



Thermal Inspection for Electrical Equipment

Using Advanced FLIR T640 Thermal Camera

For

Customer: *********

Location: ********

18/6/2014

By

Engr. Adrian Arigo







Inspection Site Information				
Customer	*****			
Address	*****			
Contact Person	*****			
Mobile	*****			
Email	*****			
WESAM Contact person	Mr. Abdulrahman Al-Tayaran			
Phone number	0543865200			
E-mail address	abdulrahman@wesams.com			
Thermographer	Engr. Adrian Arigo			

Tool used for the service:

Using Advanced FLIR T640 Thermal Camera

Engineer's Qualifications:

Engr. Adrian Arigo, Associate Electrical Engineer, SCE

Contact Details:

WESAM SYSTEMS Co. Ltd 101 Business Tower King Abdulaziz road, Jubail Kingdom of Saudi Arabia Riyadh Tel: 0112795057 Jubail Tel: 0133616126 Jeddah Tel: 0122203061

Email: info@wasams.com

Overview of Fault Rating:

0 : Normal	Temp rise 0-5 °C	No action
1: Low grade	Temp rise 5-10 °C	To be monitored – Plan new inspection
2: Medium grade	Temp rise 10-35 °C	Repair at scheduled shut down
3 : High	Temp rise >35 °C	Repair immediately

www.wesams.com 2 (13)



	Summary of Findings				
Location	Equipment	Fault	Recommendation	Page Number	
South-Under Al-Safeyah Bridge	M-16	Medium Grade	Repair at schedule shutdown	4-5	
South Al-Safeyah Garden	M-10	Low Grade	To be monitored – plan new inspection	6	
South west-versus of dates market	M-6	Normal	No Action	7	
South west –Under Al- Safeyah Bridge-Quba Signal	M-15	Normal	No Action	8-9	
Al-Anbareyah- Under(Harbi Bridge or the 60 bridge)	The new panel	High	Repair immediately	10	
The 60 Street-Al-Amarah- Versus of Marriott hotel	M-13	Medium Grade	Repair at schedule shutdown	11	
South west-Near Abu Baker Al-seddeque mosque	M-5	Normal	No Action	12	
West-Al-Salam Road- Wasel Al-Thahabe	M-12	Normal	No Action	13	



Infrared Thermogram 6/18/2014		Location South Unde	r Al-Safeyah
	119.2 ℃	Equipment M-16	
NV- was a second		Image File Name	FLIR0586.jpg
	- 100	Image Date	06/18/2014
	-	Image Time	7:10:13
	-		
Ar1	-	Atmospheric Temperature	20.0 °C
	- 80	Relative Humidity	50%
	Ť.	Emissivity	0.90
		Object Distance	1.0 m
	- 60		
	58.2	Ar1 Max. Temperature	136.9 °C
		Sp1 Max. Temperature	102.2 °C
		Dt1 Value	34.7 °C
			1



In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

To check the loading current (in Amperes) of the secondary load side wire of the circuit breaker (S phase) Do another thermal inspection

Reported by :	Engr. Adrian Arigo Signature:	date:18/6/2014
Repaired by:		date:
Comment:		



Infrared Thermogram 6/18/2014		Location South Under	er Al-Safeyah
	122.5 ℃ - 120	Equipment M-16	
Ar1	- 100	Image File Name Image Date	FLIR0589.jpg 06/18/2014 7:11:31
	- 80	Atmospheric Temperature Relative Humidity	20.0 °C 50%
Sp1	- 60	Emissivity Object Distance	0.90 1.0 m
	56.3	Ar1 Max. Temperature Sp1 Max. Temperature	122.5 °C 87.0 °C
			00.0 0

Photo and Identification		Severity Ratir	ng & Recommendati	on	
	1	Low (∆= 5-10°C)	To be monitored		
	2	Medium (∆= 10-35°C)	Repair at schedule outage		
	3	High (∆> 35°C)	Repair immediately	\mathbf{X}	
	Th sho filte	nalysis: e detected hot own above wer ers and cables nperature.	spot in thermal re many critical fa (Ar1) which are t	image ults in nigh in	

In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

To checked the loading current (in Amperes) of the secondary load side wire of the circuit breaker (S phase) Do another thermal inspection



Infrared Thermogram 6/18/2014	Location South Al-Safeyah Garden
65.7 °	Equipment M-10
	Image File NameFLIR0593.jpgImage Date06/18/2014Image Time7:16:50Atmospheric Temperature20.0 °CRelative Humidity50%
- 55	Emissivity 0.90
🐱 (1996) - Biologia (1996) - Constantino (199	Object Distance 1.0 m
	Ar1 Max. Temperature 65.9 °C
D K 50.2	Sp1 Max. Temperature 57.8 °C
	Dt1 Value 8.2 °C

