

**Application for
IN PRINCIPLE APPROVAL OF CAPITAL
WORKS AS ADDITIONAL
CAPITILIZATION**

For

(1240MW) Coal based KOTA Super Thermal
Power Station (KTPS–Stage-I TO V, Unit-1 TO7)

Submitted to

Rajasthan Electricity Regulatory Commission

Jaipur

By

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A1: BACKGROUND

- 1.1** Rajasthan Rajya Vidyut Utpadan Nigam Ltd (RVUN) was incorporated under the Companies Act 1956, as one of the five successor companies of erstwhile Rajasthan State Electricity Board (RSEB) to take over the electricity generation business in the state of Rajasthan. The existing power stations and those under commissioning in the state sector were transferred to RVUN as per the Rajasthan Power Sector Reforms Transfer Scheme, 2000 notified by State Government provisionally on 19th July 2000 and finally on 18th January 2002.
- 1.2** RVUN has entered into Long Term Power supply-Purchase Agreements (PPA) in respect of existing and future power projects for 25 Years with the three Discoms on 28.09.06 and subsequence various supplementary PPA's with Discoms which included KTPS unit1 to 7(Stage I to III).

A2: INTRODUCTION

2.1 Kota Super Thermal Power Station (KSTPS)

Kota Super Thermal Power Station (KSTPS) is located on the left bank of river Chambal in Rajasthan's Principal industrial city, Kota. Infrastructural facilities like adequate water availability in Kota Barrage, nearness to broad gauge railway line, load centre and existing transmission system for evacuation of power were some of the important factors responsible for selection of this location. Besides, better communication with all parts of the State, availability of adequate land for residential, non-residential buildings and for Ash disposal in the vicinity of the Power House were some of the additional advantages in favour of the existing location.

2.2 Sanction of Units (Stage I to III):

Stage I (Unit I & II) was sanctioned by the Planning Commission in September, 76 whereas Stage-II (Unit III & IV) was sanctioned in October, 80, Stage-III(Unit-V) comprising of only one unit was sanctioned in February, 1989, Stage-IV(Unit-VI) was sanctioned in May,02 and Stage-V(Unit-VII) was sanction in December,05 .

2.3 The Commissioned and commercial operation of KTPS Unit 1 to 7 details are given below:-

S.No.	UNIT	Date of Commissioning	Date of COD
1	UNIT#1	17.01.1983	01.04.1983
2	UNIT#2	13.07.1983	01.04.1984
3	UNIT#3	25.09.1988	11.03.1989
4	UNIT#4	01.05.1989	16.01.1990
5	UNIT#5	26.03.1994	18.07.1995
6	UNIT#6	30.07.2003	01.08.2004
7	UNIT#7	30.05.2009	31.12.2009

A3: SALIENT FEATURES OF PETITION

- Details of proposals
- Justification of proposals
- Benefits after up-gradation
- Estimate of total cost of project & Commissioning scheduled.

3.1 Details of proposals

3.1.1 Renovation of CHP Stage I&II system:-

The existing CHP wagon unloading system of Stage I&II is very old and aged and insufficient for timely unloading about 20000 MT coal required for the generation of electricity in 1240 MW unit # 1 to 7 and there is no tippler in III, IV, V stage for strength & improvement of CHP system may be done by installing one no. wagon tippler, 2 no Rotary breakers, 3 no. Ring granulators, one no Stacker Reclaimer along with associated conveyors & equipments and renovation of existing loading and unloading system and railway yard at KTPS, Kota.

3.1.2 Renovation & Modernization of Railways Track:-

Existing railways is required high maintenance, low speed track & safety considerations due to older technology which required Up gradation of Railway siding track from Gurla Chambal Cabin to KTPS Sakatpura. Changing of old sleepers Through Sleeper Renewal (TSR) with pre-stressed Reinforced Concrete (PRC) sleeper with lifting & deep screening and overhauling of Railways track from Chambal cabins /Gurla to KSTPS, Sakatpura Marshalling yard & fabrication & fixing of steel; sleepers by removing bridges timbers at steel bridges.

3.1.3 Design Engineering & comm.of Training Simulators:-

Considering the large generating capacity in near future, RVUN will require large number of trained Operators & Engineers to run Power Stations for safe operation & better performance of plant. In this reference RVUNL have been already recruited 342 fresh Engineer & deputed at various projects of RVUNL. These Engineers are to be trained for O&M activities of Power Plant & to place them in new project for commissioning & O&M activities. Therefore Training Simulator will be very useful to train our fresh Engineers as well as to experience Engineers to refresh the O&M activities of Thermal Power Stations.

3.1.4 Construction of Road over bridge:-

At present, the movement of road traffic on highway is interrupted at railway crossing during coal rakes/wagons movement.

After construction of R.O.B., the establishment expenditure at L.C.15 shall be reduced.

