

Environmental Impact Assessment (EIA) Study of Coal Mines: A Critical Review

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Abstract— EIA is to study the effect of coal mining activities on the environment through quantifying and assessing various environmental parameters seasonally and annually. EIA is a study of a project on the environment to mitigate problems with proper use of technology and generation awareness among people. This paper briefly highlights EIA and its importance for coal mining projects.

Index Terms— EIA, Coal, Mining, mineral, parameter, legislation.

I. INTRODUCTION

EIA identify or evaluate the potential, beneficial and adverse impact of the coal mines project development on the environment [1]. EIA is a systematic evaluation of the potential impacts of coal mines project, on legislation action relative to the total environment [2].

EIA with an objective to analyze the probable changes in the physical, bio-physical and socio-economic environment of the proposed project. The prediction and evaluation of the environmental consequences enable the planner to plan better to avoid irreparable damage to environment and ensure sustainable development [3].

Coal is one of the most principle minerals fuel known to be a fossil fuel. It is an organic rock which content mostly carbon, but also hydrogen, sulfur, oxygen as well some inorganic mineral and water [4].

Coal mining having adverse impacts on land, air, water, biodiversity, loss of livelihoods etc. due to displacement and encroachment of land [5].

EIA is an important procedure for insuring that the likely effects of new development on the environment are fully understood and takes into account before the development is allowed to go ahead [6].

II. PROCEDURE OF EIA

EIA is systematic process that examines the environmental consequences of the developmental action in advance. The emphasis of EIA is on the prevention through continuous monitoring of air, water, vegetation, land & people of the

surrounding area of proposed project. The EIA process involves a set of steps given as follows:

1. Screening of impacts.
2. Scoping & consideration of alternatives.
3. Baseline data collection.
4. Impact prediction.
5. Environmental management plan (EMP).
6. Decision making.
7. Monitoring of air, water, noise, biodiversity, social etc seasonally and annually.
8. Assessment of alternates.
9. Public hearing.
10. Secondary data collection for air, water, noise, vechiel, social etc [7].

III. EIA RULES AND REGULATION

1. Mineral concession rules 1960 - The mineral concession rule (MCR) outlines the procedures and mining lease. The rules also stipulate that mining plan shall incorporate, among others, a plan of the area indicating water source, limits of forest areas, density of trees, impact of mining activities, etc control devices and such measures as may be directed by concerned central and state government agencies [8].

2. Mineral conservation and development rules 1988 - The MCDR lay down guidelines for insuring mining or a scientific basis, while conserving that environment at the same time. The MCDR also governs the specification in terms of submission and reporting in case of reconaissance, operations, prospecting or applying for a mining plan [9].

3. Environmental legislation- Environmental legislation is covers many areas including comprehensive environmental impact analysis to insure that projects are ecologically destructive are not allowed, identification of no-go areas, specific forests and wildlife to protect by biodiversity and regulation governing mine closer and mine restoration. There are five main environmental acts, which impact mining industries in India.

- a. The water (prevention and control of pollution) Act, 1974.
- b. The Air (prevention and control of pollution) Act 1981.
- c. The Environment (protection) Act, 1986.(with rules 1986 and 1987) (EPA).
- d. The Forest (conservation) Act 1980 (amended in 1988).
- e. The Wildlife (protection) Act 1972(amended in 1991) [10].

4. ISO 14000:2008- ISO 14000 is actually a series of international standards on environmental management. It provides a frame work for the development of both the system

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and the supporting audit program. This offers guidelines for quality and /or Environmental management system auditing. It supersedes a number of standards including ISO 14001, 14004, 19011, 14010, 14012, [11].

5. BIS: The erstwhile Indian Standards Institution (ISI) was established in year 1947 (now bureau of Indian standard) with the objectives of harmonious development of standardization activities in India.

It includes IS 9679: 1980, IS 10245:1982, IS 14489:1998, IS 15793:2007, IS 18001:2007, IS 13624:1993, IS 13969:1994, IS 14476:1998, IS 6748(part-1):1973, IS 1583:2008 etc. are some of IS for environmental related monitoring and its accurate measurement to avoid any error at international forum [12].

IV. EIA METHODOLOGY

A. ASSESSMENT OF LAND ENVIRONMENT

The impacts on land environment would be in the form of temporary or permanent change in land use pattern as well as direct and indirect impacts on surrounding land due to pollution discharge, so in such cases the EIA of soil or land the proper collection and assessment of representative soil samples, and assessment of productivity and fertility of representative soil within the study area.

