ACB (INDIA) LTD
(Formerly Aryan Coal Beneficiations Pvt Ltd)

EXECUTIVE SUMMARY
OF
RAPID
ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENT MANAGEMENT PLAN
FOR
PATHARAPALI-FAGURAM WASHERY
AT RAIGARH, CHHATTISGARH
(0.96 MTPA)

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Prepared by:

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An ISO 9001:2000 approved company

1.0 INTRODUCTION

1.1 General background

ACB India Ltd. (formerly Aryan Coal Beneficiations Pvt. Ltd.) is leader in the business of coal beneficiation having their plants in Chhattisgarh, Maharashtra, Andhra Pradesh and Orissa. The group proposes to establish a washery unit of 0.96 MTPA capacity at Village Patharapali Faguram, Tehsil Gharghoda, District Raigarh in Chhattisgarh. The infrastructure and auxiliary facilities for washery include Rotary Breaker, Double Deck Screen, Roll Crusher, Coal Ash Monitors, Conveyor System, Electrical System, washing equipments and DG Set.

1.2 Location and communication

The land required for installing the proposed washery would be 11.077 Ha. The location of the plant and the study area can be seen in the Survey of India Topo sheet No. 64 N/8.

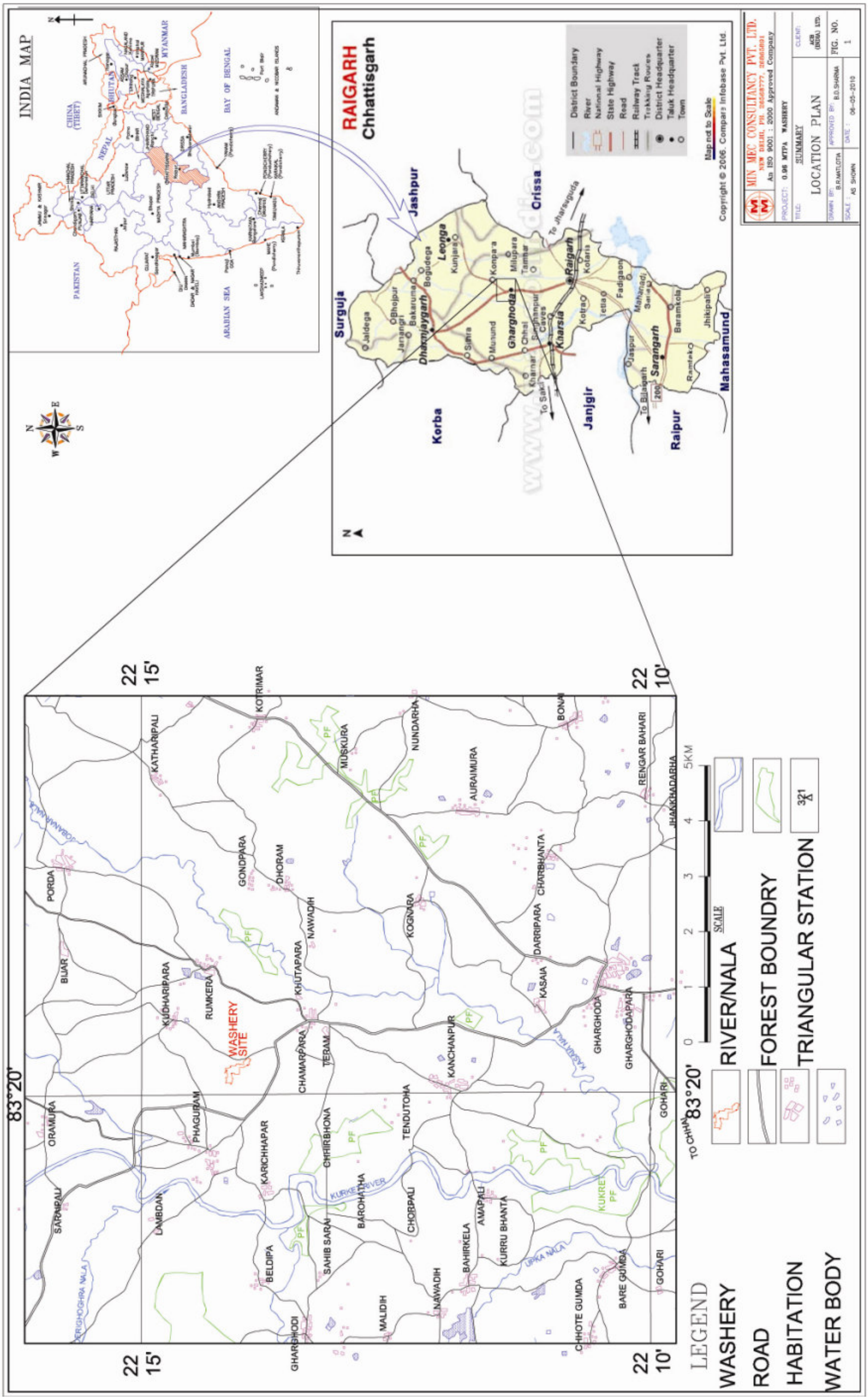
The plant site is located between latitude 22° 13' 55.48" to 22° 14' 11.06" N and Longitude 83° 20' 5.72" to 83° 20' 22.40" E. The town nearest to the project site is Raigarh, which is at a distance of about 40 kms.

