Annex – 4
(Immediate measures with financial implication)

Table 1: KTPS status of CPRI recommendation immediate term with financial implications.

S.N.	VOLUME	STATION / UNIT	CPRI Recommendations	Date / Month of Imple-mentation	STATUS AS ON 31-12-2011	Effects / Results / Improvement seen
1	V-4	STAGE-II	Installation of belt weighers for all coal conveyors.	Mar-10	Bunkering Belts 7A/7B/7C/7D/7C 1 & Stacker Belt 109 Completed. All the important belts have been covered.	For Close monitoring of coal feeding on conveyor belts from CHP control room
2	V-4	STAGE-II	The belt weighers will provide only stage wise coal measurement which is inadequate to give unit wise consumption essential for accounting purposes. The arrangement for unit wise coal consumption is essential. This is possible by providing *rail signature*	unit 5 & 7 work during FY 13-14 & 14-15 respectively. Unit 6 work is expected in FY12-13 along with R&M	For unit 5 & 7 the schemes of gravimetric feeders have been proposed EER&M. Procurement of Feeders is being done at HO. Work of unit 6 will be done under R&M .	Unit wise coal consumption can be known
3	V-4	STAGE-II	Coal level in the bunker is presently recorded manually. It is a process wherein the bunker levels are conveyed by manual observation from the bunker area to the Coal handling plant and from there it is relayed to the control room over telephone.	Aug 2012.	The scheme of Radar type level transmitters have been proposed Through DPR of performance monitoring improvement.	Availability of bunker level indication in PCR
4	V-1	STAGE-II	*Software is to be in place for online coal energy management* in the plant. The software inputs data from the various field instruments also computes the coal consumption, heat	Dec-14	Will be covered in DCS under R&M of Unit-6.Heat rate calculation by capturing the inputs of various	For better performance computation

		consumption, heat rate, etc., at various points, on line. *** Computation of unit*		parameters is available in local Generation control room & results are circulated to all PCRs daily.	
5	**V-1** STAGE-II	It is recommended to go in for fully automatic pit less in motion weigh bridges (where the entire rake is measured at a speed of 15 km/h) (see Table 4 in Annex 2 for details). The in motion weigh bridge should have an electronic digital interface to digit	Mar-12	For conversion of load cell signals to digital signals Upgraded Weighing System being installed at Wagon Tippler 3 & 4	online coal measurement
6	**V-4** STAGE-II	Separate tube type conveyors for conveying of fines to bunkers.	-----	Not Feasible due to space constraints	----
7	**V-3** UNIT 5	Calibration of RC feeder speed for coal flow in mills .	----	Feeder speed is calibrated in annual overhaul & as & when required	measurement of coal consumption of each unit
8	**V-3** UNIT 6	Calibration of RC feeder speed for coal flow in mills .	----	Feeder speed is calibrated in annual overhaul & as & when required	----
9	**V-3** UNIT 7	Calibration of RC feeder speed for coal flow in mills .	----	Feeder speed is calibrated in annual overhaul & as & when required	----
10	**V-1** Stage-II	It is recommended to go in for fully automatic on line measurement of DM water consumption.	Nov-12	The flow meters in unit 5,6 & 7 are installed & readings are available in respective control rooms. Rest of the flow meters will be	Excess water loss can be avoided

					provided in future	
11	**V-1**	STAGE-II	Recommendation: Presently bomb calorimeter has a print out. This may be further automated to connect it to a PC from where the information can be sent to daily report without human intervention.	May-12	Connectivity with computer will be checked after SAP implementation	real & correct CV information will be available
12	V-1	STAGE-II	Procurement of TGA analyzer of coal for operational optimum	Aug-12	Proposed through DPR.	
13	V-1	STAGE-II	Procurement of CHN apparatus for ultimate analysis for operation optimum	Aug-12	Proposed through DPR.	
14	**V-3**		A fuel oil monitoring software package is to be in place for on line calculation and logging of the oil receipts, etc.	Jun-12	FO consumption of individual units can be measured after installation of mass flow meters at each unit. DPR for procurement of mass flow meters for unit 5 & 7 is sent to HO The installation of unit 6 will be done in R&M. After installation of the flow meters, monitoring software will be procured.	
15	**V-3**	UNIT 5	On line Computation & monitoring of Specific Energy Consumption (SEC) for each HT equipment.”)-(SMART ENERGY	Aug-12	DPR send to HO.	Quality Project

