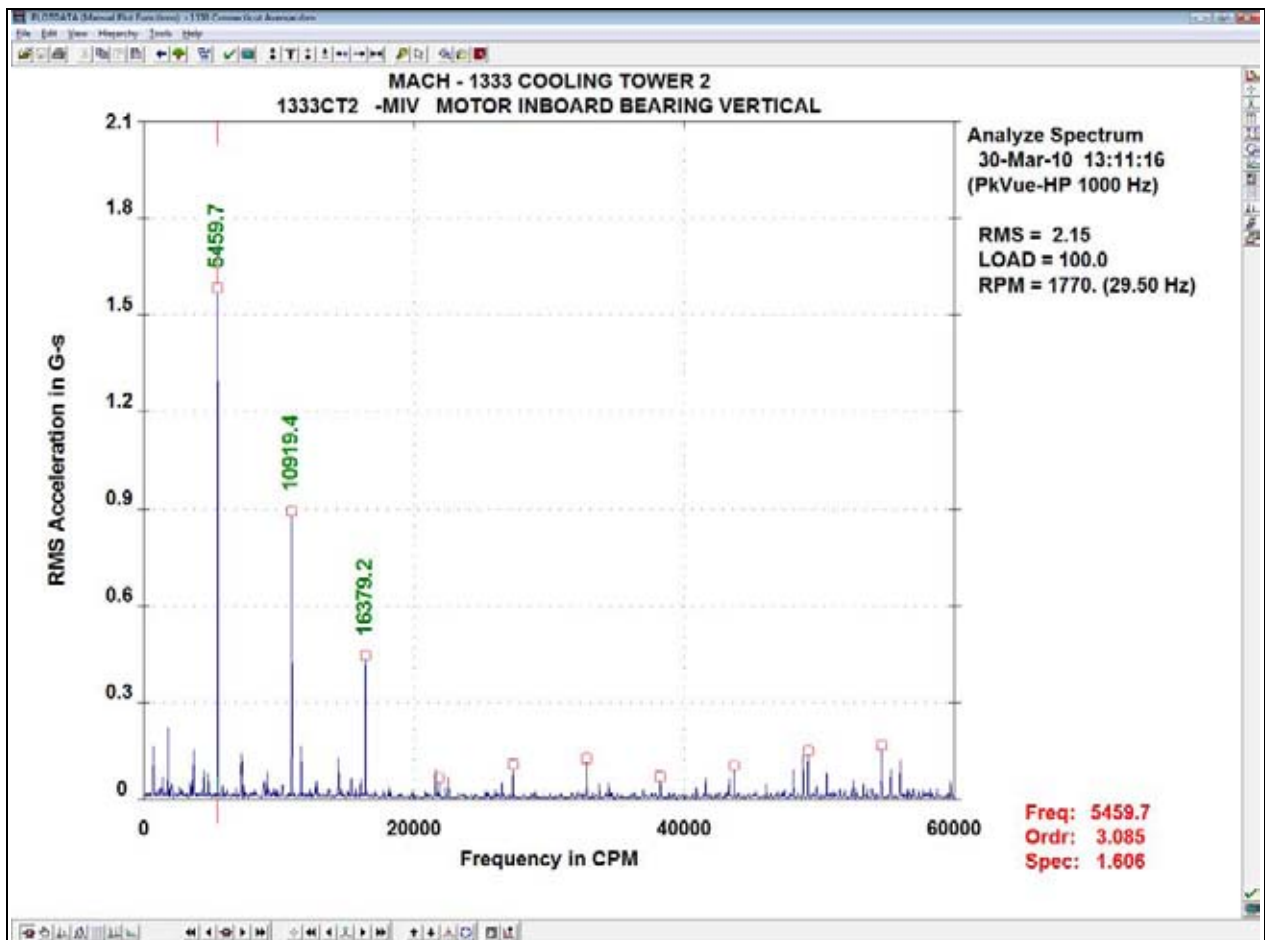
Collected Machine...

