EXECUTIVE SUMMARY

OF

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

PROPOSED 1320 MW (2X660 MW)

SUPER CRITICAL COAL BASED THERMAL POWER PLANT

AT

Village - Dadri Khurd, Tehsil - Mirzapur Sadar, Mirzapur District, Uttar Pradesh

APPLICANT

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Content Sheet

CONTENT	DETAILS	PAGE NUMBER
NUMBER	NAME OF A COMPANY	
1.0	INTRODUCTION	E-1
1.1	SCREENING CATEGORY	E-1
1.2	SCOPE OF THE REPORT	E-1
1.3	ENVIRONMENTAL SETTING	E-1
1.4	PROJECT DETAILS	E-2
2.0	DETAILS OF PROCESS	E-2
2.1	PROCESS DESCRIPTION	E-2
2.2	RESOURCE REQUIREMENT	E-3
2.2.1	RAW MATERIAL REQUIREMENT	E-3
2.2.2	LAND REQUIREMENT	E-3
2.2.3	POWER REQUIREMENT AND SUPPLY	E-3
2.2.4	WATER REQUIREMENT AND SUPPLY	E-3
2.2.5	MANPOWER REQUIREMENT	E-4
3.0	BASELINE ENVIRONMENTAL STATUS	E-4
3.1	METEOROLOGICAL DATA GENERATED AT SITE	E-4
3.2	AMBIENT AIR QUALITY	E-4
3.3		E-5
	WATER QUALITY	
3.4	SOIL CHARACTERISTICS	E-5
3.5	GEOLOGY & HYDROGEOLOGY OF THE AREA	E-5
3.6	NOISE LEVEL SURVEY	E-6
3.7	FLORA AND FAUNA STUDIES	E-6
3.8	SOCIO-ECONOMIC DETAILS	E-6
4.0	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	E-7
4.1	AIR ENVIRONMENT	E-7
4.2	WATER ENVIRONMENT	E-7
4.3	SOLID WASTE GENERATION	E-8
4.4	NOISE ENVIRONMENT	E-8
4.5	GREENBELT DEVELOPMENT	E-9
4.6	SOCIO- ECONOMICS	E-9
5.0	ENVIRONMENTAL MANAGEMNT PLAN	E-9
5.1	COST PROVISION FOR ENVIRONMENTAL MEASURES	E-10
6.0	ADDITIONAL STUDIES	E-10
6.1	RISK ASSESSMENT AND DISASTER MANAGEMENT STUDIES	E-10
6.2	REHABILITATION & RESETTLEMENT AND NEED BASED	E-10
0.2	ASSESSMENT STUDY	2.10
6.3	PUBLIC HEARING CONSULTATION	E-11
6.4	PROJECT BENEFITS	E-11
6.5	CSR ACTIVITIES	E-12
7.0	CONCLUSION	E-12



1.0 INTRODUCTION

Welspun Energy UP Private Limited (WEUPPL) proposes to setup a 2×660 MW Super Critical Coal Based Thermal Power Plant at Village Dadri Khurd, in Mirzapur Sadar Taluk, in Mirzapur District, in Uttar Pradesh. The Final EIA/EMP Report addresses the environmental impacts of the proposed power plant and proposes the mitigation measures for the same.

1.1 SCREENING CATEGORY

The proposed thermal power plant project falls under 'Category A' with project or activity type number '1(d)', as per Environment Impact Assessment (EIA) Notification dated 14th September 2006 which requires preparation of EIA Report to get Environmental Clearance (EC) from the Ministry of Environment and Forests (MoEF), New Delhi.

1.2 SCOPE OF THE REPORT

The scope of the EIA report is based on the Terms of Reference (TOR) approved by MoEF, Vide letter no. J-13012/12/2011-IA. II (T), dated 15th June 2011, on baseline data collected during Summer Season (March to May), 2011 representing pre-monsoon season 2011 and the issues raised in Public Hearing conducted for the Project on 7-04-2012. **M/s. J.M. EnviroNet Private Limited, Gurgaon** – a NABET accredited consultancy organization has been retained by M/s. Welspun Energy UP Private Limited (WEUPPL) to carry out and prepare the EIA report as per MoEF guidelines.