The site is accessible via the road from Raigarh to Dharamjaigarh, which is at a distance of 0.58 km in the W direction, Lailanga to Gharghoda at a distance of 42 km, SE and Chhal to Gharghoda at a distance of 25 km in the south direction. The nearest railway station is Raigarh, which is about 35 kms away from the site. The nearest airport is at Raipur, about 300 kms away from the site. The nearest seaport is Vishakhapatnam, which is about 500 kms from the site. The location map is given in **Fig 1**.

2.0 PROJECT DESCRIPTION

The washability characteristics and fractional analysis of crushed coal determines the quality of the end product. The quality requirement of coal by Power Houses is 32% ash, while Cement and Sponge Iron is about 28%. Therefore, the design of the washery incorporates flexibility so that the end product meets the requirement of the customers. It is proposed to have 1 stream of 200 TPH operating for 6000 hours annually (20 hrs @ of 300 days of operation) achieving a performance of efficiency of 80% resulting into the annual capacity of 0.96 MTPA of washery plant.

The salient features of the project are given in **Table 1.**


INDIA MAP
RAIGARH
Chhattisgarh
Surguja
Jashpur
Korba
Janjgir
Raipur
Mahasamund
Orissa
District Boundary
River
National Highway
State Highway
Road
Railway Track
Trekking Routes
District Headquarter
Taluk Headquarter
Town
Map not to Scale
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SUMMARY
LOCATION PLAN
FIG. NO.
1
WASHERY SITE
KURKET RIVER
SCALE
5KM
LEGEND
WASHERY
ROAD
HABITATION
WATER BODY
RIVER/NALA
FOREST BOUNDRY
TRIANGULAR STATION
83°20'
22 15'
22 10'

TABLE 1
SALIENT FEATURES OF THE COAL BENEFICIATION PROJECT

Sl. No.	Particulars	Details
1	Location	Village: Patharapali Faguram, Tehsil: Gharghoda, District: Raigarh, Chhattisgarh
2.	Plot Area (Ha.)	11.077
3.	Product	Washed coal
4.	Capacity of plants	0.96 MTPA
5.	Raw materials	Coal
6.	Source of raw materials	Coalfields of Mand-Raigarh area of SECL
7.	Water consumption	119.5 cum/day
8	Source of water	Bore wells/surface water (Permission of State Govt. for water allocation is applied)
9.	Power consumption	250 KVA
10.	Source of power	Chhattisgarh Electricity Board and DG set
11.	Proposed Project Cost	Rs. 15 crores
12	Total Manpower	100

