Bayou State Inspections, LLC

presents a

Qualitative
Infrared Thermographic Survey
Of Electrical Switchgear & Motors

at the Facility of:

Louisiana Housing Corporation
2415 Quail Drive Baton Rouge, LA

July 17-18, 2019

Prepared for:

Juon Wilson, Director of Operations

LOUISIANA HOUSING CORPORATION
2415 Quail Drive
Baton Rouge LA ,70808

Report Prepared by an Authorized ElectricIR™ Contractor

Bayou State Inspections Infrared Thermal Imaging Services

337-988-9020 james@bayoustateinspections.com

Dates of Survey:
July 17-18, 2019

Juon Wilson
Director of Operations
Louisiana Housing Corporation
225-763-8838
jwilson@lhc.la.gov

Dear Mrs. Wilson:

Thank you for your confidence in our services. Please find herein, the results of the Electrical Infrared Thermographic Survey of the electrical switchgear of The LHC Building located at 2415 Quail Drive in Baton Rouge LA 70808.

Your *ElectricIR™* report includes:

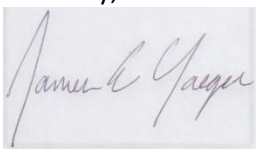
- **Cover Letter**
- **Summary and Recap**
- **Repair Guide** – List of all equipment with thermal anomalies
- **Equipment List** - List of all equipment surveyed
- **Thermographic Reports** – Individual report pages of all equipment with thermal anomalies

Bayou State Inspections Infrared Thermal Imaging Services, an Authorized ***ElectricIR™*** Contractor, was retained for an electrical thermographic survey of the building in an effort to identify areas of thermal anomalies and document them for further review and repair. Further investigations of these areas may reveal additional conditions that were not readily visible at time of inspection. We document our findings with infrared thermograms and visual photographs of the areas. Our inspection is designed to comply with accepted industrial standards and this report is for the exclusive use of our client and is not intended for any other purpose. The report is based on the information obtained at the site at this time as described in the report. Should additional information become available at a later date, we reserve the right to determine the impact, if any, that the new information may have on our discovery and recommendations and to revise the report if necessary and warranted.

IMPORTANT NOTICE: Infrared Thermography is not a substitute for visual and/or other instrumental inspection techniques and should be a regular part of the overall P/PM (preventive/predictive maintenance) program at your facilities.

Our reports are designed to be clear, concise, and useful. Please review this report carefully. If there is anything you would like us to explain, or if there is other information you need, please let us know by calling 337-988-9020. We would be happy to answer any questions you have and look forward to working with you on your next scheduled survey.

Sincerely,



James E Yaeger
Certified Infrared Thermographer, Level III #10991
Bayou State Inspections, ***Authorized ElectricIR™ Contractor***

Infrared Survey Info

Client: Louisiana Housing Corporation
Building Name: "LHC Louisiana Housing Corporation"
Client Representative Present at Inspection: Juon Wilson, Director of Operations
Building Location: 2415 Quail Drive Baton Rouge, LA 70808
Survey Date: July 17-18, 2019
Ambient Temperature: 72˚F - 74˚F
Imagers: Flir B-400 and Fotric 228
Voltage Test Meter: Fluke 336

Certified Infrared Thermographer

James E Yaeger, Level III Thermographer #10991

Understanding Infrared Imagery

Infrared imagery is often a grayscale picture or thermograph whose scales (or shades of gray) represent the differences in emitted energy from the surface often referred to as temperature. As a general rule, patterns in the image that are lighter in shade are warmer and darker patterns cooler. Unlike visible imagery that captures visible light in the 0.4-0.7 micrometer wavelengths, objects observed using infrared imagery capture infrared wavelengths in the 3-5 or 8-14 micrometer range. Visible lights that produce heat and other relatively hot objects are very evident, but as a result of their heat or infrared emission and not due to the visible light emissions.

When an image is taken with an infrared camera, it is often recorded onto videotape and/or digitally saved to an on-board storage device. The image may be then modified in a number of ways to enhance its value to the end user. Imager files are digitized, saved, then adjusted for color, contrast and brightness before being scaled and placed into a report file. The report is then printed in high quality and saved to a CD-ROM for the clients use.