			MANAGEMENT SYSTEM)			
16	**V-3**	UNIT 6	On line Computation & monitoring of Specific Energy Consumption (SEC) for each HT equipment.")-(SMART ENERGY MANAGEMENT SYSTEM)	Aug-13	DPR send to HO.	Quality Project
17	**V-2**	UNIT 7	On line Computation & monitoring of Specific Energy Consumption (SEC) for each HT equipment.")-(SMART ENERGY MANAGEMENT SYSTEM)	Aug-14	DPR send to HO.	Quality Project
18	**V-2**	UNIT 5	On line vibration monitoring for HT Aux.	Aug-12	DPR prepared & sent to HO.	Better predictive maintenance
19	**V-2**	UNIT 6	On line vibration monitoring for HT Aux.	Dec-13	Included in R&M scope	Better predictive maintenance
20	**V-4**	UNIT 7	On line vibration monitoring for HT Aux.	Aug-12	DPR prepared & sent to HO.	Better predictive maintenance
21	**V-2**	STAGE-II	Operating the CHP near to its full capacity and strengthening of preventive maintenance schedule.	Dec-12	Under this recommendation Conveyor 7C & 7D strengthening has been proposed through DPR	Prevention of generation loss
22	**V-2**	UNIT 6	Suitably designed ceramic content cassette baffles may be introduced for reduction of erosion.	---	Presently SS type cassette baffles are giving satisfactory performance	-------
23	**V-2**	UNIT 5	Use of plate type heat exchangers BFP lube oil, FD, PA, and ID fans.	Dec-12	One no of heat exchanger is procured same will be installed for PA fan Unit-6.durin AOH in Jul 2012. After	Better lube oil cooling

					observing the performance of the same implementation at all locations will be done.	
24	**V-2**	UNIT 5	Replace valve stem by stellited seats, valve plug with Inconel 750	It is in practice	HP Valves are in use with appropriate rating i.e. with specified class body, seat & stem material.	For proper control of system
25	**V-2**	UNIT 6	Use of plate type heat exchangers BFP lube oil, FD, PA, and ID fans.	Dec-12	One no of heat exchanger is procured & same will be installed for PA fan Unit-6.durin AOH in Jul 2012. After observing the performance of the same implementation at all locations will be done.	Better lube oil cooling
26	**V-2**	UNIT 6	Replace valve stem by stellited seats, valve plug with Inconel 750	It is in practice	HP Valves are in use with appropriate rating i.e. with specified class body, seat & stem material.	For proper control of system
27	**V-2**	UNIT 7	Use of plate type heat exchangers BFP lube oil, FD, PA, and ID fans.	Dec-12	One no of heat exchanger is procured & same will be installed for PA fan Unit-6.durin AOH in Jul 2012. After observing the performance of the same implementation at all locations will be done.	Better lube oil cooling

28	**V-2**	UNIT 7	Replace valve stem by stellited seats, valve plug with Inconel 750	Implemen ted	HP Valves are in use with appropriate rating i.e. with specified class body, seat & stem material.	For proper control of system
29	**V-4**	STAGE-II	Clean the cooling tower pond, splitter plates from algae, etc	Implemen ted	Regular Chlorine gas dosing is carried out to control growth of Algae in GS Cooling Tower. Splitter plate & Spray Nozzle cleaning is regularly carried out of CW cooling Towers	To control Algae in Cooling Tower
30	**V-2**	UNIT 6	Restoration of the clearance between fan impeller blades & casing during an outage	Implemen ted	Impeller replacement is done regularly for restoration of the clearance.	For better performance
31	**V-2**	UNIT 7	Restoration of the clearance between fan impeller blades & casing during an outage	Implemen ted	Impeller replacement is done regularly for restoration of the clearance.	For better performance
32	**V-3**	UNIT 7	Use of Electrostatic Cleaning system for lube oil system of Turbine, BFP, FD, PA and ID fans.	N/A	MOT Lube oil sample is checked monthly basis. As COP is provided giving satisfactory results. Electrostatic system is not required. For FD ID & PA oil is replaced in annual overhaul	----
33	**V-3**	UNIT 7	Use of Membrane Filter Oil Cleaning system lube oil system & Plate type heat exchanger for coolers of	N/A	Existing cleaning & cooling system is satisfactory	----