2.1 Technical process flow sheet

- The coal from the receiving hopper is fed into the Grizzly feeder -I
- The coal from Grizzly Feeder –I is screened through a Double Deck Screen –I, which screens the coal into three fractions :-
    1. Fraction I = +200mm
    2. Fraction II = 20-200mm
    3. Fraction III = -20mm
- The +200mm fraction is fed into a Rotary Breaker resulting into generation of -50mm and 50-200mm.
- 50-200mm dry rejects are separated.
- 20-200mm from Double Deck screen-I is fed to a Crushing Unit and routed through Double Deck Screen-II resulting into generation of three fractions:-
    1. Fraction I = +50mm
    2. Fraction II = 20-50mm
    3. Fraction III = -20mm

- -20mm fraction from Double Deck Screen and Double Deck Screen –II is fed into a dry screen, where in -4mm is collected in Fine Bunker and 6-20mm is routed through Surge Bunker-II to a Vibratory Feeder- II to a Jig/Cyclone.

- 20-50mm fraction from Crushing Unit and -50mm from Rotary Breaker are fed into a Surge Bunker-I through Double Deck Screen-II, from which the coal passes into Vibratory Feeder-II and then to a Jig/ Cyclone.

- The washed coal from Jig/Cyclone is subjected to Dewatering Screen I & II.

    - The coal screened through Dewatering Screen-I is stacked in a Clean Coal Bunker and that of Dewatering Screen-II into a Reject Coal Bunker.

3.0 PRESENT ENVIRONMENTAL SCENARIO

3.1 Topography and drainage

The study area forms a part of Kurket river catchment and has a highest elevation of 657m RL in the western part. The lowest elevation is 260 m RL in the extreme southern part of the area. The regional slope is towards south. The land slope is variable and the average slope ranges from 5 to 7 m/km. The zone represents hilly and undulating terrain. The elevation in the core zone is about 320 m above MSL.

The drainage pattern is of dendrite type with general flow direction towards south. River Kurket is the master drainage system with large number of tributaries. The important tributaries are Pajhar and Kasaia. Most of the drainage system of the area over floods their bank during monsoon season and remains dry during rest of the year. The study area is studded with number of tanks created by bunding several streams in the area to exploit storm water collection for use. There are no natural nala or drain present within the core zone.

3.2 Climate

The climate of the study area is of subtropical type, and is characterised by an oppressive hot summer, a mild winter and well distributed rainfall during the south western monsoon season.

The average temperature varies from a minimum of 20.96°C to a maximum of 33.20°C. Relative humidity varies from 42% to 86% during morning hours and from 27% to 82% during evening. Annual average rainfall for the year 1996 to 2006 has been recorded to be 1216.4 mm. The general wind speed ranges form 1 to 5 km/hr throughout the year. However, winds in the speed ranging from 6-11 kmph and 12-19 kmph also occur. Predominant wind direction is from NE during winter season (October to March) and SW during summer and monsoon seasons.

3.3 Micro-meteorological survey

Micro-meteorological survey has been undertaken for monitoring wind speed, wind direction, ambient air temperature and relative humidity during 1st September to 30th November, 2009. The temperature varies from a minimum of 14.20°C to a maximum of 36.40°C with an average of 27.36°C. Relative humidity varies from 21% to 87% with an average of 67.63%. Wind speed varies from 0.00 to 22.10 km/hr with pre-dominant wind direction in the NE direction.

3.4 Ambient air quality

Ambient air quality study has been carried out at six {Core zone, Chhirbhona, Near Nawagarh PF, Pordi (Near Rai RF), Kurumkela and Kagnara (Near Lailanga to Gharghoda road)} sampling stations by Respirable Dust Samplers continuously for three months during the monitoring period. The SPM was found to be ranging from 88 $\mu g/m^3$ to 153 $\mu g/m^3$, RPM from 34 $\mu g/m^3$ to 59 $\mu g/m^3$, SO_2 from 6 $\mu g/m^3$ to 10 $\mu g/m^3$, NOx from 7.7 $\mu g/m^3$ to 14 $\mu g/m^3$ and CO from 183 $\mu g/m^3$ to 349 $\mu g/m^3$.

