

ANALYSIS OF ENVIRONMENTAL IMPACT ASSESSMENT OF MINING PROJECTS AND THERMAL POWER PLANTS OF CHANDRAPUR REGION

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Abstract: - Environmental protection is an important issue in all Industrial, hydroelectric, mining, power plants project. Industrial activity and their procedure influence the environment and metrological changes. Industrial activity are pursued in India without focussing on environmental issue, due to natural resources are in pressure and also creating adverse effect on human health, this environment changes because of unplanned and unsuitable development. Hence India's governments introduced Environmental impact assessment (EIA) in 1994 under environmental protection act of 1986 to plan activity in sustainable and effective way. During this period of 25 year since 1994 numerous impact assessment have been conducted. Environmental impact assessment (EIA) involves identifying, measure and assesses the impact. This complicate process deals with considerable amount of information and require processing and analysis of quantitative data, qualitative information as well as expert judgement.

Under this various process of Environmental impact assessment(EIA), methodology, principles, various impact considered in Environmental impact assessment, structure of Environmental impact assessment document will be taken under study and all this study will be compare with actual field study of mining project and chandrapur super thermal power plants. The aim of study is to examine all aspects and activity of selected project in terms of its impact on the environmental component and to know the strength of environmental pollution control measure adopted. In order to identify environmental impact of selected place several interviews with the relevant authorities will conduct and present status of environment in chandrapur area will know. In addition to its public opinion survey of project affected people will conduct and conclusion from field survey will draw This study has been undertaken to investigate the determinants of stock returns in Karachi Stock Exchange (KSE) using two assets pricing models the classical Capital Asset Pricing Model and Arbitrage Pricing Theory model. To test the CAPM market return is used and macroeconomic variables are used to test the APT. The macroeconomic variables include inflation, oil prices, interest rate and exchange rate. For the very purpose monthly time series data has been arranged from April 2017 to Jan 2019.

KEYWORDS- EIA, Air Pollution, Water Pollution, Noise Pollution, Land

I. INTRODUCTION

Environmental impact assessment (EIA) involves identity, measure and assessing impacts. This process deals with sufficient amount of information and requires process and analysis of data, qualitative information as well as expert judgment on it. Central Pollution Control Board (CPCB) has identified around many major industrial clusters in the country as "critically polluted". To examine the impacts of the industrial projects on Chandrapur, we conducted a case study on the EIA of mining projects. Various Mining Underground Project is located in Chandrapur district of Maharashtra State and administered by Chandrapur Area of Western Coalfields Limited. Chandrapur city and its surrounding area were declared 4th in the list of critically polluted areas. Western coal field Ltd has 30 coal mines. Based on the coal reserve on super thermal power stations, 6 captive power projects, 4 cement factories, 2 steel plants, 6 sponge iron plants and near about 200 small companies in Maharashtra industries development corporation areas. Four major industries clusters are polluted like Ghugush, Tadali, Ballarpur, Gadchiroli, Durgapur, Bhadrawati and warora. Villages are mainly affected from air pollution, groundwater has depleted, agriculture lands are affected, gradual rise in temperature especially in summer (up to 52 degree Celsius), and health is at risk. There are no national parks, wildlife Sanctuary, Biosphere Reserve found in 15 km buffer zone. The project does not involve modification of drainage. Mining will be underground by Board & Pillar method involving hydraulic sand stowing. The extension project does not involve change in land requirement, mining technology, displacement, Manpower, and no fresh source of the water. Mineral transportation of coal is by trolley from mine face to surface to CHP located near the Incline mouth and thereafter by road and by rail the railway siding located at a distance of 2 km. Ultimate working depth of the mine is 275m below ground level. Mining has intersected water table, which is in the range of 3 to 14 m.