Photo and Identification			Severity Ratin	g & Recommendati	on	
		1	Low (∆= 5-10°C)	To be monitored	\mathbf{X}	
		2	Medium (∆= 10-35°C)	Repair at schedule outage		
		3	High (∆> 35°C)	Repair immediately		
	-	Ar Th sho wir (Ar	nalysis: e detected hot own above was re of the magn r1) which is high	spot in thermal the secondary loa etic contactor (R in temperature.	image ad side phase)	

In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

It is recommended to keep it under monitoring and to checked the load current in R phase of the contactor Do another thermal inspection

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Repaired by:	date:
Comment:	



Infrared Thermogram 6/18/2014	49,4.90	Location South We Dates Ma	st-Versus of rket
Ar1	- 48	Equipment M-6	
	-	Image File Name	FLIR0601.jpg
		Image Date	06/18/2014
	- 46	Image Time	7:31:05
and a second sec	[Atmospheric Temperature	20.0 °C
	- 44	Relative Humidity	50%
		Emissivity	0.90
	-	Object Distance	1.0 m
	42.1	Ar1 Max. Temperature	48.4 °C



Severity Rating & Recommendation				
1	Low (∆= 5-10°C)	To be monitored		
2	Medium (∆= 10-35°C)	Repair at schedule outage		
3	High (∆> 35°C)	Repair immediately		
A	nalysis:			

+966-11-2795057 (Riyadh HQ)

In maximum load, connectors and terminations (Ar1 of thermal image) model reference temperature should not exceed 90°C.

Reported by : Engr. Adri	an Arigo Signature: Aarigo	date:18/6/2014
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Comment:		
WESAM Systems Co. Ltd	www.wesams.com	info@wesams.com

<u>info@wesams.com</u> 2014/06/18



Infrared Thermogram 6/18/2014		Location	South We	st-Under Al-
Ar1	63.8 °C		Safeyah B Signal	ridge-Quba
	-	Equipment	M-15	
	60			
	- 00	Image File Nam	e	FLIR0606.jpg
		Image Date		06/18/2014
	-	Image Time		7:40:13
	- 55	Atmospheric Ter	mperature	20.0 °C
	-	Relative Humidit	y	50%
	-	Emissivity		0.90
	-	Object Distance		1.0 m
	49.9			
		Ar1 Max. Tempe	erature	63.9 °C
		Sp1 Max. Temp	erature	54.5 °C
		Dt1 Value		9.4 °C

$ \begin{array}{ c c c c c c } \hline 1 & Low & To be monitored \\ \hline (\Delta = 5 - 10^{\circ} C) & \\ \hline 2 & Medium & Repair at \\ (\Delta = 10 - 35^{\circ} C) & schedule outage \\ \hline 3 & High & Repair \\ (\Delta > 35^{\circ} C) & immediately \\ \hline \end{array} $	Photo and Identification	tion Severity Rating & Recommendation					
$\begin{array}{ c c c c c c c c } \hline 2 & Medium & Repair at \\ \hline (\Delta = 10-35^{\circ}C) & schedule outage \\ \hline 3 & High & Repair \\ \hline (\Delta > 35^{\circ}C) & immediately \\ \hline \end{array}$			1	Low (∆= 5-10°C)	To be monitored		
$\begin{array}{ c c c c c }\hline 3 & High & Repair & \\ \hline (\triangle > 35^{\circ}C) & immediately & \\ \hline \end{array}$			2	Medium (∆= 10-35°C)	Repair at schedule outage		
			3	High (∆> 35°C)	Repair immediately		
Analysis:			Ar	nalysis:			

In maximum load, this connectors and terminations (Ar1 of thermal image) model reference temperature should not exceed 90°C.

Reported by : Engr. Adrian Arigo Signature:	date:18/6/2014
Repaired by:	date:
Comment:	



Ar1	Signal	
	Equipment M-15	
	Image File Name	FLIR0611.jpg
	Image Date	06/18/2014
	Image Time	7:42:08
- 70		
	Atmospheric Temperature	20.0 °C
Citize of a state	Relative Humidity	50%
- 60	Emissivity	0.90
	Object Distance	1.0 m
55.0		
	Ar1 Max. Temperature	91.9 °C
	Sp1 Max. Temperature	64.2 °C
	Dt1 Value	27.7 °C

Photo and Identification		Severity Rating & Recommendation				
		1	Low (∆= 5-10°C)	To be monitored		
		2	Medium (∆= 10-35°C)	Repair at schedule outage	X	
		3	High (∆> 35°C)	Repair immediately		
		Th she wir (Ar	nalysis: e detected hot own above was re of the magn r1) which is high	spot in thermal the secondary loa etic contactor (T in temperature.	image ad side phase)	
	-	ì	, 0	•		

Corrective action:

In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

To check the loading current of the secondary load side wire of the contactor (T phase) To check all cable terminations Do another thermal inspection