We scan the building with sensitive infrared cameras to detect the patterns and record them for later analysis. Once a pattern is detected the infrared images can be saved for documentation in the report. *For more information, please visit us at...www.bayoustateinspections.com.*

Equipment List & General Survey Notes

1) Please read all notes in the Equipment List Section of this Report under "Notes".
2) Some panel covers may have not been removed.
3) Some repairs may have been made as the survey progressed.
4) Emissivity Settings = .95, unless otherwise noted.

KEY to Abbreviations that may be used in the Equipment List Below

N/O = Not Operating
N/S = Not Surveyed
N/F = Equipment Not Found
LL = Extremely Low Load
HL = High Load vs. Rating
OH = Overheating
L/O = Locked Out / Tagged Out
CNRC = Could Not Remove Cover

A or Amp = Amperage
MTS = Manual Transfer Switch
ATS = Automatic Transfer Switch
MCC = Motor Control Center
MCR = Motor Control Room
CNTR = Contactor
DISC = Disconnect
N/L = No Load

(Rm) = Room
(US) = Upstairs
(DS) = Downstairs
(F) = Front View
(R) = Rear View
(S) = Side View
(Φ) = Phase
(MTR) = Motor

Analysis and Recommendations

We recommend that your maintenance team carefully review this report. Items listed on the Repair Guide should be checked by qualified personnel. We use the Delta—T method of rating equipment. Below, see the temperature ratings; however, your criteria for rating a problem will include not only temperature, but criticality of the equipment and other factors.

Rating	Temperature Rise F°	Recommendation
Minor	1-15 °F	Routine, Repair during regular maintenance, little chance of physical damage.
Alert	16-50 °F	Repair within 30 days, watch load and inspect for physical damage.
Serious	51-100 °F	Repair/Replace ASAP. Inspect surrounding components for physical damage.
Critical	100+ °F	Immediate repair/replace. Danger exists!

SUMMARY OF FINDINGS

(M) Minor =	**2**
(A) Alert =	**1**
(S) Serious =	**0**
(C) Critical =	**1**
TOTAL =	**4**

REPAIR GUIDE

Area	Equipment	Component	Report #	Severity
Mech Rm 114	P1-Section 1	Circuit 19	1	Minor
Mech Rm 124	PE-1	Circuits 18 & 20	2	Minor
Mech Rm 124	AHU-1A A.O.Smith MTR	Belt	N/A	Minor
Mech Rm 206	AHU-2 MTR	Shaft Bearing	3	Alert
Chiller Yard	CH-A Chiller Panel	CNTR E	4	Critical

NEXT RECOMMENDED SURVEY: 7-18-2020

EQUIPMENT LIST

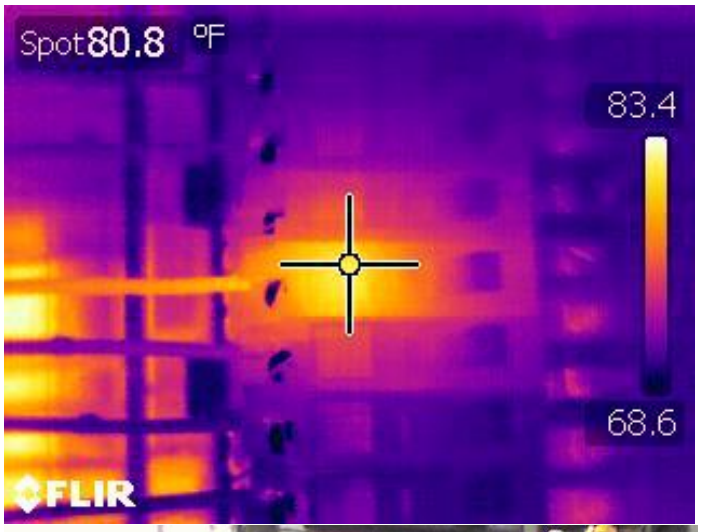
AREA	EQUIPMENT	COMPONENT	NOTES
Mech Rm 114	DP		
Mech Rm 114	L1		
Mech Rm 114	P1-Section 1	Circuit 19	Tighten Loose Wire at Lug
Mech Rm 114	P1-Section 2		
Mech Rm 114	Transformer (T)		
Mech Rm 114	LCP-1C		
Mech Rm 113	Elev 1 DISC		
Mech Rm 113	Elev 1 Lgts		
Mech Rm 113	Elev 2 DISC		
Mech Rm 113	Elev 2 Lgts		
Mech Rm 124	PE-1	Circuits 18 & 20	Tighten Loose Wire at Lug
Mech Rm 124	P1A		
Mech Rm 124	E1		
Mech Rm 124	AHU-1A		
Mech Rm 124	AHU-1B		
Mech Rm 124	AHU-1A A.O.Smith MTR	Belt	Tighten / Replace Belt
Mech Rm 124	AHU-1B A.O.Smith MTR		
Mech Rm 124	EC-1A		
Mech Rm 124	EC-1B		
Mech Rm 125	AHU-1C Lincoln MTR		
Storage 118	LCP-1A		
Storage 118	LCP-1B		
Mech Rm 201	PE-2		
Mech Rm 201	E2		
Mech Rm 201	L2		
Mech Rm 201	P2A		

