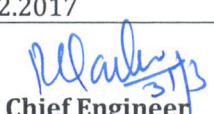


EVENT ANALYSIS REPORT				
UNIT NO : 02	TPS : Khaperkheda TPS		Unit Capacity : 210 MW	
1. *HO Code :	Station Code : T003	Time - 22:51Hrs	Date - 28/02/2017	No. of days from last sync. : 129 days
2. Operating conditions at the time of Event :				
Load		Coal Cycles in service	Oil Support	
86 MW		A	Nil	
3. Nature of Event : T.A. set forced withdrawn to attend boiler tube leakage at steam cooled wall.				
4. Name of First Up, Main Protections & Protection on which GCB tripped : Hand Tripped (First Up), Generator Reverse Power Relay Operated, PT Fuse Failed, Generator Protection Operated.				
5A) Observations : On dt.28/02/2017 at 22:00 hrs, set was on load at 190 MW with no oil support. Coal cycle-F was withdrawn in view of LD backing down. Coal mill-D was under permit for maintenance work. Tube leakage sound was noticed at 26 mtrs level. DM make up found increased. Difference between feed flow and steam flow found increased. After confirming boiler tube leakage, load reduced gradually by withdrawing coal cycles one by one. At 22:51 hrs, set hand tripped when the load was 86 MW with coal cycle-A in service.				
5 B) Remedial Action/work done : <u>Primary Failure</u> – Steam cooled wall inlet header SHH4 to SHH5 connecting elbow stub no. 1 found punctured. <u>Secondary failure</u> – Steam cooled wall inlet header SHH5 stub no.1 found eroded. <u>Work carried out</u> : Attended 04 Nos of HP weld joints. (02 Butt Joints and 02 Stub Joints) (1) Replacement of steam cooled wall inlet header SHH4 to SHH5 connecting elbow stub no.1 (2) Replacement of steam cooled wall inlet header SHH5 stub no.1 (3) As a preventive measure SCW inlet headers stub ((Total 24 nos, 6 nos. at each corner) strengthening done.				
6. Root Cause Analysis : Thermal stress rupture due to cyclic loading & unloading is the root cause of failure of steam cooled wall inlet header SHH5 to SHH4 connecting elbow stub no.1.				
7. Preventive action suggested (Short Term) : Gradual loading & unloading during load variation is to be monitored strictly and necessary instructions have been displayed in control room to carry out loading and unloading within stipulated time period. Circular (No.618 dated 03.12.16) in this regard issued to all the concerned.				
8. Preventive action suggested (Long Term) : (1) DP test of stub joints of SHH5 and SHH4 header will be carried out during forthcoming AOH of Unit-2. (2) Dimensional measurement, Hardness measurement and Ultrasonic testing of SHH5 and SHH4 will be carried out during forthcoming AOH of Unit-2.				
9. Similar event occurred last time :	Unit No # 1, 210MW	Time : 23:45 hrs.	Date : 06/08/2013	
Event : T.A. Set tripped on "Drum Level Very Low" subsequently Boiler tube leakage confirmed.				
Remedial Actions 1. Replacement of Rear Steam Cooled Wall Tube no. 51 2. Replacement of Economiser Hanger Tube no. 50 3. Replacement of Tube no. 3 of LTSH Coil No. 101 at SHH9 Header. 4. Replacement of Tube no. 1, 2 and 3 of LTSH Coil No. 102 & 103 each. 5. Replacement of Tube no. 3 of LTSH Coil No. 104 & 105 each. (Total HP Joints = 22 Nos.)				
9A. Implementation Status of Long Term/Short Term measures stated at Sr No 7&8 :-				
10. Boiler lighted up	Time - 04:20 hrs.	Date - 02/03/2017		
11. T-A Set Synchronized	Time - 10:51hrs.	Date - 02/03/2017		
12. Remark : Unit tripping on UAT Earth Fault protection for Unit-2 by-passed as per recommendation of EPC vide SE (Testing), Protection Application Department, Koradi, Letter No. (1) DYCE (T) / KRD / 180 dated 04.02.2017 and (2) DYCE (T) / KRD / 184 dated 09.02.2017				
 Chief Engineer				
13. Recommendations of Works Section:				
1. Procurement/Replacement Plan:				
2. Operational Error:				
3. Delay in Maintenance:				
4. Delay in bringing back the Unit:				
5. Training of Staff:				
6. Whether remedial action is completed satisfactory & point is closed:				
C E/Dy C E (Works)				



Maharashtra State Power Generation Co. Ltd.

SUPERINTENDING ENGINEER (TESTING)

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Ref.: DYCE(T)/KRD/ 180

DATE: 04/02/2017

OFFICE NOTE

Sub :- Proposal for removal of tripping on earth fault protection on LV side of UAT and Station Transformer at Unit#1 and 2 TPS, Khaperkheda.