3.5 Water environment

3.5.1 Ground water

The ground water occurs in the secondary porosity zone of the formation present. The depth to water table over the study area is highly variable ranging from 6 m to 18 m below ground during summer season. The rainfall is the main source of groundwater recharge in the area. No other surface water resource is available for ground water storage recharge. The seasonal fluctuation of water level over the study area as per the studies conducted by C.G.W.B is approximately 3.0 m.

3.5.2 Surface water

The study area forms a part of Kurket river watershed, which is perennial in lower reaches. The river overfloods its banks during monsoon season, while remains dry during summer except for a small portion in the middle and lower reaches. Besides, several tanks have been created by bunding streams, which remains filled during larger portion of the year, except summer season.

3.5.3 Water quality

Water samples from 12 locations (8 ground water and 4 surface water sources) have been collected during the post monsoon period of year 2009. The result shows that physical parameters, like colour, odour, taste and turbidity are within the desirable limits for drinking purpose. However the samples are slightly basic in nature. Dissolved solids, Chloride concentration, Total hardness and Alkalinity are within the permissible limit.

3.6 Noise level

Noise level was studied at ten locations during the monitoring period. The noise level was found to be ranging between 44.70 dB [A] to 58.80 dB [A] during day time and 36.40 dB [A] to 49.70 dB [A] during night. The noise levels recorded from 9 stations were found to be within the standards specified for residential zone.

3.7 Traffic density

Traffic density on Dharamjaigarh to Raigarh Road near Washery was found to be about 1511 vehicles/day. It was observed that 2/3 wheelers were more frequent on the road as compared to heavy and light motor vehicles.

3.8 Land environment

Core zone: Total area of land required for washery is 11.077 Ha (27.37 acres). The project area falls within Patharapali Faguram village.

Buffer zone: Land use pattern of the study area has been assessed on the basis of 2001 Census data. The study area comprises of 51 villages in District Raigarh. It is found that 25.37% of the total land is forest area, while irrigated agricultural land is only 1.61%, unirrigated agricultural land is 42.91%, culturable waste land is 19.62% and area not available for cultivation is 10.49%.

3.9 Soil quality

Soil study was conducted both in core as well as buffer zone. The results of soil quality analysis show that soil is slightly acidic, conductivity is normal and rich in organic carbon. However it is optimum in Nitrogen, Phosphorous and Potassium.

3.10 Socio-economic conditions

There are 51 villages in the study area, which fall under Tehsil Gharghoda of District Raigarh. Total population is 50257 with 24853 males & 25404 females. 58.16% of total population is literate. The composition of SC and ST in the study area is 8.96% and 56.64% respectively. The average family size is about 4 persons/family. 50.25% of the total population is non-worker, while main workers are 38.20% and marginal workers are 11.55%.

3.11 Ecology

Some common flora found in the area comprises of trees, shrubs, grasses, herbs, climbers, parasites, epiphytes, hydrophytes etc. Additionally, there are 21 reserved and protected forests found in the study area.

The fauna available in the core zone comprises of mammals, reptiles, and avifauna. Mammals are *Funambulus pennanti, Herpestes edwardsi, Lepus*

nigricollis, Rattus rattus, Vulpes bengalensis etc., reptiles are Bungarus caeruleus, calotes versicolor, eryx johnii, ptyas mucosus etc. and avifauna are *Acridotheres tristis, aredea ceineria, bubo bubo, bubucus ibis, columba livia, coracias bengalensis, corvus splendens, coturnix coturnix, cuculus varius, francolinus pondicerianus, perdicula asiatica, psittacula krameri* etc.

