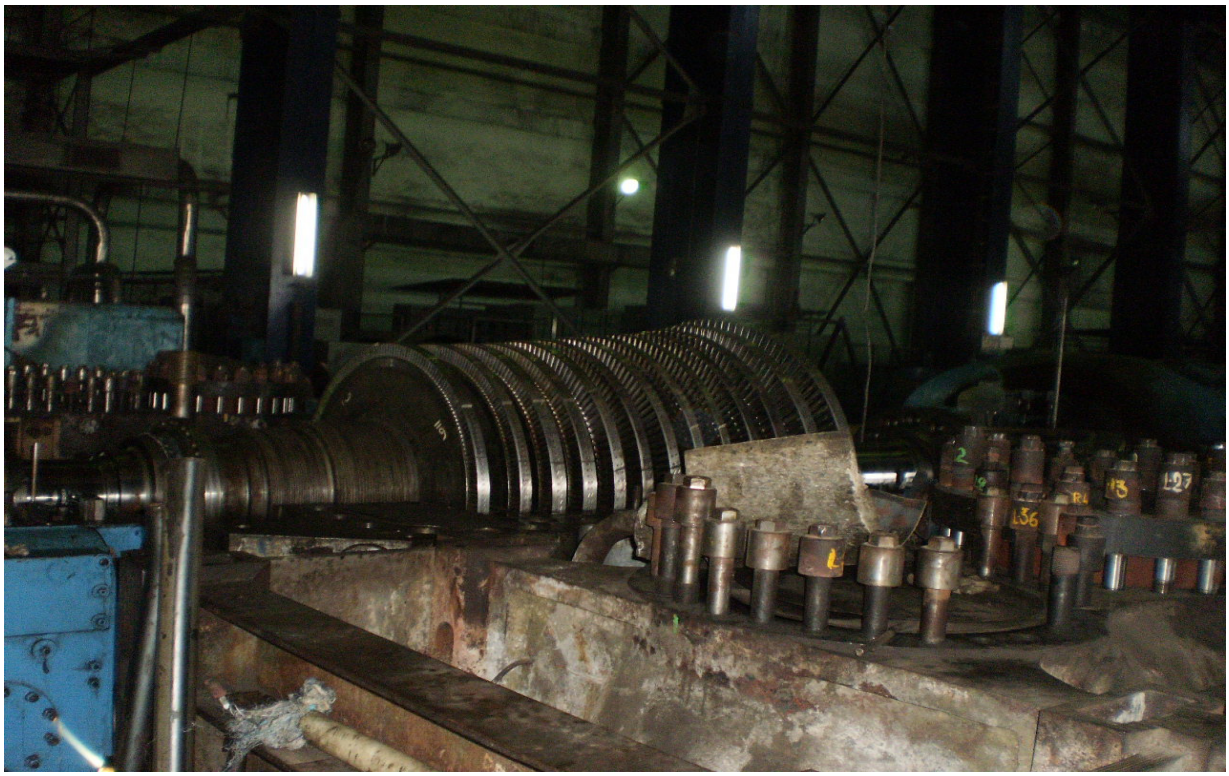
सत्यमेव जयते

# भारत सरकार

# GOVERNMENT OF INDIA

# Quarterly Review Report

## Renovation, Modernisation and Life Extension of Thermal Power Stations



केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

ताप विद्युत नवीनिकरण एवं आधुनिकीकरण प्रभाग

## Thermal Renovation and Modernisation Division

**{For the Ist Quarter of 2010 – 11, (April – June,2010)}**

# C O N T E N T S


| SL NO. | Description | Page No. |
|---|---|---|
| | **Highlight** | **01-03** |
| **1.0** | **Introduction** | **04** |
| **2.0** | **Objective of R&M programme** | **04** |
| **3.0** | **Objective of LE programme** | **04** |
| **4.0** | **R&M and LE programme from 7th Plan onwards till 10th Plan** | **05** |
| **5.0** | **National Perspective Plan** | **06** |
| **6.0** | **LE/R&M Programme during 11th Plan (2007 – 08 to 2011-12)** | **06** |
| **6.1** | Achievement of Life Extension Programme during April'2007 to June'2010 of the 11th Plan | **06** |
| **6.2** | Achievement of R & M Programme during April'2007 to June'2010 of the 11th Plan | **07** |
| **6.3** | Overall LE / R&M status during 11th Plan (From April'2007 to June'2010) | **08** |
| **6.4** | Progress during the quarter (April – June,2010) | **09** |
| **7.0** | **LE and R&M Targets during 11th Plan (2010-2011) & (2011 –2012)** | **10** |
| **8.0** | **External Co-operation for R&M of TPS** | **11** |
| **8.1** | KfW assisted Programme | **11** |
| **8.2** | Coal Fired Generation Rehabilitation programme funded by World Bank | **12-13** |
| **8.3** | Development of Tender Procedure and Model Contract for R&M of Fossil fuel based Power Plant | **14** |
| **8.4** | Japan-India co-operation for Pre- Primary study of Efficiency and Environmental improvement of Coal fired stations | **15** |
| **8.5** | Financial Assistance by World Bank under GEF facility as Grant | **15** |
| **Appendix-I A** | List of units where Life Extension works have been completed during 11th Plan as on 30.06.2010 (1/2 to 2/2) | |
| **Appendix-I B** | List of units where R&M works have been completed during 11th Plan as on 30.06.2010 (1/3 to 3/3) | |
| **Appendix-II A** | Unit wise and Sector wise details of LE works to be completed during remaining period of the 11th Plan (2010-11 & 2011-12), (1/3 to 3/3) | |
| **Appendix-II B** | Unit wise and Sector wise details of R&M works to be completed during remaining period of the 11th Plan (2010-11 & 2011-12) , (1/2 to 2/2) | |
| **Appendix-II C** | Unit wise and Sector wise details of LE/R&M works to be completed during remaining period of the 11th Plan (2010-11 & 2011-12), (1/2 to 2/2) | |
| **Appendix-III** | Details of units programmed for LE works during 11th plan but likely to slip beyond 11th plan (1/1) | |
| **Appendix-IV** | Region and Unit-wise Broad Status of LE works | |

# Foreword

In order to meet the growing power demand in the country, Govt. of India have taken number of initiatives which, inter-alia, include new multi modal generation capacity addition. To further supplement the above efforts in the area of efficient power generation, Renovation & Modernisation (R&M) and Life Extension (LE) of the existing old power stations have been recognized as one of most cost effective option by virtue of its short gestation period and low cost. Recognising the significance of the R&M/LE works, CEA has brought out the National Perspective Plan for R&M/LE works up to 2016-17. In the Perspective Plan, 53 units (7318 MW) for LE works and 76 units (18965 MW) for R&M works have been identified in 11$^{th}$ Plan and for 12$^{th}$ Plan 72 units (16532 MW) for LE work and 23 units (4871 MW) for R&M work have been identified.

As per clause 73 (f) of Electricity Act 2003, inter alia Central Electricity Authority is to "promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system". The Thermal Renovation and Modernisation (TRM) Division is entrusted with the responsibility of monitoring the progress of R&M/ LE activities of all the thermal power projects in the country till the units are re-commissioned. The progress of various activities of R&M / LE programme under execution in the country is closely monitored for timely commissioning of the units. Visits are made by the officers of TRM Division to the sites for on the spot assessment of progress of works and rendering the advice / assistance in solving the problems being faced by the project authorities and thereby helping the project authority in avoiding / minimizing the time and cost overrun of thermal power projects.

The Quarterly Report is being brought out by TRM Division on the basis of data received from various project authorities, visits made by CEA engineers to different power stations and discussions held with the executing agencies and supplier of equipments from time to time. The Quarterly Report is also available on CEA website http://cea.nic.in . The quarterly report provides up-to-date information in respect of R&M / LE works of thermal power stations under execution in the country during 11th Plan apart from the quarterly status of LE/R&M works under review and various other associated activities. The report gives the details of milestones achieved as on date highlighting present status of progress along with the targets for the remaining period of 11th Plan.

During the quarter April-June, 2010, the R&M works on unit – 4 (110 MW) of Tanda TPS of NTPC have been completed and the unit has become operation on 14.4.2010. The MoU for taking R&M/LE works in respect of Kanti TPS (Muzaffarpur) of KBUNL has been signed between BHEL and KBUNL and LOA awarded on 15.04.10. 2150 MT of materials have been received at site. The Unit-2 of Ukai TPS of GSECL has achieved full load of 120 MW on 25.5.2010. The Boiler erection works of Unit – 3 of Bathinda TPS of PSPCL (Punjab State Power Corporation Limited) have started and the Boiler light up of Unit – 9 of Obra TPS of URVUNL has been achieved on 24.06.2010.

Earlier, West Bengal Pollution Control Board (WBPCB) had advised WBPDCL to increase the height of old existing chimney of Unit – 5 of Bandel TPS while undertaking Pilot R&M programme funded by World Bank. WBPDCL sought CEA view in this matter. CEA advised WBPDCL that there was no need to increase stack height of existing unit -5 of Bandel TPS in view of provisions in OM No. B-34011/1/01/PCI-II dated January 10, 1996. WBPDCL has conveyed CEA that WBPCB has agreed their proposal regarding stack height.

The final feasibility report for unit–3 of Nasik TPS for carrying out R&M/ LE works funded by KFW has been accepted by M/s Mahagenco. The Draft Feasibility Reports of Unit–3 of Kolaghat TPS of WBPDCL and unit–1 of Bokaro TPS of DVC have been submitted by M/s Evonik and the same have been discussed with the concerned utilities.

The Terms of Reference for the consultant for preparation of standard documents for R&M projects has been prepared by the Tender Agent appointed by KfW Germany and the same have been discussed in the 2nd meeting of Task Force held on 24.6.2010 under the Chairmanship of Member (Thermal) / Chairperson, CEA The RfP document for implementation support consultant for Technical Assistance to CEA were issued on 21.5.2010 and the pre-proposal conference was held on 15.6.2010.

An MOU has been signed on 30.4.2010 with JCOAL for preliminary studies at some power thermal stations. Four thermal power stations have also been selected for the study by JCOAL.

We heartedly acknowledge the support and co-operation of the Utilities / Organisations for providing the necessary and relevant information regarding the physical and financial progress of their R&M projects. We would be highly grateful for the suggestions / feedback for further improvement in the Quarterly Review Report.

नई दिल्ली (उमा शंकर शर्मा)

दिनांक : 04.08.2010 मुख्य अभियन्ता

# Highlights

## 1. R&M and LE programme from 7th Plan onwards till 10th Plan

| S. No | 5-Year Plan | Year | No. of TPS / No. of Units | Capacity (MW) | Additional Generation Achieved MU/ Annum | Equivalent MW |
|---|---|---|---|---|---|---|
| 1 | 7th Plan & 2 Annual Plans | 85-86 to 89-90 & 90-91, 91-92 | **34 / 163** | **13570** | 10000 | 2000 |
| 2 | 8th Plan (R&M) (LEP) | 92-93 to 96-97 | **44 / 198** 43/(194) 1 (4) | **20869** (20569) (300) | 5085 | 763 |
| 3 | 9th Plan (R&M) (LEP) | 97-98 to 2001-02 | **37 / 152** 29/ (127) 7/ (25) | **18991** (17306) (1685) | 14500 | 2200 |
| 4 | 10th Plan (R&M) (LEP) | 2002-03 to 2006-07 | **9/25** (14 out of 57 planned ) (11 out of 106 *) | **3445** (2460) (985) | 2000 | 300 |

*Out of 106, 23 units were considered under PIE programme and 45 units were found techno-economically unviable.

## 2. LE/R&M Programme during 11th Plan (2007 – 2012)

| Sl No. | Particular | State Sector | | Central Sector | | Total (State sector + Central Sector | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| 1. | LE works | 33 | 4524 | 20 | 2794 | 53 | 7318 |
| 2. | R&M works | 27 | 6015 | 49 | 12950 | 76 | 18965 |
| | **Total** | **60** | **10539** | **69** | **15744** | **129** | **26283** |

## 3. LE/R&M Programme during 12th Plan (2012 – 2017) tentative

| Sl No. | Particular | State Sector | | Central Sector | | Total (State sector + Central Sector | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| 1. | LE works | 30 | 5860 | 42 | 10672.19 | 72 | 16532.19 |
| 2. | R&M works | 03 | 630 | 20 | 4341 | 23 | 4971 |
| | **Total** | **33** | **6490** | **62** | **15013.19** | **95** | **21503.19** |

## 4. Achievement during 11th Plan (From April'2007 to June'2010)

| Sl. No. | Particulars | State sector | | Central sector | | Total (State + Central ) | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| 1. | LE works completed | 7 | 584 | 3 | 267 | 10 | 851 |
| 2. | R&M works completed | 18 | 4350 | 39 | 10370 | 57 | 14720 |
| 3. | R&M works* additional completed | | | 4 | 240 | 4 | 240 |
| | **TOTAL** | **25** | **4934** | **46** | **10877** | **71** | **15811** |

* In addition, R&M works in respect of 4 number of units of Talcher TPS of 60 MW each which were not originally envisaged for R&M works in National Perspective Plan were also completed by NTPC.

## 5. Important Achievements in Monitoring of R&M Projects

i) Tanda Unit-4 of NTPC – R&M works completed and unit has been operational since 14.04.2010.

ii) KBUNL Muzaffarpur Unit-2 – CHP second stream of unit 2 of Muzaffarpur TPS became operational on 20.04.2010.

iii) KBUNL Muzaffarpur Unit-1 – 2150 MT SG materials received at site for undertaking R&M/LE works for which MOU has been signed between KBUNL (Joint venture of NTPC & BSEB) and BHEL on 21.05.2010.

iv) Ukai Unit-2 of GSECL – Full load of 120 MW was achieved on 25.05.10 on the unit and was run continuously for 15 hours after completion of LE works.

v) Bathinda Unit-3 of PSEB – Erection works of boiler started from 18.06.2010.

vi) Obra Unit-9 of UPRVUNL – Boiler was lighted up on 24.06.2010.

vii) Amarkantak Unit-2 – Expected to be recommissioned after completion of LE works by July 2010 end.

## 6. External Co-operation for R&M (LE) of TPS

The following activities were undertaken:-

**(A) KfW assisted Programme**

(i) Preparation of DFR/DPR for EE R&M by the consultant M/s Evonik Energy Services Pvt. Ltd., Essen, Germany.

**a) Unit-3 of Nasik TPS**

The scope of LE works has been finalized and Final Draft Feasibility Report (DFR) prepared by M/s Evonik has been accepted by Mahagenco.

**b) Unit 1,2 &3 of Bokaro 'B' TPS**

The DFR for unit-1 has been submitted and discussed with DVC in June'2010. The scope of LE works for the three units are under finalization by DVC.

**c) Unit 1,2 & 3 of Kolaghat TPS**

The DFR for unit-3 has been submitted and discussed with WBPDCL in June'2010. The scope of LE works for the three units are under finalization by WBPDCL.

(ii) Phase – II activity for development of tendering procedures and preparation of Model Contract for R&M Projects.

KfW appointed the Tender Agent in June'2010 for selection of a Consultant to carry out the Phase–II activities. The Tender Agent prepared the draft TOR for the Consultant for Phase–II activity, which have been discussed in 2nd meeting of the Task Force held on 24.06.10. Based on discussions, the Tender Agent submitted the revised TOR on 30.06.10, and the same were under examination by CEA.

**(B) Technical Assistance to CEA funded by World Bank**

Request for Proposal (RfP) for Implementation Support Consultant (ISC) to CEA was issued to the short listed consultants on 21st May 2010. Pre- Proposal Conference with short listed consultants was held on 15.06.10. The last date for submission of the RfP by the consultants is 19.07.10.

**(C) Japan-India co-operation for Pre- Primary study of Efficiency and Environmental improvement of Coal fired stations.**

MOU between Central Electricity Authority and JCOAL for preliminary study of Efficiency and Environment improvement study in coal fired power plants was signed during the meeting of India-Japan high level Energy Dialogues held in New Delhi on 30.4.2010. JCOAL has short listed four candidate coal fired power plants viz. Ukai and Wanakbori TPS (GSECL), Ramagundem STPS (NTPC) and Vijaywada TPS (APGENCO) for pre – primary studies.

*********

# Quarterly Review Report on Renovation, Modernisation and Life Extension of Thermal Power Plants

## 1.0 Introduction

At the time of independence, the total installed capacity in the power sector was 1362 MW of which steam power plants contributed 756 MW. The installed generation capacity has since grown manifold. The total installed capacity as on 31.3.2010 was 159398 MW of which Thermal power plants contributed 84198 MW (Coal based) and 17055 MW (Gas based).

Many of the thermal power plants are not operating to their full potential. Also large numbers of thermal units are old and outlived their normal life. Renovation and Modernisation (R&M) and Life Extension (LE) of existing old power stations have been recognized as an effective option to achieve additional generation from existing units at low cost and short gestation period. Besides generation improvement and life extension, other benefits achieved from R&M / LE include improvement in availability, safety, reliability and environmental emissions.

Presently, a large number of 200/210 MW units have completed or are near completion of their normal design life. The perspective R&M programme aims at extending their operating life further and also up grade their performance through Energy Efficient R&M (EE R&M).

## 2.0 Objective of R&M Programme

The main objective of Renovation & Modernisation (R&M) of thermal generating units is to make the operating units well equipped with modified / augmented latest technology equipment and systems with a view to improving their performance in terms of output, reliability and availability, reduction in maintenance requirements, ease of maintenance and minimizing inefficiencies.

## 3.0 Objective of Life Extension Programme

The R&M programme is primarily aimed at generation sustenance and overcoming problems. The life extension (LE) programme on the other hand focuses on plant operation beyond their original design life after carrying out specific life assessment studies of critical components.