3.1.5 Purchase of 2 No. Dozers, Hydraulic Excavator, Hydraulic Re-railing equipment, 2 no. Diesel locomotives & Fire Tender:-

Purchase of 02 Nos. Bull Dozers Type: BD-155 and 01 No. Hydraulic Excavator Type: BE-71:- The details of existing Bull Dozers are given below:-

S. No	Details of Dozers	Description	Remarks
1	Dozer No. D-142	All parts have worn out. Useful life as recommended by OEM is 09 years or 21000 Hrs whichever is earlier	Breakdown since 17.10.2003. Action for disposal / auction has been initiated. New purchase is required. Declared as scrap
	Year of Purchase: 1982		
	Running Hours: 21500		
	Breakdown/ Running: Breakdown since 17.10.2003		
2	Dozer No. D-26		<i>Now in running condition.</i>
	Year of Purchase: 1982		
	Running Hours: 21686		
	Breakdown/ Running: Breakdown from 14.08.2009 to 29.04.2011		
3	Dozer No. D-145		Under Breakdown
	Year of Purchase: 1982		
	Running Hours: 20300		
	Breakdown/ Running: Breakdown since 08.07.2008		
4	Dozer No. D-859	Overhauled time to time (04 times)	<i>Now in running condition.</i>
	Year of Purchase: 1985		
	Running Hours: 22449		
	Breakdown/ Running: Running		
5	Dozer No. D-860		<i>Now in running condition.</i>
	Year of Purchase: 1985		
	Running Hours: 19799		
	Breakdown/ Running: Running		
6	Dozer No. D-11542	Engine overhaul done in July/Aug' 09	Under Breakdown
	Year of Purchase: 1994		
	Running Hours: 13428		
	Breakdown/ Running: Breakdown since 18.12.2010		
7	Dozer No. D-11560	Engine replaced in May' 2007	<i>Now in running condition.</i>
	Year of Purchase: 1994		
	Running Hours: 15019		
	Breakdown/ Running: Running		
<i>Presently no Hydraulic Excavator is available with KSTPS for handling coal boulders and stones during un-loading process of coal from Railway wagons at Wagon Tipplers.</i>			

Purchase of 02 Nos. Diesel Hydraulic Locomotives: -

Status and problems of presently available Shunting Locomotives are given below:-

S. No	Details of Locomotives	Description & Remarks	
1	Loco No. KTPS-3	All these locomotives are WDS-6 Diesel Electric types which were purchased from Railways. These locomotives are now also rare in Railways. Scheduled maintenance of these locomotives and supply of spares are done by Railways only.	
	Year of Purchase: 1987		
	Breakdown/ Running: Running since 1987		
2	Loco No. KTPS-4		
	Year of Purchase: 1987		
	Breakdown/ Running: Running since 1987		
3	Loco No. KTPS-5		
	Year of Purchase: 1995		
	Breakdown/ Running: Running since 1985		
4	Loco No. KTPS-6		These locomotives are WDS-4B Diesel Hydraulic types which were also purchased from Railways. Scheduled maintenance of these locomotives and supply of spares are done by Railways only. Now these type of locomotives obsolete in Railways and further maintenance of these locomotives is not possible.
	Year of Purchase: 1982		
	Breakdown/ Running: Running since 1982		
5	Loco No. KTPS-7		
	Year of Purchase: 1982		
	Breakdown/ Running: Running since 1982		
02 Nos. New Diesel Hydraulic Locomotives need to be purchased at the earliest for replacing WDS-4B type locomotives and WDS-6 locomotives need to be replaced with new ones in a phased manner.			

Purchase of Hydraulic Re-railing equipment: -

No Hydraulic Re-railing equipment is available with KSTPS for re-railing of derailed wagons and Locomotives in KSTPS Railway Marshalling Yard. Therefore 01 No. Hydraulic Re-railing Equipment is needed for attending derailment of wagons & Locomotives timely and effectively. This type of equipment is used by Railways extensively for attending derailments in Railway yards and at the place of accident.

Purchase New Fire water Tender of 6000 litre capacity for KSTPS:-

In the year 2003 KSTPS was having 4 Nos fire tender and there were only 6 unit in KSTPS. In the year 2004, one fire tender was sent to Giral, now there are only 3 nos. fire tenders with KSTPS that too are more than 20 years old & there efficiency has deteriorated whereas the total units in KSTPS is increased from 6 to 7. Thus 3 nos fire tenders are insufficient to meet out the fire safety requirement and therefore at least one more fire tender is required. Hence after induction of one fire water tender the safety of KSTPS can be more effectively ensured against fire hazards.

3.1.6 Purchase of Dynamic Coal Balancing System for KSTPS Kota.-

The pulverized fuel is fed to the furnace through coal pipes. In the existing system the flow through the pipes is not measured resulting in unequal flow in pipes. The unbalanced coal flow affects the efficiency of the boiler, higher emission levels (SOX, NOX) and higher coal consumption. This also reduces the life of the equipment, boiler tubes, increased boiler tube leakages which is causing generation loss.

3.1.7 Up gradation of Contronic E-K type HMI of KOTA Unit#5 with KSTPS with 800xA HMI system of M/s ABB:-

1. Contronic E-K type DCS was commissioned in 1993-94 for station C&I package. This package deal with all the display, control and information aspects of station C&I package which consists of open loop and close loop drives / schemes and plant measurement and information system. Outage of this system will result in failure of all auto controls and unit operation may not be possible. This DCS has two sections i.e. CE-A (from I/O cards to controller) and CE-K i.e. HMI (Human machine Interface) which connects the operator to the automation system (CE-A). Until recently, such a task would have made it necessary to replace the entire process control system (CE-A & CE-K).

Now to cope up such up gradation needs ABB has introduced new HMI called 800xA which can be interfaced with all their older and latest series of control system such as Cotronic E and it is capable of extending the service life of existing automation system (CE-A), so that future plant operation is safe and cost optimised.

