

## **CHAPTER – I**

### **EXECUTIVE SUMMARY**

1. The Government of India has envisaged capacity addition of 100, 000 MW by the year 2012 to meet its Mission of Power to All. Achievement of this target also requires the development of large capacity projects at the national level to meet the requirements of a number of States.
2. Section-63 of the Electricity Act, 2003 provides that the Regulatory Commissions shall adopt the tariff, if it is determined through transparent process of bidding in accordance with the guidelines issued by the Central Government. This aims at moving away from cost-plus support for tariff determination. It is expected to further encourage private sector investment. Guidelines for competitive bidding for determination of tariff for procurement of power by distribution licensees were issued on 19<sup>th</sup> January 2005. The policy stipulates that all future requirement of power needs to be procured competitively by distribution licensees except in cases of expansion of existing projects and where regulators will need to resort to tariff determination based on norms.
3. Recognizing the fact that economies of scale leading to cheaper power can be secured through development of large size power projects, Ministry of Power, Central Electricity Authority (CEA), and Power Finance Corporation are working together for development of ultra mega power projects under tariff based competitive bidding route. These projects will be awarded to developers on Build, Own and Operate (BOO) basis. The ultra mega power projects, each with a capacity of 4000MW (Nominal), would also have scope for further expansion. The size of these projects being large, they will meet the power needs of a number of states through transmission of power on regional and national basis.

### **ROLE OF MINISTRY OF POWER**

4. Ministry of Power is playing an important role as facilitator to coordinate with concerned Ministries/ agencies and State Govt. for ensuring:
  - a) Coal block allotment/ coal linkages
  - b) Environmental clearances
  - c) Required support from State Government and its agencies
  - d) Financial closure by financial institutions
  - e) To facilitate PPA and proper security payment mechanism with State Govt./ State utilities
  - f) Monitoring the progress of Shell Companies w.r.t predetermined time lines

- g) These ultra mega power projects will add 20, 000 MW at five locations within a span of 7-8 years and help in achievements of the targets of capacity addition.
- 5. In order to enhance investor's confidence, reduce risk perception and get good response to competitive bidding, Shell Companies have been set up as wholly owned subsidiaries of Power Finance Corporation Ltd. (a Govt of India Undertaking) to facilitate tie-up of inputs, linkages and clearances for these projects. These companies will undertake preliminary studies and obtain necessary clearances and tie-ups including water, land and power selling arrangements etc, prior to award of these projects to successful bidders by way of selection of developers through a tariff based ICB. The Shell Companies shall also facilitate the process of obtaining environmental clearance.
- 6. In the first phase, two projects at coal pit heads (based on domestic coal) and four projects at coastal locations based on imported coal have been identified for development.
- 7. Wholly owned subsidiaries have been established by Power Finance Corporation Ltd, for taking up developmental work related to ultra mega power projects.

#### **COASTAL GUJARAT POWER LIMITED**

- 8. Coastal Gujarat Power Limited (CGPL), a wholly owned subsidiary of Power Finance Corporation Ltd., was incorporated on 10th Feb 2006 under the Companies Act 1956 with Registration No. U- 40102 DL2006 GOI 146110 (certificate copy of incorporation enclosed).

#### **ROLE OF CGPL**

The role of CGPL is outlined below.

- a) Appointment of Consultant to undertake preparation of bankable project report
- b) Initiative land acquisition proceedings
- c) Allocation of water by State Government
- d) Appointment of Consultant for International Competitive Bidding (ICB) document preparation and evaluation
- e) Obtain various approvals and statutory clearances
- f) Tie-ups for off-take/ sale of power
- g) Initiate action for development of the power evacuation system and grid tolerance considering the addition of capacity by these projects
- h) Green field rating of project

#### **PAYMENT SECURITY**

- 9. The payment mechanism has been stipulated by Ministry of Power for off-take of power from these projects in the following manner:
  - a) Revolving letter of credit (LC) by distribution licensees

- b) Escrow account establishing irrevocable claims on receivables of utilities
- c) In case of default, direct supply to HT consumer as per provision of Electricity act, 2003

### **ROAD MAP FOR BIDDING PROCESS**

The bidding process with respect to Mundra UMPP is furnished below.

