Annex – 5
(Medium Term Measures)

Measures Implemented

Sl. No	Name of CPRI Recommendation	Location	Benefits
1	Installation of turbine integral instrumentation including supervisory and expert systems Unit-2	PCR of unit 2	Implemented during COH of unit 2 in Oct 2011 by M.s ABB .Controllers with fast response & more accuracy are installed. New vibration transducers are installed & all signals are routed to DCS. This improved the monitoring of important parameters & faster decisions could be taken.
2	Installation of turbine integral instrumentation including supervisory and expert systems Unit-3	PCR of unit3	Implemented during COH of unit 3 in Sept 2005 by M/s ABB .Controllers with fast response & more accuracy are installed. New vibration transducers are installed & all signals are routed to DCS. This improved the monitoring of important parameters & faster decisions could be taken.
3	Replacement of old and obsolete primary sensors with smart digital data transmission U-2 & 3	At various locations of units 2 & 3 such as Boiler tube metal temp & steam pressure & temp, HPT /IPT temp & pressure, for turbovisory system, motor wdg temp, X'mer oil temp, X'mer wdg temp	Implemented during COH of unit 2 & 3 by M/S ABB. All primary sensors for temperature are replaced by new sensors. Temperature signals are directly routed to DCS avoiding temperature transmitters. Impulse lines & root valves for pressure signals are replaced. Smart transmitters with more accuracy & fast response time are installed.
4	Increased capacity of data highway and data storage	New Generation Control Room	Implemented in 2011. 2MBPs leased line from power station to head office implemented. Tier II data centre installed at HO, Mumbai for SAP-ERP
5	Improvement in steam turbine flow paths and interstage sealing (U2)	Unit 2 (210MW) HPT, IPT & LPT turbines	During the unit 2 COH i.e. Aug-Oct 2011, steam path audit was carried out by M/s Energo (P) Ltd, New Delhi & necessary corrections have been done i.e. sealing strips and packing strips of diaphragms replaced by new ones.
6	Improving the PAF efficiency by overhauling of fan & motors.	PA fan area Boiler basement	Implemented in Oct-2011 : U2, Motors OH : AOH 2010. IGV assly replaced for U2. Therefore PA fan efficiency improved. Fine controlling of primary air achieved. Motor wdg temp. are found within limits.

7	Installation of VFD for air compressors	Unit 2 & 3 compressor rooms near OHP	Implemented for units 2 &3. VFD for 2 Nos of compressors each for units 2 & 3 installed on 15.05.2010. 144 units saved per compressor per day. Also frequency of maintenance is reduced
8	Improving the CEP efficiency by overhauling of pump & motors	Turbine Basement	Implemented in Nov- Dec 2011 for CEP2A, overhaul work carried out, thrust brg converted into antifriction roller brg. Reduction observed in thrust pad failures and availability of pump is increased, also reduction in maintenance costs observed.
9	Reducing the air ingress in flue gas duct between APH to ID outlet	U2 APH to ID outlet	Implemented in Oct 2011 .Damaged Expansion joints & diverter plates are replaced. Flue gas duct patching between APH to ESP carried out & air ingress is reduced.
10	Improving the ID fan efficiency by overhauling of the fans & motors	ID fan area	ID fan impeller, IGV and GV body replaced in COH of unit 2 in Sept-Oct 2011. Both ID fan foundation strengthened with pressure grouting. Loading on ID fan reduced. Vibrations are minimized.
11	Optimizing the ID fan discharge pressure	ID fan area	IGV replaced during COH of Unit 2 in Sept - Oct 2011 and improvement observed.

Measures deferred

Reasons for Deferred Recommendations.			
1)	Installation of VFD for ID fans	Overall Vol 3	As per the MORM meeting L.No CE/Works/MORM/00413 dtd 06.07.2011, schemes deferred due to technical constraint.
2)	Installation of VFD for FD fans at stage II OR Replacement of FD fan motor by 350 kW motor OR Operating single FD fan	Overall Vol 3	As per the MORM meeting L.No CE/Works/MORM/00413 dtd 06.07.2011, schemes deferred due to technical constraint.
3)	Installation of VFD for PA fans	Overall Vol 3	As per the MORM meeting L.No CE/Works/MORM/00413 dtd 06.07.2011, schemes deferred due to technical constraint.
4)	Installation of fixed capacitor banks at UAT secondary	Overall Vol 3	There is no sufficient space available for installation of such scheme consisting of 24 Nos. HT capacitors, series reactors, HT breakers along with cable network for each 6.6kV unit bus.
5)	Installation of motor controller for ASP motors	Overall vol-3	A single motor controller for all series connected motors does not seem practically viable