2. Contronic E-K system is based on old computer architecture (main frame type). Due to the fast changing computer technology, now it becomes very tedious to maintain this type of system. For spare parts, cards, repairs we are dependent on ABB Germany which is very costly and available to very little extent. Some of very important components like 486 based engineering station based PC, Video copiers etc. are not available in the market and even we are not in position to print any trend, graphics etc. M/S ABB is also claiming that service life of this system has come to an end and upgradation of this system is the only way to revive this important system.

3.1.8 R&M of SG/TG & Station C&I package of KSTPS Unit # 3 & 4:-

The SG/TG and Station C&I package are continuously in service for more than last 23 years and have practically outlived their useful life. These have become obsolete and lots of difficulties are being faced in day to day maintenance of these systems as no support is available for these from the OEM. The situation is further worsening due to more and more components getting obsolete and non-availability of standard spares.

3.1.9 Renovation of Static AVR of unit no. 1 & 2 by Digital AVR (DAVR):-

These static AVR system (BBC make) was supplied by M/s BHEL & installed in the year 1983-84 during commissioning of Units. Spare parts of this obsolete technology AVR's are not available and some parts have been declared beyond repair.

3.1.10 Renovation of generator protection and associated 220 kV feeder protection for KSTPS Stge-I:-

KSTPS-Sanganer, KSTPS-Heerapura, KSTPS-Sakatpura feeders of Satge-I were commissioned in year 1983-84. These feeders are provided with protection system consisting of Electro mechanical relays. Their spares are not available now.

3.1.11 Renovation of:-

These 245 KV MOCB's installed at KSTPS switchyard were installed in 1983-84.

3.1.12 Replacement of Mech. Drives by Variable frequency drives:-

3.1.13 Replacement of High voltage transformers for ESP's:-

These were installed in 1984.

3.1.14 Installation of one No. Additional TC-11 Vacuum Pump (make Nash-Denver) each in 210 MW Unit # 3 and 4 of KSTPS, Kota.

Persistent problem of low vacuum. Due to aging of the power plants, tightness of the vacuum system and performance of nozzles and diffusers deteriorates causing low vacuum.

To install one no. Additional TC-11 vacuum pump makes Nash-Denver in 210 MW Unit # 3 and 4 in addition to steam jet air ejectors.

3.1.15 Construction of Barracks, Boundary wall etc for CISF:-

To fulfil the requirement of CISF authorities for accommodation and recreation of CISF personnel, further there is requirement of additional Barracks with recreation hall for the security staff of CISF.

The boundary wall is required for safety to obstruct any intrusion/entry from river side.

3.1.16 Construction of Operator cabins, office stores:-

It is necessary for facilitate proper sitting arrangements to operators who perform shift /operational duties at various locations in the plant.

The store is required for proper storage of spares etc.

3.1.17 Replacement of service & control Air Compressors installed in compressed air system for Unit 1 & 2 stage-I (2 X 110 MW) at KTPS, Kota:-

The 04 no's Service Air(Lubricated) & 04 no's Control air Compressors Kirloskar make Model – BTD-KM/2HY-2TERT was installed in 1983 & the working Efficiency of these Compressors have deteriorated With Passage of Time.

3.2 Justification of proposals:-

3.2.1 Renovation of CHP Stage I&II system:-

Presently there are 5 Wagon tippers, out of which Wagon tippler no. 1&2 were installed in 1983 & no.3&4 were installed in 1988-89. WT#5 was installed in 1994.No tippler was installed for Unit# 6&7. The wagon tippers no. 1 to 4 is quite old & has outlived their useful life & the unloading capacity is degrading day by day. The problem in unloading of coal rakes is further aggravated on receipt of lumpy & wet coal rakes, heavy demurrage charges have to be paid to Railways as these rakes could not be unloaded in time due to limitation of screen size (250mm x 250mm) at hoppers of wagon tippler No. 1 to 4. The condition becomes worse, when the wagon tippler no.5 goes under shut down / outage as 40 to 45% of unloading capacity is lost. The existing system causing problems is also proposed to be renovated for improving the unloading through existing system. Existing KTPS railway yard is also proposed to renovate by providing of additional crossings

3.2.2 Renovation & Modernization of Railways Track:-

1. KSTPS private Railway Yard Siding was constructed in the year 1982 from Gurla Railway Station/Chambal Cabin to Marshalling Yard Sakatpura. The total length of Railway siding is 16 Kms. excluding Marshalling Yard.
2. Due to continuous operation of this siding, now it requires deep screening and overhauling from safety consideration. This siding is provided with CST-9/wooden sleepers.
3. During recent inspection by Railway authorities, it was pointed out that due to safety considerations and latest development in the technology, all the steel/wooden sleepers should be replaced with Pre-stressed Reinforced Concrete (PRC) sleepers.
4. Presently Railways have enforced speed restriction on this track, due to which more time is consumed for haulage of coal racks.
5. With commissioning of Unit # 7, more racks are to be handled through this track. Therefore, from safety as well as speed considerations, this track requires up-gradation.

