Annex – 3
(Immediate measures without financial implication)

Measures Implemented

Sl. No	Name of CPRI Recommendation	Location/ Section	Benefits
1	Ready rekoner books of 100-150 pages books may be brought out for Units 1-3 in sufficient copies and distributed to operation and maintenance staff.	Efficiency & PCR of units 2 & 3	20 pages booklet prepared and circulated to Operation & Maint staff. ***Handy data is available for O&M people to enable to take correct decisions in unit running***
2	Currents of individual equipment for different plant load may be made available in the control room	Generation Control Room of units 2 & 3	Implemented. ***This is incorporated in DCS of units 2 & 3.***
3	Policy to go in for digital instrumentation preferably Intelligent electronic devices (IEDs) as preferred mode.	Efficiency	Implemented . This is an continuous process. ***The latest digital schemes are more accurate & reliable for process parameter measurement & process improvement.***
4	Station Head to facilitate exposure of latest technologies and best practices to its maintenance engineers and propagate learning at station level through talk / presentation by the deputed engineers.	IT	SAP-ERP went live in Sept 2011. End user & power user training, Regular workshops and seminars are conducted for the same. ***Proper practices of maintenance and operation reports generated online***

Measures In Practice

Sl. No	Name of CPRI Recommendation	Location/ Section	Benefits
1	A ready rekoner data base on the hourly generating costs of each set as also the sensitivity of generating cost to heat rate is essential for decisions on merit order loading of sets.	Efficiency & PCR of units 2 & 3	Online monitoring available through GCR. *This maintains economical loading on particular set*
2	Currents of individual equipment for different plant load may be made available in the control room	Generation Control Room of units 2 & 3	This is incorporated in DCS of units 2 & 3.
3	Policy to go in for digital instrumentation preferably Intelligent electronic devices (IEDs) as preferred mode.	I&CT-II	This is a continuous process. *The latest digital schemes are more accurate & reliable for process parameter measurement & process improvement*.
4	Station Head to facilitate exposure of latest technologies and best practices to its maintenance engineers and propagate learning at station level through talk / presentation by the deputed engineers.	IT	SAP-ERP went live in Sept 2011. End user & power user training, Regular workshops and seminars are conducted for the same. *Proper practices of maintenance and operation reports generated online*
5	The Railway receipt (RR) may be digitized and communicated to the TPS well before the consignment actually reaches the coal yard so that time delay is minimized.	CHP	The railway receipt is available on web site before reaching of rake to coal yard. *During non-receipt of rake, we can plan various maint. Activities and utilize available time and manpower more efficiently.*
6	Coal dust palletisation at the washery level or at the crusher level	CHP	Presently, Coal dust palletisation is done by dust extraction system at crusher level. Collection of dust by vacuum cleaner will be explored. *Fugitive dust emissions at CHP area is under control*.
7	Implementing a detailed rainy season station management plan.	CHP	Pre monsoon activities are planned well within stipulated period and completed. Before monsoon we are compacting the coal heaps with the help of compactor to avoid ingress of rain water & spontaneous combustion. Coal heaps are covered with tarpaulins. *Due to this, coal consumption optimization and load predictability can be achieved*
8	Strengthening and Improving the maintenance practices at CHP	CHP	1) Housekeeping is improved. 2) Scrappers of all conveyors are adjusted or replaced & will be maintained. 3) Preventive maint. Schedule will be adhered to.4) Predictive maintenance work

			will be introduced. *Coal loss due to burning & loss due to wet coal is minimized.*
9	Resource consumption and conservation (coal, oil, DM water make up) is also to be given importance in the operational process and decision maker must be aware of key resource ratios.	OP U 2 & 3	1) We consume oil as minimum as possible by taking measures by regular cleaning of flame scanners to increase the stability of flame scanners. 2) DM water consumption is regularly monitored shift to shift wise. If any deviation found, then we find out the reasons for the same such as checking of high energy drains, various steam leakages and possibility of steam leakage to maintain resource ratios. Coal consumption depends on quality if coal. *Resource management & action can be taken for decision making*
10	Measuring the ash to water ratio on daily basis	WTP	Ash to water ratio is being maintained by ash handling operational staff with the measuring cylinder provided to the concerned. *Environmental related problems such as excess water in the ash pond spoiling the soil of the farmers has been stopped & related ash line choke up problems have been minimized*
11	Increasing dry fly ash evacuation system.	Tech	1) As per agreement, fly ash utilization is being executed by M/s Orient Cement Ltd & it is around 75 to 78%. *Reduction in auxiliary consumption & water consumption*
12	Sampling improvement: Sampling through automatic samplers under the supervision of chemists. Chemists must witness the taking of the samples.	WTP	Sample collection of coal from WCL, SECL, MCCL, Imported and washed coal for analysis of sample is being done by Augar machine. UHV, GCV can be calculated. *Accuracy is more and sampling is fast*
13	Sample preparation improvement: Sampling preparation through standard crushing and pulverizing equipment.	WTP	Sample prepared is crushed thru the jaw crusher to 50 mm, then to 12.5mm thru secondary crusher , 3.3 mm thru another jaw crusher & finally to 250 microns. *Combustion is optimized. GCV results are obtained more accurately compared to colliery results*
14	Reporting, data entry and archiving: Data entry to be authenticated by printout of the bomb calorimeter.	WTP	The data entry reports are prepared day to day and reported. *Factual coal quality can be determined*
15	For further refinement in the coal heat value determination, it is	WTP	Sample from rake is being done as per guidelines of IS random table. Minimum sample

	recommended to measure *sample to sample variation* in a rake (for receiving end coal) for each rake and to measure *in-sample variation* to select the minimum sample size.		size is okay for measuring sample to sample variation in a shift for each rake. *Combustion is optimized. GCV results are obtained more accurately compared to colliery results*
16	Bomb calorimeter data to be interfaced with LAN.	Coal & Env	Updated knowledge of coal quality is displayed for all so as to take corrective actions by concerned *Due to this, optimisation of coal consumption & load predictability achieved*
17	Reducing overloading of motors	EM-II	Overhaul of all LT motors above 20 kW has been carried out during AOH/COH of U2 & 3. *Due to this Failure rate of motors is reduced*
18	The data recorded in each shift by the Chemists must be used for Performance Optimization.	OP U 2 & 3	We are regularly monitoring coal fineness, unburnt in fly ash & slag ash & flue gas O2 & CO2 contents, silica in drum, stack emission & conductivity of FW, moisture in lub oil. *Operational Optimization is achieved*
19	Fully automatic differential pressure orifice plate or nozzle type or mass based oil flow meters with provision for continuous digital data transfer may be installed for all units.	I&CT-II	Oil flow meters are installed at U-2 (Oct11) & at U-3 (Sept05). The signals are routed to DCS. Earlier measurement transmitters were with mechanical linkages & were out of order due to sticking up of diaphragms. *The newly installed flow meters give digital output with accurate measurement for performance improvement*
20	Recommendations of the performance optimization group for proactive parameter setting are required for optimization of the unit performance.	Effy	Recommendations regarding deviation in critical parameters that will directly affect the performance are discussed in Daily Planning Meeting. *Beneficial in optimization of performance*