1.3 ENVIRONMENTAL SETTING

The environmental setting of the proposed plant site is as follows:

- The proposed project site and the 10 km radius study area is covered in Toposheet No. 63K/12 63 L/9, 63 L/13 and 63k/16.
- The project site is located at an elevation of 180 m above Mean Sea Level (MSL);
- ➤ The geographical co-ordinates of the proposed power plant fall between 24° 58′ 41.645″ to 25° 00′ 16.887″ N latitudes and 82°39′50.425″E to 82°41′03.728″ E longitudes;
- ➤ Ash pond will be located within the plant complex and falls between 24° 59' 46.8" N to 25°00' 14.5"N Latitude and 82° 40' 8.2"E to 82° 40' 57.8"E Longitude;
- > Present land use at the proposed plant site is mostly barren and small patches of single crop agricultural land.



- ➤ The State Highways, SH-5 and National Highway NH-7 run at a distance of 1.5 km, SW and 10 km, NNE respectively from the proposed plant boundary
- ➤ The nearest railway station is Sakteshgarh Railway Station at a distance of 15.5 km in ENE direction & Sarsongram Railway Station at a distance of 15.5 Km in E direction.
- > The nearest airport is Varanasi at a distance of about 50 km in NNE direction;
- > The district head-quarter of Mirzapur is 18 km in NW direction from the proposed project site.
- > The Ganga river is at a distance of 17.0 km in North direction of the project site;
- There are twelve forest blocks in 10 km radius:
- ➤ There is no Eco sensitive zone viz. National Park, Wild life sanctuary, Biosphere Reserve, Wild Life corridors within 10 km radius of the project site;
- ➤ There is no Historical and Archeological site within 10 Km
- ➤ The project area falls under Seismic Zone-III as per Indian Standards, IS:1893-2000.

1.4 PROJECT DETAILS

The proposed Thermal Power Plant at Dadri Khurd village, Mirzapur district will include the following facilities:

- ➤ The installed capacity of plant is 1320 MW (2x660 MW) based on super critical Technology. Land of area of 875 acres i.e 354.11 Ha required for power plant & auxiliaries and water of 4002 m³/hr from Ganga River through Upper Khajuri dam will be used. A captive Railway siding of 15.5 Km from Sarsongram railway station to the project Site will be laid.
- ➤ Coal requirement is 6.74 MTPA at a PLF of 90%. The required coal will be sourced from proposed nearby coal mines such as NCL / SECL / CCL as per the availability through railway line. Long term coal linkage has been applied. Estimated project cost is Rs. 7500 Crores.

2.0 DETAILS OF PROCESS

2.1 PROCESS DESCRIPTION

The proposed 1320 MW power project consists of main power plant equipment like Boilers, turbo generator, ESP and plant auxiliary systems comprising of external and internal coal handling systems, raw water -treatment and DM water treatment systems, cooling water system with Induced Draft cooling towers, auxiliary cooling water system,



effluent treatment facilities, ash handling system and ash pond, fuel oil system, service and instrument compressed air systems, air-conditioning and ventilation systems, fire protection system, hydrogen generation system, workshop, chemical laboratory, plant electrical system and plant instrument and control systems. It also includes the transmission lines from switchyard at power plant upto nearest 400 kV substation of PGCIL.

2.2 RESOURCE REQUIREMENT

2.2.1 Raw Material Requirement

The coal requirement for the proposed power plant is 6.74 MTPA Domestic Coal for the proposed power plant capacity of 1320 MW at a Plant Load Factor (PLF) of 90%. The required coal will be sourced from proposed nearby coal mines such as NCL / SECL / CCL as per the availability through railway line. Long term coal linkage has been applied.

2.2.2 Land Requirement

The total land requirement for the proposed project has been optimized to about 875 acres (354.11 ha). This includes the proposed power plant, ash pond, railway siding. The colony will be within plant boundary towards South. The Ash Pond Area would be 140 Acres.

The private land area for the plant and for facilities required outside the plant area is being procured through willing buyer willing seller as per the prevailing norms of Uttar Pradesh Government. Out of the total land 11.1% (97.13 acres) land is Government land and the remaining 88.9% (777.88 acres) is Private land. There are no major structures in the proposed site area.

2.2.3 **Power Requirement and Supply**

Evacuation of power from the proposed power plant will be done at 400 kV level. One 400 kV switchyard will be constructed in the proposed power plant. For evacuation of power, two number of 400 kV transmission lines from the power plant switchyard to the nearby 400 kV PGCIL grid sub-station.

