6.0 ANALYSIS OF ALTERNATIVES FOR TECHNOLOGY AND PROJECT SITE

6.1 Analysis of Alternative Technology

The selection of the proper steam generator technology is a critical step in the basic design of a power project. The fuel to be fired and the steam cycle to be adopted govern the type of steam generator needed to satisfy the requirements of the project.

6.1.1 Alternatives for Boiler Technology

The following are the general options for selection of boiler technology:

- For easy to burn fuels, such as bituminous coals - suspension firing of the pulverized fuel in horizontal, wall-mounted burners is the configuration of choice;

- For low volatile, low reactivity fuels, such as anthracite and petroleum cokes, the down-fired arch furnace is the choice adopted world-wide; and

- Another option for difficult fuels, as well as for waste fuels, which cannot be properly burned with suspension firing, is the Atmospheric fluidized bed combustion (AFBC) boiler. Also the flywheel of circulating solids in the AFBC boiler allows a wide range of fuels to be fired in the same unit.

6.1.2 Alternatives for Boiler Parameters

Sub critical parameters were examined related to power generation of thermal power plant.

The major benefit of adopting higher steam cycle is increased generation due to higher efficiency and reduction in emissions of PM, CO_2, SO_2, and NOx.

Hence, in view of the above, sub critical parameters are considered for the proposed boiler configuration.

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- Atmospheric fluidized bed combustion (AFBC) boilers are more suited for power plants usually up to 40 MW capacities;
- AFBC boilers– complete combustion is ensured;
- Condensing steam type generator along with their auxiliaries and air cooled condensers ;
- Air cooled condenser – less water requirement (about 10% of the normal water requirement)
- High efficiency & low specific coal consumption when compared to the other boilers

6.1.3 Electrostatic Precipitator and its Preference over Bag Filter / Hybrid System

High particulate matter emission in the form of fly ash from coal fired boilers is a matter greater concern for environment. Electrostatic precipitator (ESP) is being used to limit the concentration of fly ash emission (generally <50 mg/Nm3 when all the fields are in operation) within the safe allowable limit. The electrostatic precipitator consists of metal plates which are charged (discharge & collecting electrodes; potential of these plate are in the range of 40-60 KV). When the flue gas pass through the ESP, the particulate matter in the form of fly ash gets attracted on these plates and we get clean flue gas outside of ESP and from the top of the stack. Thus ESP helps in reducing the pollution of atmosphere to a great extent. Regular mechanical hammer blows on these plates cause the accumulated dust particles to fall at the bottom of the ESP where they are collected in hoppers from where the fly ash are conveyed pneumatically through pipe to Fly ash storage silo. The whole system is enclosed and there is no chance dust particles polluting the atmosphere.

On the other hand a Bag filter is cheaper and occupies less space and can achieve Dust emission <50 mg/Nm^3, but the filter bags generally can withstand temperature only upto 170^0C. In presence of Sox, the flue gas can form weak acid if the dew point of flue gas is low which can cause damage to filter bags. In India, the ash content be ignored. The quality of coal also varies too much as per availability of coal at a particulate time. During start-up, the flue gas temperature is low and due to presence of sulphur (which is in the range of 1-2% in case of LDO being used during start-up) weak acid is formed which affects the internals of bag filters. Also due to carry over of oil vapors there is likelihood of chokage of filter bags. The details of CPPS equipped with high efficiency ESPs, the stack emission reports of some of such plants in operation are given below in **Table-6.1**.

TABLE-6.1
DETAILS OF EMISSIONS IN CPPS EQUIPPED WITH ESPS

Month	JSCP	Dalla Cements	Chunar Cement Factory
April 2010	-	-	40.00
May 2010	-	-	40.44
June 2010	-	-	41.46
July 2010	-	-	39.86
August 2010	-	-	38.90
September 2010	-	-	38.76
October 2010	-	-	37.38
November 2010	-	-	37.47
December 2010	-	-	36.17
January 2011	-	-	36.11
February 2011	-	-	37.96
March 2011	-	-	37.37
April 2011	-	-	37.85
May 2011	-	37.00	38.28
June 2011	-	38.00	41.01
July 2011	-	25.00	Shut down
August 2011	-	33.00	43.16
September 2011	-	35.00	36.91
October 2011	-	34.00	39.91
November 2011	-	39.00	39.89
December 2011	-	38.00	37.23
January 2012	-	35.00	39.53
February 2012	-	46.00	38.44

Month	JSCP	Dalla Cements	Chunar Cement Factory
March 2012	-	39.00	38.87
April 2012	39.91	39.00	39.08
May 2012	32.78	42.00	39.03
June 2012	42.91	35.00	39.38
July 2012	38.38	48.00	36.54
August 2012	39.04	45.00	35.19
September 2012	32.80	47.00	35.19
October 2012	42.02	43.00	34.92

6.2 Analysis of Alternative Sites for Location of Power Plant

No alternative sites are proposed. The proposed 30 MW power plant will be setup within the cement plant premise which is under operation as captive source of power to cement plant.