Recommendations letter for execution of works from W.C. Railways Kota is enclosed as **Annexure-I**

3.2.3 Design Engineering & comm.of Training Simulators:-

As per National Training Policy for power sector (June-2002) ministry of power, Govt. of India. The Simulator training tool useful in terms of availability, thermal performance, component life & environment compliance savings, and an average of Rs. 2.00 Lacs per MW per year savings in expenditure. The organization should allocate at least **1.5% of the salary Budget to training & development activities**, effort should however be constantly made to increase the same to a level of 5% for funding training & development activities like procurement of Simulator, working modules, etc. Power Plant Simulator is an advanced hands-on-training tool, used mainly for the plant operation staff training in areas such as Unit startup, shutdown, load operation, emergency handling etc. Simulator gives the feeling of operating a real power plant without incurring any generation loss or damaging any plant equipments. It raises the level of proficiency and builds up confidence required to handle emergencies in an actual plant operation. In addition, a simulator can also be used as a powerful tool to verify process design and control strategies prior to startup of a plant as well as investigation and testing of operational problem that are normally not allowable under real plant operating conditions.

3.2.4 Construction of Road over bridge:-

At present, the movement of road traffic on highway is interrupted at railway crossing during coal rakes/wagons movement.

After construction of R.O.B., the establishment expenditure at L.C.15 shall be reduced. The copy of 186th MOM of BOD of RVUN held on 08.04.2011 is enclosed as **annexure –V** along with general abstract of estimate received from UIT Kota.

3.2.5 Purchase of 2 No. Dozers, Hydraulic Excavator, Hydraulic Re-railing Equipment, 2 no. Diesel locomotives & Fire Tender:-

Dozers & Hydraulic Excavator:-

Out of 07 Bull dozers, 05 dozers have completed economic useful life. As per recommendations of the OEM a Bull Dozer is only has economic useful life as 9 years or 21000 Hrs of operation whichever is earlier. Thus the Bull dozers which have completed 9 years and more than 21000 hrs of operation need to be replaced in a phased manner (OEM NOTE enclosed as **annexure –II**).

Generally either one or two dozers remain under maintenance. Now with synchronization of Unit # 7 an additional coal requirement of 01 rake /day has been increased. Apart from this, imported coal is being stacked / reclaimed exclusively by one Dozer for proper blending with the indigenous coal.

Presently no Hydraulic Excavator is available with KSTPS for handling coal boulders and stones during un-loading process of coal from Railway wagons at Wagon Tipplers.

KSTPS is receiving heavy coal boulders and stones at Wagon tippers due to which wagon tippler hopper grating is frequently choked and takes too much time to remove/ clear the boulders at wagon tippler. This results in delay in unloading of coal rakes and in turn heavy demurrage is levied by Railways. Hydraulic excavator shall help in breaking of coal boulders and removing stones from wagon tippler grating. Also it will help in removal and stacking of stones near wagon Tippler area, loading of stones in Tractor Trolleys for timely disposal and clearing of wagon tippler area. The same may also be used for clearing of coal heaps near the coal handling system in emergency.

Purchase of Hydraulic Re-railing equipment:-

01 No. Hydraulic Re-railing Equipment is needed for attending derailment of wagons & Locomotives timely and effectively. This type of equipment is used by Railways extensively for attending derailments in Railway yards and at the place of accident. All four wagon Tipplers of Stage-I & II are having mechanical clamping arrangement and there are incidences of derailment of wagons on Wagon Tippler tables. This hampers the process of un-loading of wagons. Presently hydraulic jacks with manual arrangement are used for attending such derailments which causes undue delay in attending derailment and unloading of coal from wagons.

Purchase New 2 no. Diesel locomotives:-

Presently KSTPS is having five Nos. Diesel Locomotives. Three of them are WDS-6 Diesel Electric type (1350 / 1200 HP) and are being utilized for hauling the loaded coal wagons for placement at different Wagon Tipplers. Remaining two Nos. are WDS-4B Diesel Hydraulic type (700 HP) and are being utilized for formation of empty rakes.

Two Nos. WDS-6 (KTPS-3 & 4) is of model 1987 and both WDS-4B are of model 1982. These Locomotives have completed their useful life. One No.WDS-6(KTPS-5)

was purchased in the year 1995 and since then no locomotive has been purchased in the span of last 15 years.

The coal linkage has also been increased enormously due to commissioning of Unit # 6 & 7 and thus these locomotives are being used extensively. KSTPS is receiving on an average 6 coal rakes per day and many a times 8 to 10 rakes are required to be handled / hauled by these locomotives. Each rake is placed on wagon Tipplers in spurs of 8 wagons at WT-1 to 4 each and 15 wagons on WT -5 as per capacity of hauling equipments. Thus the frequency of operation of the locomotives is very high for placement of loaded wagons on Wagon Tipplers.

The manufacturing of WDS-6 and WDS-4B at the works of OEM M/s DLW and M/s CLW respectively have already stopped by Railways. Hence arranging spares for these locomotives is a very difficult task as the original vendors for brought out parts used in these locomotives have stopped manufacturing of the spare parts.

There is always a chance of break -down of any locomotive under operation due to continuous operation. Frequently a situation of bunching of coal rakes arises and in case of major break down of any locomotive placement of loaded coal wagons and formation of empty rakes may suffer which in turn may result in heavy demurrage charges.

Purchase New Fire water Tender of 6000 litre capacity for KSTPS:-

Fire Tenders are Mobile Vehicle that assist the staff in carrying out Fire Fighting operations in the un-accessible areas. The present water tender comprises of auxiliary 150 LPM@ 100 Bar High Pressure Pump for effective quantity of mist generation that performs exceptionally well with very little quantity of Water thus will prove effectively useful in future. Therefore after induction of one fire water tender the safety of KSTPS can be more effectively ensured against fire hazards.