Environmental Impact Assessment (EIA) is a process to assess the environmental consequences of any project and design proper mitigation plans to minimize the possible adverse impacts. It is a process of identification, prediction, evaluation, and mitigation of biophysical, social and other relevant effects of developmental activity on environment prior to make commitment. EIA is used to identify, predict, evaluate and mitigate the environmental, social and other potential impacts and consequences of projects prior to major decisions being taken and commitments made to recommend suitable mitigation measures and to decrease possible adverse impacts. It is a good management tool to predict the type, magnitude and probability of environmental and social changes likely to occur as direct or indirect result of a plan or policy and to decrease adverse impacts. Environmental Impact Assessment is usually considered as the appraisal of impacts that any developmental activity may affect on the environment. Environmental impacts may be positive or negative, harmful or beneficial. EIA process implemented prior to any developmental project in order to ensure that no adverse impact will be faced by the environment. Human activities are both beneficial and harmful for environment such as biological, cultural, social, economic impacts and so on and they must be taken into consideration when the development projects or plans are evaluated. In this view, EIA process should be used as a decision making tool rather than decision aiding tool. EIA method helps in providing a guideline to select and design the project, plan or activity with long term viability and to improve cost effectiveness.

II. OBJECTIVES OF PROJECT

The main objectives of the study are:

- To study the effect due to mines (coal) and power plants on the environment.
- To study the principles, processes, methodology, components and actors involved in the EIA and generic structure of EIA.
- To study the Environmental Impact Assessment of coal mines (underground mine).
- To study the mitigation measures used to control and reduce adverse impacts on environment.
- To study the public opinion of affected people due to mining and conclude their views.

III. LITERATURE REVIEW

[1] Galina Ivanova(2007): The coal mining industry makes a key contribution to the Queensland economy, and is the underlying driver of employment and economic conditions in many local and regional communities. This article aims to focus on how the social and economic impacts of mining should be assessed and negotiated with local and regional communities.

[2] M.Monjezi(July 2009): Mining is widely regarded as having adverse effects on environment of both magnitude and diversity. Some of these effects include erosion, formation of sink-hole, biodiversity loss and contamination of groundwater by chemicals from the mining process in general and open-pit mining in particular. As such, a repeatable process to evaluate these effects primarily aims to diminish them. This paper applies Folchi method to evaluate the impact of open-pit mining in four Iranian mines that lacked previous geo-environmental assessment. Having key geologic resources, these mines are: Mouteh gold mine, Gol-e-Gohar and Chogart iron mines, and Sarcheshmeh copper mine.

[3] Mai Fangdai(May 2011): The environmental impact post assessment is a further extension and improvement on the basis of environmental impact assessment. There is an important role to improve the effectiveness of environmental impact assessment and guidance to carry out environmental protection. In our country, coal mining environmental impact assessment study is still in the exploratory stage. This paper systematically discusses the impact of coal mining on the environment, focusing on coal mining environmental impact assessment contents.

[4]Environmental Impact Assessment: Insights from mining communities in Ghana(December 2014): The object of this paper is to ascertain the level of Environmental Impact Assessment (EIA) compliance of mining companies in selected mining communities in Ghana. Over the past three decades, Ghana has demonstrated considerable commitment to the conservation and management of bio-physical and socio-cultural environment. Laws and regulations have been enacted to monitor and ensure compliance for sound environmental management by mining companies. Contextually, this paper examines how communities affected by large-scale mining perceive EIA compliance and their expected role in the design and implementation of the process Thetemplateisu

IV. METHODOLOGY

- At first stage we have collected all the data and the research paper on the EIA of mining projects and studied them deeply.
- Then we gave visit to Maharashtra Pollution Control Board (MPCB) and (Western coal Ltd) WCL mines for the data required for the case study.
- The field survey has been carried to collect the opinion of expert of the project and the people of the affected area.
- The concluding remark based on the study was made.
- In the next stage we did a case study on mining projects in the Chandrapur region and Western Coal Limited (WCL) Mines.
- Case study includes study of environmental study report and public opinion survey on respective project.
- In the final stage, we concluded the impacts of the projects on the environment and gave suitable mitigation measures to reduce them.

4.1 Methodology of Sampling and Analysis:

4.1.1 Processing Of EIA

The Environmental Impact Assessment entails nine steps, where in each step is equally significant in influencing the overall performance of the project.

4.1.2 Screening: First stage of EIA, which determines whether the proposed project, requires an EIA or not. If it does, then the level of assessment required.

4.1.3 Scoping: Scoping is identify problems that need to be mitigated or that may cause the project to be cancelled. This stage also defines the boundary and time limit of the study.

4.1.4 Public Involvement: This aim to assure the quality, comprehensiveness and effectiveness of the EIA.

4.1.5 Impact Analysis: This stage of EIA identifies and predicts the likely environmental and social impact of the proposed project and evaluates the significance.