## 4.0 Renovation and Modernisation (R&M) and Life Extension Programme (LEP) from 7th Plan onwards till 10th Plan

R&M Programme in a structured manner was initiated in 1984 as a centrally sponsored programme during 7th Plan and the programme continued during the two Annual plans 1990-91 & 1991-92. The momentum for undertaking R&M works continued during the 8th & 9th Plan. But the same could, however not be sustained during 10th Plan. The plan wise details are given below :-

| Sl. No. | 5-Year Plan | Year | No. of TPS / No. of Units | Capacity (MW) | Additional Generation Achieved MU/ Annum | Equivalent MW |
|---|---|---|---|---|---|---|
| 1 | 7th Plan & 2 Annual Plans | 85-86 to 89-90 & 90-91, 91-92 | **34 / 163** | **13570** | 10000 | 2000 |
| 2 | 8th Plan (R&M) (LEP) | 92-93 to 96-97 | **44 / 198**<br>43/(194)<br>1 (4) | **20869**<br>(20569)<br>(300) | 5085 | 763 |
| 3 | 9th Plan (R&M) (LEP) | 97-98 to 2001-02 | **37 / 152**<br>29/ (127)<br>7/ (25) | **18991**<br>(17306)<br>(1685) | 14500 | 2200 |
| 4 | 10th Plan (R&M) (LEP) | 2002-03 to 2006-07 | **9/25**<br>(14 out of 57 planned )<br>(11 out of 106 *) | **3445**<br>(2460)<br>(985) | 2000 | 300 |

*Out of 106, 23 units were considered under PIE programme and 45 units were found techno-economically unviable.

## 5.0 National Perspective Plan

Based on the discussions held with Ministry of Power, various utilities, PFC and BHEL, CEA have prepared a document on "National Perspective Plan for Renovation & Modernisation and Life Extension and uprating (LE&U) of thermal power stations upto the year 2016-17". This document also includes revised guidelines for Renovation & Modernization / Life Extensions works on coal / lignite based thermal power stations and this document was released by Honorable Minister of Power on 14.12.2009 on the occasion of Energy Conservation day.

In the Perspective Plan, 53 units (7318 MW) for LE works and 76 units (18965 MW) for R&M works have been identified in 11th Plan and for 12th Plan 72 units (16532 MW) for LE work and 23 units (4871 MW) for R&M work have been identified.

## 6.0 LE / R&M Programme during 11th Plan (2007 - 08 to 2011-12)

The Sector wise break up of units identified for LE / R&M works during 11th plan is furnished as under :-

| Sl No. | Particular | State Sector | | Central Sector | | Total (State sector + Central Sector | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| 1. | LE works | 33 | 4524 | 20 | 2794 | 53 | 7318 |
| 2. | R&M works | 27 | 6015 | 49 | 12950 | 76 | 18965 |
| | **Total** | **60** | **10539** | **69** | **15744** | **129** | **26283** |

### 6.1 Achievement of LE Programme during April'2007 to June'2010 of the 11th Plan

During the period from April'2007 to June'2010 of the 11th Plan (till June, 2010), LE works have been completed in 10 units comprising 7 units in the state sector and 3 units of NTPC in the central sector out of total 53 units planned for 11th plan. Sector wise details of units where LE works have been completed are furnished as under:-

**6.1.1 State Sector (7 Nos. of units)**

1. Obra TPS Unit – 1 (40 MW)
2. Obra TPS Unit – 2 (40 MW)
3. Obra TPS Unit – 6 (94 MW)
4. Haduaganj TPS Unit – 5 (60 MW)
5. Panipat TPS Unit – 1 (110 MW)
6. Ukai TPS Unit – 1 (120 MW)
7. Ukai TPS Unit – 2 (120 MW)

**6.1.2 Central Sector (3 Nos. of units)**

1. Anta CCGT (NTPC) GT – Units 1 to 3 (3x89 MW)

**Sub total (LE) - 10 Units (851 MW)**

## 6.2 Achievement of R & M Programme during April'2007 to June'2010 of the 11th Plan

During the period from April'2007 to June'2010 of the 11th Plan (till June, 2010), R&M works have been completed in 57 nos. of units comprising 18 nos. of units and 39 nos. of units in the state and central sector respectively as against total 76 nos. of units planned for the 11th plan. Sectorwise details of units where R&M works have been completed are furnished as under:-

### 6.2.1 State Sector (18 Nos. of units)

1. Ropar TPS Unit – 1 to 6 (6x210 MW)
2. Koradi TPS Unit – 5 to 7 (1x200 + 2x210 MW)
3. Chandrapur TPS Unit – 1 to 6 (4x210 + 2x500 MW)
4. Parli TPS Unit – 3 to 5 (3x210 MW)

### 6.2.2 Central Sector

**a) DVC (2 Nos. of units)**

1. Durgapur TPS (DVC) Unit 3 & 4 (130 MW + 210 MW)

**b) NTPC (37 nos. of units)**

1. Korba STPS Unit – 1 to 6 (3x200 + 3x500 MW)
2. Vindhyachal STPS Unit – 1 to 6 (6x210 MW)
3. Ramagundem STPS Unit – 1 to 6 (3x200 + 3x500 MW)
4. Farakka STPS St-I, Unit – 1 to 3 (3x200 MW)
5. Tanda TPS Unit – 1,3 & 4 (3x110 MW)
6. Talcher TPS , Unit – 5 & 6 (2x110 MW) *
7. Singrauli STPS Unit 1 to 7 (5x200 + 2x500 MW)
8. Unchahar TPS St. – 1, Unit 1 & 2 (2x210 MW)
9. Rihand St – 1, Unit 1 & 2 (2x500 MW)

* In addition, R&M works completed in Talcher TPS Unit – 1 to 4 (4x60 MW) by NTPC, which were not originally envisaged for R&M works in National Perspective Plan.

**Sub total (R&M) - 61 Units (14960 MW)**

**Total (LE and R&M) - 71 Units (15811 MW)**

## 6.3 Overall LE / R&M status during 11th Plan (From April'2007 to June'2010)

Out of 53 units (7318 MW) for LE works and 76 units (18965 MW) for R&M works planned for 11th plan, LE works in 10 units (851 MW) and R&M works in 57 units (14720 MW) were completed during the period from April'2007 to June'2010 of the 11th plan. Gist of LE and R&M works completed during the 11th plan (till June, 2010) are tabulated below:

| Sl. No. | Particulars | State sector | | Central sector | | Total (State + Central ) | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| A) | **LE works** Completed | 7 | 584 | 3 | 267 | 10 | 851 |
| B) | **R&M works** Completed | 18 | 4350 | 39 | 10370 | 57 | 14720 |
| C) | **R&M works*** Additional Completed | | | 4 | 240 | 4 | 240 |
| | **TOTAL** | **25** | **4934** | **46** | **10877** | **71** | **15811** |

* In addition, 4 number of units of Talcher TPS of 60 MW each which were not originally envisaged for R&M works in National Perspective Plan by NTPC, were also completed.

Out of 129 units planned for LE/R&M works during 11th plan (60 units in State Sector and 69 units in Central Sector with a capacity 26283 MW)), LE/R&M works in respect of 67 units (25 numbers in State Sector and 42 number in Central Sector) of total capacity of 15571 MW) were completed (till June, 2010). In addition, 4 number of units of Talcher TPS of 60 MW each which were not originally envisaged for R&M works in National Perspective Plan, were also completed.

Further LE works on another 7 units in the state sector of total capacity of 1260 MW would likely to be slipped beyond 11th Plan. Details are given at **Appendix – III**.

## 6.4 Progress during the quarter (April – June 2010)

### 6.4.1 LE works completed during the quarter (April – June 2010)

During the first quarter of year 2010-11 of 11th Plan, LE works have not been completed in any unit in the state sector and central sector.

**(a) State Sector**

Nil

**(b) Central Sector**

Nil

### 6.4.2 R&M works completed during the quarter (Jan. – Mar. 2010)

During the first quarter of year 2010-11 of 11th Plan, R&M works have been completed in one unit of Tanda TPS (unit-4) of NTPC in the central sector. Tanda TPS (Unit-4) has been operational since 14.04.2010 after completion of R&M works.

**(a) State Sector**

Nil

**(b) Central Sector (1 No. of unit)**

(i) Tanda TPS Unit – 4 (1 x 110 MW)

List of units where LE & R&M works have been completed during 11th Plan as on 30th June, 2010 is furnished at **Appendix I-A & I- B** respectively. Unit-wise status of LE works (single page Broad Status) pertaining to State Utilities is furnished at **Appendix – IV**.

## 7.0 LE and R&M Targets during 11th Plan (2010-2011) & (2011 – 2012)

Broad details of State / Central Sector wise LE/ R&M works to be taken up during remaining period of 2010- 2011 & 2011 – 12 of 11th Plan are furnished below:

| Sl. No | Particulars | State sector | | Central sector | | Total (State + Central ) | |
|---|---|---|---|---|---|---|---|
| | | No. of units | Capacity (MW) | No. of units | Capacity (MW) | No. of units | Capacity (MW) |
| 1 | LE works | 19 | 2680 | 17 | 2527 | 36 | 5207 |
| 2 | R&M works | 9 | 1665 | 10 | 2580 | 19 | 4245 |
| | TOTAL | 28 | 4335 | 27 | 5107 | 55 | 9452 |

Unit-wise and Sector details of LE and R&M works to be completed during remaining Period of 11th Plan are furnished in **Appendix II A, II B & IIC** respectively.

Further LE works on another 7 units in the state sector of total capacity of 1260 MW are likely to slip beyond 11th Plan and details of such units are furnished in **Appendix III**.

## 8.0 External Co-operation for R&M of TPS

World Bank & KfW-Germany have committed to provide an aid of US $ 180 & Euro 90 million respectively for energy efficient R&M at few identified thermal power stations in India. Also, METI (Ministry of Economy, Trade and Industry) and MOP have agreed to extend their cooperation in sharing of technical expertise as well as in actual implementation of mutually agreed techno-economical R&M solutions.

### 8.1 KfW assisted Programme

Under Energy Efficiency Programme, KfW development Bank –Germany has provided a soft loan of Euro 90 million for the implementation of energy efficient R&M at the following thermal power plants:

i) Bokaro 'B' TPS, U-1, 2 & 3 (3x210MW) of DVC.
ii) Kolaghat TPS, U-1 ,2 & 3 (3x210MW) of WBPDCL.
iii) Nasik TPS, U-3 (210MW) of Mahagenco.

In addition to the above, KfW has provided a grant of Euro 1.3 million for preparation of feasibility reports/DPR to identify & finalize the scope of works for R&M/LE for the above seven units through a consultant. M/s Evonik Energy services Pvt. Ltd, Essen , Germany have been selected as consultant through ICB route to prepare feasibility Study / DPR for the above seven units at three power stations. The implementation of R&M/LE works based on the feasibility report would be taken up by the concerned utilities.

**a) Nasik TPS**

The Feasibility Report was submitted by the M/s Evonik in Feb., 2010. Based on the comments received from Mahagenco, Final Draft Feasibility Report (DFR) prepared by M/s Evonik has been accepted by Mahagenco and the scope of R&M works has been finalised. M/s Evonik have been requested to prepare the Detailed Project Report (DPR) for the selected option – D

**b) Bokaro 'B' TPS**

Draft Feasibility Report (DFR) for Unit-1 of Bokaro 'B' TPS was submitted in first week of June'2010. The DFR has been discussed with DVC on 12.06.10 at DVC HQs. The scope of R&M works for the three units is under finalization by DVC.

**c) Kolaghat TPS**

Draft Feasibility Report for Unit- 3 of Kolaghat TPS was submitted in first week of June'2010. The DFR has been discussed with WBPDCL on 11.06.10 at WBPDCL HQs. The scope of R&M works for the three units were further discussed in CEA on 29.06.10 with M/s Evonik. M/s Evonik have listed out the works under R&M and O&M separately and the lists have been sent to WBPDCL for finalization and confirmation.

## 8.2 Coal Fired Generation Rehabilitation Project funded by World Bank

World Bank is financing a project under the title "Coal Fired Generation Rehabilitation Project –India" for Energy Efficient Renovation & Modernisation (EER&M) of coal fired generation units through rehabilitation of 640 MW of capacity across three States i.e., West Bengal, Maharashtra & Haryana as per following details:

i) Bandel TPS, U-5 (210 MW) of WBPDCL
ii) Koradi TPS, U-6 (210MW) of Mahagenco.
iii) Panipat TPS, U-3 & 4 (2x110MW) of HPGCL.

This project would be funded through IBRD loan of US$180 million and GEF grants of US$45.4 million. Out of GEF grant of US$45.5 million, US$ of 7.5 million have been earmarked for technical assistance components. CEA has been provided a grant of US$ 1.1 million out of this technical assistance components to carry out various studies related to R&M in India through appointment of some consultants.

### A. Pilot R&M Projects Funded by World Bank

#### i) Bandel TPS, Unit-5

DPR for the R&M project consisting following major packages have been prepared by the M/s Evonik Energy Services (Project design consultant):-

i) Main Plant Package (BTG -Boiler, Turbine & Generator)
ii) Coal Handling System Package (CHP)
iii) Ash Handling Package & Water System Package (AHP & Water)
iv) Electrical System Package

The Cost of the project is around Rs. 472 crores (330 +142; Loan + Equity) with a Loan: Equity ratio as 70:30. The execution period of the project is 24 months as per tender document.

**Main Plant Package**

The first stage bids for BTG was evaluated and evaluation report submitted to World Bank. Out of four bids received, only one was found responsive. WBPDCL had negotiations with other three bidders to cover up the deficiencies as advised by the World Bank to make other three bids responsive. But the three bidders could not submitted responsive bid. WBPDCL has taken a decision for rebidding. Accordingly a proposal was placed before World Bank and World Bank has sent their "No Objection" on 02.06.10. WBPDCL is preparing fresh bidding documents for BTG pkg. Expected Date of submission to World Bank for clearance is by Sept.'2010.

Based on the CEA advice, West Bengal Pollution Control Board (WBPCB) has accepted not to increase the existing chimney height of the old chimney for the Unit –5 of Bandel TPS in June'2010.

#### ii) Koradi TPS, unit-6

Fund allocation for the Koradi TPS is around 59.00 million US $ (loan) and grant US $ 12.45 million. M/s Evonik Energy Services was selected as Project Design Consultant and contract awarded to them in Nov.'2007. M/s Evonik prepared the DPR of the project consisting four major packages BTG, Electrical, CHP & other BOP.

DPR with option-D (Replacement of HP,IP & LP turbines with efficient one and others) with an estimated cost of Rs. 486 Crs. was accepted and approved by Mahagenco Board. Final reports for Environmental Audit & Due Diligence (EADD) and Rapid Social Assessment (RSA) were submitted and accepted by Mahagenco. The DPR & technical specification approved by Mahagenco were sent to World Bank. World Bank suggested some modification in the technical specifications. The same has been incorporated in the specification and approved by World Bank. NIT is expected to be floated by end of July 2010. In principle approval of MERC for capital expenditure received vide letter dated 24.05.2010.

**iii) Panipat TPS, unit-3&4**

Fund allocation for the Panipat TPS is around 62 million US $ as Loan and 13 million US $ as Grant. M/s SMEC, Gurgaon has submitted inception report dt. 23.12.2009 for Rapid Social Assessment (RSA). Environment Assessment Due Diligence (EADD) Report has been submitted by M/s ENZEN, Bangalore. The RSA and EADD report are under finalization by HPGCL. The RFP for Design Consultant has been received by HPGCL and the Technical Proposal has been opened and evaluated. The Financial Proposal will be opened on 19.07.10. The Consultant may be appointed by 31.08.10.

**B. Technical Assistance to CEA**

The World Bank is providing technical assistance of US$1.1 million as a part of GEF grant under Coal Fired Generation Rehabilitation Project to CEA for addressing the barriers to energy efficient R&M in India. The scheme would be implemented through appointment of consultants for carrying out the following studies.

a) Study on reduction of barriers to R&M interventions in thermal power stations in India.

b) Study on developing markets for implementation of R&M in thermal power stations in India.

c) Review of experience from Pilot R&M interventions in thermal power stations in India.

d) Review of institutional capacity and capacity strengthening interventions at CEA.

An implementation support consultant (ISC) would also be appointed to assist CEA in procurement of the above consultancy services and in implementing the "Technical Assistance to CEA" project. The appointment of ISC through ICB route is under process. The expression of interest (EOI) was invited from the consultants through advertisement. Six consultants submitted their EOI for the ISC job and short listing was done based on the evaluation of received EOIs. **The Request for Proposal (RfP) document was prepared in consultation with World Bank after receiving 'NOC' from World Bank. RfP was issued to the short listed consultants in the month of May 2010. Pre- proposal conference with short listed consultants has been held on 15.06.10.** The last date for submission of the RfP by the consultants is 19.07.10.

## 8.3 Development of the Tendering Procedures and Model Contract for the R&M of Fossil Fuel Based Power Plants in India."

A task force on "development of tender procedure and model contracts for the Renovation & Modernization (R&M) of fossil fuel based power plants" under the chairmanship of Member (Thermal),CEA was constituted vide MoP letter no. 5/33/2009-S.Th. dated 29/10/2009 comprising the members from various power utilities. The scope of the assignment to be completed by the task force is divided in two phases as under:

**Phase-I Task**

It comprises of an assessment of tendering procedures currently being followed by public utilities in India and a review of documents used for standard R&M projects and the documents which have already been developed for energy efficient R&M projects financed by particularly World Bank.

**Phase-II Task**

Phase-II activity comprises the preparation of the model documents / templates in consultation with task force, power utilities & financing agencies. It is intended to apply the documents for the Energy Efficiency Programme financed by KfW.

In the 3rd meeting of Indo-German Energy Forum(IGEF) convened in Berlin on 4th November 2009, KfW proposed to finance and carryout the work programme of phase-II on behalf of CEA & in consultation with the task force. The first meeting of task force was held on 20th November 2009 in CEA, N Delhi to discuss the report of phase-I activity i.e. "Review of tendering procedures and documents followed by public utilities for renovation & modernization projects" and further approach & methodology for development of the tendering procedures and model contract for the R&M of fossil fuel based power plants under phase-II activity.

Ministry of Power, GOI vide their letter D.O. No. 5/33/2009-S.Th dated 24th December 2009 have entrusted the task of "Project Executing Agency" to CEA for implementing phase-II activity. A consultant is to be procured by CEA for Phase-II activity with the assistance of a Tender Agent to be provided by KfW-Germnay. The cost of consultancy services will be borne by KfW-Germnay.