3.12 Places of religious, historical, archaeological or ecological industries

There are no places of historical/tourist/religious or archaeological importance in the study area. There are no biosphere reserves, national parks or wildlife sanctuaries within 10 km of the project area.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT & MITIGATION MEASURES

4.1 Topography and drainage

There will not be any major change in the topography of the proposed plot, except some minor levelling of the land in some parts and slight rise in the plinth area. Office buildings and infrastructure will be constructed, which may hinder the free flow of the storm water. To overcome this problem, few storm water drains shall be provided. However no major impact on the drainage system is envisaged. Minor impact on topography is envisaged due to storage of raw materials since small stacks shall be created. Thus, any impact on the topography and the drainage system shall be managed by providing proper drainage systems during construction.

4.2 Climate and meteorology

The beneficiation and other allied activities will not tend to influence the climate as such. Moreover carbon dioxide, which is a green house gas, contributes fossil fuel in the form of diesel. This diesel will be used to operate the trucks as well as other earth moving machineries. During the construction phase, the activities will be restricted to construction of roads, warehouse buildings, erection of structures, water reservoirs, plant and machineries, construction of oil/fuel storage areas etc. Thus, no negative impact is anticipated.

4.3 Air quality

Impact: The major sources of air pollution are discharge of coal into receiving hopper, discharge of coal at the crusher, discharge of coal at screens, operation of DG set and Primary impact due to transportation. Appropriate pollution control equipment with adequate capacity is proposed to be installed to avoid degradation of air environment. There will be only one stack of 10m height for the DG set. The maximum incremental ground level concentration in $\mu g/m^3$ would be 0.05 for SPM, 0.09 for SO_2, 6.84 for NOx and 0.36 for CO at a distance of 100 m in the east direction.

Mitigation: The dust generated by transportation activities will be mitigated by sprinkling. Atomised spraying systems will be provided at hopper, where in loading takes place to prevent fugitive dust. Roads will be strengthened and maintained. The stack emission shall be monitored for particulate emission as per the frequency prescribed by State Pollution Control Board. Wind shelters /wind breaks will be provided by green belt and plantation.

4.4 Water quality

Impact: Rainwater will carry loose soil, increasing suspended solids of the run off water in case of heavy rain. However, the impact will be temporary & reversible. In addition, the major sources of effluent generation will be run off from the coal wash area, Domestic waste water from the plant and Discharge of liquid waste.

Ground water would be sourced mainly through the bore wells located inside the plant site. The make up water requirement will be about 120 m^3/day. The annual ground water resource in the study area is estimated to be 19.73 MCM, while the annual utilisation of the same is 4.08 MCM. Therefore the water demand due to this project will be approximately 20.67% of the available ground water resources in the area. Thus there will be negligible impact of the ground water withdrawal on the agricultural and other users of ground water. During the operation of the plant, there will not be any direct contact between shallow water table and effluent/slurries.

Mitigation: Garland drains around the plant would be provided for the proper drainage of rain water. The plant would operate on '*Zero Effluent Discharge*' concept and all the process water would be properly clarified and recycled back to the system in a closed circuit module. Therefore, no impact on surface water bodies due to withdrawal or effluent shall take place.

Workshop effluent will be passed through grease trap and recirculated. The run-off from the coal handling area will flow through the surrounding ditches into a settling tank, from where it will be pumped into the station sump. The oil water mixture collected in separate drains will lead to an oil-water separator. The separated water containing oil and grease within the prescribed limit will be led into the drainage system, which will be finally discharged into the station sump. The oil separated out will be reutilized, if possible. The domestic sewage from the proposed plant will be treated in septic tank and soak pit system.

With the five stage treatment system and 100% recycling, there is no possibility of mixing of coal fines with surface water.

4.5 Land environment

Impact: The total land area requirement is 11.077 ha (27.37 acres) for the installation of the washery plant, which is under the possession of the project proponent There is no impact envisaged on the land use of the nearby area or in the study area as any minor change due to the proposed activity are restricted to the plant premises.