Activities	Tentative Schedule
a) Notice for Expression of Interest	31.01.2006
b) Bidders Conference for Mundra	21.02.2006
c) Submission of Expression of Interest	28.02.2006
d) Issue of RFQ Documents	31.03.2006
e) Submission of Bids (RFQ)	31.05.2006
f) Issue of RFP Documents	05.08.2006
g) Submission of RFP documents	22.09.2006
h) Selection of Developer/ Transfer of SPV	22.04.2007

10. On selection of successful bidder, the shell company ownership will be transferred from PFC to successful bidder.
11. The deficit in peak power demand in Gujarat would be 1785 MW in the year 2007-08 and 3656 MW by the year 2011-12. The peak power demand for the western region (Gujarat, Maharashtra, Haryana, Punjab, Rajasthan and Uttar Pradesh) would be 56,928 MW by the year 2006-07 and 78,849 MW by the year 2011-12. Even considering installation of new plants, there would be a shortfall of 22,829 MW by the year 2011-12 in the western region.
12. In terms of energy for Gujarat, there would be a deficit of 5237 Million kWh during the year 2006-2007. For western region, the deficit of energy by 2011-12 is estimated to be about 120,759 Million kWh, which is substantial.
13. Power Finance Corporation Ltd. (PFC) has been appointed as nodal agency with the task of establishment of ultra mega power project (UMPP) of 4000 MW (Nominal) capacity at Tundawand village of Mundra taluka in Kutch district of Gujarat. Coastal Gujarat Power Limited (CGPL) as special purpose vehicle (SPV) was incorporated by PFC to carry out various preparatory activities at site. These activities include initial and detailed survey, site selection, fuel tie up, expediting various clearances, preparation of the project report along with plant layout and detailed investigations. CGPL is entrusted to bring the proposed UMPP to a stage of readiness for handing over to developers, who would be selected through a process of competitive bidding. CGPL was transferred to Tata Power Company as a wholly owned subsidiary on 22.04.07.

14. It is proposed that the power generated from Mundra UMPP be allocated to states of Gujarat (1900 MW), Maharashtra (800 MW), Punjab (500 MW), Haryana (400 MW) and Rajasthan (400 MW). Electrical power flow transmission system studies have been assigned to M/s Power Grid Corporation Ltd. (PGCL) to augment the existing 400 kV/other transmission network in Gujarat and other states of western and northern regions.
15. The core team comprising engineers of CEA has carried out initial work on site selection, water availability, for the proposed Mundra UMPP. Some of the activities such as topographical survey, geo-technical investigation, hydrographic, seismic and oceanographical studies, area drainage, fuel transportation study, environmental studies, socio-economic studies, power evacuation and load flow studies, grid tolerance / system stability study, preparation of feasibility / project report for the ultra mega project are being outsourced. The consultants having adequate experience / exposure in respective fields have been appointed for respective activities. CGPL in turn have retained the services of TCE Consulting Engineers Limited to carry out the Environmental Impact Assessment study (Coastal) for the proposed 4000 MW (Nominal) UMPP.