4.1.6 Mitigation: EIA, mitigation measures are proposed to avoid or reduce environmental and social Impacts.

4.1.7 Report: Report is summarizes the description of the project, baseline conditions, important findings, regional setting, and impact prediction of the study.

4.1.8 Review of EIA: It examines the adequacy and effectiveness of the EIA report and provides the information and effectiveness decision-making.

4.1.9 Decision-making: It decides whether the project is rejected, approved or needs further change.

V. IMPACTS OF MINING PROJECT ON ENVIRONMENT

5.1 Effect on Water: Mining can have adverse effects on surrounding surface and groundwater if protective measures are not taken. The result can be unnaturally high concentrations of some chemicals, such as arsenic, sulphuric acid and mercury over a significant area of surface or subsurface. Large amounts of water produced from mine drainage, mine cooling, aqueous Extraction and other mining processes increases the potential for these chemicals to contaminate ground and surface water.



Figure 2 surface water pollution due to Industries and mining

5.2 Effect on Air: The ambient air of Chandrapur region has SPM (suspended particulate matter) and RSPM (respirable suspended particulate matter) more than acceptable limits during most of the time. The National Ambient Air Quality Standards' (NAAQS)-24 hours' time weighted average standards for RSPM and SPM concentrations are 100 $\mu\text{g}/\text{m}^3$ and 200 $\mu\text{g}/\text{m}^3$ respectively for residential and rural areas ambient air quality. The same for industrial area are 150 $\mu\text{g}/\text{m}^3$ and 500 $\mu\text{g}/\text{m}^3$ respectively. Ambient air had a lot of dust, including ash, soil dust from roads, and coal dust. The coal dust comes from the stock yards, the heavy and continuous transport of coal in the area and from fugitive emissions from coal handling.



Figure 1 Air pollution due to Chandrapur power plants



Figure 2 Effect of air pollution on transportation

5.3 Effect on Humans: Humans are affected by mining. There are many diseases that can come from the pollutants that are released into the air and water during the mining process. Most of the miners suffer from various respiratory and skin diseases. Miners working in different types of mines suffer from asbestosis, silicosis, or black lung diseases.

5.4 Effect on Land: Mining causes physical destructions to the surrounding area by creating landscape blots such as open pits and piles of waste rock. Such disruptions contribute to the deterioration of the plants animals. The surface features that were present before mining activities cannot be replaced after the process has ended. Landscape declination caused by ground movements on the surface of the earth as a result of collapsing overlaying sheets cause damage to roads and buildings properties.



Figure 3 Degradation of Soil due to coal mine

5.5 Depletion of Ground and Surface Water Resources: One of the most serious impacts on water resources observed by the team was the drying up of ground water sources like wells and tube wells in the vicinity of coal mines. The digging to very low levels for extraction of coal (about 100-200 feet for opencast mines and about 300-400 feet for underground mines) disrupts groundwater aquifers and groundwater flows, and as a result, wells and tube wells in an area of 4-5 km radius have either totally dried up or dry up soon after the monsoon. Even surface water sources like nallahs and tanks / ponds face similar problem. Villages are now facing difficulty in even meeting daily water need while agriculture is also severely impacted. Another problem in this

regard that was mentioned by the local villagers was that even wild animals get affected by this and when they don't find Water they come to the mines where they themselves often get killed and also become a risk for the local populations.



Figure 4 Degradation of surface water bodies

VI. ENVIRONMENTAL POLLUTION CONTROL MEASURES

6.1 Land Management: Underground mining method of coal extraction injection with hydraulic has been adopted in this mine, it is anticipated that no serious damage escape and land use pattern will occur in this region. Detail control measures to be adopted for controlling the subsidence as far as its possible to perform has been discussed here. The control measures to be adopted are as follows:-

- Grounding the depillaring area correlated on the surface, protective bunds and the garland drains shall be laid so that no water from surface enters the subsistence area and throw the crack to the working area.
- The surface crack shall be sealed by using shale, clay or other suitable material.
- Depressed portions shall be levelled up using soil, clay or other suitable material.
- There is also a statutory requirement to monitor subsidence regularly. For this purpose, grid pillars shall be located 30m apart at the surface, over the working panels and at intervals of 50m beyond. Level section shall be taken every month and plotted. This will provide information regarding progress of subsidence in stability of equilibrium conditions are reached.
- Any cracks or potholes formed consequent to underground coal extraction would be filled up from time to time. However, the entire operation will be carried strictly in accordance with the permission of DGMS and related guidelines. Regular monitoring will be carried out and records will be maintained as per statue.