EQUIPMENT LIST CONTINUED

AREA	EQUIPMENT	COMPONENT	NOTES
Mech Rm 201	P2B		
Mech Rm 201	LCP-2		
Mech Rm 201	LG15 DISC		
Mech Rm 206	AHU-2 MTR	Shaft Bearing	Unable to Read Nameplate; Replace Overheating Shaft Bearing
Server Rm 218A	Emergency Panel		
Mech Rm 351	AHU-3 Century MTR		
Mech Rm 351	F1 Rooftop Fan DISC		
Mech Rm 353	PE-3		
Mech Rm 353	E3		
Mech Rm 353	L3		
Mech Rm 353	P3-A		
Mech Rm 353	P3-B		
Mech Rm 353	LG16 DISC		
Mech Rm 353	LCP-3		
Server 320A			
W Stairwell	Genteq MTR		
E Stairwell	A.O.Smith MTR		
Chiller Yard	CHDP		CNRC; Scanned with Cover On
Chiller Yard	PNL.A		
Chiller Yard	CH-A Chiller Panel	CNTR 2E	2E (B Φ) 163.6˚F; Troubleshoot and Repair 2E (B Φ) Exception
Chiller Yard	CH-A Chiller Compressors (2)		
Chiller Yard	CH-B Chiller Panel		
Chiller Yard	CH		
Chiller Yard	PA Starter		
Chiller Yard	PB Starter		
Chiller Yard	P-A Lincoln MTR		
Chiller Yard	P-B General Electric MTR		
Chiller Yard	Cummings Generator		
Exterior NE Wall	EXT1		
Exterior NW Wall	CRU-1 Pad Mounted DISC		Unit Missing; DISC off
Exterior NW Wall	CRU-2 Pad Mounted DISC		
Exterior SW Wall	Unit 13 Pad Mounted DISC		

THERMOGRAPHIC REPORTS:

THERMOGRAPHIC REPORT # 1



AREA: Mechanical Room 114

EQUIPMENT: P-1 Section 1

COMPONENT: Circuit 19

Date: 07/17/2019
Time: 15:36

Reference Temperature:
71.8 °F
Maximum Temperature:
81.8 °F
Temperature Rise:
+10 F°