			Mills.			
34	**V-2**	UNIT 7	Burner mouth panels may be replaced with hard faced throat tube assemblies	---	Failure rate is nil hence not required	----
35	**V-2**	UNIT 7	Change over to dynamic classifiers for mills	--	The existing classifier system is giving satisfactory performance	----
36	**V-2**	UNIT 7	Suitably designed ceramic content cassette baffles may be introduced for reduction of erosion.	---	Presently SS type cassette baffles are giving satisfactory performance	-------
37	**V-3**	UNIT 5	Use of Electrostatic Cleaning system for lube oil system of Turbine, BFP, FD, PA and ID fans.	----	MOT Lube oil sample is checked monthly basis. As COP is provided giving satisfactory results. Electrostatic system is not required. For FD ID & PA oil is replaced in annual overhaul	----
38	**V-3**	UNIT 5	Use of Membrane Filter Oil Cleaning system lube oil system & Plate type heat exchanger for coolers of Mills.	----	Existing cleaning & cooling system is satisfactory	-----
39	**V-2**	UNIT 5	Burner mouth panels may be replaced with hard faced throat tube assemblies	--	Failure rate is nil hence not required	----
40	**V-2**	UNIT 5	Suitably designed ceramic content cassette baffles may be introduced for reduction of erosion.	---	Presently SS type cassette baffles are giving satisfactory performance hence not necessary	-------

41	**V-3**	UNIT 6	Use of Electrostatic Cleaning system for lube oil system of Turbine, BFP, FD, PA and ID fans.	---	MOT Lube oil sample is checked monthly basis. As COP is provided giving satisfactory results. Electrostatic system is not required. For FD ID & PA oil is replaced in annual overhaul	----
42	**V-3**	UNIT 6	Use of Membrane Filter Oil Cleaning system lube oil system & Plate type heat exchanger for coolers of Mills.	----	Existing cleaning & cooling system is satisfactory	----
43	**V-2**	UNIT 6	Burner mouth panels may be replaced with hard faced throat tube assemblies	-----	Failure rate is nil hence not required	----
44	**V-4**	STAGE-II	Well designed covers for all bunker conveyors of stage I and for lower conveyor of Stage II (augmentation).	Jun-12	Hood Covers procured for St. II Plant. Installation work in progress. Stage I Plant is presently Not in Service.	To prevent the coal from becoming wet during rainy season &
45	**V-2**	UNIT 6	Change over to dynamic classifiers for mills	----	The existing classifier system is giving satisfactory performance hence not found necessary	----
46	**V-3**	UNIT 5	Installation of VFD for all RC feeders.	FY 2009	Already implemented in 2009	coal feed control
47	**V-3**	UNIT 6	Installation of VFD for all RC feeders.	Mar-13	Proposed in R&M	coal feed control
48	**V-3**	UNIT 7	Installation of VFD for all RC feeders.	Mar-13	2 no's VFD (7D & 7F are installed in Nov 2011 during Overhaul.	coal feed control

				Balance 4 no's are being installed during 12-13	
49	**V-4** STAGE-II	Overhauling the RWP pump no. 1 and motor at stage II to avoid overloading.	Mar-13	Procurement of new RWP is Proposed through R&M of unit 6	For maximum availability
50	**V-3** UNIT 5	Replacement of AVR (automatic voltage regulator) by digital voltage Regulator (DVR)	IMPLEMENTED	Unit 5 has been implemented	1.Reductiion in trippings during Grid disturbance 2. Fast Response of AVR.
51	**V-3** UNIT 6	Replacement of AVR (automatic voltage regulator) by digital voltage Regulator (DVR)	Mar-13	Unit no.6 will be carried out during R&M activities	1.Reductiion in trippings during Grid disturbance 2. Fast Response of AVR.
52	**V-3** UNIT 7	Replacement of AVR (automatic voltage regulator) by digital voltage Regulator (DVR)	IMPLEMENTED	Unit 7 has been implemented	1.Reductiion in trippings during Grid disturbance 2. Fast Response of AVR.
53	**V-3** UNIT 6	Overhauling of pulse air compressor and motors .	IMPLETED	It is done in annual overhaul	improvement in performance
54	**V-3** UNIT 6	Reducing the pressure drop in flue gas duct and APH .	IMPLEMENTED	It is practice to repair the ducts in overhaul for the problem of erosion & to Repair /replace the damaged expansion joints & fabric expansion joints. Unit 5 & 6 CFD modeling is not feasible due to bag filter & Unit	Efficiency improvement