D0 another	inerna inspection

	Aarig	
Reported by :	Engr. Adrian Arigo Signature:	date:18/6/2014
Repaired by:		date:
Comment:		



iniaieu merniograni 0/10/2014		Location Al-Anbarey	ah-Under(Harbi
Ari Ari	85.3 °C	Equipment The new pa	anel
	i i	Image File Name	FLIR0616.jpg
sn1.		Image Date	06/18/2014
		Image Time	7:49:27
	- 60	Atmospheric Temperature	20.0 °C
000000000000000000000000000000000000000	-	Relative Humidity	50%
		Emissivity	0.90
	- 50	Object Distance	1.0 m
	42.6	Ar1 Max. Temperature	95.6 °C
		Sp1 Max. Temperature	57.6 °C
		Dt1 Value	38.1 °C



In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

To check the loading current of the secondary load side wire of the contactor (R phase) To check all cable terminations Do another thermal inspection

 Reported by :
 Engr. Adrian Arigo Signature:
 Annum
 date:18/6/2014

 Repaired by:
 date:

 Comment:
 date:



Infrared Thermogram 6/18/2014		Location	The 60 Str	eet-Al-Amarah-
	83.9 °C	Equipment	Versus of M-13	Marriott hotel
Ari	- 80	Les e es Elle Nerre	_	
		Image File Name	9	FLIR0626.jpg
		Image Date		06/18/2014
	- 70	Image Time		7:56:34
	60	Atmospheric Ter	nperature	20.0 °C
		Relative Humidity		50%
	-	Emissivity		0.90
	- 50	Object Distance		1.0 m
	45.5	Ar1 Max. Tempe	rature	84.9 °C
		Sp1 Max. Tempe	erature	56.6 °C
		Dt1 Value		28.3 °C

Photo and Identification Severity Rating & Recommendation			on			
		1	Low (∆= 5-10°C)	To be monitored		
		2	Medium (∆= 10-35°C)	Repair at schedule outage	X	
		3	High (∆> 35°C)	Repair immediately		
		Ar	nalysis:			
		Th she wir ph	e detected hot own above was re of the mini ase) (Ar1) which	spot in thermal the secondary loa ature circuit breat is high in temperate	image ad side ker (T ure.	
	L					

In maximum load, this insulated conductor, enclosure surface (Ar1 of thermal image) model reference temperature should not exceed 50°C.

To check the loading current of the secondary load side wire of the contactor (T phase) To check all cable terminations Do another thermal inspection

 Reported by :
 Engr. Adrian Arigo Signature:
 Arrive
 date:

 Repaired by:
 date:
 date:

 Comment:
 date:
 date:



Infrared Thermogram 6/18/2014		Location	South west	Near Abu Baker
	43.1 ℃	Equipment	M-13	emosque
Ari	- 47	Image File Nag	he	FLIR0631 ipg
		Image Date		06/18/2014
	-	Image Time		8:04:04
	- 40	Atmospheric Te	emperature	20.0 °C
	-	Relative Humid	ity	50%
	-	Emissivity		0.90
		Object Distance	Э	1.0 m
	- 38			
	37.7	Ar1 Max. Temp	erature	43.5 °C

Photo and Identification

1Low $(\Delta = 5 - 10^{\circ} \text{C})$ To be monitored2Medium $(\Delta = 10 - 35^{\circ} \text{C})$ Repair at schedule outage3High $(\Delta > 35^{\circ} \text{C})$ Repair immediately
2Medium $(\Delta = 10-35^{\circ}C)$ Repair at schedule outage3High $(\Delta > 35^{\circ}C)$ Repair immediately
3 High (Δ> 35°C) Repair immediately Analysis:
Analysis:

In maximum load, this connectors and terminations (Ar1 of thermal image) model reference temperature should not exceed 90°C.

Reported by : Engr. Adrian Arigo Signature:	date:18/6/2014
Repaired by:	date:
Comment:	



Infraed Thermogram 6/18/2014		Location West-Al-Sa	lam Road-
Ar1	59.8 °C	Equipment M-12	hahabe
	-	Image File Name	FLIR0641.jpg
	- 55	Image Date	06/18/2014
	-	Image Time	8:09:42
Sp1 50		Atmospheric Temperature	20.0 °C
		Relative Humidity	50%
	-	Emissivity	0.90
		Object Distance	1.0 m
	- 45		
	14.3	Ar1 Max. Temperature	59.1 °C
		Sp1 Max. Temperature	53.8 °C
		Dt1 Value	5.3 °C



	Severity Ratir	ng & Recommendati	ion	
1	Low (∆= 5-10°C)	To be monitored		
2	Medium (∆= 10-35°C)	Repair at schedule outage		
3	High (∆> 35°C)	Repair immediately		
A	nalysis:			

In maximum load, this connectors and terminations (Ar1 of thermal image) model reference temperature should not exceed 90°C.

	Aarig			
Reported by :	Engr. Adrian Arigo Signature:	date:18/6/2014		
Repaired by:		date:		
Comment:				