3.2.6 Purchase of Dynamic Coal Balancing System for KSTPS Kota:-

Installation of dynamic coal balancing system in pulverized coal discharge pipes, so that Coal flow through pipes shall be online measured and balanced by adjusting orifice valves in coal pipes. In addition coal air mixture velocity, particle size; unburnt carbon in fly ash should also be measured online for monitoring the boiler condition. The unbalanced coal flow affects the efficiency of the boiler, higher emission levels (SOX, NOX) and higher coal consumption. This also reduces the life of the equipment, boiler tubes, increased boiler tube leakages which is causing generation loss.

3.2.7 R&M of contronic E-K type HMI of KOTA Unit#5:-

The above system is proposed to be upgraded to ensure reliability and availability of the system. The reliability and availability of the existing system is not fully ensured due to the following reasons:

1. The cost of spare electronic modules, RGB monitors and dedicated keyboard/ video copiers are very high due to obsolescence of existing system Contronic E-K (HMI). The spares are neither available with M/s ABB nor in open market.
2. Cost of repair is very high and reliability is not ensured.
3. M/S ABB is also claiming that service life of this system has come to an end and R&M of this system is the only way to revive this important system.

3.2.8 R&M of SG/TG & Station C&I package of KSTPS Unit # 3 & 4:-

The above system is proposed to be upgraded to ensure reliability and availability of the system. The reliability and availability of the existing system is not fully ensured due to the following reasons:

The following problems are faced due to these:-

- A. The existing control system of SG/TG package manufacturing have been discontinued by M/S BHEL since long and most of the defective modules are declared irreparable by M/S BHEL M/S H&B now known as M/S ABB have also stopped the production of Contronic-3 modules and these have also become obsolete and even the refurbished modules are not easily available and are too costly and beyond repair.

- B. There have been spurious and unexplained trips out of equipment and unit on account of malfunction of these modules; the reason for which is mainly attributed to the ageing of electronic components.
- C. The boiler, turbine and other main equipment of these units have become old and therefore to reduce stresses on these equipments, the parameter monitoring has to be done more accurately and fine control of parameter monitoring & tuning has to be achieved. This requires a good supervision with highly reliable and accurate control system to achieve safe and optimal running.
- D. These systems are primitive and lack the facilities of modern diagnostics and configuration and have little scope for modifications / additions of control schemes /logics as required by changing times (like implementation of load control for ABT).

3.2.9 Renovation of Static AVR of unit no. 1 & 2 by Digital AVR (DAVR):-

These static AVR system (BBC make) was supplied by M/s BHEL & installed in the year 1983-84 during commissioning of Units. Spare parts of this obsolete technology AVR's are not available and some parts have been declared beyond repair.

3.2.10 Renovation of generator protection and associated 220 kV feeder protection for KSTPS Stge-I

Generator protection and associated 220 kV feeder protections for KSTPS Stge-I were commissioned in year 1983-84. These feeders are provided with protection system consisting of Electro mechanical relays. Their spares are not available now.

3.2.11 Renovation of 25 KV MOCB's installed at KSTPS switchyard:-

The 25 KV MOCB's were installed in 1983-84. The Spares 25 KV MOCB's of are not available presently. So replacement with 245 KV SF6 breakers is required.

3.2.12 Replacement of Mech. Drives by Variable frequency drives

Mech. Drives has High Auxiliary consumption, frequent outage of Rotary mechanical drives, less control on regulation, slow response time.

3.2.13 Replacement of High voltage transformers for ESP's:-

These were installed in 1981 and have completed their useful life hence require replacement.

3.2.14 Installation of one No. Additional TC-11 Vacuum Pump (make- Nash Denver) each in 210 MW Unit # 3 and 4 of KSTPS, Kota:-

To maintain vacuum by steam jet air ejector is very old & obsolete procedure .Poor vacuum due to old steam jet air ejector results in increased heat rate,

resulting in higher coal consumption and more expenditure of money for each unit generated.

Vacuum pumps are more versatile, compact and well proven. Their starting time is very less and their capacity of creating vacuum is more than ejectors. Since air handling capacity of vacuum pump is higher than ejectors during various operating modes.

The problem of low vacuum will be resolved by installation of vacuum pump. Due to increase in vacuum the heat rate of the power plant will improve providing economic benefits.

3.2.15 Construction of Barracks, Boundary wall etc for CISF:-

To fulfil the accommodation requirements of CISF staff.

The boundary wall is required for safety to obstruct any intrusion/entry from river side.

3.2.16 Construction of Operator cabins, office stores:-

Operator's cabins required for new system of U#7 and retaining walls at SR/1 & SR/2 damaged at many places & as such new construction is required to avoid spillage of coal on track.

3.2.17 Replacement of service & control Air Compressors installed in compressed air system for Unit 1 & 2 stage-I (2 X 110 MW) at KTPS, Kota:-

The firm have declared these compressor model obsolete vide letter no. MKTG: DEL: ACD: SPS dt 13.08.08 & hence no spares are available for routine & Breakdown maintenance.

3.3 Benefits after up-gradation: -

3.3.1 Renovation of CHP Stage I&II system:-

On timely unloading of coal rakes, heavy demurrage charges of Railways will be avoided and uninterrupted feeding of coal to Bunkers of electricity generating units & proper stacking of Indian & Imported coal will be maintained. In addition, shut down for routine checking/ preventive maintenance of old wagon unloading system will also be available.