				no 7 erosion problem is negligible.	
55	**V-3** UNIT 5	Reducing the pressure drop in flue gas duct and APH .	IMPLEMENTED	It is practice to repair the ducts in overhaul for the problem of erosion & to Repair /replace the damaged expansion joints & fabric expansion joints. Unit 5 & 6 CFD modeling is not feasible due to bag filter & Unit no 7 erosion problem is negligible.	Efficiency improvement
56	**V-3** UNIT 7	Reducing the pressure drop in flue gas duct and APH .	IMPLEMENTED	It is practice to repair the ducts in overhaul for the problem of erosion & to Repair /replace the damaged expansion joints & fabric expansion joints. Unit 5 & 6 CFD modeling is not feasible due to bag filter & Unit no 7 erosion problem is negligible.	Efficiency improvement
57	**V-2** UNIT 5	Change over to dynamic classifiers for mills	---	The existing classifier system is giving satisfactory performance hence not found necessary	----

58	**V-4**	STAGE-II	Implementing fogging dust suppression system at all level from wagon tippling to bunkering. Any other solution than water mixing can also be explored.	Jul-11	At most of the emitting points dust suppression systems have been installed..	For better environment
59	**V-4**	STAGE-II	Sidewalk for both sides of conveyors to enable replacement of rollers and belts.	Dec-12	Proposed through DPR for stage-II (Old Plant) Conveyor belts	For safety & easy working process for maintenance & cleaning staff

Table 2: Kordi status of CPRI recommendation (Not indicated term).

S. N.	vol no	Project Code	STATION / UNIT	CPRI Recommendations	Date / Month of Imple-mentation	STATUS AS ON 31-12-2011	Effects / Results / Improvement seen
1	V-2	**P-8**	UNIT 6	Change over to rotating vane wheel assy. for coal mill.	IMPLEMENTED	Already Done during MPSP system.	Better coal fineness achieved
2	V-2	**P-8**	UNIT 7	Change over to rotating vane wheel assy. for coal mill.	IMPLEMENTED	Already Done during MPSP system.	Better coal fineness achieved
3	V-3	**P-8**	UNIT 5	Constant adjustment of spring load.	IMPLEMENTED	It is being done regularly after monitoring the mill performance	Better coal fineness achieved
4	V-4	**P-9**	UNIT 6	Constant adjustment of spring load.	IMPLEMENTED	It is being done regularly after monitoring the mill performance	Better coal fineness achieved
5	V-5	**P-10**	UNIT 7	Constant adjustment of spring load.	IMPLEMENTED	It is being done regularly after monitoring the mill performance	Better coal fineness achieved
6	V-2	**P-8**	UNIT 5	Strain gauge under the bearing supports of the mill for online weight of the mill.	FY 13-14	Coal measurement will be monitored by Gravimetric feeder are being installed during R&M hence found not necessry.	----

7	V-2	**P-8**	UNIT 6	Strain gauge under the bearing supports of the mill for online weight of the mill.	FY 13-14	Coal measurement will be monitored by Gravimetric feeder are being installed during R&M hence found not necessry.	----
8	V-2	**P-8**	UNIT 7	Strain gauge under the bearing supports of the mill for online weight of the mill.	FY 14-15	As gravimetric feeders are being installed for coal measurement The strain gauges are not found necessary.	----
9	V-1	**P-8**	UNIT 5,6, 7	Zero Coal leakage	IMPLEMENTED	Regular practice to arrest leakages by patch welding & replacing the damaged bends & pipes in n AOH & short shut down.	Leakages minimized
10	V-3	**P-8**	UNIT 5	Condenser tube cleaning by bullet shot method and coating of polyglass.	IMPLEMENTED	Polyglass coating in unit -5 condenser is already carried out. Condenser tube cleaning is carried out during AOH 0f Unit -5 in July 2010 by bullet shot	About 15-20 mm of Hg vacuum improvement observed.