2.2.4 Water Requirement and Supply

The total water requirement for the proposed power project is 4002 m³/hr. The water demand for the proposed plant will be met from Upper Khajuri dam which will be fed by the Ganga river through a suitable water intake system. Water Resources Department of Govt. of UP vide letter dated 9th September, 2011 has confirmed the allocation of 36 MCM of water from Upper Khajuri dam, which has further been approved by GoI, Central



Water Commission, Irrigation Planning (North) Dept. Vide letter no. 7/2/18/UP/2008/IP(N)/804 dated 12.10.2011.

2.2.5 Manpower Requirement

The total direct manpower requirement of the project during operation period is estimated to be about 400 persons. Further, more than 1000 personnel will be indirectly employed.

3.0 BASELINE ENVIRONMENTAL STATUS

Baseline environmental studies have been carried out during study period i.e. Summer Season 2011 (Pre-Monsoon) Season. Studies have been carried out in 10-km radius from project as centre for Soil quality, ambient air quality, Water quality, Noise level, Flora and fauna studies and demography.

3.1 METEOROLOGICAL DATA GENERATED AT SITE

The meteorological parameters like wind speed, wind direction (from 0 to 360 degrees), temperature, relative humidity, atmospheric pressure, rainfall and cloud cover were recorded on hourly basis during the study period (Summer season 2011) at proposed plant site. The data shows that the

• Temperature Min: 11.6°C and Max: 42.0°C

Relative Humidity
 Min: 32 % and Max: 52 % at 8:30 hrs

Min: 16 % and Max: 48 % at 17:30 hrs

Predominant Wind Direction West:

Highest Wind Speed in predominant 12 km/hr.

Wind direction

3.2 AMBIENT AIR QUALITY

The ambient air quality was monitored at 11 locations the data shows:

Arr PM₁₀: 45.10 µg/m³ and 71.35 µg/m³

Arr PM_{2.5}: 13.22 µg/m³ to 28.15 µg/m³

ightharpoonup SO₂: 5.78 to 9.65 µg/m³

> NOx: 12.56 to 21.39 μg/m³

 \triangleright Ozone: 2.00 µg/m³ to 4.90 µg/m³

> Mercury: Below 0.50 μg/m³



The results of the monitored data indicate that the ambient air quality of the region in general is in conformity with respect to norms of the National Ambient Air Quality (NAAQ) Standards.

3.3 WATER QUALITY

The baseline groundwater quality status in the region is established by analyzing 9 samples. The pH varies from 7.14 to 7.84. Calcium and Magnesium content varies between 21.05 to 64.77 mg/l and 5.89 to 23.02 mg/l respectively. Total hardness and alkalinity expressed as $CaCO_3$ ranges between 76.76 to 218.16 mg/l and 66.33 to 402.52 mg/l respectively. Chlorides and Sulphates are found to be in the range of 13.31mg/l to 81.77 mg/l and 3.80 mg/l 19.79 mg/l respectively. Nitrates and Fluorides are found to be in the range of 2.33 mg/l to 4.26 mg/l and 0.23 mg/l to 0.69 mg/l respectively. The physico-chemical and biological analysis revealed that most of the parameters of groundwater are within the permissible limits as per IS: 10500.

Five surface water samples were taken for analysis. The monitoring results show that pH of all the monitoring locations varies from 7.25 to 7.82. Total hardness varies from 60.60 to 132.21 mg/l. Total dissolved solids are in the range of 122.00 to 209.00 mg/l. All the parameters were found well within the limits. Total coliforms was found to be <2 MPN/100 ml. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits

3.4 SOIL CHARACTERISTICS

The analysis results for soil shows that soil is neutral in nature as pH value ranging from 6.76 to 7.87. Organic matter ranges from 0.21% to 0.62 % in the soil samples. Phosphorous varies from 11.56 to 32.98 kg/ha in the good amount, whereas the Potassium is found to be in the range of 99.02 to 142.19 kg/ha. Nitrogen is found in the range of 131.79 to 256.50 kg/ha.