**KfW has appointed the Tender Agent for selection of a Consultant to carry out the Phase–II activities in June'2010.** The Tender Agent prepared the draft TOR for the Consultant for Phase–II activity, which was discussed in 2nd meeting of the Task Force held on 24.06.10. Based on discussions, **the Tender Agent submitted the revised TOR on 30.06.10, which were under examined by TRM Div., CEA**. The TOR shall be finalized in consultation with the Task Force Members and KfW.

## 8.4 Japan-India co-operation for Pre- Primary study of Efficiency and Environmental improvement of Coal fired stations.

India and Japan have been going through a series of intense discussion to materialize the bilateral cooperation, based on the spirit of cooperation in the Power and Coal Sectors as envisaged in the Joint Statement, at the Japan-India Energy Policy Dialogue on September 17, 2008.

Furthermore, the discussion during the Steering Committee and the subsequent Working Group of Japan-India Energy Policy Dialogue on March 16, 2009, brought Japan and India respectively represented by METI and MOP, to an agreement that the efficiency improvement in existing thermal power stations in India is a highly prioritized area of cooperation. METI and MOP have agreed to extend their cooperation in sharing of technical expertise as well as in actual implementation of mutually agreed techno-economical R&M solutions.

In the spirit of above **a MOU between Central Electricity Authority and JCOAL for preliminary study of Efficiency and Environment improvement study in coal fired power plants was signed during the meeting of India-Japan high level Energy Dialogues held in New Delhi on 30.4.2010.** The purpose of this MOU is to carryout necessary diagnostic activities for few candidate coal-fired power plants pertaining to Energy Efficient Renovation & Modernisation works and finding out measures to overcome barriers for promoting R&M, towards carrying out efficiency and environmental improvement of coal-fired power plants in India.

JCOAL has short listed four candidate coal fired power plants viz. Ukai and Wanakbori TPS (GSECL), Ramagundem STPS (NTPC) and Vijaywada TPS (APGENCO) for pre – primary studies. A Pre-Primary Questionnaire prepared by JCOAL was forwarded to concerned utilities and related data has been received from the utilities. JCOAL has planned to visit these four candidate coal fired power plants by their expert team during Aug.'-Sept.' 2010.

## 8.5 Financial Assistance by World Bank under GEF facility as Grant:

World Bank has made available GEF Grant for various studies viz. Design, Environment Audit & Due Diligence (EADDA) and Rapid Social Assessment (RSA) for LE works under 12$^{th}$ plan at various thermal units of Mahagenco. The units of Mahagenco proposed for above mentioned studies are Bhusawal units 2&3 (2x210MW) , Chandrapur unts 1&2 (2x210MW) and Parli unit 3 (1x210MW).

**********

**List of Units where LE Works have been completed during 11th Plan**
**(AS ON 30.06.2010).**

**A. State Sector**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| | **Uttar Pradesh** | | | | | | |
| 1 | UPRVUNL | Obra | 1 | 1968 | 40 | 2009-10 (Actual) | Unit synchronised on 4th May 2009 |
| 2 | | | 2 | 1968 | 40 | 2008-09 (Actual) | Unit synchronised on 2nd February 2009 |
| 3 | | | 6 | 1973 | 94 | 2007-08 (Actual) | Unit synchronised on 20th March 2008 |
| | | **Total** | 3 | | 174 | | |
| 4 | | H'Gunj | 5 | 1977 | 60 | 2008-09 (Actual) | Work completed, unit synchronised in May'08. |
| | | **Total** | 1 | | 60 | | |
| | **Haryana** | | | | | | |
| 5 | HPGCL | Panipat | 1 | 1979 | 110 | 2008-09 (Actual) | Unit synchronised on 4th Nov'08. |
| | | **Total** | 1 | | 110 | | |
| | **Gujarat** | | | | | | |
| 6 | GSECL | Ukai | 1 | 1976 | 120 | 2008-09 (Actual) | Unit -1 was taken under s/d on 06.9.2006 for LE works, synchronised on 24.5.2008. Unit running at 100 -105 MW load. |
| 7 | | | 2 | 1976 | 120 | 2009-10 (Actual) | Unit -2 was taken under s/d for LE on 12th August'08. Synchronised on 24-2- 2010. Full load was achieved on 20.05.10. Unit running at 100-110 MW. |
| | | **Total** | 2 | | 240 | | |
| | **Total State Sector (A)** | | 7 | | 584 | | |

**B. Central Sector**

GAS FIRED

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| 1 | NTPC | Anta GT | 1 | 1989 | 89 | 2009-10 (Actual) | Work completed in Feb.2010. |
| 2 | | | 2 | 1989 | 89 | | |
| 3 | | | 3 | 1989 | 89 | | |
| | | Total | 3 | | 267 | | |
| Total Central Sector (B) | | | 03 | | 267 | | |

| | | | |
|---|---|---|---|
| Grand Total (A+B) | 10 | | 851 |

**List of Units where R&M Works have been completed during 11th Plan**

**(AS ON 30.06.2010)**

**A. State Sector**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm-issioning | Capacity (MW) | Completion Schedule (Actual / Targeted) | Present Status |
|---|---|---|---|---|---|---|---|
| | **Punjab** | | | | | | |
| 1 | **PSEB** | **Ropar** | 1 | 1984 | 210 | **2007-08 (Actual)** | Schemes completed in March'08.(2007-08) |
| 2 | | | 2 | 1985 | 210 | | |
| 3 | | | 3 | 1988 | 210 | | |
| 4 | | | 4 | 1989 | 210 | | |
| 5 | | | 5 | 1992 | 210 | | |
| 6 | | | 6 | 1993 | 210 | | |
| | | **Total** | **6** | | **1260** | | |
| | **Maharashtra** | | | | | | |
| 7 | **Mahagenco** | **Koradi** | 5 | 1978 | 200 | **2007-08 (Actual)** | Schemes completed in March'08 (2007-08) |
| 8 | | | 6 | 1982 | 210 | | |
| 9 | | | 7 | 1983 | 210 | | |
| | | **Total** | **3** | | **620** | | |
| 10 | | **Chandrapur** | 1 | 1983 | 210 | **2008-09 (Actual)** | Schemes completed in March'09 (2008-09) |
| 11 | | | 2 | 1984 | 210 | | |
| 12 | | | 3 | 1985 | 210 | | |
| 13 | | | 4 | 1986 | 210 | | |
| 14 | | | 5 | 1991 | 500 | | |
| 15 | | | 6 | 1992 | 500 | | |
| | | **Total** | **6** | | **1840** | | |
| 16 | | **Parli** | 3 | 1980 | 210 | **2008-09 (Actual)** | Schemes completed in March'09 (2008-09) |
| 17 | | | 4 | 1985 | 210 | | |
| 18 | | | 5 | 1987 | 210 | | |
| | | **Total** | **3** | | **630** | | |
| | **Sub Total (A)** | | **18** | | **4350** | | |

**B. Central Sector**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm-issioning | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present Status |
|---|---|---|---|---|---|---|---|
| 1 | DVC | **Durgapur TPS** | 3 | 1966 | 130 | **2008-09 (Actual)** | **Completed (2008-09)** |
| 2 | | | 4 | 1984 | 210 | **2008-09 (Actual)** | **Completed (2008-09)** |
| | | **Total** | **2** | | **340** | | |
| 1 | NTPC | **Vindhyanchal STPS** | 1 | 1987 | 210 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 2 | | | 2 | 1987 | 210 | | |
| 3 | | | 3 | 1989 | 210 | | |
| 4 | | | 4 | 1990 | 210 | | |
| 5 | | | 5 | 1990 | 210 | | |
| 6 | | | 6 | 1991 | 210 | | |
| | | **Total** | **6** | | **1260** | | |
| 7 | | **Korba STPS** | 1 | 1983 | 200 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 8 | | | 2 | 1983 | 200 | | |
| 9 | | | 3 | 1984 | 200 | | |
| 10 | | | 4 | 1987 | 500 | | |
| 11 | | | 5 | 1988 | 500 | | |
| 12 | | | 6 | 1989 | 500 | | |
| | | **Total** | **6** | | **2100** | | |
| 13 | | **Ramagundem STPS** | 1 | 1983 | 200 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 14 | | | 2 | 1984 | 200 | | |
| 15 | | | 3 | 1984 | 200 | | |
| 16 | | | 4 | 1988 | 500 | | |
| 17 | | | 5 | 1989 | 500 | | |
| 18 | | | 6 | 1989 | 500 | | |
| | | **Total** | **6** | | **2100** | | |
| 19 | | **Farakka Stg-I STPS** | 1 | 1986 | 200 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 20 | | | 2 | 1986 | 200 | | |
| 21 | | | 3 | 1984 | 200 | | |
| | | **Total** | **3** | | **600** | | |
| 22 | | **Tanda TPS** | 1 | 1988 | 110 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 23 | | | 3 | 1990 | 110 | | |
| 24 | | | 4 | 1998 | 110 | **2010-11 (Actual)** | **Operational since 14.04.2010.** |
| | | **Total** | **3** | | **330** | | |
| 25 | | **Talcher TPS Stg-II** | 5 | 1982 | 110 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 26 | | | 6 | 1983 | 110 | | |
| | | **Total** | **2** | | **220** | | |

| Sl. No. | Name of Utility | **Name of Station** | Unit No. | Year of Comm-issioning | Cap. (MW) | **Completion Schedule (Actual / Targeted)** | Present Status |
|---|---|---|---|---|---|---|---|
| 27 | NTPC | **Singrauli STPS** | 1 | 1982 | 200 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 28 | | | 2 | 1982 | 200 | | |
| 29 | | | 3 | 1983 | 200 | | |
| 30 | | | 4 | 1983 | 200 | | |
| 31 | | | 5 | 1984 | 200 | | |
| 32 | | | 6 | 1986 | 500 | | |
| 33 | | | 7 | 1987 | 500 | | |
| | | **Total** | **7** | | **2000** | | |
| 34 | | **Unchahar TPS** | 1 | 1988 | 210 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 35 | | | 2 | 1989 | 210 | | |
| | | **Total** | **2** | | **420** | | |
| 36 | | **Rihand Stg - I STPS** | 1 | 1988 | 500 | **2009-10 (Actual)** | **Completed (2009-10)** |
| 37 | | | 2 | 1989 | 500 | | |
| | | **Total** | **2** | | **1000** | | |
| **Sub Total NTPC** | | | **37** | | **10030** | | |
| **Total Central Sector (B)** | | | **39** | | **10370** | | |
| **Total of R&M (A+B)** | | | **57** | | **14720** | | |

**LE targets during remaining period of the 11th Plan (2010-11 & 2011-12)**

**State Sector**

**A. 2010 – 2011 – Target (5 nos. of Units)**

1. Obra TPS – 2 Unit (2x200 MW)
2. Bhatinda TPS – Unit-3 (110 MW)
3. Amarkantak Ext. TPS – Unit 1 & 2 (2x120 MW)

Sub total : 5 units (750 MW)

**B. 2011 – 2012 – Target (14 nos. of Units)**

1. Obra TPS – 3 Units (3x200 MW)
2. Harduaganj TPS - Unit 7 (110 MW)
3. Parichha TPS - Unit 1&2 (2x110 MW)
4. Bhatinda TPS – Unit-4 (110 MW)
5. Gandhinagar TPS - Unit 1&2 (2x120 MW)
6. Barauni TPS - Unit 6&7 (2x110 MW)
7. Muzaffarpur TPS - Unit 1 &2 (2x110 MW)
8. Bandel TPS - Unit 5 (210 MW)

Sub total : 14 units (1930 MW)

Total State Sector: 19 units (2680 MW)

**Central Sector**

**A. 2010 – 2011 – Target**

**Nil**

**B. 2011 – 2012 – Target (17 nos. of Units)**

1. Badarpur TPS - unit 4&5 (2x210 MW)
2. Singrauli STPS Unit 1&2 (2x200 MW)
3. Korba STPS Unit 1 (200 MW)
4. Ramagundem STPS Unit1 (200 MW)
5. Dadri CCGT GT Unit 1 to 3 (3x131 MW)
6. Auraiya CCGT GT Unit 1 to 3 (3x111.19 MW)
7. Kawas CCGT GT Unit 1 to 3 (3x106 MW)
8. Gandhar CCGT GT Unit 1&2 (2x131 MW)

Sub total : 17 units (2527 MW)

**Total State Sector + Central Sector : 36 units (5207 MW)**

**R&M targets during remaining period of the 11th Plan (2010-11 & 2011-12)**

**State Sector**

**A. 2010-2011 – Target (4 nos. of Units)**

1. Patratu TPS Unit 9&10 (2x110 MW)
2. Rajghat TPS Unit 1&2 (2x67.5 MW)

Sub total: 4 – units (355 MW)

**B. 2011-2012 – Target (5 nos. of Units)**

1 Anpara TPS - Unit 4&5 (2x500 MW)
2 Obra TPS - Unit 7&8 (2x100 MW)
3 Durgapur Projects Ltd. Unit 6 (110 MW)

Sub total: 5 – units (1310 MW)

Total State Sector: 9-units (1665 MW)

**Central Sector**

**A. 2011-2012 – Target (10 nos. of Units under NTPC)**

1. Tanda TPS Unit 2 (110 MW)
2. Farakka Stage-II Unit 4&5 (2x500 MW)
3. NCTPP Dadri Unit 1 to 4 (4x210 MW)
4. Kahalgaon STPS Unit 1 to 3 (3x210 MW)

Total Central Sector: 10-units (2580 MW)

**Total State Sector + Central Sector: 19 units (4245 MW)**

## Details of Units Programmed for LE Works during 2010-12 of 11th Plan

### A. State Sector

**Status as on 30-6-2010**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| | **Uttar Pradesh** | | | | | | |
| 1 | | Obra | 9 | 1980 | 200 | 2010-11 (Target) | Contract agreement signed with BHE in Feb, 2007. Unit -9 taken under s/c on 2-11-2008. Boiler of U-9 was lighted up on 24.06.10. U-9 likely to b synchronised by mid August' 2010. Shutdown of Unit No. 10 &11 will be taken after stabilisation of unit-9. There after unit 12 & 13 will be taken up. |
| 2 | | | 10 | 1979 | 200 | 2010-11 (Target) | |
| 3 | | | 11 | 1977 | 200 | 2011-12 (Target) | |
| 4 | | | 12 | 1981 | 200 | 2011-12 (Target) | |
| 5 | | | 13 | 1982 | 200 | 2011-12 (Target) | |
| | | **Total** | **5** | | **1000** | | |
| 6 | | H'Gunj | 7 | 1978 | 110 | 2011-12 (Target) | LOI issued to BHEL on 25.03.09. Advance payment released in June'09, draft contract prepared by BHEL has been cleared by UPRVUNL and consultant NTPC. Supply of structural material has started. S/D expected in Dec.'2010. |
| | | **Total** | **1** | | **110** | | |
| 7 | | Parichha | 1 | 1984 | 110 | 2011-12 (Target) | Contract was negotiated with UPRVUNL by BHEL during Oct'09. However,a study report for techno-economical viability of LE works prepared by the consultant M/s Evonik has been submitted and is being examined by UPRVUNL. |
| 8 | | | 2 | 1985 | 110 | 2011-12 (Target) | |
| | | **Total** | **2** | | **220** | | |
| | **Punjab** | | | | | | |
| 9 | PSEB | Bathinda | 3 | 1978 | 110 | 2010-11 (Target) | Order placed on BHEL on 6.11.2006. S/d on unit -3 was taken from 14.1.2010, dismantling work compltd. and erection work of boiler started on 18.06.10. Unit expected to be recommisioned by Oct. 2010. Thereafter unit-4 will be taken up. |
| 10 | | | 4 | 1979 | 110 | 2011-12 (Target) | |
| | | **Total** | **2** | | **220** | | |
| | **Gujarat** | | | | | | |
| 11 | | Gandhinagar | 1 | 1977 | 120 | * | *Order awarded to BHEL on 28 May 2007. BHEL has supplied 55% material at site. Due to poor performance of BHEL at Ukai TPS, M/s GSECL are planning to short closure of the contract. |
| 12 | | | 2 | 1977 | 120 | * | |

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| | **Madhya Pradesh** | | | | | | |
| 13 | MPPGCL | Amarkantak Ext. | 1 | 1977 | 120 | 2010-11 (Target) | Works on 11 packages out of 12 completed. Order for Turbine package placed on NASL in July 07. Works on Unit- 2 had been commenced from 26.7.09 and expected to be recommissioned by July end. Completion schedule in 2010-11. |
| 14 | | | 2 | 1977 | 120 | 2010-11 (Target) | |
| | | **Total** | **2** | | **240** | | |
| | **West Bengal** | | | | | | |
| 15 | WBPDCL | Bandel | 5 | 1982 | 210 | 2011-12 (Target) | Taken up under World Bank programme. Due to lack of more than one qualified bidders for 2nd stage Bid, WBPDCL has decided for rebidding of BTG Pkg. Proposal sent to WB and WB sent their "No Objection" on 02.06.10.WBPDCL is preparing fresh bidding documents for BTG pkg. |
| | | **Total** | **1** | | **210** | | |
| | **Bihar** | | | | | | |
| 16 | BSEB | Barauni | 6 | 1983 | 110 | 2011-12 (Target) | Unit #6 has been restored by BHEL under Rashtriya Sam Vikas Yojana. LOA has been awarded to BHEL on 15th Feb.2010. 4600 MTs materials reached at site. Dismantling of Turbine of U-7 completed, rotor is being sent to BHEL.. |
| 17 | | | 7 | 1985 | 110 | 2011-12 (Target) | |
| | | **Total** | **2** | | **220** | | |
| 18 | KBUNL | Muzaffarpur | 1 | 1985 | 110 | 2011-12 (Target) | Unit #2 has been restored under RSVY. LOA awarded on 15.04.10. Kick Off meeting held on 21.05.10. 2150 MTs SG materials reached at site. Both the streams of CHP are operational from 20.04.10. R&M of one wagon Tippler will be compltd. in Aug.'2010. |
| 19 | | | 2 | 1986 | 110 | 2011-12 (Target) | |
| | | **Total** | **2** | | **220** | | |
| **Total of State Sector (A)** | | | **19** | | **2680** | | |