Mitigation: Due care will be taken to keep up the natural settings/greenery in and around the plant. For the purpose of landscaping, it is intended to provide green belt of adequate width in and around the plant site. An area of 3.5 hectares is devoted for the green belt.

4.6 Noise & vibration

Impact: The noise level is expected to increase due to equipment machinery and coal transfer points. The noise level due to the sources such as crushers, DG set and other operational points will be higher.

Mitigation: The noise level will be maintained by providing and maintaining thick green belt around the noise generating sources, like machineries, the roads for transporting raw and finished materials. The exposure time of workers to the higher noise levels will be minimised. All transfer points, cleats shall be lined with rubber lining so that the noise levels are reduced.

4.7 Traffic density

Impact: The raw material transport will be carried out by closed conveyor system from coal deliverance point to the plant. The washed coal will also be transported from plant to the siding through conveyors. Thus, marginal increase in the traffic density is expected. It may be noted that the washed coal transported to the siding shall be damp in nature and hence, no fugitive dust emission shall be encountered.

Mitigation: Since 100% of the raw material and rejects are being transported through closed conveyor system from the deliverance point to the railway siding, there will not be any increase in traffic due to material transportation. The road connecting plant site to the Kharsia as well as Robertson (South Eastern Coal) railway sidings will be maintained for human access.

4.8 Ecology

Impact: There are 21 forests in the study area at a distance ranging between 1.71 kms and 9.68 kms from the core zone. These forests consist of a wide variety of flora and fauna that may get adversely affected due to noise and vibrations generated in the factory. However, with proper and progressive development of the greenery around the project area, the

terrestrial biological environment of the area will get improved in due course of time.

Mitigation: To reduce the impact of air pollution, it has been proposed to create and maintain 3.5 ha area (32% of the proposed area) of green belt in and around the plant boundary, road sides, office building and stretches of open land. A curtain of trees all around the plant complex will be provided.

The minimum width of the green belt would be 10 m on all sides. The number of trees per hectare shall not be less than 1500. Total water requirement to irrigate green belt has been kept as 15 KLD.

4.9 Solid waste

Impact: There will not be any impact envisaged due to the solid waste generation. Coal rejects will be used as fuel and combusted in captive power generating units. Belt press cakes will be mixed with clean coal and combusted at consumer plant.

Mitigation: No impact is envisaged on the water resources due to discharge of waste water, since plant would operate on zero discharge concept. However, the suspended solids removed in the five stage clarification process would be mixed with the rejects and combusted for power generation.

5.0 REASONS FOR SELECTION OF SITE

- The proposed location is having proximity of raw material.
- Skilled and unskilled manpower is easily available.
- Investment climate is good.
- Government policies are favourable.
- Availability of necessary infrastructure, such as transportation, communication, roads, water, etc.
- Convenient rail and road links.

6.0 ENVIRONMENT CONTROL AND MONITORING ORGANISATION

In view of the importance of monitoring results in the implementation and continual improvement of the environment management programme, an organization will function under the Environment Department Head. To evaluate the effectiveness of environment management programme, regular monitoring of the important environmental parameters will be taken up. The total capital investment on environmental protection and improvement is envisaged as Rs. 125.30 lakhs and the recurring expenditure is envisaged as Rs. 34.38 lakhs/annum.

7.0 BENEFITS OF THE PROJECT

A total of 100 manpower will be under direct employment of the company. Additionally, some more work force will be required during construction phase, who will be mostly employed from the surrounding areas. Some other benefits of the project are as follows:

- Better economic status of the community due to better earnings;
- Higher inputs towards infrastructural facilities due to establishment of plant;
- Enhancement of literacy due to upcoming educational facilities;
- The company shall earmark funds for social development and welfare measures in the surrounding villages;
- The workers engaged in pollution generation area will be equipped with appropriate protective equipments. Other facilities such as health camps, medical checkups, drinking water facilities etc. will be provided;
- Indirect employment will be generated by the plant for supply of daily domestic goods.