MACHINE ID -----	DESCRIPTION -----	NUMBER OF POINTS -----	LATEST DATE -----
1333P1	1333 PUMP 1	9 OUT OF 11	30-Mar-10
1333P2	1333 PUMP 2	9 OUT OF 11	30-Mar-10
1333P3	1333 PUMP 3	9 OUT OF 11	30-Mar-10
1333CT1	1333 COOLING TOWER 1	10 OUT OF 11	30-Mar-10
1333CT2	1333 COOLING TOWER 2	10 OUT OF 11	30-Mar-10
1333CT3	1333 COOLING TOWER 3	10 OUT OF 11	30-Mar-10
1330 TP1	1330 TOWER PUMP 1	9 OUT OF 11	30-Mar-10
1330TP2	1330 TOWER PUMP 2	9 OUT OF 11	30-Mar-10
1330CDWP1	1330 CONDENSER PUMP 1	9 OUT OF 11	30-Mar-10
1330CDWP2	1330 CONDENSER PUMP 2	9 OUT OF 11	30-Mar-10
1330CDWP3	1330 CONDENSER PUMP 3	9 OUT OF 11	30-Mar-10
1330CDWP4	1330 CONDENSER PUMP 4	9 OUT OF 11	30-Mar-10
Twr1Cell1	1330 Tower 1 Cell 1	8 OUT OF 11	09-Mar-10
Twr1Cell2	1330 Tower 1 Cell 2	8 OUT OF 11	09-Mar-10
Twr2Cell1	1330 Tower 2 Cell 1	9 OUT OF 11	09-Mar-10
Twr2Cell2	1330 Tower 2 Cell 2	8 OUT OF 11	09-Mar-10
Monitored Point Total =		144 OUT OF 502	
Monitored Machine Total =		16 OUT OF 46	

## VIBRATION TESTING REPORT

**MACHINE:** 1333 Cooling Tower 2

**PROBLEM DISCUSSION:** A bearing defect is present in the motor. It is unclear whether it is the inboard or outboard bearing, since bearing fault frequencies are found at both locations and with similar amplitudes. Both bearings should be changed.