						method.	
11	V-3	**P-8**	UNIT 5	Increase tap position by one tap of UAT.	FY 12-13	During unit AOH in the month of July 2010 internal inspection carried out. Tap changer contacts found damaged so fixed connection done at normal tap position hence change in tap position is not possible. However it will be replaced Tap changer will be replaced shortly.	----
12	V-3	P-8	UNIT 5	Cleaning Of HT/LT panels in O/H.	IMPLEMENTED	Cleaning is regularly done during overhaul	Auxiliary failure reduced.
13	V-3	P-8	UNIT 6	Cleaning Of HT/LT panels in O/H.	IMPLEMENTED	Cleaning is regularly done during overhaul	Auxiliary failure reduced.
14	V-3	P-8	UNIT 7	Cleaning Of HT/LT panels in O/H.	IMPLEMENTED	Cleaning is regularly done during overhaul	Auxiliary failure reduced.

15	V-3	P-8	UNIT 5	Water sealing of bottom ash hopper	IMPLEMENTED	It is carried out in shutdown & annual overhauls	Better sealing for furnace draft
16	V-3	P-8	UNIT 6	Water sealing of bottom ash hopper	IMPLEMENTED	It is carried out in shutdown & annual overhauls	Better sealing for furnace draft
17	V-3	P-8	UNIT 7	Water sealing of bottom ash hopper	IMPLEMENTED	It is carried out in shutdown & annual overhauls	Better sealing for furnace draft
18	V-1	P-12	STAGE-II	Closed circuit TVs may be installed in boiler elevations AB, CD, EF, etc., on all corners for Stage II units and near either sides of Stage I units. The viewing must be in control room and in Station Head's office. In all around 40 CCTVs may be installed	FY 12-13	The same will be installed at all four corners of a single elevation on trial basis & will be implemented at all locations	---
19	V-3	P-12	UNIT 5	To check the cable joint temperatures by thermography.	IMPLEMENTED	This exercise is done in respect of GTRS for monitoring the joints of CA bushing & HT cables	Benefits achieved
20	V-3	P-12	UNIT 6	To check the cable joint temperatures by thermography.	IMPLEMENTED	This exercise is done in respect of GTRS for monitoring the joints of CA bushing & HT cables	Benefits achieved
21	V-3	P-12	UNIT 7	To check the cable joint temperatures by thermography.	IMPLEMENTED	This exercise is done in respect of GTRS for	Benefits achieved

						monitoring the joints of CA bushing & HT cables	
22	V-3	**P-13**	UNIT 5,6 &7	Wind box leakage control	IMPLEMENTED	Wind box leakages are being attended during shutdown & overhauls	Benefits achieved
23	V-3	**P-13**	UNIT 5,6 & 7	Sealing of man holes & inspection holes	IMPLEMENTED	Leakages from man holes & inspection hole is attended during shutdown & Overhauls	Benefits achieved
24	V-3	**P-13**	UNIT 5	Overhaul the CEP - 5C and motor to avoid overloading of motor.	IMPLEMENTED	Overhaul of CEP 5C is carried out departmentally during Annual Overhaul of Unit in July-10	Power consumption is reduced by ~ 48 kw
25	V-3	**P-13**	UNIT 5	Replacement of damaged insulation.	IMPLEMENTED	Damaged insulation is replaced ,Condition of Turbine and other steam/water pipe lines insulation is monitor & rectified as and when required	Heat loss is reduced but it cannot be quantified
26		**P-13**	UNIT ,6	Replacement of damaged insulation.	IMPLEMENTED	--,,--	--,,--

27		**P-13**	UNIT 7	Replacement of damaged insulation.	IMPLEMENTED	--,,--	--,,--
28	V-3	P-14	UNIT 5	Steam supply system for quenching of mill fires.	N/A	System Installed for Unit 5,6&7 in coal mills B&C This system is installed in lieu of bunking the imported coal through mill B& C. hence not necessary for Other mills	---
29	V-3	**P-14**	UNIT 6	Steam supply system for quenching of mill fires.	----	This system is installed in lieu of bunkering the imported coal through mill B& C. hence differed for Other mills	---
30	V-3	**P-14**	UNIT 7	Steam supply system for quenching of mill fires.	----	This system is installed in lieu of bunkering the imported coal through mill B& C. hence differed for Other mills	----