3.3.2 Renovation & Modernization of Railways Track:-

This proposal involves up-gradation of technology to meet out safety standards of Railway norms and reduces maintenance cost and time of arrival of coal rakes to our yard by raising track speed i.e. saving in time to reach coal rakes to our yard. The proposal shall meet safety requirements of rail movement as such commercial considerations are not a restraint. Reliable and safe operation of coal rakes.

3.3.3 Design Engineering & comm.of Training Simulators:-

Power Plant Simulator is an advanced hands-on-training tool, used mainly for the plant operation staff training in areas such as Unit startup, shutdown, load operation, emergency handling etc. Simulator gives the feeling of operating a real power plant without incurring any generation loss or damaging any plant equipments. It raises the level of proficiency and builds up confidence required to handle emergencies in an actual plant operation. In addition, a simulator can also be used as a powerful tool to verify process design and control strategies prior to startup of a plant as well as investigation and testing of operational problem that are normally not allowable under real plant operating conditions.

Training Simulator will be very useful to train our fresh Engineers as well as to experience Engineers to refresh the O&M activities of Thermal Power Stations.

3.3.4 Construction of Road over bridge:-

Safe traveling of coal wagons and reduction in the establishment expenditure.

It will facilitate the general public also by uninterrupted movement of road traffic on highway & avoiding railway crossing.

3.3.5 Purchase of 2 No. Dozers, Hydraulic Excavator, Hydraulic Re-railing equipment, 2 no. Diesel locomotives & Fire Tender:-

Purchase of 02 Nos. Bull Dozers and 01 No. Hydraulic Excavator:-

1. Availability of bull Dozers for blending of imported coal with Indigenous coal shall be beneficial for achieving optimum generation in all running units.
2. Availability of bull Dozers shall ensure uninterrupted feeding of coal through ERH and Plow feeders' canopy for maintaining the bunker level of all Units in case of failure of Stacker Re-claimer /other conveyor system.
3. Availability of Hydraulic Excavator will be of immense importance for timely unloading of coal wagons and in turn reducing demurrage on coal rakes by Railways.

Purchase of 02 Nos. Diesel Hydraulic Locomotives:-

1. Availability of locomotives will ensure timely placement of loaded coal wagons on Wagon Tiplers and over hauling of empty wagons for forming rake to hand over to Railways.
2. Timely placement of coal wagons will result in time unloading of coal wagons and in turn reducing demurrage on coal rakes by Railways.

Purchase of Hydraulic Re-railing equipment:-

By using this type of equipment for attending derailments in Railway yards and at the place of accident reduce the Delay in unloading of rakes.

Delay in unloading of rakes attracts the demurrage charges by Railways and sometimes coal feeding to bunkers is also affected.

Purchase New Fire water Tender of 6000 litre capacity for KSTPS: -

After induction of one fire water tender the safety of KSTPS can be more effectively ensured against fire hazards.

3.3.6 Purchase of Dynamic Coal Balancing System for KSTPS Kota.-

Looking to the cost of raw material like coal, DM water and stringent environmental norms, efficient generation along with higher PLF has become necessity. In addition to above the condition of fire ball, boiler tubes, furnace temperatures should be monitored and maintained at optimum level so as to increase the life of the equipment using latest technologies. Integrated condition monitoring and controls of thermal boilers for combustion optimization is one such latest tool available.

Advantages of the system are:-

Balance air fuel flow from each pipe to the furnace improves the heat-rate of the Unit by minimizing excess air requirement.

Balanced air fuel mixture flow from each pipe to the furnace improves the heat-rate of the Unit by minimizing excess air requirement. Reduced emissions, slagging will improve the boiler tube life. This will reduce unit outage due to boiler tube leakages

3.3.7 R&M of HMI of KOTA Unit#5:-

1. The spares cost of electronic modules, RGB Monitors and dedicated keyboard are very high due to obsolescence of existing system Contronik E-K (HMI). Presently we do not have any spare and to keep the system in order, the cost of required spares is around Rs. 1 cr. for a year.
2. After the R&M of existing CEK HMI of Kota unit # 5, the electronic modules and dedicated system accessories will serve as spares for unit # 1 & 2 of Suratgarh Thermal power station, for 2-3 years. The approximate cost of existing HMI system is Rs. 4 cr.
3. Availability of less service in present Contronik E-K system: - Presently it is not possible to take print out of trends, generation of on demand logs and adding of archiving points. It causes delayed restoration of unit and sometimes repeated tripping due to poor analysis and diagnostic. If we consider 2 trappings per annum on this account (outage of 5-6 hours), around Rs. 1.0 crore will be saved in 3-4 years.
4. For this HMI the existing process control system does not need to modify during R&M. All engineering data remains unchanged. The existing engineering system can continue to work with latest upgraded hardware without any limitation. The capital intensive Contronik E automation cabinets can also be kept in service along with installed sub assemblies for signal conditioning, open loop and close loop controls.

5. The quality, the ergonomics and the efficiency of operating and monitoring activities is improved considerably with 800xA. The system reports, trends, event logs and other information systems become more user-friendly, flexible and effective.

6. With 800xA operation staff will work in more easy and user-friendly OS environment that is Windows where they can quickly and easily access all relevant functions and run the plant processes more efficiently with less manpower.