B. ASSESSMENT OF NOISE ENVIRONMENT

Studies pertaining to noise environment where conducted as follows-

1. Reconnaissance.
2. Identification and characterization of noise source.
3. Measurement of baseline noise level in the study area.
4. Measurement of prevailing noise levels due to vehicular Movements.
5. Stabilizing existing status of noise levels in residential, Commercial, industrial areas and silence zone within the Mining zone.

C. ASSESSMENT OF AIR ENVIRONMENT

A methodologically designed air quality surveillance program (AQSE) was adopted as the basis to determine the impact assessment of air environment. The basic considerations for EIA of air environment include –

1. Representative selection of sampling location primarily guide by the topography and micro-meteorology of the region.
2. Adequate sampling frequency.
3. Monitoring of the index pollutants.
4. Proper and carefully collection of surface
5. Meteorological data like wind speed, wind direction, Relative Humidity, Rainfall, Atmospheric, Temperature etc.
6. Proper management of measurement of 24 hourly.
7. Average concentrations of SO₂, NO_x, HC, SPM, RSPM, PM₁₀ & PM_{2.5} etc parameters.

D. ASSESSMENT OF WATER ENVIRONMENT

For the proper assessment of EIA on water environment is conducted as-

1. Proper collection of surface as well as ground water for determining the quality of water within the study area.
2. Proper assessment of planktonic environment (phytoplankton & zooplankton) of enumeration, indices and distribution of rivers and ponds.
3. Proper and carefully data collection of water quality parameter which if found within the study area.

E. 5. ASSESSMENT OF BIOLOGICAL ENVIRONMENT

Study of biological environment is one of the most important components for EIA. For the EIA of biological environment (biotic and abiotic component) management plan following steps needs-

1. Proper collection of information about wildlife Sanctuaries/ national parks/ biosphere reserves of any in the vicinity of the project area.
2. Carefully assessment of species diversities, genetic Diversities, densities abundance etc. within the study area.
3. Proper and carefully collection of data of flora and fauna (rare, endangered and venerable species) within the mining area

F. ASSESSMENT OF SOCIAL ENVIRONMENT

Social environment assessment can be monitored through studying the social status around the coal mining project annually.

This can be done through door to door survey on the basis of evaluating matrix based on the social amenities and resources and effectiveness of the proposed project. Public response through meeting, awareness camp and questionnaire survey.

The quality of life must be evaluated annually and assessed in context of local, regional and national level. This helps in up gradation and improvement of in and around environmental condition of coal mining projects [13].

V. CONSTRAINTS

The process of EIA and criteria to identify constraints to development of project area has been designed below.

1. Land use policies and resource management initiatives that pertains to the project.
2. Abnormal traditional land use.
3. All known trap lines.
4. The environmental setting.
5. Cumulative environmental impacts of the region.
6. Cumulative social impact of the region.
7. Results of projects specific or regional monitoring.
8. Potential for new or additional technology to increase resources recovery at later time.
9. Potential for changes in the regulatory regime.
10. Possibility of lack of complete monitoring and compliance of EC conditions no cross check system to

validate the monitoring.

11. For the EIA process conducting there is no good technical evaluation, measuring the quality of EIA reports, reliable baseline secondary environmental data of that area [14].

VI. ECONOMICS

The process of EIA is to perform seasonally, annually and wisely accordance with environmental components. This has to be reviewed and evaluated by outside agency and scrutinized intensively for continuous improvement process and maximum benefits to the coal mining project surroundings. An approximate expenses cost of Rs: 6-18 lacks annually to perform this study depending upon the project size and area to be covered with environmental component included for EIA [15].

VII. FUTURE SCOPE

EIA is having a very useful practice in upcoming future because the developing countries are progressive towards a harmful and less health supporting future. The life sustaining measures are mostly requiring which can only be recovered by EIA [16].

The EIA report shall be prepared considering applicable regional and national legislations, code of practice, guidelines, policies, standard and directives [14].

As it was introduced in 1994 where it was relied on institutional framework that has a strong supportive legislative, administrative and procedural setup [17].

VIII. CONCLUSION

In order to save our ecosystem it is very necessary to a well planned mining thus, EIA plays a vital role in these situation. It tells how to exploit the coal for human with wisely, thus EIA has a great impact on a country development. It has been recognized that India is a well in adopting legal provisions, which are very essential for future. Strengthening of the EIA process thus, further recommended project level EIA needs an immediate attention but efforts should also be targeted. Such initiative could help in filling up the gaps and co-ordination between various governments authorities planning and execution of the coal mine in our country.

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