6)	The principle of loading loss of coal into the heat rate of units results in errors in systems. Heat rate should strictly indicate heat consumption by the units and coal losses (if any) should be separately accounted as a weight loss. Coal losses before bunker cannot be attributed to the units & must not be included therein.	Vol 1, Page No-9, Sr. No1	The present truing up order of MERC considered the Coal GCV of blended (mathematical) coal (Raw, wash and Imported) for heat rate calculation. Therefore the recommendation will not work.
7)	Use of fly ash slurry disposal for bottom ash slurry also	Vol 4, Page -5, Sr No 5a	Not feasible . The system is separate & hence not feasible & if we mix fly ash with bottom ash, line choke up problem increases
8)	Oil gun on-off operation data must be recorded through a time based system automatically	Vol 1, Page 7, Sr No 19	Not possible for U#3 but For U #2 feasibility will be checked.
9)	Cleaning of tube nest of HP heater 5,6 & 7	Vol 2, U-3	Not required. OEM do not recommend tube nest cleaning. There is no deviation in ECO –inlet temp. to the boiler observed.
10)	Operators need to operate the units on sliding pressure mode with 3 element drum level control in the case of 210 MW sets (U2&3)	Vol 1, Page 14, Sr No 101	210 MW LMZ design turbine is of nozzle governing type. Hence, it is not required
11)	Pressurization of turbine area to avoid dust in turbine floor.	Not indicated	Not feasible due to site constraints
12)	Operating single CWP pumps during winter season.	Overall Vol -3	Not feasible. It will be reviewed to provide VFD for one CWP pump.

13)	Increasing the FD Fan discharge pressure.(Unit 3)	Vol 3 APC Sr No2	Not feasible. Since there is no such arrangement in the FD fan. However, we maintain the design pressure by minimising the leakages in the ducting system. Since new technology are involved and modification is required in the blade profiles.
14	Installation of inhaul outhaul betel chargers in CHP 1 & 2	Vol-1, Page No 6, Sr. No 06	Scheme Not feasible Scheme Not feasible at site due to space constraint, but proposal for side arm chargers is clubbed with DPR for coal measurement & monitoring of coal consumption
15	Grab cranes may be used for removal of stones from the wagon tippler area. Removal of stones before entry into the wagon tippler area	Vol-1, Page No 6, Sr. No 08	Not feasible due to space constraints, Hence it is Cancelled.
16	Circular conveyors for conveying of fines from the coal yard to the bunkers.	Vol-1, Page No 14, Sr. No 100	At this stage it is not feasible due to old installation. In this stage it will be reviewed in EE R & M Schemes of U # 2
17	Ultrasonic level indicators for all fuel oil tanks	Vol-1, Page No 6, Sr. No 12	Detail study and feasibility will be checked for our power station and reviewed in EER& M Schemes or earlier.
18	Fuel oil monitoring software package	Vol 1, Page 7, Sr No 26	After installation of Ultrasonic radar indicator Fuel oil monitoring software package will be incorporated.
19	Cleaning of tube nest of HP heater (U#3)		OEM do-not recommend the tube nest cleaning. There is no deviation in Eco inlet temp to the boiler is observed.

20	Cleaning of LPH		This scheme is not required to be implemented as no scales are observed on the tube nest. TTS are well within limits.
21	In the heat exchanger replacement process, the station must explore possibilities of material up gradation, material profile improvement, design changes to improve velocity profiles and improved erosion control devices in preference over old design	Not indicated	Modified coolers at BFP's are installed at U #2. Hence heat transfer is improved and BFP tripping on working oil temperature high is eliminated.
22	New BFP scoop mechanism	Vol 2 U 3 Sr No 15	It is not required. Existing scoop mechanism is okay.
23	Change over to *honeycomb sealing system* for turbine sealing system (U2&3)	Vol 2 U2 & 3, SR Nos 12 & 10	This scheme is not feasible. Feedback from BHEL taken and they say this scheme cannot be practically implemented.
24	Up gradation of turbine control valve actuators	Vol 2 U 3 Sr No 15	It will be reviewed in EE R & M Schemes.
25	Installation of fixed capacitor banks at UAT secondary	U2 & 3, Vol 3	Not feasible as there is no sufficient space available for installation of such scheme consisting of 24 Nos. HT capacitors, series reactors, HT breakers along with cable network for each 6.6kV unit bus.
26	Introduction of vapour absorption system for PCR air conditioning system	Not indicated	Not feasible. Existing Vapour Compression system is found working ok.
27	Installation of fixed capacitor banks at ST1 & ST2 secondary	Overall Vol 3	Not feasible due to space constraint