7. Engineering and maintenance will be very easy and less costly because proposed HMI (800xA) will be based on some PCs instead of old CEK system based on mainframe type computer architecture (obsolete system). So the system 800xA is an ideal solution for migration projects and retrofits of the kind like DCS of unit # 5 of KSTPS.

3.3.8 R&M of SG/TG & Station C&I package of KSTPS Unit # 3 & 4

In a separate SG-TG package and station C&I system, signal exchange between two different DCS has been successful. This has the following advantages:-

- A.
1. Signal transfer between the two DCS has to be done using hardware. This reduces the requirement of I/O's to be exchanged.
 2. As signal transfer using communication protocols is working; the no. of signal exchanged between the two DCS is unlimited.
 3. These are different Historian Servers recording history and SOE for different DCS, easily exchange the data through OPS platform therefore diagnostics & analysis is much simpler.
 4. The hardware requirement for Operator Work Station (OWS), Engineering Station, Historian Domain Servers, Printers, Network switches, Network Cables etc. along with floor space to house these may be same for SG/TG & station C&I package.
- B.
- A single vendor can offer both the SG/TG & station C&I system having following advantage:-
1. Signal unified DCS provides a facility for the operation engineer to operate the complete plant from this OWS without switching from one desk to the other as is being done at present.
 2. The hardware & peripherals will reduce in single unified system saving the cost simplicity of graphics & space. And system designing will be much better being single vendor.

3.3.9 Renovation of Static AVR of unit no. 1 & 2 by Digital AVR (DAVR)

By adopting DAVR, excitation system of these units will become advance and will be able to give required output.

3.3.10 Renovation of generator protection and associated 220 kV feeder protection for KSTPS Stage-I

These Digital/ Numerical relays having advance features like recording of disturbances & fault location thus able to clear faults in minimum possible time.

3.3.11 Renovation of 25 KV MOCB's installed at KSTPS switchyard:-

Advantage of replacement of 25 KV MOCB's by SF6 breakers is that SF6 breakers have latest technology of circuit making / breaking and need lesser space. Frequent outage of MOCB's cause's loss of generation and uninterrupted evacuation of power may be ensured by this new technique.

3.3.12 Replacement of Mech. Drives by Variable frequency drives:-

Variable frequency drives has Fast response, Significant Saving in Aux. consumption, less requirement of space. High efficiency of ESP system.

3.3.13 Replacement of High voltage transformers for ESP's:-

The efficiency of ESP system will improve.

3.3.14 Installation of one No. Additional TC-11 Vacuum Pump (make Nash-Denver) each in 210 MW Unit # 3 and 4 of KSTPS, Kota

By installing one no. vacuum pump each in Unit # 3 & 4 as per recommendation of M/s. BHEL in addition to existing steam jet air ejectors, resulting lesser coal consumption & improvement in back pressure / vacuum is expected.

The problem of low vacuum will be resolved. Due to increase in vacuum the heat rate of the power plant will improve providing economic benefits.

3.3.15 Construction of Barracks, Boundary wall etc for CISF:-

To fulfil the accommodation requirement of CISF & safety requirement of plant. Letter for Construction of Barracks, Boundary wall etc have received from Dy. Commandant, CISF, KOTA (Copy enclosed as annexure-4).

3.3.16 Construction of Operator cabins, office stores:-

It will increase the working efficiency of operators and for safety/proper stacking of costly spares.

3.3.17 Replacement of service & control Air Compressors installed in compressed air system for Unit 1 & 2 stage-I (2 X 110 MW) at KSTPS, Kota:-

After carrying out the proposed augmentation works of service & control Air system of unit 1 & 2, the smooth, efficient & reliable operation of the plant shall be ensured. The system availability & flexibility will increase with above proposed system.

3.4 Estimate of total cost of project & Commissioning scheduled:-

Sr. No.	Description of Proposals	Estimate total cost of Project	For FY (2011-12)	For FY (2012-13)	Commissioning scheduled
1.	Renovation of CHP system Stage I&II by installing one no. wagon tippler, 2 no. Rotary breakers, 3 no. Ring granulators, one no. Stacker Reclaimer along with associated conveyors & equipments at KTPS, Kota	Rs.23500 Lakhs	Rs.15200 Lakhs	Rs. 8300 Lakhs	By open tender enquiry from experienced agency like M/s Elecon, M/s L&T etc.
2	Renovation & Modernization of Railways Track (up-gradation of Railway track from Gurla / Chambal Cabin to KSTPS, Sakatpura Marshalling Yard is proposed to carry out by W.C. Railways as a deposit work and it will likely to be completed in one year. Material and labour and all other requirements will be arranged by W.C. Railway.)	Rs. 1260 Lakhs	Rs. 600 Lakhs	Rs. 660 Lakhs	Within a period of one year from commencement / placing the order to W.C. Railway Kota.
3	Purchase of Operator Training Simulator for RVUNL Unit of KSTPS. (Purchase order placed to M/s IL Kota)	Rs 410 Lakhs	Rs 410 Lakhs		FY 2011 – 12 and 6 months for installation, testing, commissioning and fine tuning of the supplied engineered system.
4.	Construction of Road over bridge at LC-15 (R.O.B.) As per decision OF BOD of RVUNL has to share only 50% of total cost that comes out to Rs. 2637 Lakhs Work through UIT, Kota. (RVUNL to deposit. this amount with UIT Kota)	Rs. 5,275 Lakhs.	Rs. 2,637 Lakhs		As per D.P.R. which is under preparation with UIT kota.
5	Purchase of 02 Nos. Bull Dozers and 01 No. Hydraulic Excavator (Purchase made through M/s BEML Ltd., A Govt. of India Mini Ratan Company under Ministry of defense).	Rs. 334 Lakhs	Rs. 334 Lakhs		06 Months after getting approval
	Purchase of 02 Nos. Diesel Hydraulic Locomotives (Purchase Agency shall be finalized through open competitive bidding)	Rs. 600 Lakhs	Rs. 600 Lakhs		16 Months after getting approval.
	Purchase of Hydraulic Re-railing equipment (Purchase Agency shall be finalized through open competitive bidding)	Rs. 60 Lakhs	Rs. 60 Lakhs		10 Months after getting approval
	Purchase New Fire water Tender of 6000 litre capacity for KSTPS (Purchase Agency shall be finalized through open competitive bidding)	Rs. 40 Lacs	Rs. 40 Lacs		2011 - 12

