

INFRARED THERMOGRAPHIC SURVEY

For

ABC Company, Inc.

123 Any Street
Any Town, US 12345

Survey Performed

January 31, 2019

By

JR Smith

AVP / Level III Thermographer

HSB Thermography Services

Ronald_Smith_Jr@hsb.com

(216) 588-1381

ABC Company, Inc.
123 Any Street
Any Town, US 12345

Dear Mr. Johnson,

Thank you for allowing HSB Thermography Services to provide this service. We trust that this report proves helpful and is of assistance to you.

The scope of work included the following areas:

Outside Substation, Load Centers, Motor Control Centers, Control Panels, Breaker Panels, and Disconnects.

Equipment not surveyed during this visit includes de-energized, lightly loaded, inaccessible and/or deemed by facility personnel to be non-critical.

As a result of this service the following Findings are presented for your review:

1 CRITICAL
1 SEVERE
2 ALERT
0 ADVISORY

Should you have any questions or comments concerning this report or our services, we are here to assist you. Please feel free to call me at (216) 588-1381 or email Ronald_Smith_Jr@hsb.com

Sincerely,

JR Smith

AVP / Level III Thermographer
HSB Thermography Services

COMMENTS

The criteria used to categorize findings in this report are based on the potential effect that a failure will have on operations and production.

CRITICAL- Failure of this component will have a significant impact on operations or the facility and require costly repairs.

SEVERE- Failure is not expected to go beyond the component listed and should have minimal impact on operations or the facility; repair costs could be significant.

ALERT- Failure is of a routine nature and repairs can be made easily and at a reasonable cost. Cost is, more often than not, limited to labor and a few minor parts.

ADVISORY- Helpful information based on sound engineering judgment.

Infrared thermographic surveys are non-contact, non-destructive examinations used to find abnormal or unexpected thermal patterns or temperature differentials. These thermal patterns may indicate such conditions as loose connections, overloaded circuits or phases, deteriorated or damaged insulation or refractory, or excessive or unwanted friction, among others.

To perform the thermographic survey of your facility, HSB Thermography Services used the FLIR Thermacam infrared imaging system. This system utilizes the latest developments in un-cooled technology to generate the most accurate data available.

The calibration for this system is certified traceable to The National Institute of Standards and Technology, NIST, USA and the Swedish National Testing and Research Institute, SP. This calibration is based on the International Temperature Scale (ITS-90).

The Findings of this survey are in the following pages. These conditions warrant your attention.

Inspection Summary

Finding No.	CATEGORY	Location Area	Equipment Location	Equipment ID	Est. Repair Cost Before Failure	Est. Repair Cost After Failure
1	CRITICAL	Outside Substation	Main Transformer	East Secondary Bushing	\$5,000	\$78,000
2	SEVERE	Raw Materials	Pellet Feeder	Main Breaker	\$100	\$4,000
3	ALERT	Packaging Dept.	Palletizer No.3	Fuse No.1673	\$25	\$40
4	ALERT	Press Dept.	Press No.22	Disconnect	\$50	\$475

Total Estimated Repair Costs Before Failure	\$5,175
Total Estimated Repair Costs After Failure	\$82,515
Cost Avoidance =	\$77,340

**Before and After costs- This estimate is based only on direct damage to the equipment and does not include the costs of business interruption, extra expenses, spoilage, etc.*

Finding No.

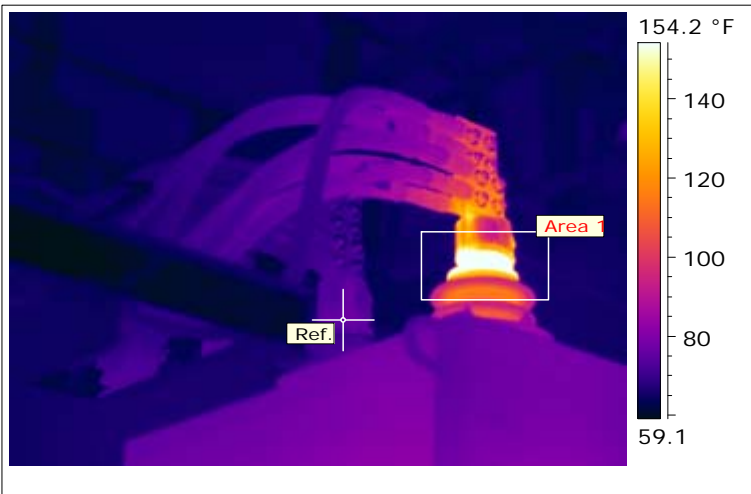
1

Category

CRITICAL



Location Area	Outside Substation
Equipment Location	Main Transformer
Equipment ID	East Secondary Bushing
Est. Repair Cost Before Failure	\$5,000
Est. Repair Cost After Failure	\$78,000
Est. % of Production	90%
Est. Down Time	10-14 Days



Ref. Temperature	76.2 °F
Area 1 Max. Temperature	176.0 °F
Area 1: Rise	99.8 °F

Recommendation/Comments:

The thermal pattern indicates the transformer has an internal problem conducting out to the surface of the bushing. This should be investigated and repaired by a qualified HV electrical contractor.