#### **DESCRIPTION OF THE PROJECT**

16. The proposed power plant would be located at a site near south of Tundawand village in Mundra taluka of Kutch district in Gujarat coastal area. Proposed site is located at 22<sup>o</sup> 49' 48" N latitude and 69<sup>o</sup> 30' 58" E longitude. The site is well connected with State Highways No. SH-50 (Via Anjar) and No. SH-6 (Via Gandhidham) and would be nearer to the proposed NH-8A (Delhi-Kandala). The nearest railway station is Adipur, which is 57 km away from the proposed site. Adipur railway station is well connected to multi terminal Mundra port through broad gauge railway system privately owned by M/s. Adani Group.
17. The proposed 4000MW(Nominal) power plant would have 1242 Ha of land which includes 241 Ha of land for disposal of ash generated in 9 years. Approximately 182 Ha of land for colony has been identified within 3 km radius from the power plant. A total of 1242 Ha of area has been identified for project facilities. The site is plain/barren and sandy land. UMPP land under ownership of Govt. of Gujarat, MSEZ and private, is under process of acquisition. The proposed site has no inhabitation and is free of trees, vegetation and wild fauna life.
18. The proposed power plant with illustrative configuration of 5 x 800 MW (Nominal) units requires about 14.26Mm<sup>3</sup>/day (594,200 m<sup>3</sup>/hr) of water. The only source of water, required for the proposed thermal power plant is nearby sea (Gulf of Kutch), which is located at a distance of 2.5 km from the power project site. Sea water will be taken to plant boundary through open channel for condenser cooling and other fresh water requirement. Fresh water requirement would be fulfilled by installation of thermal desalination plant. Inorder to meet the cooling water requirements, once through cooling water system will be incorporated since the same found to be a least cost tariff option.
19. Overall length of intake channel (approx. width=100m) is about 6.5 km, which will be routed through Kotdi Creek. Length of outfall channel (width=60m) is nearly 4.9 km which will be routed through Mudhwa Creek. A precooling

channel will be provided, if necessary, to ensure that the temperature of hot water at the location of discharge meets the environmental stipulations.

20. Detailed studies including model studies will be carried out for finalizing the alignment and design of intake and outfall structures.
21. Coal for the project would be imported, sourced from countries like Indonesia Australia and south Africa through cargo vessels of capacity of 125,000 MT to the nearest Mundra port. The existing facilities at Mundra port for storage and handling of coal would not be adequate, hence, facilities at the port are to be augmented to meet UMPP requirement. MGR rail link has been indicated to the developer for transportation of coal from Mundra port to proposed power project site.
22. The steam generator (SG) would be designed for firing 100% imported coal. The SG would be of two pass design, radiant, single reheat, balanced draft and semi-outdoor type. Steam turbine would be a four cylinder reheat, extraction condensing turbine. It would be complete with all necessary accessories. Power evacuation and its transmission network would be developed. 400 kV system is proposed for cold start up power requirements of the plant and evacuation of power from the plant.. For the purpose of evacuation of the generated power it is currently proposed to have six nos.400KV transmission lines from the power plant connecting to the 400KV substations at Limbdi (chorania), Jetpur and Ranchodpura (Vadavi).
23. The imported coal will have maximum ash content of 15 % and a maximum of 1% sulphur .The annual coal consumption for the proposed 5 X 800 MW (Nominal) power plant is estimated to be 11 –13 million tonnes considering designed gross calorific value (GCV) of 5700 kcal/kg and worst coal having GCV of 5350 kcal/kg and considering an annual plant load factor of 85 %. The daily requirement would be about 35,000 tonnes based on design coal (GCV 5700 kcal/kg). .

### **EXISTING ENVIRONMENT**

24. Baseline environmental condition for ambient air quality was monitored for three seasons of the year 2006 -07. The average background concentration of the study area for SPM, RPM, SO<sub>2</sub>, NO<sub>x</sub> and CO was recorded. Average ambient concentrations of SPM, RPM, SO<sub>2</sub>, NO<sub>x</sub> and CO were observed to be 110.5, 67.9,11.5,16.7 and 1560.9 µg/m<sup>3</sup>, respectively considering all the Ambient Air Quality Monitoring Stations (AAQMS). The observed background ambient air quality values are well within the stipulated National Ambient Air Quality Standards (NAAQS) set by MOEF.
25. Meteorological data has been collected for wind speed, wind direction, relative humidity, temperature, rainfall, cloud cover and solar radiation for the year starting from March'06 to February'07. Yearly wind rose pattern during the study period indicated that predominant wind direction is from NNW and WSW sector with 5.4% calm condition.
26. Surface and ground water samples were collected during all season of the year, which were analyzed for their quality based on the parameters of Indian Standard IS 10500. The measured parameters are within the stipulations of the standard.