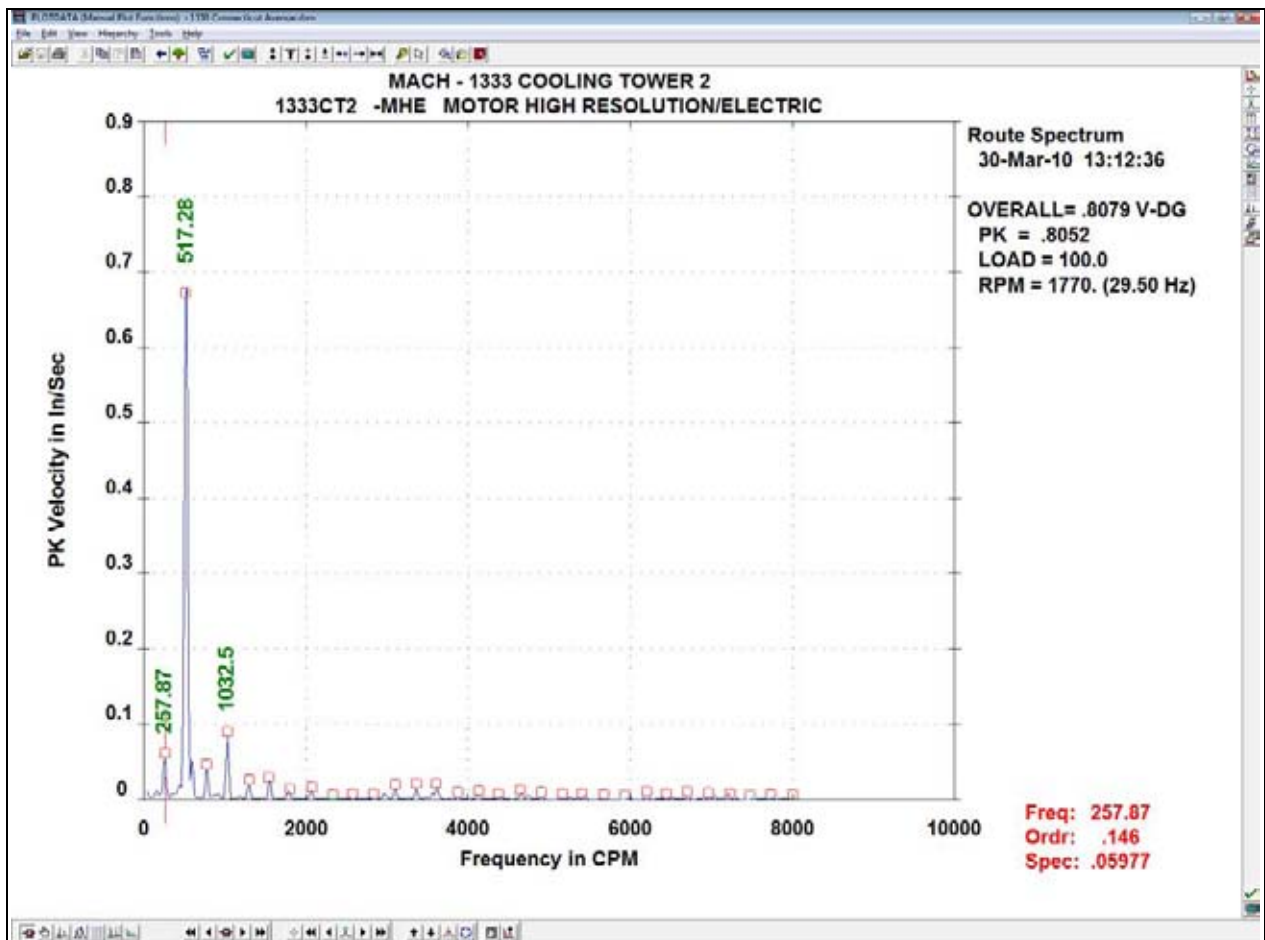




## VIBRATION TESTING REPORT

**MACHINE:** 1333 Cooling tower 2

**PROBLEM DISCUSSION:** High belt vibration is present at the motor. Check the belts for wear and tension. Check the sheave alignment between the two fans and the motor.



# Infrared Survey Equipment Inventory

Major Widgets

06-May-10

Equip Type	Floor	Room	Equip Name	Manufacturer	Volts	Amps	KVA
<b>Equipment Type:</b> Air Handler							
Air Handler	1	MAIN ELEC RM	AHU27	Liebert	480	60	0
Air Handler	1	MAIN ELEC RM	AHU28	Liebert	480	60	0
Air Handler	1	MAIN ELEC RM	AHU29	Liebert	480	60	0

Total= 3

<b>Equipment Type:</b> Bus Disconnect							
Bus Disconnect	1	CENTER ELEC RM	H1	Cutler Hammer	480	400	0
Bus Disconnect	1	CENTER ELEC RM	L1	Cutler Hammer	480	150	0
Bus Disconnect	1	CENTER ELEC RM	AC1	Cutler Hammer	480	200	0
Bus Disconnect	1	CENTER ELEC RM	H1A	Cutler Hammer	480	400	0
Bus Disconnect	2	CENTER ELEC RM	H2	Cutler Hammer	480	400	0
Bus Disconnect	2	CENTER ELEC RM	L2	Cutler Hammer	480	150	0
Bus Disconnect	2	CENTER ELEC RM	AC2	Cutler Hammer	480	225	0
Bus Disconnect	3	CENTER ELEC RM	H3	Cutler Hammer	480	400	0
Bus Disconnect	3	CENTER ELEC RM	L3	Cutler Hammer	480	150	0
Bus Disconnect	3	CENTER ELEC RM	AC3	Cutler Hammer	480	225	0
Bus Disconnect	4	CENTER ELEC RM	AC4	Cutler Hammer	480	225	0
Bus Disconnect	4	CENTER ELEC RM	L4	Cutler Hammer	480	150	0
Bus Disconnect	4	CENTER ELEC RM	H4	Cutler Hammer	480	400	0
Bus Disconnect	5	CENTER ELEC RM	L5	Cutler Hammer	480	150	0
Bus Disconnect	5	CENTER ELEC RM	H5	Cutler Hammer	480	400	0
Bus Disconnect	5	CENTER ELEC RM	AC5	Cutler Hammer	480	225	0
Bus Disconnect	6	CENTER ELEC RM	H6	Cutler Hammer	480	400	0
Bus Disconnect	6	CENTER ELEC RM	AC6	Cutler Hammer	480	225	0
Bus Disconnect	6	CENTER ELEC RM	L6	Cutler Hammer	480	150	0

Total= 19

<b>Equipment Type:</b> Disconnect							
Disconnect	1	MAIN ELEC RM	1E2	GE	480	125	0
Disconnect	PH	ELEV PH	ELEV 4	Cutler Hammer	480	60	0
Disconnect	PH	ELEV PH	ELEV 2	Cutler Hammer	480	60	0
Disconnect	PH	ELEV PH	ELEV 3	Cutler Hammer	480	60	0
Disconnect	PH	ELEV PH	ELEV 1	Cutler Hammer	480	60	0
Disconnect	PH	PUMP RM	ELEV SHUNT	Cutler Hammer	480	350	0
Disconnect	PH	PUMP RM	ELEV SHUNT 1	Cutler Hammer	480	60	0
Disconnect	PH	ROOF	PUMP 1	GE	480	150	0
Disconnect	PH	ROOF	PUMP 2	GE	480	150	0

Total= 9

<b>Equipment Type:</b> Emerg. Disconnect							
Emerg. Disconnect	1	BLDG MAIN ELEC R	EML1	Cutler Hammer	208	100	0
Emerg. Disconnect	1	BLDG MAIN ELEC R	EMPL	Cutler Hammer	208	100	0
Emerg. Disconnect	1	BLDG MAIN ELEC R	EMPH	Cutler Hammer	480	100	0
Emerg. Disconnect	1	BLDG MAIN ELEC R	EM DISC	Cutler Hammer	480	200	0
Emerg. Disconnect	1	BLDG MAIN ELEC R	FA XFMR	Cutler Hammer	480	20	0