Sr. No.	Description of Proposals	Estimate total cost of Project	For FY (2011-12)	For FY (2012-13)	Commissioning scheduled
6	Purchase OF DYNAMIC Coal Balancing System for KSTPS Kota.(Purchase Agency shall be finalized through open competitive bidding)	Rs. 1500 Lakhs	Rs 100 Lakhs	Rs. 1400 Lakhs	8 Months after getting approval & 4 Months for installation, testing, commissioning and fine tuning of the supplied engineered system
7	Up gradation of Contronic E-K type HMI system based on old computer architecture (Main Frame type) ABB make of unit # 5 KSTPS with 800xA HMI system of M/s ABB.	Rs. 740 Lakhs.	Rs 700 Lakhs	Rs. 40 Lakhs	Within 6 months from the date of approval & 28 weeks for installation, testing, commissioning.
8	R&M of SG/TG & Station C&I package of KSTPS Unit # 3 & 4 (1800 Lakhs for Unit#3, 1800 Lakhs for Unit # 4)	Rs. 3600 Lakhs.		Rs.3600 Lakhs	M/S BHEL or M/S ABB or M/S Rockwell or M/S IL, Kota or M/S Honeywell One year after placement of order.
9	Renovation of Static AVR of unit no. 1 & 2 by Digital AVR (DAVR)	500 Lakhs		500 Lakhs	M/s BHEL
10	Renovation of generator protection and associated 220 kV feeder protection for KSTPS Stge-I	400 Lakhs		400 Lakhs	M /s BHEL, M/s ABB
11	Renovation of 25 KV MOCB's installed at KSTPS switchyard	300 Lakhs		300 Lakhs	M /s BHEL
12	Replacement of Mech. Drives by Variable frequency drives	300 Lakhs		300 Lakhs	M /s BHEL
13	Replacement of High voltage transformers for ESP's	200 Lakhs		200 Lakhs	M/s Hind Rectifiers
14	Engineering, Supply, Erection, Testing and Commissioning of two stage vacuum pump, one each in unit # 3 & 4 (2x210MW), KSTPS, Kota. . (M/s. Nash – Denver, through their Indian agent M/s. Millennium Implex Pvt. Ltd. Delhi)	Rs. 450 Lakhs	Rs. 300 Lakhs	Rs. 150 Lakhs	Within 6 months from the date of approval and detailed Engineering by consultant.12 Months for delivery of material and 4 months for installation, testing, commissioning and Fine tuning of the supplied engineered system.
15	Construction of Barracks, Boundary wall etc for CISF etc.(Purchase Agency shall be	Rs. 65 Lakhs	Rs.65		2011-12

Sr. No.	Description of Proposals	Estimate total cost of Project	For FY (2011-12)	For FY (2012-13)	Commissioning scheduled
	finalized through open competitive bidding)		Lakhs		
16	Construction of Operator cabins, office stores etc. (Purchase Agency shall be finalized through open competitive bidding)	Rs, 51 Lakhs	Rs.51 Lakhs		2011-12
17	Replacement of service & control Air Compressors installed in compressed air system for Unit 1 & 2 stage-I (2 X 110 MW) at KTPS, Kota	Rs 282 Lakhs		Rs 282 Lakhs	M/s KPCL
	Totals Rs.	Rs. 39867 Lakhs	Rs. 21097 Lakhs	Rs. 16134 Lakhs (Rs.2636 Lakhs expenditure will be borne by the UIT Kota which is not included)	
	IDC & Finance charges	Rs.5584 Lacs	Rs.3164Lacs	Rs.2420 Lacs	
	Grand Totals. Rs.	Rs.45451Lacs	Rs.24261 Lacs	Rs. 18554 Lakhs (Rs.2636 Lakhs expenditure will be borne by the UIT Kota which is not included)	

All the three Discom's (i.e JVNL/AVNL/ Jd.VNL) Jaipur/ Ajmer/ Jodhpur are respondents for the above petition.

A5: Prayer:-

RVUN humbly requests the Hon'ble Commission to:-

In principle approval of expenditure on capital works of Rs.24261Lakhs during FY11-12 & Rs.18554 Lakhs during FY 12-13 at KSTPS (1240MW) as Additional capitalization.

And pass such other further orders as are deemed fit and proper in the facts and Circumstances of the case.

(S.K. Rajpurawala)
Chief Accounts Officer (W&M)

(R. K. Gaur)
Dy.Chief Engineer (PPC&F)