*This is rated as “CRITICAL” due to the high replacement cost of the transformer and potential business interruption should a failure occur.

Repair notes:

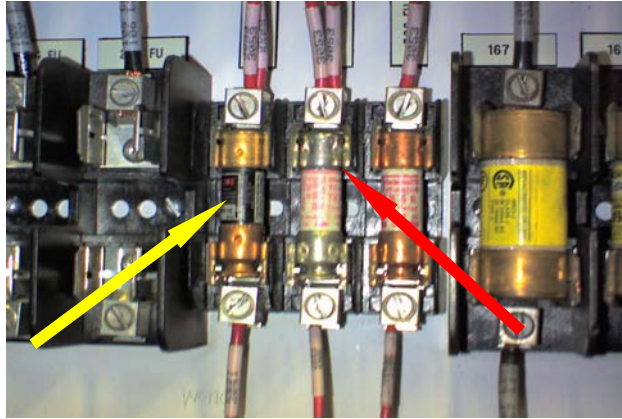
Signature:.....Date:

Finding No.

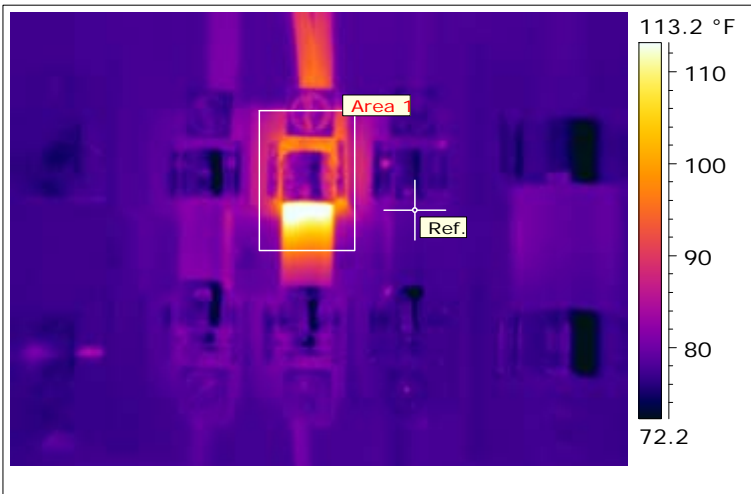
3

Category

ALERT



Location Area	Packaging Dept.
Equipment Location	Palletizer No.3
Equipment ID	Fuse No.1673
Est. Repair Cost Before Failure	\$25
Est. Repair Cost After Failure	\$40
Est. % of Production	0%
Est. Down Time	0



Ref. Temperature	78.9 °F
Area 1 Max. Temperature	121.0 °F

Area 1: Rise	42.1 °F
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Recommendation/Comments:

Remove the fuse and clean the fuse and fuse clip. Reinsert the fuse ensuring the fuse clip is providing adequate tension and making good contact with the fuse. Also, all three fuses (yellow arrow) should be the same size, style, and type from the same manufacturer.

Repair notes:

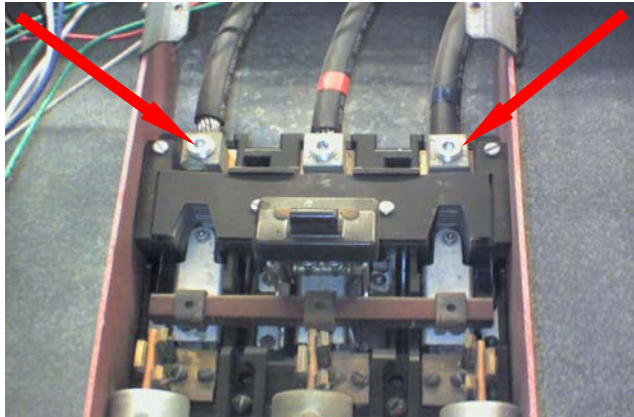
Signature:.....Date:

Finding No.

4

Category

ALERT



Location Area	Press Dept.
Equipment Location	Press No.22
Equipment ID	Disconnect
Est. Repair Cost Before Failure	\$50
Est. Repair Cost After Failure	\$475
Est. % of Production	10%
Est. Down Time	1 Day



Ref. Temperature	91.4 °F
Area 1 Max. Temperature	132.3 °F
Area 2 Max. Temperature	139.1 °F

Area 1: Rise	40.9 °F
Area 2: Rise	47.7 °F

Recommendation/Comments:

The connections should be disassembled, cleaned, inspected for damage and repaired as necessary. Reassemble and torque fasteners according to the manufacturer's specifications using new hardware as required.

Repair notes:

Signature:.....Date:

For more information or comments contact:

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If you would like to learn more about electrical risk management, please click on the following link:

http://www.hsb.com/hsbext/Electrical_Risk_Management/