Ref :- 1. Khaperkheda TPS letter No. KHG/TIC-I/02/15099 dated 24/01/2017.
2. Event analysis report No. DYCE(T)/KRD/ 179 dated 04/02/2017 submitted by PAD office.
3. ED/O&M/Works/Circular/ 10746 dated 03/09/2016.

With reference to above subject matter and event report vide under reference No. 2, Protection Audit Department proposes the modification in earth fault protection of UAT and Station Transformer at Unit#1 and Unit#2 Khaperkheda TPS, Khaperkheda on the basis of points as mention below.

1. Power Station - Khaperkheda Thermal Power Station, Khaperkheda.

2. Scheme - Unit Auxiliary Transformer (UAT) and Station Transformer (ST).

a. Existing Scheme-

As per the scheme, high impedance grounding is provided for UAT and ST. As per calculations enclosed herewith in Annexure-I, maximum phase to earth fault level is restricted to 6.5 Amp for LV side of UAT and ST. Since CT operated earth fault protection cannot be provided for high impedance grounding systems due to low magnitude of restricted current, tripping is provided on the LV side earth fault through Neutral Displacement relay. Settings adopted for Neutral Phase Displacement Relay of UAT and ST:-

Equipment	Type of Relay	Setting	VT
UAT	English Electric VDG 14	5.4 V ; TMS= 0.7	400/ $\sqrt{3}$ V/110V
Station Transformer	English Electric VDG 14	5.4 V ; TMS =1.0	400/ $\sqrt{3}$ V/110V

Earth fault protection is provided to the individual outgoing feeders on 6.6KV Unit and Station Switchgear through the CBCT and its setting for the various outgoing is

Name of Feeder	Type of Relay	CTR	Earth Fault Setting
Motor	CTMM502DF45A	70/1	Iset- 30 mA ; Time - 1.06 sec.
Transformer	Sensitive E/F Relay CTU	70/1	Iset- 40 mA ; Time - 3.25 sec.

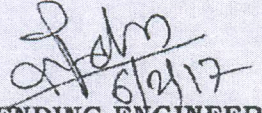
these circumstances then this double earth fault converts into phase to phase fault.

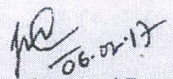
As per circular vide under reference no.3, the chairman of Electrical Protection Committee is the final setting approval authority.

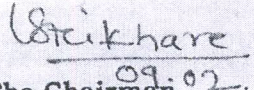
Submitted for necessary approval please.

Enclosed:-

1. Event analysis report.
2. Annexure-I (UAT & Station Transformer existing Grounding System and Earth Fault Level at Unit#1 and Unit#2 Khaperkheda TPS, Khaperkheda).
3. Annexure-II (Action plan for UAT and ST in the event of earth fault).


SUPERINTENDING ENGINEER (TESTING)
(Protection Application Department)
M.S.P.G.C.L. KORADI


Chief Engineer (Const.),
Koradi.


The Chairman
Electrical Protection Committee
(Chief Engineer (O&M), Nasik)

Ref. : DYCE(T)/KRD/184

Date: 09/02/2017

To,
The Chief Engineer (O & M),
MSPGCL,
TPS, Khaperkheda.

Sub.: Regarding implementation of modification in earth fault protection scheme of UAT and Station Transformer of Unit#1 and Unit#2 at Khaperkheda TPS, Khaperkheda.

Ref.: PAD office note no. DyCE(T)/KRD/180, dated 04/01/2017.

With reference to above subject matter, this office has carried out detail event analysis of unit tripping on UAT earth fault protection. Accordingly, modification in the earth fault protection scheme of UAT and ST suggested by this office through office note to the chairman of electrical protection committee. The chairman of EPC approved the said modification of UAT and ST scheme.

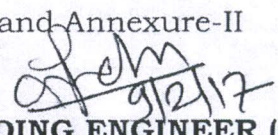
In view of the above, it is requested to implement the same in UAT and ST scheme of Unit#1 and Unit#2 of Khaperkheda TPS during the shutdown.

As per the modified scheme, during the earth fault condition on the UAT or ST scheme, alarm of the respective equipment will appeared. Action plan for this situation is enclosed herewith in Annexure-II.

This is for your information, please.

Enclosed:

1. Approved office Note along with Annexure-I and Annexure-II


SUPERINTENDING ENGINEER (TESTING)
(Protection Application Department)
MSPGCL, KORADI

Copy s.w.r.to :

1. The Executive Director (O & M), MSPGCL, Prakashgad, Mumbai.
2. The Chief Engineer (const), MSPGCL, Koradi.
3. The Chief Engineer (Works), MSPGCL, Mumbai.