A STUDY ON ENVIORNMENT IMPACT ASSESMENT IN BHEL HARDWAR

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A thesis submitted in partial fulfilment of the requirements for the Degree of
Master of Technology
(Health, Safety and Environment)

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College of Engineering
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APPROVAL SHEET

This is to certify that the project titled

"A STUDY ON ENVIORNMENT IMPACT ASSESMENT
IN BHEL HARDWAR"

Has been satisfactorily completed by the **Anirudh Kumar -R070208003** of M. Tech HSE course at the University of Petroleum & Energy Studies during the academic year 2009 - 2010

This report has been submitted in partial fulfilment of the requirement

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Master of Technology (HSE)

As prescribed and approved by the University of Petroleum & Energy Studies.

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BHARAT HEAVY ELECTRICALS LIMITED

RANIPUR, HARIDWAR

HUMAN RESOURCE DEVELOPMENT CENTRE

No.: 3758

Training Certificate

Mr./Ms. ANIRUDH KUMAR S/o/D/o PREMSINGH

a Student of (College) UNIVERSITY OF PETROLEUM & ENERGY STUDIES Branch M.Tech. (H.S.E.) has

Undergone Practical Training From 23/01/2010 to 22/02/2010 in the organization.

His/ Her field of training was :

STUDY OF "EIA" IN BHEL, HARIDWAR

FOR SIX MONTH PROJECT DURATION

His/Her performance and conduct during the above training period was found Very Good. This training imparted is under the curriculum of the Institute of Study.

Dated 12/03/2010

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Incharge/ Vocational Trg.
(Sign. & Seal)

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Anirudh Kumar

ABSTRACT

As EIA is included regular activity of PCRI, the spring session REIA (Rapid Environment Impact assessment) was carried from January 2010. Mr. Bhojraj (Senior Manager) was in charge of spring session's REIA. As new block of HEEP (Block No. 8) is under construction, CPRI performed EIA of block 8 in same month.

My project was under guidance of Mr. Bhojraj (S.M. PCRI) for REIA, information, collection of Parametric Result & report was guided by my External & Internal Guide. According to my best of knowledge I enable to collect following during my project-

- Actively participation for collection of data under guidance of my guide.
- Generation of Result related to Project's objectives.
- Preparation of Project report.

FINDINGS:

- Study of Impact on Air quality as compared to the existing environment. Quality and comparison with National Standards (CPCB and MOEF) Includes the various gases pollutants and SPM.

- Study of Impact on Water quality and damage to the Eco-system in terms of Effect on the potable natural over ground resources, impact on life and flora and Fauna (Bacteria, fungus etc.).

- Study of Impact on social cultures, habits, profession and sports.

- Study of Review conformance to Laws and standards.

NOMENCLATURE:

1. BHEL	Bharat Heavy Electrical Limited
2. HEEP	Heavy Electrical Equipment Plant
3. CFFP	Central Forging and Foundry Plant
4. AC/DC	Alternative Current/Direct Current
5. ISO	International Standard Organization
6. PCRI	Pollution Control Research Organization
7. REIA	Rapid Environment Impact Assessment
8. NEPA	National Environment Protection Agency
9. MEF/MOEF	Ministry of Fnvironment and Forest
10. dB	Decible
11. CPCB	Central Pollution Control Board
12. NAQM	National Air Quality Measures
13. SPM	Solid Particulate Matter
14. RSPM	Residual Solid Particulate Matter
15. SO2	Sulphur Di Oxide
16. NOx	Oxides of Nitrogen
17. CO(ppm)	Carbon monoxide
18. BDL	Below Define Limit

CHAPTER I

1.0 INTRODUCTION:

Establishment of Industries offers 20th century a rapid growth in economic status and also create lot of pollution due to discharge of pollutants in weather.

Government of India established rules and regulations to control these discharges in air, water and soil.

EIA is a meaningful tool to asses Impact of these pollutant in environment for this notification of EIA can be considered.