Severity - Minor

Temperature Rise Above

Reference

Rating: Minor

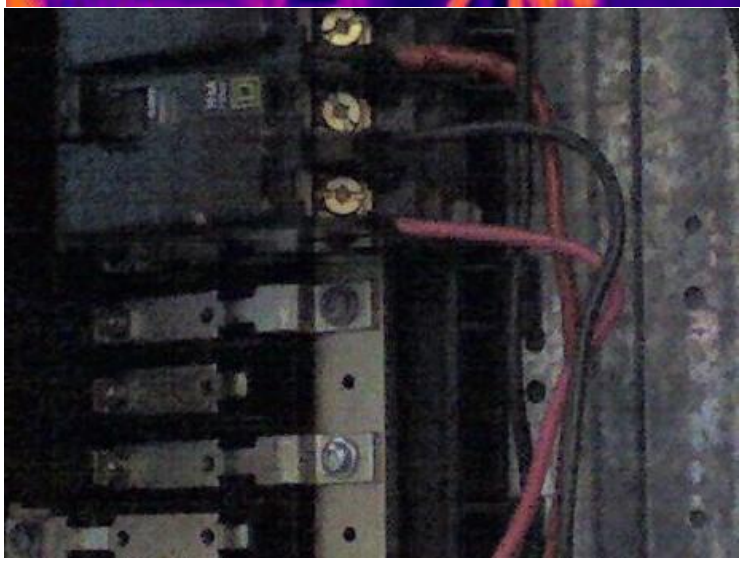
Amperage
Phase A: 10.4 Amps

Description:
Loose Wire at Lug

Recommendations:
Tighten Wire at Lug

Rating	Temp. Rise	Recommendation
Minor	1-18 °F	Routine, Repair during regular maintenance, little chance of physical damage.
Alert	19-36 °F	Repair within 30 days, watch load and inspect for physical damage.
Serious	37-54 °F	Repair/Replace ASAP. Inspect surrounding components for physical damage.
Critical	55+ °F	Immediate repair/replace. Danger exists!

THERMOGRAPHIC REPORT # 2



AREA: Mechanical Room 124

EQUIPMENT: P-1

COMPONENT: Circuits 18 & 20

Date: 07/17/2019
Time: 14:58

Reference Temperature:
71.2 °F
Maximum Temperature:
89.5 °F
Temperature Rise:
+18.3 F°

Severity - Minor

Temperature Rise Above

Reference

Rating: Minor

Amperage
Phase A: 1.1 Amps
Phase B: 1.1 Amps

Description:
Loose Wire at Lugs and / or Load Side Connection

Recommendations:
Tighten Wiring at Lugs and / or Load Side Connections

Rating	Temp. Rise	Recommendation
Minor	1-18 °F	Routine, Repair during regular maintenance, little chance of physical damage.
Alert	19-36 °F	Repair within 30 days, watch load and inspect for physical damage.
Serious	37-54 °F	Repair/Replace ASAP. Inspect surrounding components for physical damage.
Critical	55+ °F	Immediate repair/replace. Danger exists!

THERMOGRAPHIC REPORT # 3

AREA: Mechanical Room 206

EQUIPMENT: AHU-2 Motor

COMPONENT: Shaft Bearing

Date: 07/18/2019
Time: 09:30

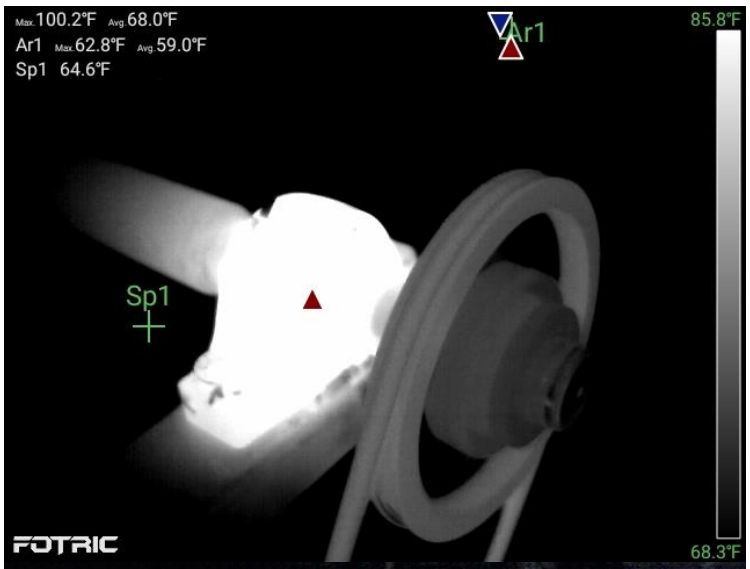
Reference Temperature:
68.0 °F
Maximum Temperature:
100.2 °F
Temperature Rise:
+32.2 F°