## B. Central Sector

(i) Coal Fired

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| 1 | NTPC | Badarpur | 4 | 1978 | 210 | | Tech. bids for Main Plant R&M Pkg. opened on 15.12.09. Evaluation of Tech. & comm.. bid in progress. Order is expected to be placed by Sept.'2010. |
| 2 | | | 5 | 1981 | 210 | | |
| | | **Total** | **2** | | **420** | | |
| 3 | | Singrauli STPS | 1 | 1982 | 200 | | Scheme under finalisation. |
| 4 | | | 2 | 1982 | 200 | | |
| | | **Total** | **2** | | **400** | | |
| 5 | | Korba STPS | 1 | 1983 | 200 | | Scheme under finalisation. |
| | | **Total** | **1** | | **200** | | |
| 6 | | Ramagundam | 1 | 1983 | 200 | | Scheme under finalisation. |
| | | **Total** | **1** | | **200** | | |
| | **Total of (i)** | | **6** | | **1220** | | |

(ii) Gas Fired

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7 | NTPC | Dadri GT | 1 | 1992 | 131 | | Scheme finalised. CEA clearance on 30.05.08. |
| 8 | | | 2 | 1992 | 131 | | |
| 9 | | | 3 | 1992 | 131 | | |
| | | **Total** | **3** | | **393** | | |
| 10 | | Auraiya GT | 1 | 1989 | 111.19 | | Scheme finalised. Bidding process started for GT renovation and C&I pkgs. |
| 11 | | | 2 | 1989 | 111.19 | | |
| 12 | | | 3 | 1989 | 111.19 | | |
| | | **Total** | **3** | | **333.57** | | |
| 13 | | Kawas GT | 1 | 1992 | 106 | | Scheme finalised. Bidding process started for GT renovation and C&I pkgs. |
| 14 | | | 2 | 1992 | 106 | | |
| 15 | | | 3 | 1992 | 106 | | |
| | | **Total** | **3** | | **318** | | |
| 16 | | Gandhar GT | 1 | 1994 | 131 | | Scheme finalised. CEA clearance on 25.05.09. |
| 17 | | | 2 | 1994 | 131 | | |
| | | **Total** | **2** | | **262** | | |
| **Total of (ii)** | | | **11** | | **1306.57** | | |
| **Total Central Sector (B)** | | | **17** | | **2527** | | |

| | | | |
|---|---|---|---|
| **Grand Total (A+B)** | **36** | | **5207** |

**Details of Units Programmed for R&M Works during 2010-12 of 11th Plan**

**A. State Sector**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm-issioning | Capacity (MW) | Completion Schedule (Actual / Targeted) | Present Status |
|---|---|---|---|---|---|---|---|
| | **Uttar Pradesh** | | | | | | |
| 1 | UPRVUNL | Anpara'B | 4 | 1993 | 500 | **2011-12 (Target)** | Scope of work yet to be finalised (Targeted in 2011-12) |
| 2 | | | 5 | 1994 | 500 | | |
| | | **Total** | **2** | | **1000** | | |
| 3 | | Obra | 7 | 1974 | 100 | **2011-12 (Target)** | BHEL to submit scope of work (Targeted 2011-12) |
| 4 | | | 8 | 1975 | 100 | | |
| | | **Total** | **2** | | **200** | | |
| | **Delhi** | | | | | | |
| 5 | IPGCL | Rajghat | 1 | 1989 | 67.5 | **2010-11 (Target)** | Works are in progress (Targeted in 2010-11) |
| 6 | | | 2 | 1989 | 67.5 | | |
| | | **Total** | **2** | | **135** | | |
| | **Jharkhand** | | | | | | |
| 7 | JSEB | Patratu | 9 | 1984 | 110 | **2011-12 (Target)** | Restoration works are in progress (Targeted in 2011-12) |
| 8 | | | 10 | 1986 | 110 | | |
| | | **Total** | **2** | | **220** | | |
| | **West Bengal** | | | | | | |
| 9 | DPL | Durgapur | 6 | 1985 | 110 | **2011-12 (Target)** | Works are in progress (Targeted in 2011-12). |
| | | **Total** | **1** | | **110** | | |
| **Total of State Sector (A)** | | | **9** | | **1665** | | |

**B. Central Sector**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm-issioning | Capacity (MW) | Completion Schedule (Actual / Targeted) | Present Status |
|---|---|---|---|---|---|---|---|
| 1 | | Tanda | 2 | 1989 | 110 | **2011-12 (Target)** | |
| | | **Total** | **1** | | **110** | | |
| 2 | | NCTPP, Dadri | 1 | 1992 | 210 | 2011-12 (Target) | Scope of work finalized. CEA clearance on 6.10.08. |
| 3 | | | 2 | 1992 | 210 | | |
| 4 | | | 3 | 1993 | 210 | | |
| 5 | | | 4 | 1994 | 210 | | |
| | | **Total** | **4** | | **840** | | |
| 6 | | Farakka Stg-II | 4 | 1992 | 500 | 2011-12 (Target) | Scheme under finalisation |
| 7 | | STPS | 5 | 1994 | 500 | | |
| | | **Total** | **2** | | **1000** | | |
| 8 | | Kahalgaon | 1 | 1992 | 210 | 2011-12 (Target) | Scheme under finalisation by NTPC |
| 9 | | | 2 | 1994 | 210 | | |
| 10 | | | 3 | 1995 | 210 | | |
| | | **Total** | **3** | | **630** | | |
| **Total Central Sector (B)** | | | **10** | | **2580** | | |
| **Total of R&M (A+B)** | | | **19** | | **4245** | | |

## Details of Units Programmed for LE Works during 11th Plan but likely to slip beyond 11th Plan

**State Sector**

**Status as on 30-6-2010**

| Sl. No. | Name of Utility | Name of Station | Unit No. | Year of Comm. | Cap. (MW) | Completion Schedule (Actual / Targeted) | Present status / Expected Date of Completion |
|---|---|---|---|---|---|---|---|
| | **Uttar Pradesh** | | | | | | |
| 1 | | Panki | 3 | 1976 | 105 | Likely to slip beyond 11th plan | BHEL has been asked to furnish scope of work. Order expected to be placed in 11th Plan, completion in 12th Plan. |
| 2 | | | 4 | 1977 | 105 | | |
| | | **Total** | **2** | | **210** | | |
| 3 | | Anpara "A" | 1 | 1986 | 210 | Likely to slip beyond 11th plan | BHEL has been asked to furnish scope of work . Order expected to be placed in 11th Plan, completion in 12th Plan. |
| 4 | | | 2 | 1986 | 210 | | |
| 5 | | | 3 | 1988 | 210 | | |
| | | **Total** | **3** | | **630** | | |
| | **Punjab** | | | | | | |
| 6 | PSEB | Ropar | 1 | 1984 | 210 | Likely to slip beyond 11th plan | RLA completed. Order expected to be placed in 11th Plan, completion in 12th Plan. |
| 7 | | | 2 | 1985 | 210 | | |
| | | **Total** | **2** | | **420** | | |

| | | | |
|---|---|---|---|
| **TOTAL** | **7** | | **1260 MW** |

Appendix IV

# Northern Region

## (Unit wise Broad Status of LE works)

## Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station

**As on 30.6.2010**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Completed** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler : :** Replacement of Supporting structure-50t<br>100% Replacement of Refractory & thermal Insulation.<br>100% Replacement of safety calves, Feed control valves, drain and vent valves - 100%.<br>100% Replacement of Main steam pipes including bends & fittings.<br>Replacement of Skin casing 300 $m^2$ .<br>100% Replacement of Furnace Walls, Headers, Down Flow Pipes, riser tubes, Economiser, Platen SH, Conv SH, radiant SH, Ceiling SH, Attemperator, sing rods and supports.<br>O/H of other boiler equipments<br>Air –Pre- Heater: 100% repl. of tube plates, expansion joints<br>Replacement of F.D.Fans (2 Nos),<br>Replacement of I.D.Fan (1 No). 100% replacement of Cold and Hot Air ducts flue Gas Ducts with supports & hanger with insulation, Damper components, Sample coolers, Hot air for mill ducts.<br>Coal Milling & Firing System: Replacement of 2 Nos Raw coal scraper feeder, armor plates, balls, reduction gear of the Mill (2 Nos), coal dust feeder, Coal burners, coal dust pipes,– 100% replacement<br>HFO Guns (6 Nos) - 100% replacement. O/H of oil firing system.<br>ESP: New ESP in place of Mechanical dust collector.<br>100% replacement of bottom ash handling system, fly ash handling system Ash slurry pumps (3 Nos), Ash slurry pipeline –. New installation of seal water pumps (1 W + 1 S).<br>O/H of HP &LP flush water pump |
| 2 | Unit No. & capacity | **U-1 (50 MW)** | |
| 3 | Make | | |
| | i) Boiler | KKBW | |
| | ii) TG. | LMW | |
| 4 | Date of commissioning | 08/1967 | |
| **B.** | **RLA Study / Consultancy** | | |

| **Description** | Boiler | TG. |
|---|---|---|
| Estimated Cost (Rs in Cr) | Included in the cost of R&M works | |
| Executing Agency | TPE, Russia | TPE, Russia |

**ii) TG :**

HP & LP casing – repair works.
Turbine Rotor with coupling – New Rotor. 100% Replacement of Nozzle Boxes, Nozzle Rings
Diaphragms of HP & LP part Repl of last 3 stages
ESC, MSV, Condensate, Extraction water pumps, L.P. Heaters, Deaerator, BFP – repair & OH.
Replacement of tubes & tube Bundles.. O/H of L.P. Heaters (4 Nos).
Complete Replacement of H.P. Heaters (3 Nos).
Stud, nuts for casing, control valves - 100% repl.
Auxiliary piping. & fitting : Valve below 1" - 100% repl. Other sizes 10 to 50 % .100% Replacement of replacement. Auxiliary piping.
O/H of other equipment.
Condensate Plant: Replacement of tubes (15%). Replacement of circulating water pump (2 Nos), CW valves

**Continued…….**

| C | LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | TPE Russia, (balance of works were completed U.C.C.I. & ILK) |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | |
| 4 | Date of Start Actual | 21.7.2003 |
| 5 | Actual Date of **Completion** | **30.4.2009** |
| 6 | Estimated Cost (Rs in Cr) | Rs. 486.40 Cr. for 5x50 MW units. |
| 7 | Actual Expenditure incurred (Rs in Cr) | Rs 186.31 Cr. (On unit 1 & 2) |

iii) **BOP/ Other works:**

Phosphate dosing pump (1 No) piping, valve & dosing system-100% replacement

Replacement of 4 Nos compressors of compressed air system.

Installation of new air conditioning plant.

One no New fire water pump, Fire detection system,

Major O/H of 100T/20T E O T cranes. Replacement of cargo lift. Hoist & Beams for Ball mills, ID fans, feed water tank, ESP, Deatator, CW pump house, DM plant, ash water pump house & ash slurry pump house

Replacement of circulating water pump(2 nos)

New DM water treatment plant 2x75 $m^3$/ hr capacity along with clarifloculator of 350 $m^3$/ hr capacity and replacement of 350 m of 150 MSRL pipe line.

O/H of all the equipment/instruments of WTP and raw water intake system.

Refurbishment of Wagon tipplers, Wagon tipplers hoppers, coal crushers (2 Nos), Pusher car, water spray system,

Replacement of about 2000 mts of conveyor belts of 1400mm. wide

Provision of Dust suppression Extraction system at all transfer points crushers house.

Replacement of other core handling equipment like vibrators, conveyor gallery's structure conveyor, motors, gear boxes, fluid couplings, drive, pulleys, idlers etc, Conveyor gallery.

1No new bulldozer D-155 and refurbishment of 3nos dozers (D-80A-12,BEML make

Hoisting and handling facility, full cord switches, weighing system,. magnetic pulleys separators, transfers chutes, transfer chutes, conveyor short post and gearboxes etc.

Electrical System: Rewinding (class-F insulation) of stator of generator & Excitors. Refurbishment of rotor winding, New excitation system.

O/H & oil replacement of Generator transformer & UAT. 2 Nos 350kVA & 8 Nos 560 kVA New LT service transformers. 1 No 560 kVA New lighting transformer.

Replacement of 6.6 KV unit switch boards (21 Nos.) & LT switchboard 5 Nos.

Motors – replacement of 2Nos BFP motors, 2Nos ID fan Motors, 2 nos mill fans Motors, 2Nos ball mills Motors. All other motors to overhauled.

LT motors: drain pump motor (2 Nos), SGT motors (1 No), RC feeder motors (12 Nos), Ball mill motors (4 Nos), sump motors (4 Nos).

**Common Auxiliaries:** HP flush water pump motors (2 Nos), Ash disposal pump motors (1No). LP flush water pump motor (2 Nos), fire pump motor (1No), service pump motor (1No). Replacement of Generator protection panel, complete lighting system, power & control cables.

New modern 7 loud phones and public address system.

**Completely replacement of new C&I system. of new C&I system.**

The work was awarded to TPE Russia, the contract Between UPRVUNL & TPE was discontinued. The balance of work was completed by U.C.C.I., and ILK.

**After Refurbishment works unit – 1 is running at 50 MW load.**

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Completed** |
| 1 | Name of Power Station | **OBRA** | i) **Boiler :** Replacement of Supporting structure-50t<br>100% Replacement of Refractory & thermal Insulation.<br>100% Replacement of safety calves, Feed control valves, drain and vent valves - 100%.<br>100% Replacement of Main steam pipes including bends & fittings.<br>Replacement of Skin casing 300 $m^2$ .<br>100% Replacement of Furnace Walls, Headers, Down Flow Pipes, riser tubes, Economiser, Platen SH , Conv SH, radiant SH, Ceiling SH, Attemperator, sing rods and supports.<br>O/H of other boiler equipments<br>Air –Pre- Heater: 100% repl. of tube plates, expansion joints<br>Replacement of F.D.Fans (2 Nos),<br>Replacement of I.D.Fan (1 No). 100% replacement ofCold and Hot Air ducts flue Gas Ducts with supports & hanger with insulation, Damper components, Sample coolers, Hot air for mill ducts.<br>Coal Milling & Firing System: Replacement of 2 Nos Raw coal scraper feeder, armor plates, balls, reduction gear of the Mill (2 Nos), coal dust bunker, coal dust feeder, Coal burners, coal dust pipes, mill fans – 100% replacement<br>HFO Guns (6 Nos) - 100% replacement. O/H of oil firing system.<br>ESP: New ESP in place of Mechanical dust collector.<br>100% replacement of bottom ash handling system, fly ash handling system Ash slurry pumps (3 Nos), Ash slurry pipeline –. New installation of seal water pumps (1 W + 1 S).<br>O/H of HP &LP flush water pump |
| 2 | Unit No. & capacity | **U-2 (50 MW)** | |
| 3 | Make | | |
| | i) Boiler | KKBW | |
| | ii) TG. | LMW | |
| 4 | Date of commissioning | 03/1968 | |
| **B.** | **RLA Study / Consultancy** | | |
| **Description** | Boiler | TG. | ii) **TG :**<br>HP & LP casing – repair works.<br>Turbine Rotor with coupling – New Rotor. 100% Replacement of Nozzle Boxes, Nozzle Rings Diaphragms of HP & LP part Repl of last 3 stages<br>ESC, MSV, Condensate, Extraction water pumps, L.P.Heaters, Deaerator, BFP – repair & OH.<br>Replacement of tubes & tube Bundles.. O/H of L.P. Heaters (4 Nos).<br>Complete Replacement of H.P. Heaters (3 Nos).<br>Stud, nuts for casing, control valves - 100% repl.<br>Auxiliary piping. & fitting : Valve below 1" - 100% repl. Other sizes 10 to 50 % .100% Replacement of replacement. Auxiliary piping.<br>O/H of other equipment.<br>Condensate Plant: Replacement of tubes (15 %). Replacement of circulating water pump (2 Nos), CW valves |
| Estimated Cost (Rs in Cr) | Included in the cost of R&M works | | |
| Executing Agency | TPE, Russia | TPE, Russia | |
| **C** | **R&M/ LE Works** | | iii) **BOP/ Other works:**<br>Phosphate dosing pump (1 No) piping, valve & dosing system-100% replacement<br>Replacement of 4 Nos compressors of compressed air system.<br>Installation of new air conditioning plant.<br>One no New fire water pump, Fire detection system,<br>Major O/H of 100T/20T E O T cranes. Replacement of cargo lift. Hoist & Beams for Ball mills, ID fans, feed water tank, ESP, Deatator, CW pump house, DM plant, ash water pump house & ash slurry pump house<br>Replacement of circulating water pump(2 nos)<br>New DM water treatment plant 2x75 $m^3$/ hr capacity along with clarifloculator of 350 $m^3$/ hr capacity and replacement of 350 m of 150 MSRL pipe line.<br>O/H of all the equipment/instruments of WTP and raw water intake system.<br>Refurbishment of Wagon tipplers, Wagon tipplers hoppers, coal crushers (2 Nos), Pusher car, water spray system,<br>Replacement of about 2000 mts of conveyor belts of 1400mm. wide<br>Provision of Dust suppression Extraction system at all transfer points crushers house.<br>Replacement of other core handling equipment like vibrators, conveyor gallery's structure conveyor, motors, gear boxes, fluid couplings, drive, pulleys, idlers etc, Conveyor gallery.<br>1No new bulldozer D-155 and refurbishment of 3nos dozers (D-80A-12,BEML make<br>Hoisting and handling facility, full cord switches, weighing system,. magnetic pulleys separators, transfers chutes, transfer chutes, conveyor short post and gearboxes etc.<br>**Electrical System:** Rewinding (class-F insulation) of stator of generator & Excitors. Refurbishment of rotor winding, New excitation system.<br>O/H & oil replacement of Generator transformer & UAT. 2 Nos 350kVA & 8 Nos 560 kVA New LT service transformers. 1 No 560 kVA New lighting transformer.<br>Replacement of 6.6 KV unit switch boards (21 Nos.) & LT switchboard 5 Nos.<br>Motors – replacement of 2Nos BFP motors, 2Nos ID fan Motors, 2 nos mill fans Motors, 2Nos ball mills Motors. All other motors to overhauled.<br>LT motors: All motor overhauled. & ball mill lop motors (4 Nos) replaced.<br>**Common Auxiliaries: Already indicated in unit – 1.**<br>**Completely replacement of new C&I system.** |
| 1 | Executing Agency Boiler/ TG. | TPE, Russia, U.C.C.I. & ILK. | |
| 2 | No. of Activities Boiler/ TG. | | |
| 3 | Zero date | | |
| 4 | Actual Date of Start of work | 21.7.2003 | |
| 5 | Date of **Completion** | **05.02.2009** | |
| 6 | Estimated Cost (Rs in Cr) | Rs. 486.40 Cr. For 5 x 50 MW units. | |
| 7 | Actual Expenditure incurred (Rs in Cr) | ***Rs 186.31 Cr on units 1& 2.*** | |

The unit was under forced shutdown since 01.07.1991 and it was almost cannibalized.