3.5 GEOLOGY & HYDROGEOLOGY OF THE AREA

Geomorphology of the study area says that the Northern part of the lower Son valley is composed of the finer alluvium deposits derived from the river Ganges which is sloping towards North-West, North and North-East directions. All the tributaries of Ganges flow towards north in the central region. In the eastern part of the lower Son valley, the rivers Son and Punpun flow almost parallel which was mainly ravaged by the river Son and hence this portion has many depressions. The drainage patterns indicate that porosity of the soil is good with low permeability.



Geology of the study area depict that the project site is located in the Vindhyan basin in Central India is an Intra-Cratonic sedimentary basin with sandstone-shale-limestone sequences. It covers a very long period of 1600-400 Ma during Meso-Neo Proterozoic eras and exposed over 1,04,000 sq. km in the states of Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan having a total thickness of 4000-5000 m. Detailed Hydrogeological Study Report is prepared by M/S MINMEC Consultancy Pvt. Ltd.

3.6 NOISE LEVEL SURVEY

a) Day Time Noise Levels [(L_{day})]

The day time noise levels at all the residential locations were observed to be within the prescribed limit of 55 dB (A) for Residential Zone. The noise levels ranged between 41.60 dB (A) to 52.66 dB (A).

b) Night Time Noise Levels (L_{night})

The night time noise levels at all the residential locations were observed to be slightly on a higher side as compared to prescribed limit of 45 dB (A). The noise levels ranged between 37.39 dB (A) to 43.31 dB (A).

3.7 FLORA AND FAUNA STUDIES

Detailed ecological studies were conducted during study to identify the floristic composition in and around proposed project site and surrounding villages. A primary survey was conducted in proposed project site and surroundings. Plant species and animals observed/recorded through primary survey and with interaction local people and forest officials of the area. The study area has varied patches of forest separated by habitation & agriculture lands. There is bamboo cultivation around the project site. During the survey it was noted that most of the forest was mixed forest with Acacia catechu and *Butea monosperma* dominant among tree species and at place dominated by *Bambusa arundinacea* (bamboo). The shrub layer was dominated by the straggling *Zizyphus oenoplia* and *Acacia sinuta*.

3.8 SOCIO-ECONOMIC DETAILS

The information on socio-economic aspects of the study area has been compiled from census data of 2001, The study area consists of a total population of 241710 in 38736 households. The % of male and female are about 52.34 % and females 47.66 % respectively. About 45.67 % of the population in the study area belongs to Scheduled Castes (SC) and there are no ST population in study area. The overall literacy rate is of



34.34 %, of which male literacy is 45.52 % and the female literacy is 22.06 %. The total main working population is 26.98 %.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 AIR ENVIRONMENT

The major pollutants from the power plant include SO2, SPM & NOx. Prediction of impacts on air environment has been carried out employing mathematical model based on a steady state Gaussian plume dispersion model designed for multiple point sources. In the present case, AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) version 6.4 dispersion model based on steady state gaussian plume dispersion, designed for multiple point sources and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from Industrial sources. Modeling studies reveal that the maximum incremental ground level concentrations for Particulate Matter10 (PM10) likely to be encountered during study period are $0.508~\mu g/m3$ at a distance of about 2 km from the project site on eastern direction.

The maximum incremental short term ground level concentrations for SO2 and NOx are 40.97 and $18.84~\mu g/m3$ respectively occurring at a distance of about 2.0~km from project site in the E direction. The resultant concentrations are predicted to be well within the standards. The resultant concentrations on superimposing the results over the baseline data collected indicate that the AAQ to be well within the standards specified by CPCB.

The following air pollution control systems are proposed to be installed in this project to reduce the anticipated adverse impacts:

- ➤ Installation of ESPs of 99.9% efficiency to limit the SPM concentrations below 50 mg/Nm³;
- ➤ Provision of 275 m high stack for wider dispersion of gaseous emissions;
- \triangleright Providing low NO_x burners to reduce the NO_x emissions;
- Dust extraction system will be provided at transfer points;
- Provision of water sprinkling system at material handling and storage yard;
- > Development of Greenbelt around the plant to arrest the fugitive emissions.

4.2 WATER ENVIRONMENT

The total water requirement for the power project is 4002m³/hr, which will be met from Upper Khajuri dam which will be fed from Ganga River through a suitable water intake system. The project will not extract groundwater and hence there will be no impact on ground water.