27. Noise levels were also monitored at all AAQMS. The monitored noise levels in the study area were also found to be within the specified limits of NAAQS with respect to noise.

### **ENVIRONMENTAL IMPACTS**

#### **MARINE ENVIRONMENTAL IMPACT ANALYSIS**

29. Separate marine EIA study had been carried out by NIO Mumbai. Rapid marine EIA report includes baseline on marine environment and impacts of proposed UMPP on sea water quality. This report had been separately submitted to CRZ committee of MOEF. MOEF has accorded CRZ clearance based on submitted Rapid marine EIA report.

#### **CONSTRUCTION PHASE**

30. Construction phase is going to last for nearly 4.5 to 5 years. Dust emission, noise and water pollution from the construction sites were assessed to be the major environmental impacts during the construction period. Dust pollution can be minimized by water spraying and proper maintenance of road. The compulsion of using pollution certification for properly maintained vehicles and proper maintenance of heavy machinery used during construction period will help in reducing the noise levels. Adopting good construction and engineering practices will help in mitigating the water pollution. Arrangements will be made for septic tank/pit to provide proper sanitary conditions at construction site. The impacts during construction are expected to be temporary in nature that will subside once construction period is over.
31. Temporary beneficial socio-economic impact in terms of increased jobs and availability of money to the workers and villagers settled nearby is expected during the construction period. Migration of workers population is expected to be minimum, as local workers from the nearby area will be preferred for temporary employment.

#### **OPERATION PHASE**

##### **Air Pollution**

32. The air pollutants from a power plant are:
- a) Dust particulates from coal and ash handling systems, fly ash from stack flues, fly ash dust particles from ash silos and ash disposal area
  - b) Sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) from flue gas
33. The applicable standard of 150 mg/Nm<sup>3</sup> for particulate emission will be followed. The electrostatic precipitators (ESP) proposed to be installed in the project will be designed to limit the emission level of the particulate matter.
34. Single-flue for each 800 MW (Nominal) unit is proposed to be constructed for effective dispersal of SO<sub>2</sub>. Two multiflue stacks (one with 3 flues and the second one with 2 flues, each flue of 7.5 m inside diameter) of 275 m height will be provided. This would meet the requirement of Indian Emission Regulation. Space provision is also made for future installation of flue gas desulphurization (FGD) unit.