**After Refurbishment works unit – 2 is running at 50 MW load.**

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Ongoing** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :** 100%Replacement damaged ceiling structure, Refractory and thermal insulation- Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe.<br>100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes.<br>100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, O/H of Boiler Drum & Internals, Economizer,.<br>100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping,<br>O/H of PRDS system.<br>Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system.<br>O/H & repair of damaged parts of FD fans.<br>100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan.<br>O/H & Replacement of damaged parts of P.A. Fans., Suit blowing system, wall blowers.<br>100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system.<br>Complete O/H of Oil firing system:<br>**Replacement of Control & Instrumentation:** Boiler Controls**,** FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets,<br>**Auto Control Loops for Boiler ( maxDNA based).** |
| 2 | Unit No. & capacity | **U-9 (200 MW) Upgradation to 216 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 01/1980 | |
| **B.** | **RLA Study / Consultancy** | | |

| **Description** | Boiler | TG. |
|---|---|---|
| Estimated Cost (Rs in Cr) | 1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW) | |
| Executing Agency | BHEL | BHEL |
| Actual start of work | | |
| Expected date of Completion | | |
| Actual expenditure (Rs in Cr) | | |

**ii) TG :**
**HP Turbine::** Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing
**IP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms
**LP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).
**Jacking oil pump (1 set).**
**Electro hydraulic governing system (1 set).**
**Auxiliary equipment:** Ejectors, Condenser tubes 100% replacement
**Generator(1 set). :** Stator winding bars and winding, Supply of end packets and shunts for stator and assembly, Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB, Tools and tackles for generator for unit 9-13,
Rotor and diaphragms lifting device (common for unit 9-13)
Spares for commissioning (common for unit 9-13)
**TG Auxiliaries:** Gland steam condenser: Supply of cupronickel tube bundles considered
Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,
Boiler Feed Pump: BFP cartridge (I No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters: Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | 20.6.2006 |
| 4 | Date of Start (Original) | 02.11.2008 |
| 5 | Expected Date of Completion | Mid August' 2010 |
| 6 | Estimated Cost (Rs in Cr) | Rs 1635 crores for units (9 to 13) 5x200 MW units. |
| 7 | Actual Expenditure incurred (Rs in Cr) | Rs 727.07* Cr (On unit 9-13) |

**iii) BOP :**

**Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW.**

**Station C&I Equipment,** SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system),
**Static excitation system:** Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.

- **Boiler was lighted up on 24.06.2010 and unit likely to be recommissioned after LE works by mid August'2010.**

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Supply started** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :** 100%Replacement damaged ceiling structure, Refractory and thermal insulation-<br>Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe.<br>100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes.<br>100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, Economizer. O/H of Boiler Drum & Internals,<br>100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping,<br>O/H of PRDS system.<br>Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system.<br>O/H & repair of damaged parts of FD fans.<br>100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan, Suit blowing system, wall blowers.<br>O/H & Replacement of damaged parts of P.A. Fans., 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system.<br>Complete O/H of Oil firing system:<br>**Replacement of Control & Instrumentation:** Boiler Controls**,** FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets,<br>**Auto Control Loops for Boiler ( maxDNA based).** |
| 2 | Unit No. & capacity | **U-10 (200 MW) Upgradation to 216 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 01/1979 | |

| **B.** | **RLA Study / Consultancy** | |
|---|---|---|
| **Description** | Boiler | TG. |
| Estimated Cost (Rs in Cr) | 1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW) | |
| Executing Agency | BHEL | |
| Expected/Actual start of work | | |
| Completion date | | |
| Actual Expenditure (Rs in Cr) | | |
| | | |

**ii) TG :**

**HP Turbine::** Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing

**IP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms

**LP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).

**Jacking oil pump (1 set).**

**Electro hydraulic governing system (1 set).**

**Auxiliary equipment:** Ejectors, Condenser tubes 100% replacement

**Generator(1 set). :** Stator winding bars and winding, Supply of end packets and shunts for stator and assembly, Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB.

**TG Auxiliaries:** Gland steam condenser: Supply of cupronickel tube bundles considered

Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,

Boiler Feed Pump: BFP cartridge (I No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters:

Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | 20.6.2006 |
| 4 | Expected date of Start of work | After Stabilization of unit-9 (May, 2010), Expected date of start of work July, 2010. |
| 5 | Expected date of Completion of work | March, 2011 |
| 6 | Estimated Cost (Rs in Cr) | Rs 1635 crores for units (9 to 13) 5x200 MW units. |
| 7 | Actual Expenditure incurred (Rs in Cr) | **Rs 727.05 Cr (On unit 9-13)** |
| | | |

**iii) BOP :**

**Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW.**

**Station C&I Equipment,** SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system),

**Static excitation system:** Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Supply started** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :** 100%Replacement damaged ceiling structure, Refractory and thermal insulation-<br>Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe.<br>100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes.<br>100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, Economizer. O/H of Boiler Drum & Internals,<br>100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping,<br>O/H of PRDS system.<br>Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system.<br>O/H & repair of damaged parts of FD fans.<br>100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan, Suit blowing system, wall blowers.<br>O/H & Replacement of damaged parts of P.A. Fans., 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system.<br>Complete O/H of Oil firing system:<br>**Replacement of Control & Instrumentation:** Boiler Controls**,** FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets,<br>**Auto Control Loops for Boiler ( maxDNA based).** |
| 2 | Unit No. & capacity | **U-11 (200 MW) Upgradation to 216 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 01/1979 | |

| B. | RLA Study / Consultancy | | |
|---|---|---|---|
| **Description** | Boiler | TG. | **ii) TG :**<br>**TG HP Turbine::** Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing<br>**IP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms<br>**LP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).<br>**Jacking oil pump (1 set).**<br>**Electro hydraulic governing system (1 set).**<br>**Auxiliary equipment:** Ejectors, Condenser tubes 100% replacement<br>**Generator(1 set). :** Stator winding bars and winding, Supply of end packets and shunts for stator and assembly, Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB.<br>**TG Auxiliaries:** Gland steam condenser: Supply of cupronickel tube bundles considered<br>Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,<br>Boiler Feed Pump: BFP cartridge (I No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters:<br>Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area |
| Estimated Cost (Rs in Cr) | 1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW) | | |
| Executing Agency | BHEL | BHEL | |
| Expected/ Actual start of work | | | |
| Completion date | | | |
| Actual Expenditure (Rs in Cr) | | | |
| | | | |

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | 20.6.2006 |
| 4 | Expected date of Start of work | After Stabilization of unit-9 (May, 2010), expected date of start of work October, 2010. |
| 5 | Expected date of Completion of work | June, 2011 |
| 6 | Estimated Cost (Rs in Cr) | Rs 1635 crores for units (9 to 13) |
| 7 | Actual Expenditure incurred (Rs in Cr) | **Rs 727.05 Cr (On unit 9-13)** |
| | | |

**iii) BOP :**

**Capping Amount of Rs. 60 crores has been of BOP for all the five units of 200MW.**

**Station C&I Equipment,** SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system),

**Static excitation system:** Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Supply started** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :** 100%Replacement damaged ceiling structure, Refractory and thermal insulation-<br>Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe.<br>100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes.<br>100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, O/H of Boiler Drum & Internals, Economizer,.<br>100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping,<br>O/H of PRDS system.<br>Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system.<br>O/H & repair of damaged parts of FD fans.<br>100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan.<br>O/H & Replacement of damaged parts of P.A. Fans., Suit blowing system, wall blowers.<br>100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system.<br>Complete O/H of Oil firing system:<br>**Replacement of Control & Instrumentation:** Boiler Controls**,** FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets,<br>**Auto Control Loops for Boiler ( maxDNA based).** |
| 2 | Unit No. & capacity | **U-12 (200 MW) Upgradation to 216 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 01/1979 | |

| B. | RLA Study / Consultancy | |
|---|---|---|
| **Description** | Boiler | TG. |
| Estimated Cost (Rs in Cr) | 1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW) | |
| Executing Agency | BHEL | BHEL |
| Expected/ Actual start of work | | |
| Completion date | | |
| Actual Expenditure (Rs in Cr) | | |
| | | |

**ii) TG :**

**HP Turbine::** Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing

**IP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms

**LP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).

**Jacking oil pump (1 set).**

**Electro hydraulic governing system (1 set).**

**Auxiliary equipment:** Ejectors, Condenser tubes 100% replacement

**Generator(1 set). :** Set of accumulator (1 set), Rewinding of generators rotors (1 No), Retaining ring (2 Nos), Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB.

**TG Auxiliaries:** Gland steam condenser: Supply of cupronickel tube bundles considered

Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,

Boiler Feed Pump: BFP cartridge (I No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters:

Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | 20.6.2006 |
| 4 | Expected Date of Start of works | April, 2011 |
| 5 | Expected date of Completion of works | December, 2011 |
| 6 | Estimated Cost (Rs in Cr) | Rs 1635 crores for units (9 to 13) 5x200 MW units. |
| 7 | Actual Expenditure incurred (Rs in Cr) | Rs 727.05 Cr (On unit 9-13) |
| | | |

**iii) BOP :**

**Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW.**

**Station C&I Equipment,** SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area.,
Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system),
**Static excitation system:** Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Supply started** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :** 100%Replacement damaged ceiling structure, Refractory and thermal insulation-<br>Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe.<br>100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes.<br>100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, O/H of Boiler Drum & Internals, Economizer,.<br>100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping,<br>O/H of PRDS system.<br>Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system.<br>O/H & repair of damaged parts of FD fans.<br>100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan.<br>O/H & Replacement of damaged parts of P.A. Fans., Suit blowing system, wall blowers.<br>100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system.<br>Complete O/H of Oil firing system:<br>**Replacement of Control & Instrumentation:** Boiler Controls**,** FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets,<br>**Auto Control Loops for Boiler ( maxDNA based).** |
| 2 | Unit No. & capacity | **U-13 (200 MW) Upgradation to 216 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 01/1979 | |

| B. | RLA Study / Consultancy | |
|---|---|---|
| **Description** | Boiler | TG. |
| Estimated Cost (Rs in Cr) | 1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW) | |
| Executing Agency | BHEL | BHEL |
| Expected/ Actual start of work | | |
| Completion date | | |
| Actual Expenditure (Rs in Cr) | | |
| | | |

**ii) TG :**

**HP Turbine::** Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing

**IP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms

**LP Turbine:** Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).

**Jacking oil pump (1 set).**

**Electro hydraulic governing system (1 set).**

**Auxiliary equipment:** Ejectors, Condenser tubes 100% replacement

**Generator(1 set). :** Set of accumulator (1 set), Rewinding of generators rotors (1 No), Retaining ring (2 Nos), Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB.

**TG Auxiliaries:** Gland steam condenser: Supply of cupronickel tube bundles considered

Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,

Boiler Feed Pump: BFP cartridge (I No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters:

Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | 20.6.2006 |
| 4 | Expected date of Start of work | July, 2011 |
| 5 | Expected date of Completion of work | Mar, 2012 |
| 6 | Estimated Cost (Rs in Cr) | Rs 1635 crores for units (9 to 13) |
| 7 | Actual Expenditure incurred (Rs in Cr) | Rs 727.05 Cr (On unit 9-13) |
| | | |

**iii) BOP :**

**Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW.**

**Station C&I Equipment,** SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area.,
Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system),
**Static excitation system:** Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Completed** |
| 1 | Name of Power Station | **OBRA** | **i) Boiler :**<br>Replacement of boiler pressure parts, tubes, coils & Headers with clamping.<br>Replacement of top, middle, bottom Air blocks.<br>Replacement of MPS & EPS with new ESP along with Fly ash handling system.<br>Renovation of Ball Mills(repl of ream gear, pinion gear, middle pinion shaft, reduction gear assly, couplings, modification of ball mill internals, reduction gear foundation (3 nos/set each).<br>Replacement of HP Valves and lines (LP drain, air vent, gate valve/ stop valve,<br>Replacement of complete skin casing, structure, sealing of pent house, hot air, cold air & flue gas ducting., skin casing of slag hoppers.<br>Replacement of coal burner assembly – 20 Nos, vapor burner assembly – 12 Nos, slag crusher coal burner assembly – 5 Nos<br>Refractory and Re-insulation of feed line, down comers main steam lines, bottom headers, complete water walls pent house, false sealing and other parts of boiler and auxiliaries.<br>Coal dust system-Replacement of compressors, RC & PC feeders, pipelines, bends etc. |
| 2 | Unit No. & capacity | **U-6 (94/100 MW)** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 05/1978 | |
| **B.** | **RLA Study / Consultancy** | | |

| **Description** | Boiler | TG. |
|---|---|---|
| Estimated Cost (Rs in Cr) | | 21 lakhs (included) |
| Executing Agency | | BHEL |
| Actual start of work | | |
| Completion date | | |
| Actual Expenditure (Rs in Cr) | | |

**ii) TG :**

Major O/H of turbine, repair of HP rotor & , LP rotor.
Replacement of diaphragms of second and third stage of HP cylinder, gland seal box, sealing rings, studs, cap nuts etc. Repairing of HP rotor tesion heads and replacement of warn out shrouds.
Replacement of12 blades of 30th stage and 6 blades of 25th stage with repl of satellite strip of blades of last stage followed by slow speed balancing.
Procurement and replacement sealing rings studs cap nuts etc. of turbine.
Procurement and replacement of new diaphragms 2nd & 3rd stage of HP cylinder of turbine.Procurement and replacement of Gland Seal box.
Remetallisation & replacement of T G bearing. Replacement of liners of control valves & changing of valves stem and seat of control valves.
Reinsulation of turbine, pipelines and dearators. Procurement and replacement of condenser tubes, gaskets. Retubing of L.P.H 2 & 4.
O/H and maintenance of auxiliaries of Turbine

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | |
| 4 | Date of Start (Original/Expected/Actual) | |
| 5 | Date of Actual Completion | 18.3.2008 |
| 6 | Estimated Cost (Rs in Cr) | Rs 52.47 Cr |
| 7 | Actual Expenditure incurred (Rs in Cr) | Rs 52.47 Cr |

**iii) BOP :**

**Unit-6 is running at 76 MW after R&M works**

* The status incorporated updated as per Chief Engineer (R&M), UPRVUNL, Lucknow letter dated on 13.01.2010.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order Placed and Supply of steel has started.** |
| 1 | Name of Power Station | **Harduaganj** | **i) Boiler :**<br>Conversion of Tangent type of boiler into Membrane type boiler.<br>Conversion of Ball mills into Bowl Mills. |
| 2 | Unit No. & capacity | **U-7 (105/110 MW) Upgradation to 120MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 03/1978 | |

| B. | RLA Study / Consultancy (NTPC has been appointed for consultancy works) | | |
|---|---|---|---|
| **Description** | Boiler | TG. | **ii) TG :**<br>Replacement of old HP Turbine with New HP Turbine along with Inner casing, Diaphragm, Rotor (with blades).<br>Replacement of old Inner MP casing with New Inner MP casing, Diaphragm and Rotor (with blades).<br>Modernisation of LP casing, New Diaphragm and Rotor (with blades).<br>Replacement of old governing system with new Electronic- Hydroelectric governing system.<br>Replacement of old 125 MVA transformer with new 150 MVA transformer |
| Estimated Cost (Rs in Cr) | | | |
| Executing Agency | | | |
| Expected/Actual start of work | | | |
| Completion date | | | |
| Actual Expenditure (Rs in Cr) | | | |

| C | R&M/ LE Works | | |
|---|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL | **iii) BOP :**<br>New max DNA C&I system in place of old C&I system.<br>BOP works for almost complete power station. |
| 2 | No. of Activities Boiler/ TG. | | |
| 3 | Zero date | | |
| 4 | Expected date of Start of work | December, 2010 | |
| 5 | **Expected Date of Completion** | **June,11** | |
| 6 | Estimated Cost (Rs in Cr) | Rs 290.0 Cr | **Note:** A capping amount of Rs 9.0 crores has been kept (will be paid on mutual agreement between BHEL and UPRVUNL on the bases of RLA studies will be carried out BHEL. |
| 7 | Actual Expenditure incurred (Rs in Cr) | Advance payment has been made | |