Out of the total waste water generation at source will be of 888 m³/hr, , 860 m³/hr of domestic, sanitary and service waste water will be suitably treated and utilized for greenbelt development, ash handling dust suppression, service etc. The remaining 28 m³/hr of treated wastewater will be discharged to the nearest nalah/water body, in case of emergency. The quality of treated effluent from the plant will conform to UPPCB/MoEF standards.

4.3 SOLID WASTE GENERATION

The main solid waste from the proposed power plant will be ash (fly ash and bottom ash). Considering worst coal quality with 40% ash content, a maximum of about 2.70 MTPA of ash will be generated from the proposed power plant Out of this, the bottom ash will be about 20% of the total ash generated i.e. 0.54 MTPA and the fly ash will be remaining 80% of the total ash generated i.e. about 2.16 MTPA.

It is proposed to utilize the entire fly ash generated from the project for cement and brick manufacturing.

- ➤ Most of Fly ash generated is proposed to be extracted and disposed in dry form by setup of silos.
- > Bottom ash would be disposed in slurry mode.
- ➤ Fly ash would be used in making value added products as in cement production, bricks manufacturing, low lying area filling, for road construction and other usages. M/s Prism Cements and M/s Chunar Cement Factory have shown inclination to lift to max of 2.0MTPA and 1.0 MTPA fly ash respectively to their grinding unit.
- > The rest of the ash will be utilized for brick making and low lying area filling.
- Unused fly ash, if any shall be disposed in slurry mode to the ash pond with provision of recovery of ash water.
- > Ash pond of adequate area which can hold ash for designated period has been planned
- ➤ A blanket of water shall be maintained over the ash pond to control fugitive dust emission.
- > Action Plan for 100 % Fly Ash utilization has been proposed as per the MoEF

4.4 NOISE ENVIRONMENT

The main noise generating sources are blowers from boilers and turbines. The noise generation from these sources will be as per the international norms and the impact of noise emission from turbo generator will be minimized by acoustic enclosures. The



resultant noise levels due to the proposed power plant will be less than 50 dB (A) near the plant boundaries in all the directions. The specifications for procuring major noise generating machines/equipment shall include built in design requirements to have minimum noise levels meeting Occupational Safety and Health Association (OSHA) requirement. The ambient noise levels at the boundary will be maintained with noise levels notified under Environment (Protection) Act, 1986.

4.5 GREENBELT DEVELOPMENT

Out of the total area of 875 acres area about 285 acres area is proposed be developed as green belt which range from 50 - 100 m wide greenbelt, consisting of at least 3 tiers along plant boundary will be developed as greenbelt and green cover as per CPCB guidelines. The density of 2500 trees per hectare with local native species will be maintained.

4.6 SOCIO- ECONOMICS

The project requires 875 acres of land of which 777.88 acres of land are private land, of which 0.19 acres is habitated land. The land losers will be compensated as per the National and state R&R policies and the local regulations. No tribal people are affected. The project will have major economic benefits to the locals by way of employment and associated skill and entrepreneur development activities. During the construction phase and operation of the proposed power plant, will be an increased availability of direct and indirect employment. As can be seen from the baseline data the literacy levels in the area require lot of impetus, Welspun energy UP Private Limited will undertake a comprehensive CSR as per the company CSR policy focusing on EEE (Environment , Education & Empowerment).

5.0 ENVIRONMENTAL MANAGEMNT PLAN

The project will have robust post project monitoring facilities within the company to check the efficacy of the environmental mitigation measures undertaken and it will have a full time environmental management cell with adequately qualified environmental engineers and scientists. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/UPPCB. The source emissions are monitored by establishing online monitoring facilities. AAQ, water /effluents, noise are monitored as per stipulations by MoEF. A systematic documentation of results will be submitted to UPPCB for their records and advise. Environmental audits as per the Environment (Protection) Act will be submitted once the plant is commissioned and in operational stage. A rainwater harvesting system to utilize the collected rain water for plant use will be in place.



5.1 COST PROVISION FOR ENVIRONMENTAL MEASURES

It is proposed to Capex of about Rs 466 Crores on pollution control, treatment and monitoring systems for proposed power plant and Opex will be Rs. 9.9 Cr.

6.0 ADDITIONAL STUDIES

6.1 RISK ASSESSMENT AND DISASTER MANAGEMENT STUDIES

The project like spontaneous ignition of coal and Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the proposed power plant. On the other hand, risk analysis deals with the recognition risks associated with the proposed and computation of risks, the equipment in the plant and personnel are prone to, due to accidents resulting from the hazards present in the plant.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies and these details discussed in details in EIA report.