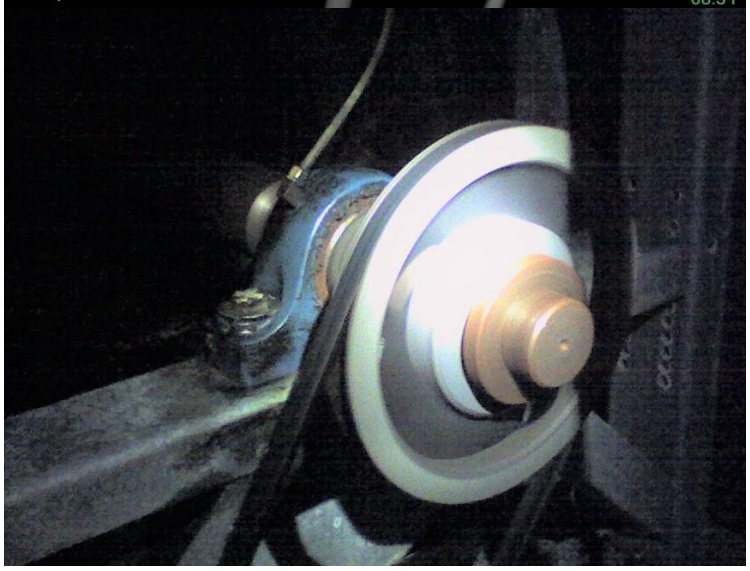
Severity - Alert

Temperature Rise Above

Reference

Rating: Alert



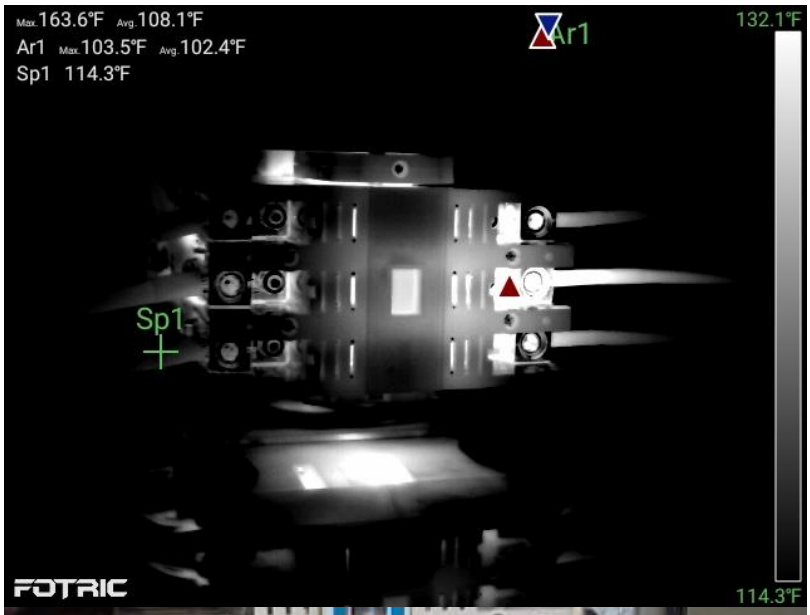


Description:
Overheating Shaft Bearing

Recommendations:
Replace Belt, Align Shaft to Motor, and / or Replace Shaft Bearing

Rating	Temp. Rise	Recommendation
Minor	1-18 °F	Routine, Repair during regular maintenance, little chance of physical damage.
Alert	19-36 °F	Repair within 30 days, watch load and inspect for physical damage.
Serious	37-54 °F	Repair/Replace ASAP. Inspect surrounding components for physical damage.
Critical	55+ °F	Immediate repair/replace. Danger exists!

THERMOGRAPHIC REPORT # 4



AREA: Chiller Yard

EQUIPMENT: CH-A Chiller PNL

COMPONENT: Contactor 2E

Date: 07/18/2019
Time: 08:50

Reference Temperature:
108.1 °F
Maximum Temperature:
163.6 °F
Temperature Rise:
+55.5 F°

Severity - Critical
Temperature Rise Above
Reference

Rating: Critical

Amperage
Phase A: 34.3 Amps
Phase B: 31.3 Amps
Phase C: 25.3 Amps

Description:
Overheating Contactor E on B Φ

Recommendations:
Repair / Replace Fan Motor and / or Contactor 2E

Rating	Temp. Rise	Recommendation
Minor	1-18 °F	Routine, Repair during regular maintenance, little chance of physical damage.
Alert	19-36 °F	Repair within 30 days, watch load and inspect for physical damage.
Serious	37-54 °F	Repair/Replace ASAP. Inspect surrounding components for physical damage.
Critical	55+ °F	Immediate repair/replace. Danger exists!