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order Placed** |
| 1 | Name of Power Station | **Parichha** | **i) Boiler :** Modification in Economiser system along with inlet/outlet headers & elements. Replacement of water wall panels including burner panel and radiant roof tubes. Superheater System: Replacement of Steam cooled wall tube (fully), LTSH coils and terminal tubes (fully), Radial Roof tubes 1st pass & Roof panels of 2nd pass (fully). Replacement of De-Superheater System, Re-heater coils & headers. Replacement of All conventional valves of size below 65mm. Replacement of all safety valves, escape pipes, drum safety valves, MS safety valves , CRH & HRH safety valves, Soot blower lines, Soot blower lines safety valve along with SB control station and thermal drain system to suit the new C&I system Replacement of volumetric feeders with Microprocessor based dual belt gravimetric feeders. Replacement of Seal air system for Pulverisers. Replacement of existing coal pipes to suit the XRP 623 mills. Replacement of existing wind boxes with HEA igniters. Piping, valves & fittings of HFO/ LDO system will be redesign and refurbished to suit the NEW C&I system. Replacement of existing Air cooled oil guns. Replacement of existing hot air and cold air ducting, fuel gas ducting. Replacement of existing Refractory and insulation wool. Replacement of soot blowers system along with soot blowers lines, control station, drain station and valves. Replacement of Hangers and supports, Critical piping for PRDS along with piping, valves, Auxiliary steam piping, Blow down piping.Replacement of Air preheater (2 Nos. per boiler) Refurbishment of existing FD fan & , P A fan (2 Nos each per boiler). Replacement of ID fans (3 Nos per boiler) along with hydraulic coupling. Replacement of seal Air fans (2 Nos per boiler) along with motorNew C&I system for boiler and its auxiliaries. |
| 2 | Unit No. & capacity | **1 (110 MW)** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 03/1984 | |
| **B.** | **RLA Study / Consultancy** | | **(NTPC has been appointed for consultancy works)** |
| **Description** | | Boiler / TG. | **ii) TG :** Replacement of H.P. turbine along with inner casing, rotor with improved design bladings, improved design casing, improved gland boxes along with new gland rings. Replacement of M.P. inner casing, rotor with improved design bladings, improved gland boxes along with new gland rings. Modernisation of L.P. casing and replacement of old diaphragm with new diaphragm and rotor. Replacement of old governing system with new electronic governing system. |
| Estimated Cost (Rs in Cr) | | | |
| Executing Agency | | | |
| Expected/ Actual start of work | | | |
| Completion date | | | |
| Actual Expenditure (Rs in Cr) | | | |
| **C** | **R&M/ LE Works** | | **iii) BOP :** CHP: Replacement 2 Nos. Plough feeders, 13 Nos Vibrofeeders, 13 Nos rack & pinion gates, bunker sealing arrangement at bunker floor, belt scrapers -17 Nos, idlers, pulleys, I No. ring granulator, transfer chutes, surge hopper in crusher house with liners, gear box of conveyor drive, strengthening of structure for all conveyors, safety switches, pull card, belt sway, for all conveyors. AHP: Supply, fabrication and erection of bottom ash hoppers, structure for bottom ash hoppers along with refractory, 4-way solenoid valves, slurry pipe(150 M), L P water piping with fitting, air piping with fitting motorized valves. Replacement of 2 Nos ash slurry disposal pipe lines (1KM). Complete civil, electrical, and C&I work for CHP & AHP. DM Plant: Replacement of alkali storage tank, acid storage tank, acid transfer pump(1 No), alkali transfer pump(1No), anion pimps (4 Nos), degasser pumps (4 Nos), degasser blowers (2 Nos), acid & alkali dozing system, pipes. Compressed Air system: Replacement of 4 Nos instrument air compressors, 4 Nos air dryers with pipings. Fire protection system: New Fire alarm system, Foam pourer system for FO/LDO tanks. Electrical system: Replacement of 7 Nos ABCB breakers with SF-6 breaker, Replacement of 11 Nos Isolators, 6 Nos lightening arrestors |
| 1 | Executing Agency Boiler/ TG. | BHEL | |
| 2 | No. of Activities Boiler/ TG. | | |
| 3 | Zero date | | |
| 4 | Expected Date of Start of work | | |
| 5 | Expected Date of Completion of work | Nov, 2012 | |
| 6 | Estimated Cost (Rs in Cr) | **Rs 444.90 Cr including Taxes & duties, freight & Insurance (for unit 1 & 2)** | |
| 7 | Actual Expenditure incurred (Rs in Cr) | | |

* The Broad Status of LE works updated as per chief Engineer (R&M), UPRVUNL, Lucknow letter dated on 13.01.2010.

** UPRVUNL has informed telephonically that they have awarded study for techno-economical viability of the LE works to the consultant M/s Evonik. The consultant has submitted the report which shall be examined by UPRVUNL authority in July-August' 2010.

**Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order Placed** |
| 1 | Name of Power Station | **Parichha** | **i) Boiler :** Modification in Economiser system along with inlet/outlet headers & elements. Replacement of water wall panels including burner panel and radiant roof tubes.<br>Superheater System: Replacement of Steam cooled wall tube (fully), LTSH coils and terminal tubes (fully), Radial Roof tubes 1st pass & Roof panels of 2nd pass (fully). Replacement of De-Superheater System, Re-heater coils & headers. Replacement of All conventional valves of size below 65mm. Replacement of all safety valves, escape pipes, drum safety valves, MS safety valves , CRH & HRH safety valves, Soot blower lines, Soot blower lines safety valve along with SB control station and thermal drain system to suit the new C&I system<br>Replacement of volumetric feeders with Microprocessor based dual belt gravimetric feeders.<br>Replacement of Seal air system for Pulverisers.<br>Replacement of existing coal pipes to suit the XRP 623 mills. Replacement of existing wind boxes with HEA igniters.<br>Piping, valves & fittings of HFO/ LDO system will be redesign and refurbished to suit the NEW C&I system.<br>Replacement of existing Air cooled oil guns.<br>Replacement of existing hot air and cold air ducting, fuel gas ducting. Replacement of existing Refractory and insulation wool. Replacement of soot blowers system along with soot blowers lines, control station, drain station and valves.<br>Replacement of Hangers and supports, Critical piping for PRDS along with piping, valves, Auxiliary steam piping, Blow down piping.Replacement of Air preheater (2 Nos. per boiler)<br>Refurbishment of existing FD fan & , P A fan (2 Nos each per boiler). Replacement of ID fans (3 Nos per boiler) along with hydraulic coupling. Replacement of seal Air fans (2 Nos per boiler) along with motorNew C&I system for boiler and its auxiliaries. |
| 2 | Unit No. & capacity | **2 (110 MW)** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 02/1985 | |
| | | | **(NTPC has been appointed for consultancy works)** |
| | | | **ii) TG :** |

| B. | RLA Study / Consultancy | | |
|---|---|---|---|
| **Description** | Boiler | G. | **ii) TG :** Replacement of H.P. turbine along with inner casing, rotor with improved design bladings, improved design casing, improved gland boxes along with new gland rings.<br>Replacement of M.P. inner casing, rotor with improved design bladings, improved gland boxes along with new gland rings.<br>Modernisation of L.P. casing and replacement of old diaphragm with new diaphragm and rotor.<br>Replacement of old governing system with new electronic governing system. |
| Estimated Cost (Rs in Cr) | | | |
| Executing Agency | | | |
| Expected/ Actual start of work | | | |
| Completion date | | | |
| Actual Expenditure (Rs in Cr) | | | |

| C | R&M/ LE Works | | iii) **BOP :** CHP: Replacement 2 Nos. Plough feeders, 13 Nos Vibrofeeders, 13 Nos rack & pinion gates, bunker sealing arrangement at bunker floor, belt scrapers -17 Nos, idlers, pulleys, I No. ring granulator, transfer chutes, surge hopper in crusher house with liners, gear box of conveyor drive, strengthening of structure for all conveyors, safety switches, pull card, belt sway, for all conveyors.<br>AHP: Supply, fabrication and erection of bottom ash hoppers, structure for bottom ash hoppers along with refractory, 4-way solenoid valves, slurry pipe(150 M), L P water piping with fitting, air piping with fitting motorized valves. Replacement of 2 Nos ash slurry disposal pipe lines (1KM). Complete civil, electrical, and C&I work for CHP & AHP.<br>DM Plant: Replacement of alkali storage tank, acid storage tank, acid transfer pump(1 No), alkali transfer pump(1No), anion pimps (4 Nos), degasser pumps (4 Nos), degasser blowers (2 Nos), acid & alkali dozing system, pipes.<br>Compressed Air system: Replacement of 4 Nos instrument air compressors, 4 Nos air dryers with pipings.<br>Fire protection system: New Fire alarm system, Foam pourer system for FO/LDO tanks.<br>Electrical system: Replacement of 7 Nos ABCB breakers with SF-6 breaker, Replacement of 11 Nos Isolators, 6 Nos lightening arrestors |
|---|---|---|---|
| 1 | Executing Agency Boiler/ TG. | | |
| 2 | No. of Activities Boiler/ TG. | | |
| 3 | Zero date | | |
| 4 | Expected date of Start of work. | | |
| 5 | Expected Date of Completion of work. | Nov, 2012 | |
| 6 | Estimated Cost (Rs in Cr) | **Rs 444.90 Cr including Taxes & duties, freight & Insurance (for unit 1 & 2)** | |
| 7 | Actual Expenditure incurred (Rs in Cr) | | |

* UPRVUNL has informed telephonically that they have awarded study for techno-economical viability of the LE works to the consultant M/s Evonik. The consultant has submitted the report which shall be examined by UPRVUNL authority in July-August' 2010.

**Status of LE works of Punjab (PSEB) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order Placed** |
| 1 | Name of Power Station | **Bathinda** | **i) Boiler :**<br>Complete replacement of existing indirect fired boiler with direct fired boiler.<br>Replacement of air heaters, flue gas ducting, fuel firing system, milling system, upgradation for direct firing & fans etc.<br>**After dismantlement work of Boiler, erection work of Boiler started from 18.06.2010.** |
| 2 | Unit No. & capacity | **U-3 (110 MW) Upgradation to 120 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 29.7.1978 | |
| **B.** | **RLA Study / Consultancy** | | |

| **Description** | Boiler | TG. |
|---|---|---|
| Estimated Cost (Rs in Cr) | 0.28 | |
| Executing Agency | CPRI, Bangalore | |
| Actual start of work | 02/01 | 02/01 |
| Completion date | 03/01 | 03/01 |
| Actual Expenditure (Rs in Cr) | 0.28 | |

**ii) TG :**
Retrofitting of HP, IP & LP cylinders.
Replacement of turbine gland sealing system, HP heaters, Control valves, RCV valves.

| C | R&M/ LE Works | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | |
| 4 | Actual Date of Start of work | **14.01.2010** |
| 5 | Expected Date of Completion of work | Oct, 2010 |
| 6 | Estimated Cost (Rs in Cr) | **483.95 Cr. For U-3 & 4** |
| 7 | Actual Expenditure incurred (Rs in Cr) | 175.88Cr. |

**iii) BOP :**
ESP rectification.
Ash Handling System (Replacement of ash slurry pipe lines etc.)
Complete replacement of Instrument & Controls.
Electrical system :
Replacement of existing 220 KV ABCB with SF-6 breakers.
Replacement of Pneumatic 220 KV Isolators with motor operated mechanism, Replacement of 6.6 KV switchgear etc.
Civil and structural works of boiler and auxiliaries.

Order for R&M and uprating works on units – 3& 4 was placed on BHEL on Vide by PSEB letter No 02/R&M-121 dated 14.11.2006.

**Status of LE works of Punjab (PSEB) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | | Broad Scope of Works |
|---|---|---|---|---|
| | | | | **Order Placed** |
| 1 | Name of Power Station | **Bathinda** | | **i) Boiler :**<br>Complete replacement of existing indirect fired boiler with direct fired boiler.<br>Replacement of air heaters, flue gas ducting, fuel firing system, milling system, upgradation for direct firing & fans etc. |
| 2 | Unit No. & capacity | **U-4 (110 MW) Upgradation to 120 MW** | | |
| 3 | Make | | | |
| | i) Boiler | BHEL | | |
| | ii) TG. | BHEL | | |
| 4 | Date of commissioning | 31.01.1979 | | |
| **B.** | **RLA Study / Consultancy** | | | |
| **Description** | | Boiler | TG. | **ii) TG :**<br>Retrofitting of HP, IP & LP cylinders.<br>Replacement of turbine gland sealing system, HP heaters, Control valves, RCV valves. |
| Estimated Cost (Rs in Cr) | | 0.28 | | |
| Executing Agency | | CPRI, Bangalore | | |
| Actual start of work | | 11/01 | 11/01 | |
| Completion date | | 12/01 | 12/01 | |
| Actual Expenditure (Rs in Cr) | | 0.32 | | |
| **C** | **R&M/ LE Works** | | | **iii) BOP :**<br>ESP rectification.<br>Ash Handling System (Replacement of ash slurry pipe lines etc.)<br>Complete replacement of Instrument & Controls.<br>Electrical system :<br>Replacement of existing 220 KV ABCB with SF-6 breakers.<br>Replacement of Pneumatic 220 KV Isolators with motor operated mechanism, Replacement of 6.6 KV switchgear etc.<br>Civil and structural works of boiler and auxiliaries.. |
| 1 | Executing Agency Boiler/ TG. | BHEL | | |
| 2 | No. of Activities Boiler/ TG. | | | |
| 3 | Zero date | | | |
| 4 | Expected Date of Start of work | January, 2011 | | |
| 5 | Expected Date of Completion of work | August, 2011 | | |
| 6 | Estimated Cost (Rs in Cr) | **483.95 Cr. For U-3 & 4** | | |
| 7 | Actual Expenditure incurred (Rs in Cr) | 175.88Cr. | | |

**Order for R&M and uprating works on units – 3& 4 was placed on BHEL Vide PSEB letter No 02/R&M-121 dated 14.11.2006.**

**Status of LE works of Punjab (PSEB) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order yet to be Placed** |
| 1 | Name of Power Station | **GGSSTPS, Ropar** | **i) Boiler :** |
| 2 | Unit No. & capacity | **U-1 (210 MW)** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 26.9.84 | |

| B. | RLA Study / Consultancy | | NTPC has been appointed for consultancy works for units – 1 & 2), Rs 9.00 Cr. have been charged by NTPC for consultancy works) |
|---|---|---|---|
| **Description** | Boiler | TG. | **ii) TG :** |
| Estimated Cost (Rs in Cr) | 4.7373 Cr | | |
| Executing Agency | M/s Evonik Energy services (India Pvt Ltd) | | |
| Actual start of work | 1.1.2006 | | |
| Completion date | 4.7.2009 | | |
| Actual Expenditure (Rs in Cr) | Rs.4.23 Cr (Work) + Rs 3.07 Cr (consultancy) | | |

| C | R&M/ LE Works | | BOP : |
|---|---|---|---|
| 1 | Executing Agency Boiler/ TG. | Not yet finalised | |
| 2 | No. of Activities Boiler/ TG. | | |
| 3 | Zero date | | **Detailed Project Report (DPR) finalized,** |
| 4 | Expected date of Start of work. | Not yet finalised | **The detailed project report for carrying out R&M and l.E. works submitted to Board for approval.** |
| 5 | Expected date of Completion of work. | Not yet finalised | |
| 6 | Estimated Cost (Rs in Cr) | Rs 774.69 Crores (For Units 1 & 2) | |
| 7 | Actual Expenditure incurred (Rs in Cr) | | |

**Status of LE works of Punjab (PSEB) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Order Placed** |
| 1 | Name of Power Station | **GGSSTPS, Rorar** | **i) Boiler :** |
| 2 | Unit No. & capacity | **U-2 (210 MW)** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 29.3.85 | |

| B. | RLA Study / Consultancy | | |
|---|---|---|---|
| **Description** | Boiler | TG. | **ii) TG :** |
| Estimated Cost (Rs in Cr) | | | |
| Executing Agency | M/s Evonik Energy services (India Pvt Ltd) | | |
| Actual start of work | 1.1.2006 | | |
| Actual date of Completion | 4.7.2009 | | |
| Actual Expenditure (Rs in Cr) | Rs.4.23 Cr (Work) + Rs 3.07 Cr (consultancy) | | |

| C | R&M/ LE Works | | **BOP :** |
|---|---|---|---|
| 1 | Executing Agency Boiler/ TG. | Not yet finalised | |
| 2 | No. of Activities Boiler/ TG. | Not yet finalised | **Detailed Project Report (DPR) finalized, The detailed project report for carrying out R&M and l.E. works submitted to Board for approval.** |
| 3 | Zero date | | |
| 4 | Expected Date Start of work | Not yet finalised | |
| 5 | Expected date of Completion of work | Not yet finalised | |
| 6 | Estimated Cost (Rs in Cr) | Rs 774.69 Crores (For Units 1 & 2) | |
| 7 | Actual Expenditure incurred (Rs in Cr) | | |
| | | | |

**Status of LE works of Haryana (HPGCL) Thermal Power Station (As on 30.6.2010)**

| A | Project Details | Description | Broad Scope of Works |
|---|---|---|---|
| | | | **Completed** |
| 1 | Name of Power Station | **Panipat** | **i) Boiler :** Material required for replacement of economizer tubes, water wall up to 37M , buck stage, front and rear side steam cooled wall, ceiling super heater LTSH, platen SH and final SH, reheater, suit blowing system, SH/RH spray control valve, feed control valves, additional oil elevation, furnace insulation, refurbishment of critical piping and replacement of Russian type actuators etc. |
| 2 | Unit No. & capacity | **Unit-1 Uprating 110 MW to 117.8 MW** | |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii) TG. | BHEL | |
| 4 | Date of commissioning | 03/1979 | |
| **B.** | **RLA Study / Consultancy** | | |

| **Description** | Boiler | TG. |
|---|---|---|
| Estimated Cost (Rs in Cr) | Included in refurbishment works | |
| Executing Agency | BHEL | BHEL |
| Actual start of work | Carried out during S/D for refurbishment works | |
| Completion date | Completed during S/D for refurbishment works | |
| Actual Expenditure (Rs in Cr) | Included in uprating works | |

**ii) TG :** Turbine, Generator and Auxiliaries :- Material required for uprating of turbine to 117.8 MW by modification of inner casing rotor of impulse type HP IP and LP turbines to suit reaction type of blading, provision of additional HP elevation valves, HP/LP seal steam valves, barring gear system etc.
Re-coring and rewinding of Generator stator, rewinding of rotor, replacement of static excitation system, diaphragm valves and regulating valves etc.
Replacement of HP heater 1 & 2 and LP heater 1 & 2, hydrogen coolers, level control valves, actuators, overhauling of BFW hydraulic couplings with modified cartridge and other pumps and motors, replacement of valves, critical piping insulation etc.

| **C** | **R&M/ LE Works** | |
|---|---|---|
| 1 | Executing Agency Boiler/ TG. | BHEL |
| 2 | No. of Activities Boiler/ TG. | |
| 3 | Zero date | |
| 4 | Actual date of Start | 25.9.07 |
| 5 | Actual date of Completion of work | 04.11.08 |
| 6 | Estimated Cost (Rs in Cr) | Ex-work Rs 104 Crores + Ex-work price for service Rs 16 Crores |
| 7 | Actual Expenditure incurred (Rs in Cr) | |
| | | |

**iii) BOP :** Refurbishment/ Augmentation of Fuel oil handling system, ash handling plant, Overhauling of CW/BCW system, provision of new compressors, debris filter and on line tube cleaning system, Refurbishment of air conditioning ventilation system with additional 2x20 Ton AC. Refurbishment of fire fighting system, overhauling of DM plant, servicing of 6.6 KV switchgear, HT & LT motors, refurbishment of old cables etc.
Control & Instrumentation :- Material required for replacement of old C&I system for boiler and turbine with Max-DNA microprocessor based electronic system and man machine interface, replacement of regulating actuators for auto loops in boiler and turbine control, UPS and batteries enunciation system, suit blowing system, FSSS, SADC and turbo-visory system etc.
Control & Instrumentation :- Material required for replacement of old C&I system for boiler and turbine with Max-DNA microprocessor based electronic system and man machine interface, replacement of regulating actuators for auto loops in boiler and turbine control, UPS and batteries enunciation system, suit blowing system, FSSS, SADC and turbo-visory system etc.