6.2 REHABILITATION & RESETTLEMENT AND NEED BASED ASSESSMENT STUDY

The proposed project site i.e. core zone is slighly undulating and barren with negligible settlement. It is been carved out from part of Dadri Khurd village.

The total land requirement for the proposed project has been optimized to about 875 acres (354.11 ha). It includes 97.13 acres Govt. land and rest 777.88 acres private land. The land mainly barren land with scattered patches rain fed single agriculture practice occasionally.

As a proactive measure land acquisition and other involuntary settlement is avoided in while selecting the location of project. The entire land has been procured from the willing sellers through direct negotiations on the willing buyer and willing seller concept. The price paid is determined through mutual negotiation on mutually acceptable terms and conditions. The procured land has 221 title holders in 63 Khatas from Dadri Khurd village, whose land is located in the area identified for the project. There are 4 small structures located in the identified land. There are no cultural properties and common property resources in the identified land. There are no non title holders in the land being procured as defined in NRRP 2007. There are also no scheduled tribes land sellers from the land being procured. The Uttar Pradesh state



government R&R policy as well as present national R&R policy is silent and do not insist on specific R&R provisions to such procurement of land through a private mutual negotiation process. Most of land owners have left Mirzapur and settled at different locations faraway places and are willing to dispose the land. Only 51 of land owners are residing in villages around the project site like Sukhnai, Juruhliya, Umariya etc and Mirzapur city. Xavier Institute of Development Action and Studies. Jabalpur has been commissioned to look into the aspect of Need assessment Study and resettlement needs in such scenario and a separate report has been prepared by them. As a good corporate citizenship it is proposed to adopt certain measure to the land deprived persons for their lively hood from the land sellers community.

The national Rehabilitation & Resettlement policy 2007 is applicable where 400 families are affected due to land acquisition in plains and 200 families in hilly terrains for public purposes.

6.3 PUBLIC HEARING CONSULTATION

As per the new EIA Notification dated 14th September 2006, Public hearing for this project has been conducted in accordance with the procedure to obtain the Environmental Clearance.

The advertisement for the conduction of Public hearing was given in both Hindustan Times and Amar Ujala, Mirjapur on 4.3.12. The public hearing was conducted on 7.4.12 at village Dadri Khurd, Tehsil- Sadar and district – Mirzapur, UP. AT 11 AM.

Mr Shrish Chandra Shivastava, Upper Collector (Mirzapur) and Mr . Kalika Singh (Regional Officer , UP Pollutional Control Board, Sonbhadra) were the honourable guests of this Public Hearing. Public Hearing was initiated by Regional Officer (UPPCB, Sonbhadra).

The issues of Electricity, employment to the local people, women empowerment pollution control and education were raised by the local people and attendees during the conduction of public hearing for which appropriate action plan were suggested from the project proponent side.

At the end of Public hearing, attendance and signature of the attendees were taken.

6.4 PROJECT BENEFITS

The proposed project by WEUPPL would not only reduce the demand supply gap of electricity in northern region for irrigation, domestic and commercial purposes Further, the proposed power plant will result in improvement of infrastructure as well upliftment of social structure in the area. It is anticipated that the proposed power plant will



provide employment benefits for the locals in two phases i.e. during construction phase as well as during operational stage. It will also invoke supplementary support growth of industry and entrepreneurship in the area.

6.5 CSR ACTIVITIES

WEUPPL will implement a Community Development Plan in phased manner through a dedicated cell, starting from the construction phase onwards. It is proposed to invest an estimated amount of Rs 31.15 Crores for various community development activities in the region. Concept proposals for community development plan prepared on the basis of primary socio-economic survey in the region are already under active consideration. WEUPPL will implement the same with the help of NGOs/Government Organizations in the region.

7.0 CONCLUSION

The proposed coal based power plant having utilizing super critical technology will have fewer adverse impacts on the environment compared to conventional power plant using subcritical technology. These impacts are only marginal on the local and global environment. The pollution control facilities proposed to be installed as a part of project and the comprehensive CSR activities planned to be implemented by WEUPPL will contribute to the overall development of environment and social fabric of the area. The direct and indirect employment opportunities likely to emerge due to the power project will improve the social and economic well being of the society around.