1.1 MINISTORY OF ENVIRONMENT AND FORESTS's NOTIFICATION

New Delhi, the 27th January, 1994 As amended on 04/05/1994, 10/04/1997, 27/1/2000 and 13/12/2000 can be use as a reference which state that-

- Whereas a notification under clause (a) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 inviting objections from the public within sixty days from the date of publication of the said notification, against the intention of the Central Government to impose restrictions and prohibitions on the expansion and modernization of any activity or new projects being undertaken in any part of India unless environmental clearance has been accorded by the Central Government or the State Government in accordance with the procedure specified in that notification was published as SO No. 80(E) dated 28th January, 1993;

  Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby directs that on and from the date of publication of this notification in the Official Gazette, expansion or modernization of any activity (if pollution load is to exceed the existing one, or new project listed in Schedule I to this notification, shall not be undertaken in any part of India unless it has been accorded environmental clearance by the Central Government in accordance with the procedure hereinafter specified in this notification;

- Requirements and procedure for seeking environmental clearance of projects:

I(a) Any person who desires to undertake any new project in any part of India or the expansion or modernization of any existing industry or project listed in the Schedule-I shall submit an application to the Secretary, Ministry of Environment and Forests, New Delhi.

The application shall be made in the proforma specified in Schedule-II of this notification and shall be accompanied by a project report which shall, inter alia, include an Environmental Impact Assessment Report, an ** Environment Management Plan and details of public hearing as specified in Schedule-IV** prepared in accordance with the guidelines issued by the Central Government in the Ministry of Environment and Forests from time to time.

(b) Cases rejected due to submission of insufficient or inadequate data and *Plans may be reviewed as and when submitted with complete data and *Plans. Submission of incomplete data or plans for the second time would itself be a sufficient reason for the Impact assessment Agency to reject the case summarily.

II In case of the following site specific projects:

(a) mining;

(b) pit-head thermal power stations;

(c) hydro-power, major irrigation projects and/or their combination including flood control;

(d) ports and harbours (excluding minor ports);

(e) *prospecting and exploration of major minerals in areas above 500 hectares; *

The project authorities will intimate the location of the project site to the Central Government in the Ministry of Environment and Forests while initiating any investigation and surveys. The Central Government in the Ministry of Environment and Forests will convey a decision regarding suitability or otherwise of the proposed site within a maximum period of thirty days. *The said site clearance shall be granted for a sanctioned capacity and shall be valid for a period of five years for commencing the construction, operation or mining. *

III (a) The reports submitted with the application shall be evaluated and assessed by the Impact Assessment Agency, *and if deemed necessary it may consult* a committee of Experts, having a composition as specified in Schedule-III of this Notification. The Impact Assessment Agency (IAA) would be the Union Ministry of Environment and Forests. The Committee of Experts mentioned above shall be constituted by the Impact Assessment Agency or such other body under the Central Government authorised by the Impact Assessment Agency in this regard.

(b) The said Committee of Experts shall have full right of entry and inspection of the site or, as the case may be, factory premises at any time prior to, during or after the commencement of the operations relating to the project.

**(c) The Impact Assessment Agency shall prepare a set of recommendations based on technical assessment of documents and data, furnished by the project authorities, supplemented by data collected during visits to sites or factories if undertaken, and details of public hearing.

The assessment shall be completed within a period of ninety days from receipt of the requisite documents and data from the project authorities and completion of public hearing and decision conveyed within thirty days thereafter.

The clearance granted shall be valid for a period of five years for commencement of the construction or operation of the project. **

No construction work, preliminary or otherwise, relating to the setting up of the project may be undertaken till the environmental and site clearance is obtained.

IV. In order to enable the Impact Assessment Agency to monitor effectively the implementation of the recommendations and conditions subject to which the environmental clearance has been given, the project authorities concerned shall submit a half yearly report to the *Impact Assessment Agency. Subject to the public interest, * the Impact Assessment Agency shall make compliance reports publicly available.

V. If no comments from the Impact Assessment Agency are received within the time limit, the project would be deemed to have been approved as proposed by project authorities.