**Appendix IV**

# Western Region

## (Unit wise Broad Status of LE works)

## STATUS OF LE WORKS OF GUJRAT (GSECL) THERMAL POWER STATION

**As on 30.06.10**

| | PROJECT DETAILS | DESCRIPTION | | Major works carried out during LE Works |
|---|---|---|---|---|
| 1 | Power Station | **Ukai TPS** | | **Completed** |
| 2 | Unit No. & capacity | **U-1, 120MW** | | **a) Boiler :**<br>(1) Repair/replacement of water wall , Platen SH, final SH, final RH header, final RH coils (56 Nos) , primary RH coils (94 Nos) , Hanger support.<br>(2) Replacement of Economizer.<br>(3)Replacement/repair RH/SH de-superheating system, penthouse.<br>(4) Installation of HEA igniter assembly, repair/replacement of Duct & Dampers, Soot blower, Erection of New ID fan, Overhauling of FD & PA fan.<br>(5) Replacement of Tubular Air preheater.<br>(6) ESP–Modification<br>(7) Servicing of coal mills, replacement of worn-out parts<br>(8)Installation of Gravimetric coal feeder.<br>(9) Boiler Instrumentation modification.<br><br>**b) TG:**<br>(1) Replacement of stator winding with-F class insulation<br>(2) Replacement of TG bearings from 1 to 7.<br>(3) Replacement of Hydrogen sealing rings.<br>(4) Repairing of IP casings.<br>(5) Replacement of HP/IP rotors.<br>(6) Repairing of LP rotors.<br>(7) Servicing of modified steam chest.<br>(8) C& I work & Turbovisory fittings.<br>(9) Complete replacement of C&I system by DDCMIS.<br>(10) Retrofitting of BFP with new design BFP Carridge.<br><br>**c) C&I /Other works (if any):**<br>1) CHP (2) AHP (Ash Handling Plant),<br>(3) Raw water & cooling water system, ACW & BCW<br>(4) Fire fighting & detection system, Crane & hoists<br>(5)Water treatment plant ( O/H of clarificator and DM water plant)<br>(6) Fuel oil handling system & LDO transfer and unloading pump O/H work<br>(7) Compressed Air System.<br>(8) AC & Ventilation system.<br>(9) Servicing of GT, ST , HT, & LT motors, LT Auxilliary Transformer, Breaker & Isolators, 415 V MCC & Switchgear.<br>(10) Replacement of 6.6 KV (MOCB) by VCB. |
| 3 | Make | | | |
| | i) Boiler | BHEL | | |
| | ii)TG: | BHEL | | |
| 4 | Date of Commissioning | 19.03.1976 | | |
| **B** | **RLA Studies / Consultancy** | | | |
| | **Descrip- tion** | **Boiler** | **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in LE work | | |
| 2 | Executing Agency | BHEL | BHEL | |
| 3 | Exp / Act Start date | 18.09.2003 | | |
| 4 | Comple-tion date | 31.01.2004 | | |
| 5 | Actual Exp. (Rs.Cr.) | 142.5 Lakhs | | |
| **C** | **R&M / LE works** | | | |
| 1 | Estimated cost (Rs. Cr.) | 260 (for unit 1&2 incl RLA studies) | | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL / BHEL | | |
| 3 | No. of activities : Boiler / TG | 169 including BOP | | |
| 4 | Date of start / completion (E/A) | 06.09.2006(A)<br>24.5.2008 (A) | | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | 243.48 (for U1&2 incl RLA) | | |

## STATUS OF LE WORKS OF GUJRAT (GSECL) THERMAL POWER STATION

**As on 30.06.2010**

| A | PROJECT DETAILS | DESCRIP-TION | Major works carried out during Ukai R&M/LE |
|---|---|---|---|
| 1 | Name of Power Station | **Ukai TPS** | **Completed** |
| 2 | Unit No. & capacity | **U-2, 120MW** | **a) Boiler :**<br>(1) Repair/replacement of water wall , Platen SH, final SH, final RH header, final RH coils (56 Nos) , primary RH coils (94 Nos) , Hanger support.<br>(2) Replacement of Economizer.<br>(3)Replacement/repair RH/SH de-superheating system, penthouse.<br>(4)Installation of HEA igniter assembly, repair/replacement of Duct & Dampers, Soot blower, Erection of New ID fan, Overhauling of FD & PA fan.<br>(5) Replacement of Tubular Air preheater.<br>(6) ESP–Modification<br>(7) Servicing of coal mills, replacement of worn-out parts<br>(8)Installation of Gravimetric coal feeder.<br>(9) Boiler Instrumentation modification.<br><br>**b) TG:**<br>(1) Replacement of stator winding with-F class insulation<br>(2) Replacement of TG bearings from 1 to 7.<br>(3) Replacement of Hydrogen sealing rings.<br>(4) Repairing of IP casings.<br>(5) Replacement of HP/IP rotors.<br>(6) Repairing of LP rotors.<br>(7) Servicing of modified steam chest.<br>(8) C& I work & Turbovisory fittings.<br>(9) Complete replacement of C&I system by DDCMIS.<br>(10) Retrofitting of BFP with new design BFP Carridge.<br><br>**c) C&I /Other works (if any):**<br>1) CHP (2) AHP (Ash Handling Plant),<br>(3) Raw water & cooling water system, ACW & BCW<br>(4) Fire fighting & detection system, Crane & hoists<br>(5)Water treatment plant ( O/H of clarificator and DM water plant)<br>(6) Fuel oil handling system & LDO transfer and unloading pump O/H work<br>(7) Compressed Air System.<br>(8) AC & Ventilation system.<br>(9) Servicing of GT, ST , HT, & LT motors, LT Auxilliary Transformer, Breaker & Isolators, 415 V MCC & Switchgear.<br>(10) Replacement of 6.6 KV (MOCB) by VCB. |
| 3 | Make | | |
| | i) Boiler | BHEL | |
| | ii)TG: | BHEL | |
| 4 | Date of Commissioning | 23.6.1976 | |
| **B** | **RLA Studies / Consultancy** | | |
| | **Descrip-tion** | **Boiler** / **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in LE work | |
| 2 | Executing Agency | BHEL / BHEL | |
| 3 | Exp / Act Start date | 20.03.2003 | |
| 4 | Comple-tion date | 30.04.2003 | |
| 5 | Actual Exp. (Rs.Cr.) | 142.5 Lakhs | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost (Rs. Cr.) | 260 (for unit 1&2 incl RLA studies) | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL /BHEL | |
| 3 | No. of activities : Boiler / TG | 169 including BOP | |
| 4 | Date of start / completion (E/A) | 12.8.2008(A)<br>31.07.2009(E) | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | 243.48 (for U1&2 incl RLA) | |

Full load was achieved on 20.05.2010. Unit running at 100-110 MW load.

# STATUS OF LE WORKS OF GUJRAT (GSECL) THERMAL POWER STATION

**As on 30.06.10**

| A | PROJECT DETAILS | DESCRIP-TION | BROAD STATUS OF VARIOUS ACTIVITIES |
|---|---|---|---|
| 1 | Name of Power Station | **Gandhinagar TPS** | **Supply Started.** |
| 2 | Unit No. & capacity | **1 & 2 (2x120 MW)** | **(A) Main Plant Auxiliaries:**<br>**(Boiler/ TG / C&I/ Electricals and Switchyard)** :<br>• Order awarded to M/s BHEL on 12.10.06 / 28.05. 2007.<br>• 70% - 80% of Design & Engineering completed.<br>• 55% of materials for unit no. 1 and 2 have been received.<br>• Due to poor work performance of R&M/LE works and excessive time taken by BHEL at Ukai TPS resulting in of GSECL, GSECL management has decided to discontinue all the activities for R&M/LE works of Gandhinagar TPS unit Nos. 1&2 (2x120MW). Accordingly BHEL have been informed to stop all the related activities for the units. 1&2 . |
| 3 | Make : Boiler / TG | BHEL / BHEL | |
| 4 | Date of Commissioning | U-1: 13.3.1977<br>U-2: 23.3.1977 | |

| B | RLA Studies / Consultancy | | |
|---|---|---|---|
| | **Descrip-tion** | RLA study of Main Plant (Boiler, TG, C&I, Elec, S/Y) and BOP | Providing Consultancy for RLA Study and R&M/LE works for Main Plant (Boiler, TG,C&I, Elec, S/Y) and BOP |
| 1 | Estimated Cost (Rs.Cr.) | Rs. 1.8 Cr. for both the units | Rs. 8.4 Cr. for both the units |
| 2 | Executing Agency | M/s PPIL, New Delhi | M/s NTPC, Noida |
| 3 | Exp / Act Start date | Shut down date of Unit No. 2 : 30.09.2003 to 28.03.2004 | 01.04.2000 (Starting of Consultancy works) |
| 4 | Comple-tion date | 13.07.2005 | 24.03.2010 |
| 5 | Actual Exp. (Rs.Cr.) | 1.62 Cr. for both units 1&2. | 3.3793 Cr. for both units **(considering invoices up to June-2009)** |

| C | R&M / LE works for Main Plant Auxiliaries and BOP | | | |
|---|---|---|---|---|
| | **Description** | **Main Plant: (Boiler/ TG/C&I** | **BOP** | **TOTAL** |
| 1 | Estimated cost (Rs. Cr.) | Rs 361 Cr. | Rs 60 Cr. | Rs. 421 *Cr. |
| 2 | Executing Agency : **Boiler/ TG** | BHEL New Delhi | Different Agencies | -- |
| 3 | No. of activities : Boiler / TG | 216 Nos. | 20 Nos. | 236 Nos. |

**(B) BOP /Other works (if any):**

All the activities for BOP have also been stopped except four nos. of BOP packages where orders have been placed (Rs. 13.6276 Crores) and works for which were under process. The present status for these four nos. of BOP Packages is as under:

| Sl No | Name of BOP Packages/Ordered value | Present Status |
|---|---|---|
| 1. | O/H of CHP (Mech) | LOI/detailed order issued to M/s Elecon Engg. Comp. Ltd. Vallabh Vidhyanagar on 20.05.09/27.07.09. About 300 tonnes of material is received. |
| 2. | O/H of Air Washing unit & ventilation system. | LOI/Order issued to M/s Calwin Engg. Ahmadabad on 07.07.07/11.08.09.<br>Unit-1: Ducting/Cooling system works comp. except installation of CWP.<br>Unit-2 : Ducting/Cooling system works 90% comp. except installation of CWP. |
| 3. | O/H of Transformers | LOI/Order issued to M/s Dalvi Transformers and Services, Vadodara on 30.05.09/21.07.09.<br>Unit-1: 80% works comp.<br>Unit-2 : Comp. |
| 4. | O/H of cooling tower (civil work) | LOI/Order to M/s Standard Builders, Neyveli is issued on 12.06.09/04.08.09.<br>Unit-1: Comp. except epoxy painting of 1500 $m^2$.<br>Unit-2 : Comp. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | Date of start / completion (E/A) | Due to poor work performance of R&M/LE works and excessive time taken by BHEL at Ukai TPS resulting in loss to GSECL, GSECL management has decided to discontinue all the activities for R&M/LE works of Gandhinagar TPS unit Nos. 1&2 (2x120MW). Accordingly BHEL have been informed to stop all the related activities for R&M/LE works of Gandhinagar unit nos. 1&2. Moreover all the activities for BOP have also been stopped, except 4 Nos. of BOP packages where the orders have been placed and works which are under progress. | | | | | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | Rs. 142.72 Cr. | Rs. 10.62 Cr. | Rs. 157.37** Cr. | | | |

* Excluding Consultancy Charges Rs. 8.4 Crs.

** Excluding Consultancy Charges Rs. 4.027 Crs.

**STATUS OF LE WORKS OF MADHYA PRADESH (MPPGCL) THERMAL POWER STATION (As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Amarkantak Ext. TPS** | **Partly Completed** |
| 2 | Unit No. & capacity | **U-1 (120 MW)** | **a) Boiler:** Following works have completed during 2006-08.<br>i. Replacement of boiler pressure parts.<br>ii. Replacement of Dampers and Actuators<br>iii. Replacement of Fabric Expansion Joints<br>iv. Replacement of one no. ash slurry pump motor set.<br>v. Replacement of valves and piping.<br>vi. Renovation of Mills.<br>R&M works of Air Heaters in unit no.1 is planned to be completed during COH in the year 2010-11 |
| 3 | Make : Boiler/TG | AVB / BHEL | |
| 4 | Date of Commissioning | U-1: 11.9.1977 | |
| | | | |
| **B** | **RLA Studies / Consultancy** | | |
| | **Description** | **Boiler** / **TG** | **b) TG :**<br><br>Order for R&M works of turbine-Generator & its auxiliaries placed on M/s NASL. Supply is almost completed. R&M works of TG & its auxiliary will be taken up after completion of R&M works in unit no. 2 which commenced from 26.07.2009 |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in R&M/LE works. | |
| 2 | Executing Agency | Various agencies / NASL | |
| 3 | Expected / Act Start date | | **c) BOP :**<br><br>The following R&M works of Electrical Equipments and C&I have been completed during 2004-06:<br>i. Replacement of relays.<br>ii. Replacement of 4 nos. 220 KV MOCBs by SF-6 breakers<br>iii. Replacement of 8 nos. LT transformers by Dry Type transformers.<br>iv. Retrofitting / replacement of of 415 V switchgears / MCCs/ DBs.<br>v. Retrofitting / replacement of 6.6. KV switch gears.<br>vi. R&M works of C&I equipments. |
| 4 | Exp / Act Completion date | | |
| 5 | Actual Expenditure. (Rs.Cr.) | | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost (Rs. Cr.) (for unit 1&2) | Rs.124.03 Cr. (for R&M of Boilers,Elect.,C &I and TG works) out of which BTG 59.79 Cr pertains to TG and associated Auxilliaries. | |
| 2 | Executing Agency : **Boiler/ TG** | Boiler-Various agencies<br>TG package - M/s NASL | |
| 3 | No. of activities : Boiler / TG | | |
| 4 | Date of start / completion (E/A) | Aug.2010 (E)<br>Dec, 2010 (E) | |
| 5 | Actual Expenditure incurred (Rs. Cr.) (**for unit 1&2**) up to 31.03.10 | Rs. 62 Cr.(approx.) on R&M of Boilers, Elect and C&I +Rs 39 Crs.on TG.(Total-Rs 101 **Crs.)** | |

## STATUS OF LE WORKS OF MADHYA PRADESH (MPPGCL) THERMAL POWER STATION

**(As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Amarkantak Ext. TPS** | **Partly Completed & On Going** |
| 2 | Unit No. & capacity | **U-2 (120 MW)** | **a) Boiler:** Following works have completed during 2006-08.<br>i. Replacement of boiler pressure parts.<br>ii. Replacement of Dampers and Actuators<br>iii. Replacement of Fabric Expansion Joints<br>iv. Replacement of one no. ash slurry pump motor set.<br>v. Replacement of valves and pipings.<br>vi. Renovation of Mills.<br>The R&M works of Air Heaters in unit no.2 is completed during COH in the year 2009-10. |
| 3 | Make : Boiler/TG | AVB / BHEL | |
| 4 | Date of Commissioning | U-2: 31.3.1978 | |
| | | | |
| **B** | **RLA Studies / Consultancy** | | **b) TG :** |
| | **Description** | **Boiler** / **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in R&M/LE works. | Order for R&M works of turbine-Generator and its auxiliaries placed on M/s NASL. Supply is almost completed. The renovation work in unit no. 2 has been commenced from 26.7.09 and will be completed by July 2010. |
| 2 | Executing Agency | Various agencies / NASL | **c) BOP :** |
| 3 | Expected / Act Start date | | The following R&M works of Electrical Equipments and C&I have been completed during 2004-06:<br>i.Replacement of relays.<br>ii.Replacement of 4 nos. 220 KV MOCBs by SF-6 breakers<br>iii.Replacement of 8 nos. LT transformers by Dry Type transformers.<br>vii. Retrofitting / replacement of of 415 V switchgears / MCCs/ DBs.<br>viii. Retrofitting / replacement of 6.6. KV switch gears.<br>ix.R&M works of C&I equipments. |
| 4 | Expected / Act Completion date | | |
| 5 | Actual Expenditure. (Rs.Cr.) | | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost (Rs. Cr.) (for unit 1&2) | Rs.124.03 Cr. (for R&M of Boilers,Elect.,C &I and TG works) out of which BTG 59.79 Cr pertains to TG and associated Auxilliaries. | |
| 2 | Executing Agency : **Boiler/ TG** | M/s NASL- TG package | |
| 3 | No. of activities : Boiler / TG | | |
| 4 | Date of start / completion (E/A) | 26.07.09 (A) July'2010 (E)** | **Reason for Delay : During execution after opening of TG set, some additional work pertaining to LP, IP & HP rotor had been required to be carried out which were not envisaged in the contract agreement. |
| 5 | Actual Expenditure incurred (Rs. Cr.) **(for unit 1&2) up to 31.03.10** | Rs. 62 Cr.(approx.) on R&M of Boilers, Elect and C&I +Rs 39 Crs.on TG.(Total- Rs 101 **Crs.)** | |