35. To reduce NO<sub>x</sub> emissions, steam generators would be fitted with advanced low NO<sub>x</sub> burners. Further, over-fire air system equipment with air ports would be installed for the furnace. The NO<sub>x</sub> emissions would be checked for ground level concentrations (GLC) as per the above-indicated Indian Emission Regulations.
36. Coal dust would be generated generally at the conveyor transfer points, coal unloading area and coal stockpile area. Hence, track hopper, coal transfer points and coal stockyard would be provided with dust suppression facilities.
37. Dust collection system would also be provided in coalbunkers to evacuate dust and hazardous gases like Methane from the coalbunkers. Collected dust would be returned to either the associated belt conveyor or to the coalbunker. The dust collector outlet emission would be restricted to 100 mg / Nm<sup>3</sup>.
38. Fly ash evacuated from the ESP collecting hoppers would be transported in closed pipelines by pneumatic means. At the time of unloading fly ash in to the silos, some ash-laden air would get vented out. In order to restrict the fly ash dust particles to the limits of 100mg / Nm<sup>3</sup>., a vent filter would be installed on top of each of the fly ash silos at the vents.
39. The following pollution control measures would be installed for ash disposal :
  - a) To reduce the dust nuisance while loading the ash into the trucks from fly ash silos, the fly ash would be conditioned with water spray. It is proposed to cover the ash in the open trucks with tarpaulin to prevent flying of fine ash during transportation.
  - b) The ash disposal area would be lined with impervious lining to prevent seepage of water in the slurry or rain water from the disposal area in to the ground which will prevent contamination of ground water.
  - c) Arrangements would be made with private entrepreneurs for utilizing fly ash for commercial purposes.
40. US-Environmental Protection Agency's (US-EPA) Industrial Source Complex Short Term (ISCST3) is used for the air quality dispersion analysis. Impact on ambient air quality of the study area is predicted. The fuel is coal having particulates and sulfur. Therefore, emissions have been considered for SPM, NO<sub>x</sub> and SO<sub>2</sub>. Accordingly, air pollution dispersion modeling has been carried out for these pollutants. Since a stringent standard norm for particulate emission of 100mg / Nm<sup>3</sup>. will be followed, particulate emission from stack will be negligible. Meteorological data collected for all three seasons of the year were used for air quality dispersion modeling.
41. The incremental GLCs were predicted for SO<sub>2</sub>, NO<sub>x</sub> and SPM at all AAQMSs and within the study area of 25 Km. radius. The same were superimposed over maximum monitored background concentrations at all AAQMSs. The resultant back ground concentrations were found to be within the stipulated limits of NAAQS set by MOEF.
42. The maximum worst case incremental GLCs among all the ambient air quality monitoring stations of the study area were computed to be 42.7 µg/m<sup>3</sup> for SO<sub>2</sub>, 14.3 µg/m<sup>3</sup> for NO<sub>x</sub> and 2.1 µg/m<sup>3</sup> for SPM. These maximum concentrations were reported to be at Desalpar village. The incremental GLCs were superimposed on monitored maximum back ground pollutant concentrations at Desalpar. The predicted maximum worst case background

concentrations are therefore found to be 61.1  $\mu\text{g}/\text{m}^3$  for  $\text{SO}_2$ , 39.1  $\mu\text{g}/\text{m}^3$  for  $\text{NO}_x$  and 144.1  $\mu\text{g}/\text{m}^3$  for SPM within 25 km study area. The results are furnished in the following Table I.1:

**Table I.1**  
**Overall Worst Case Predicted GLCs at all AAQMS**

24 Hourly Concentrations	$\text{SO}_2$	$\text{NO}_x$	SPM
Baseline Maximum Monitored Concentration ( $\mu\text{g}/\text{m}^3$ )	18.4	24.8	142.0
Predicted Maximum Incremental GLC ( $\mu\text{g}/\text{m}^3$ )	42.7	14.3	2.1
Overall GLCs during Worst Case Scenario ( $\mu\text{g}/\text{m}^3$ )	61.1	56.5	144.1
NAAQS Limit (Rural & Residential) ( $\mu\text{g}/\text{m}^3$ )	80	80	200

43. The maximum worst case incremental GLCs of the study area for  $\text{SO}_2$ ,  $\text{NO}_2$ , and SPM during winter were calculated to be 63.1, 21.0 and 3.1  $\mu\text{g}/\text{m}^3$ , respectively. The same were superimposed over the maximum monitored background concentration observed during winter season. The result indicated that predicted GLCs are within the stipulated MOEF standards.
44. The results shown in above table indicate that predicted maximum worst case GLCs within the study area are found to be within the limit of air quality standard set by MOEF. However, space provision will be made for installation of flue gas desulphurization (FGD) unit in future, if required at any stage.

#### Coastal Fumigation Study

45. At coastal sites, sea breeze conditions exist for some period depending on the thermal differential between land and sea. Therefore, impact of coastal fumigation was also studied to assess the situation. This study indicates that effective plume height ( $H+\Delta H$ ) for effluent releases is greater than 1000 m. The majority of the plume will attain the height above the Internal Boundary Layer and as such the increase of GLC due to fumigation condition will not occur at this site.