6.2 Air Pollution:

- Overloading of truck is avoided during coal transportation, preventing the spillage. Covering of coal transportation has been implemented.
- Dust suppression by water spraying is being done in CHP.
- Dry sweeping of coal transportation road is also done regularly.
- Adequate number of trees shall be planted so far around infrastructure colony, along road, etc. In future plantation programme continued.
- Regular monitoring of ambient air quality in and around the project will continue to be done during the balance life.

6.3 Water Pollution:

6.3.1 Domestic Effluents: To deal with the domestic effluents, adequate disposal scheme has been made by providing Septic tank and soak pit residential unit.

6.3.2 Industrial Effluents: So far as this UG mine is concerned, the quality of industrial effluent is negligible.

6.3.3 Mine Water: The quality of pumped out water from mine is quite satisfactory is being monitored regularly as per Environment (Protection) Amendment Rule such that possibility of any adverse effect on natural watercourses is ruled out.

6.3.4. Noise pollution: Preventive maintenance of vehicles, plants and machineries. As far as practicable provision of silencers, mufflers equipment has been made. Personal protective gears to expose to high noise level have been provided. Provision of noise absorbing pads at the foundation of the equipment Provision of green belts around the areas where excessive noise to be produced will be helpful in minimizing-propagation of noise. Regular monitoring of noise level of the project area.

VII. ANALYSIS AND RESULTS

7.1 General Description of Project:

(1) Name of Research project: Expansion of Ballarpur U.G. Coal mines consisting underground Mine WCL.

(2) Location of Project: Underground Mining project is located in Chandrapur district of Maharashtra State and is administered by Chandrapur Area of Wesern Coalfield Limited.

(3)Climate: The climate of the area is dry to moist tropical with well-defined summer from April to June, rainy season from July to September and winter from December to January. In summer, the temperature generally goes to a maximum of 48oC whereas in winter, it falls to a minimum of 10oC. The average annual rainfall is about 1200mm.

(4)Industry: beside other coalmines, Maharashtra twin Super Thermal Power stations operated by MESB falls in the vicinity of project area.

(5)Pollution Due to Other Sources: The above-mentioned industries are also likely to contribute in increasing the pollution of area.

7.2 Frequency of Monitoring:

7.2.1 Air: Frequency of monitoring as per the Environmental (Protection) Amendment Rules Published wide Gazette date. 25.9.2000 Water: Water Quality is monitored on fortnightly basis.

7.2.2 Noise: Noise level is monitored on fortnightly basis.

7.2.3 Water: Mine water discharge is collected on fortnightly basis in plastic zaricane and is transported to the laboratory for analysis. As per the Environmental (Protection) Amendment Rules Published wide Gazette2000, water samples are analysed fortnightly for the parameters- pH, TSS, Oil & Grease and COD and once in a year for all parameters as per schedule

7.3, Environmental Protection rule.

7.3.1 Noise: Day time and night time noise level data are recorded fortnightly.

7.3.2 Air: 24 hourly air samples are collected Respirable dust Sampler at selected locations to monitor ambient air quality w.r.t. Suspended Particulate matter (SPM), Respirable Particulate matter (PM-10), Sulphur di-oxide (SO₂) and Oxides of nitrogen (NO_x) etc.

VII. CONCLUSIONS

- Negative impacts of this projects are for long period over 40-50 years after commencement of project because of complete change in land pattern and its physical properties.
- Temperature in the surrounding area rises due to emission of huge amount of fly ash and toxic gases in Atmospheres from the power plants.
- Presence of dust content in air due to transportation of coal from mines contaminates it causing various fatal diseases.
- Huge land being used in mines and power plant and also particulate matter reduce land fertility making it Improper certain regular crop. Gases released, make fog thick, reducing visibility and causes road accidents.
- An underground mines reduces the ground water level of the nearby Chandrapur area.
- Up to 6 km distance from point of discharge of treated effluents, the water is unfit for any domestic use.
- Project affected people and project benefited people have different views regarding the project; hence public opinion survey should be conducted for both category of people. Even though Mining and Thermal Power project contributes major portion to overall development but it causes extensive damage to environment.

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