Appendix IV

# Eastern Region

## (Unit wise Broad Status of LE works)

# STATUS OF LE WORKS OF BIHAR (BSEB) THERMAL POWER STATION

**(As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Barauni TPS** | **Completed / On-Going. 4600 MT materials/equipments received at site units 6&7.** |
| 2 | Unit No. & capacity | **U-6 ,110MW** | **i) Boiler :** The scope of works includes :<br>1) Strengthening of Structure( columns, backstays, ceiling girders, floor grills, hand grills, painting)<br>2) Furnace bottom sealing arrangements<br>3) Replacement of water walls, Superheater , Reheater, Soot blower system, Economizer, drain& vent piping, Hangers & Supports<br>4) Pulverized fuel firing system-Coal mills (5 no.), Coal feeders (5 no.), PF piping 5 no. sets), Seal air system (2x100%)<br>5) Fuel oil firing system<br>6) Supply/Replacement of Draft & Ducting System (APH,PA fan, FD fan, ID fan, Air and Flue gas ducting<br>7) Refurbishment of ESP<br>**ii) TG :** The scope of works includes :<br>1 ) Refurbishment of HP,IP&LP turbine<br>2) Replacement/ Refurbishment of Shaft turning gear, Turbine governing system, lubricating oil coolers, Hydrogen coolers, Jacking oil pump, Seal oil coolers, Condenser, HP heaters, LP Heaters, Steam jet air ejector, Deaerator, BFP, CEP, Chimney Steam condenser and chimney exhaust fan, Turbine drain system valves, Hangers& Supports<br>3) Replacement/ Refurbishment of existing AVR with digital DVR incl. necessary modifications and existing excitation system incl. supply of necessary spares.<br>4) Complete overhauling of generator stator, Testing & varnishing of rotors and refurbishment of silica gel Hydrogen drier incl. supply of necessary spares.<br>5) Replacement/Supply/Testing of transformers, isolated phase Bus-duct of generator, Protection panels, 6.6 KV Switchgears, Bus changeover scheme ,LT Switchgears and Bus ducts, LT Motors, HT Motors , Station Lighting, Cabling, Earthing and Lighting Protection, Station Batteries & Chargers, Emergency AC Supply System, 132 KV Switchyard.<br>6) Installation of Distributed Digital Control Monitoring & Information System(DDCMIS) and other C&I Systems<br><br>In the first phase of R&M, the restoration work of TG-Set has been completed by BHEL and the unit no. 6 is running at a load of 70-75 MW.<br>**iii) BOP :** The scope of works includes :<br>1) Supply and installation of Tube well system, CW System, Aeration System, DM Plant, Softening plant, CW Chlorination System, Air Compressors, Cooling towers, Misc. pump house, AC plant, Ventilation system, Fire fighting system<br>2) Replacement/ Refurbishment/Repair of Coal Handling Plant, Ash Handling Plant & F.O. Unloading Plant.<br><br>In the first phase of R&M, the restoration of BOP has also been done by BHEL. |
| 3 | Make | BHEL/ BHEL | |
| 4 | Date of Commissioning | U# 6-01.05.1983 | |
| **B** | **RLA Studies / Consultancy** | | |
| | **Description** | **Boiler** / **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in R&M work | |
| 2 | Executing Agency | BHEL / BHEL | |
| 3 | Exp / Act Start date | Boiler-4.5.06<br>Turbine – 18.5.06<br>Generator Stator-15.5.06 | |
| 4 | Comple-tion date | Boiler-17.5.06<br>Turbine –5.6.06<br>Generator Stator- 17.5.06 | |
| 5 | Actual Exp. (Rs.Cr.) | R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost. | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost for both units no.6&7 (Rs. Cr.) | 572.16 Cr. (including the cost of RLA) | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL/ BHEL | |
| 3 | No. of activities : Boiler / TG | | |
| 4 | Date of start / completion (E/A) | LOA:16/02/2010<br>Zero Date: 16/11/2009<br>June' 2012. | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | Restoration cost –Rs. 49.90 cr.<br>Consultancy charge- Rs. 7.74 Cr. | |

**STATUS OF LE WORKS OF BIHAR (BSEB) THERMAL POWER STATION**

**(As on 30.06.2010)**

| A | Project details | Description | | Broad status of various activities |
|---|---|---|---|---|
| 1 | Name of Power Station | **Barauni TPS** | | **Supply Started. 4600 MT materials/equipments received at site for units 6&7..** |
| 2 | Unit No. & capacity | **U- 7, 110MW** | | **i) Boiler :** The scope of works includes :<br>1) Strengthening of Structure( columns, backstays, ceiling girders, floor grills, hand grills, painting)<br>2) Furnace bottom sealing arrangements<br>3) Replacement of water walls, Superheater ,Reheater, Soot blower system, Economizer, drain& vent piping, Hangers & Supports<br>4) Pulverized fuel firing system-Coal mills (5 no.), Coal feeders (5 no.), PF piping 5 no. sets), Seal air system (2x100%)<br>5) Fuel oil firing system<br>6) Supply/Replacement of Draft & Ducting System (APH,PA fan, FD fan, ID fan, Air and Flue gas ducting<br>7) Refurbishment of ESP<br>**ii) TG :** The scope of works includes :<br>1 ) Refurbishment of HP,IP&LP turbine<br>2) Replacement/ Refurbishment of Shaft turning gear, Turbine governing system, lubricating oil coolers, Hydrogen coolers, Jacking oil pump, Seal oil coolers, Condenser, HP heaters, LP Heaters, Steam jet air ejector, Deaerator, BFP, CEP, Chimney Steam condenser and chimney exhaust fan, Turbine drain system valves, Hangers& Supports<br>3) Replacement/ Refurbishment of existing AVR with digital DVR incl. necessary modifications and existing excitation system incl. supply of necessary spares.<br>4) Complete overhauling of generator stator, Testing & varnishing of rotors and refurbishment of silica gel Hydrogen drier incl. supply of necessary spares.<br>5) Replacement/Supply/Testing of transformers, isolated phase Bus-duct of generator, Protection panels, 6.6 KV Switchgears, Bus changeover scheme ,LT Switchgears and Bus ducts, LT Motors, HT Motors, Station Lighting, Cabling, Earthling and Lighting Protection, Station Batteries & Chargers, Emergency AC Supply System, 132 KV Switchyard.<br>6) Installation Of Distributed Digital Control Monitoring& Information System(DDCMIS) and other C&I Systems<br><br>**Dismantling of Turbine of U-7 completed, rotor is being sent to BHEL, Hyderabad.**<br>**iii) BOP :** The scope of works includes :<br>1) Supply and installation of Tube well system, CW System, Aeration System, DM Plant, Softening plant, CW Chlorination System, Air Compressors, Cooling towers, Misc. pump house, AC plant, Ventilation system, Fire fighting system<br>2) Replacement/ Refurbishment/Repair of Coal Handling Plant, Ash Handling Plant & F.O. Unloading Plant.<br><br>In the first phase of R&M, the restoration of BOP has also been done by BHEL. |
| 3 | Make : Boiler/ TG | BHEL/ BHEL | | |
| 4 | Date of Commissioning | U# 7- 31.03.1985 | | |
| **B** | **RLA Studies / Consultancy** | | | |
| | **Description** | **Boiler** | **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | Cost included in R&M work | | |
| 2 | Executing Agency | BHEL | BHEL | |
| 3 | Exp / Act Start date | Boiler-4.5.06<br>Turbine – 18.5.06<br>Generator Stator-15.5.06 | | |
| 4 | Comple-tion date | Boiler-17.5.06<br>Turbine –5.6.06<br>Generator Stator- 17.5.06 | | |
| 5 | Actual Exp. (Rs.Cr.) | R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost. | | |
| **C** | **R&M / LE works** | | | |
| 1 | Estimated cost for both units no.6&7 (Rs. Cr.) | 572.16 Cr. (including the cost of RLA | | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL/ BHEL | | |
| 3 | No. of activities : Boiler / TG | | | |
| 4 | Date of start / completion (E/A) | LOA:16/02/2010<br>Zero Date: 16/11/2009<br>Nov.' 2011. | | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | Restoration of U -6 –Rs. 49.90 cr.<br>Consultancy charge- Rs. 7.74 Cr. | | |

*Planning Commission vide their letter dated 16.11.2009 approved the revised cost estimates of Rs.1053 crores including consultancy charges under the Special Plan for Bihar for both BTPS & MTPS.

**STATUS OF LE/R&M WORKS OF BIHAR (KBUNL) THERMAL POWER STATION**

**(As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Muzaffarpur TPS** | **Supply Started. 2150 MT SG material received at site.** |
| 2 | Unit No. & capacity | **U-1,110MW** | **i) Boiler:** The scope of works includes :<br>1) Replacement/refurbishment of Furnace water walls, Economizer, Super Heater, Re heater, Steam cooled wall tubes, SH&RH DESH station, Soot blowing system, Drain and vents, Fuel preparation and firing system.<br>2) Fuel Oil Firing System.<br>3) Renovation/ Overhauling of APH &Draft system<br>4) Refurbishment of ESP<br>5) Replacement of Gates & dampers and Sample cooler along with valves and piping<br>6) Supply of Hangers and supports, BHEL Vision (electronic water level indicator)<br>7) Servicing of Boiler drum with internals and strengthening of boiler main structure and painting<br><br>**ii) TG:** The scope of works includes :<br>1) Replacement/repairs/polishing & modification of HP/IP/LP Turbine<br>2) Replacement of all flexible hoses<br>3) Balancing of all finished rotor & repairing of casing<br>4) Refurbishment of Shaft Turning gear(U-1 only),Turbine Governing System, Turbine gland system, Deaerator, Steam jet air ejector<br>5) Supply/replacement of Lubricating oil coolers, Seal oil coolers, Hydrogen coolers, Jacking oil pumps, condenser tubes, HP Heaters, LP Heaters, BFP,CEP, Condensate booster pump, Turbine drain system valves, Turbine governing valves, Insulation, Turbine lube oil system, TG Bearing & Coupling bolts<br>6) Installation Of Distributed Digital Control Monitoring & Information System(DDCMIS)<br>7) Complete overhauling of generator stator & complete testing /varnishing of generator rotor.<br>8) Regarding Electrical works, Refurbishment / replacement/supply of transformers, Generator bus duct, Protection panels, Bus changeover schemes, 220/132KV Switchyard.<br><br>**iii) BOP :** The scope of works includes :<br>R & M of Bore well system ,Fire fighting system, Pre Treatment Plant, DM Plant , Chlorination Plant , Cooling Tower, Compressed Air System, Air Conditioning System, Ash Handling System, Fuel Oil System, Workshop, CW System, Raw Water System, Feed Water Booster Pumps, Chemistry Lab. |
| 3 | Make | BHEL/BHEL | |
| 4 | Date of Commissioning | 31.03.1985 | |
| **B** | **RLA Studies / Consultancy** | | |
| | **Description** | **Boiler** / **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | a) Included in restoration cost for unit # 2<br>b) For unit # 1 Not charged | |
| 2 | Executing Agency | BHEL / BHEL | |
| 3 | Exp / Act Start date | Boiler-4.5.06<br>Turbine – 18.5.06<br>Generator Stator-15.5.06 | |
| 4 | Comple-tion date | May 2008 | |
| 5 | Actual Exp. (Rs.Cr.) | R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost. | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost for both units no.1&2 (Rs. Cr.) | 471.80 | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL/ BHEL | |
| 3 | No. of activities : Boiler / TG | 48 Packages | |
| 4 | Date of start / completion (E/A) | LOA:15/04/2010<br>15.07.2010<br>June' 2011 | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | 56.8 (for unit @ 2 restoration)& BOP (partly | |

*Planning Commission vide their letter dated 16.11.2009 approved the revised cost estimates of Rs.1053 crores including consultancy charges under the Special Plan for Bihar for both BTPS & MTPS

**STATUS OF LE/R&M WORKS OF BIHAR (KBUNL) THERMAL POWER STATION**

**(As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Muzaffarpur TPS** | **On-Going.** |
| 2 | Unit No. & capacity | **U-2,110MW** | **i) Boiler:** The scope of works includes :<br>1) Replacement/refurbishment of Furnace water walls, Economizer, Super Heater, Re heater, Steam cooled wall tubes, SH&RH DESH station, Soot blowing system, Drain and vents, Fuel preparation and firing system.<br>2) Fuel Oil Firing System<br>3) Renovation/ Overhauling of APH &Draft system<br>4) Refurbishment of ESP<br>5) Replacement of Gates & dampers and Sample cooler along with valves and piping<br>6) Supply of Hangers and supports, BHEL Vision (electronic water level indicator)<br>7) Servicing of Boiler drum with internals and strengthening of boiler main structure and painting<br>*Partly restored during restoration of unit -2.<br>**ii) TG:** The scope of works includes :<br>1) Replacement/repairs/polishing & modification of HP/IP/LP Turbine<br>2) Replacement of all flexible hoses<br>3) Balancing of all finished rotor & repairing of casing<br>4) Refurbishment of Shaft Turning gear(U-1 only),Turbine Governing System, Turbine gland system, Deaerator, Steam jet air ejector.<br>5) Supply/replacement of Lubricating oil coolers, Seal oil coolers, Hydrogen coolers, Jacking oil pumps, condenser tubes, HP Heaters, LP Heaters, BFP,CEP, Condensate booster pump, Turbine drain system valves, Turbine governing valves, Insulation, Turbine lube oil system, TG Bearing & Coupling bolts<br>6) Installation Of Distributed Digital Control Monitoring & Information System(DDCMIS)<br>7) Complete overhauling of generator stator & complete testing/varnishing of generator rotor<br>8) Regarding Electrical works, Refurbishment / replacement/supply of transformers, Generator bus duct, Protection panels, Bus changeover schemes, 220/132KV Switchyard.<br>*Partly restored during restoration of unit -2.<br>**iii) BOP :** The scope of works includes :<br>R & M of Bore well system ,Fire fighting system, Pre Treatment Plant, DM Plant , Chlorination Plant , Cooling Tower, Compressed Air System, Air Conditioning System, Ash Handling System, Fuel Oil System, Workshop, CW System, Raw Water System, Feed Water Booster Pumps, Chemistry Lab.<br>*Partly restored during restoration of unit -2.<br>Both the streams of CHP become operational on 20.04.2010.<br>R&M of one wagon Tippler will be completed in Aug.'2010. |
| | Make | BHEL/BHEL | |
| 4 | Date of Commissioning | 17.03.1986 | |
| **B** | **RLA Studies / Consultancy** | | |
| | **Description** | **Boiler** / **TG** | |
| 1 | Estimated Cost (Rs.Cr.) | a) Included in restoration cost for unit # 2<br>b) For unit # 1 Not charged | |
| 2 | Executing Agency | BHEL / BHEL | |
| 3 | Exp / Act Start date | Boiler-4.5.06<br>Turbine – 18.5.06<br>Generator Stator-15.5.06 | |
| 4 | Completion date | Nov-2006 | |
| 5 | Actual Exp. (Rs.Cr.) | R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost. | |
| **C** | **R&M / LE works** | | |
| 1 | Estimated cost for both units no.1&2 (Rs. Cr.) | 471.80 | |
| 2 | Executing Agency : **Boiler/ TG** | BHEL/ BHEL | |
| 3 | No. of activities : Boiler / TG | 48 Packages | |
| 4 | Date of start / completion (E/A) | LOA:15/04/2010<br>Sept.' 2011<br>April' 2012 | |
| 5 | Actual Expenditure incurred (Rs. Cr.) | 56.8 (for unit @ 2 restoration)& BOP (partly) | |

**STATUS OF LE WORKS OF WEST BENGAL (WBPDCL) THERMAL POWER STATION**

**(As on 30.06.2010)**

| A | Project details | Description | Broad status of various activities |
|---|---|---|---|
| 1 | Name of Power Station | **Bandel** | WBPDCL has taken a decision for rebidding. |
| 2 | Unit No. & capacity | **U-5** , 210MW | **i) Boiler :**Main Plant Package(B-T-G)<br>International Competitive Bidding in accordance with IBRD's Two Stage bidding procedure has been adopted. 1st Stage Bid evaluated and evaluation report submitted to World Bank. Due to lack of more than one qualified bidders for 2nd stage bid WBPDCL has taken a decision for retendering. A proposal was placed before World Bank and on 02.06.10 WB sent their "No Objection". WBPDCL is preparing fresh bidding documents for BTG pkg. Exp. Date of submission to WB for clearance is by Sept.'2010. |
| 3 | Make : Boiler/TG | AVB/BHEL | |
| 4 | Date of Commissioning | 23/03/1983 | |
| **B** | **RLA Studies / Consultancy** | | |

| | Description | Boiler | TG | |
|---|---|---|---|---|
| | | | | **ii) TG :** Main Plant Package(B-T-G)<br>Same as Boiler |
| 1 | Estimated Cost (Rs.Cr.) | | | |
| 2 | Executing Agency | NASL | | |
| 3 | Exp / Act Start date | | | |
| 4 | Completion date | January 2005) | | |
| 5 | Actual Exp. (Rs.Cr.) | | | |

| C | R&M / LE works | | **iii) BOP :Process yet to start**<br>Electrical System Package, Coal Handling Package & Ash Handling Package |
|---|---|---|---|
| 1 | Executing Agency : **Boiler/ TG** | Yet to be finalized. | |
| 2 | No. of activities : Boiler / TG | 4 no. of packages. | |
| 3 | Zero date | | |
| 4 | **Date of start** (Original/ Expected /Actual) | Expected Date of start-May,2011 | |
| 5 | **Date of completion** (Original/ Expected /Actual) | Yet to be finalized. | |
| 6 | Estimated cost (Rs. Cr.) | 472.38 | |
| 7 | Actual Expenditure incurred (Rs. Cr.) | * | |

*Till date, payment made to three consultancy services only for preparing DPR & tender document. All these charges were funded by PHRD Grant. Project is at present in Bidding Stage.