#### Water Pollution

46. The sources of effluents from the proposed power plant are the following:
- Water treatment plant
  - Effluent from bottom ash handling system
  - Coal pile area run off
  - Air pre-heater wash water effluent
  - Plant wash down water
  - Floor and equipment drainage effluent

h) Sewage from various buildings in the plant.

47. Various water pollution controls measures would be undertaken depending on the type of effluent generated. Acidic/ alkali effluent would be drained into an underground neutralization pit. The treated effluent would be neutralized and led to guard pond. The ash slurry would be led to ash pond where ash would be settled and recovered clear water from ash pond would be led to sea. The effluent generated by washing of equipment and plant areas would be suitably led to settling basins / guard pond.

Thermal Pollution

48. As once through cooling system is proposed for the project, the cooling water return will be led to outfall structure leading to sea. An arrangement of pre-cooling channel would be provided if required, which will dissipate cooling water temperature to surrounding atmosphere. The resultant discharge water temperature shall meet MOEF norms.
49. The predicted temperature of the flue gas at exit of the boiler would be 134.5 °C. The heat flux of discharged flue gas from the height of 275 m stacks will not be significant and it will not have any impact at structures on ground, vegetation and human beings. Hence, proposed UMPP would not have significant impact on heat flux of the surrounding environment.

Noise Pollution

50. The source of noise in a power plant are :
- a) Steam turbine generator
  - b) Other rotating equipment
  - c) Combustion induced noises
  - d) Flow induced noises
  - e) Steam safety valves
51. The steam turbine generators would be housed in closed buildings, which would considerably reduce the transmission of noise from the steam turbine generators to the outside environment. The maintenance and plant operating personnel working within the steam turbine generator building would be provided with adequate personal protection against noise.
52. Provision of 100 m wide green belt will attenuate considerable portion of generated noise apart from the natural attenuation achieved due to moist air through the noise traveling up to plant boundary.

Socio-Economic

53. Proposed UMPP site has neither villages, inhabitation nor permanent structures. Hence, rehabilitation and resettlement (R & R) issues are not involved that could alter the existing socio-economic pattern.
54. Most of the people around the site have an income directly or indirectly from agriculture and other service related work. Proposed green field project will employ local people both during construction and operation phase of the project. Infrastructure facilities and amenities developed for the project could be also used by local villagers. The project will improve the infrastructure

facilities and amenities of the study area. Therefore, socio-economic impact of proposed plant is expected to be positive.

55. Since power is the wheel for any of the development, the surrounding villages and region would get maximum benefits out of generated electricity. The benefits may be realized either as up coming of industries and its allied ancillary units. Other benefits would be generation of either direct or indirect employment to the locals. The ensured and reliable supply of power to upcoming industries and surrounding region would be a boon for development of the region. The locals of the project area are expected to get more benefits from the proposed power project.
56. The overall impact of the project is expected to be positive.

#### ECOLOGICAL

57. Both terrestrial and marine ecology of the surrounding areas including MGR system were studied. Natural vegetation of the surrounding area was dominated with *Prosopis juliflora* as an open scrub forest. Mangrove vegetation were not recorded in close vicinity of the proposed project site.
58. Since the proposed project is consisting of barren sandy area with minimum cultivation and patches of thin vegetation, the setting up of project will not require tree felling , rehabilitation and resettlement. Hence no adverse impact is expected on ecology and land use of the surrounding study area.
59. The site is remotely situated from metropolitan city or eco-sensitive spots including national parks, wildlife sanctuaries, historical, religious and cultural sites, defence installation, tropical forests, biosphere reserves, important lakes, etc. Therefore, impacts are not envisaged for the mentioned sensitive locations.
60. The predicted incremental GLCs of SO<sub>2</sub>, NO<sub>x</sub> and SPM are not sufficient enough to have any adverse impact on the open scrub forest of the surrounding study area. Addition of 33% of the project land for greenbelt area would improve the aesthetic look and surrounding environment and ecology. Hence, impact of the proposed UMPP is expected to be positive on surrounding environment.

#### SOLID WASTE MANAGEMENT

61. Generated coal dust will be suppressed using dust suppression /dust extraction facilities. Total area identified for ash disposal is about 241 Ha, which will be adequate for storage fly ash generated for the about 9 years and bottom ash storage for operational period of the plant. Ash disposal would be followed by stabilization of the area using plantation and other suitable technical measures till the ash pond is full. This practice would minimize fugitive dust emission.
62. MOEF notification on utilization of fly ash would be implemented for utilization of 100% fly ash within 9 years after the commissioning of the proposed project.
63. The required consent for handling and disposal of solid waste would be taken before commissioning of the proposed project. Therefore, proper disposal and management of generated solid waste would not pose any pollution problem to the surrounding environment.

### POLLUTION MONITORING AND SURVEILLANCE SYSTEM

64. A well-defined environmental monitoring programme would be emphasized with trained and qualified staff that would monitor the ambient air as well as stack gas quality to ensure that the pollutants level is always maintained within the permissible levels.
65. The emission and gas monitoring systems installed in this project would consist of the following :
  - a) Flue Gas O<sub>2</sub> and CO Monitoring: These would be measured at the economiser outlet. In addition, O<sub>2</sub> would be monitored at the air pre heater outlet.
  - b) Stack Emissions: Flue gas letting into the atmosphere would be monitored for CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, SPM and opacity. Stack emission readings would be sent to the DCS for monitoring.
  - c) Ambient Air Quality Monitoring: Ambient air quality monitoring stations would be set up to monitor the air quality in the neighbouring villages. The parameters to be monitored are suspended particulate matter (SPM), respirable particulate matter (RPM), sulphur di-oxide (SO<sub>2</sub>), and nitrogen oxide (NO<sub>x</sub>).
  - d) Water Quality Monitoring: Effluents generated from various sources will be monitored. The ash pond effluent would be analyzed weekly for pH and suspended solids. Sampling and monitoring area will cover locations around intake and outfall structures. This will be implemented through qualified persons who will be in-charge of monitoring.
  - e) Marine Environment: Post project periodical marine environmental monitoring shall be carried out for shoreline and sea floor changes, quality of water, sediment, mangroves, seaweeds and fishery resources. Intake and out fall channels will be monitored regularly for instant ambient temperature and alkalinity.
  - f) Meteorological Data: Meteorological station will be set up to monitor wind velocity / direction, temperature, rain fall, relative humidity, cloud cover, solar radiation and barometric pressure.

### RISK ANALYSIS

66. Electro chlorination or chlorine dioxide is proposed for CW system chlorination. Therefore there is no risk of chlorine gas leakage.
67. All equipment vulnerable to explosion or fire would be designed to relevant IS codes & statutory regulations. Suitable fire protection system comprising hydrants and spray systems would be provided for fire protection.

### SUMMARY AND CONCLUSIONS

68. Emissions from the proposed project will not degrade the ambient air quality of the surrounding areas. The impact on water, noise level, soil and land use is expected to be negligible. Impact on ecology, socio-economics, amenities and infrastructure of the study area is expected to be positive. All necessary pollution control measures would be installed for minimizing any impact foreseen due to proposed power project.



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69. Power is the wheel for any development. The surrounding villages, neighboring states and particularly Gujarat State would get maximum benefits out of generated electricity. The benefits may be realized either as up coming of industries or allied ancillary units. Other benefits would be generation of either direct or indirect employment to the locals. The assured and reliable supply of power to upcoming industries and surrounding region would be a boon for development.
  70. The setting up of the proposed power plant will not degrade the quality of surrounding environment. It would contribute towards the improvement of the socio-economic status of the surrounding areas.