- Concealing factual data or submission of false, misleading data/reports, decisions or recommendations would lead to the project being rejected. Approval, if granted earlier on the basis of false data, would also be revoked. Misleading and wrong information will cover the following:
  False information
  False data
  Engineered reports
  Concealing of factual data
  False recommendations or decisions

- **LIST OF PROJECTS REQUIRING ENVIRONMENTAL CLEARANCE FROM THE CENTRAL GOVERNMENT**

1. Nuclear Power and related projects such as Heavy Water Plants, nuclear fuel complex, Rare Earths.
2. River Valley projects including hydel power, major Irrigation and their combination including flood control.
3. Ports, Harbours, Airports (except minor ports and harbours).
4. Petroleum Refineries including crude and product pipelines.
5. Chemical Fertilizers (Nitrogenous and Phosphatic other than single superphosphate).
6. Pesticides (Technical).
7. Petrochemical complexes (Both Olefinic and Aromatic) and Petro-chemical intermediates such as DMT, Caprolactam, LAB etc. and production of basic plastics such as LLDPE, HDPE, PP, PVC.

8. Bulk drugs and pharmaceuticals.
9. Exploration for oil and gas and their production, transportation and storage.
10. Synthetic Rubber.
11. Asbestos and Asbestos products.
12. Hydrocyanic acid and its derivatives.
13 (a) Primary metallurgical industries (such as production of Iron and Steel, Aluminium, Copper, Zinc, Lead and Ferro Alloys).
(b) Electric arc furnaces (Mini Steel Plants).
14. Chlor alkali industry.
15. Integrated paint complex including manufacture of resins and basic raw materials required in the manufacture of paints.
16. Viscose Staple fibre and filament yarn.
17. Storage batteries integrated with manufacture of oxides of lead and lead antimony alloys.
18. All tourism projects between 200m—500 metres of High Water Line and at locations with an elevation of more than 1000 metres with investment of more than Rs.5 crores.
19. Thermal Power Plants.
20. Mining projects *(major minerals)* with leases more than 5 hectares.
21. Highway Projects **except projects relating to improvement work including widening and strengthening of roads with marginal land acquisition along the existing alignments provided it does not pass through ecologically sensitive areas such as National Parks, Sanctuaries, Tiger Reserves, Reserve Forests**
22. Tarred Roads in the Himalayas and or Forest areas.
23. Distilleries.
24. Raw Skins and Hides
25. Pulp, paper and newsprint.
26. Dyes.
27. Cement.
28. Foundries (individual)
29. Electroplating
30. Meta amino phenol

Figure 1.1 : sight view of Project

1.2 ABOUT EIA

The stages of an EIA process will depend upon the requirements of the project. However, most EIA processes have a common structure and the application of the main stages is a basic standard of good practice.

The environment impact assessment consists of eight steps with each step equally important in determining the overall performance of the project. Typically, the EIA process begins with screening to ensure time and a resource are directed at the proposals that matter environmentally and ends with some form of follow up on the implementation of the decisions and actions taken as a result of an EIA report. The eight steps of the EIA process are presented in brief below:

- **Screening:** First stage of EIA, which determines whether the proposed project, requires an EIA and if it does, then the level of assessment required.

- **Scoping:** This stage identifies the key issues and impacts that should be further investigated. This stage also defines the boundary and time limit of the study.

- **Impact analysis:** This stage of EIA identifies and predicts the likely environmental and social impact of the proposed project and evaluates the significance.

  Mitigation: This step in EIA recommends the actions to reduce and avoid the potential adverse environmental consequences of development activities.

- **Reporting:** This stage presents the result of EIA in a form of a report to the decision-making body and other interested parties.

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

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

- **Post monitoring:** This stage comes into play once the project is commissioned. It checks to ensure that the impacts of the project do not exceed the legal standards and implementation of the mitigation measures are in the manner as described in the EIA report.

The Environmental Impact Assessment, is therefore, an exercise to ascertain the impact of the industry, process or operation on long term and short term basis and to ensure conformity with the Environmental (Protection) Act, 1986 and the Rules there under and the related other Acts relating to Environment as defined in the Environmental (Protection) Act, 1986. Environmental impact is essentially the end result of an activity on the Environment & Ecosystem on Short Term in hours & days and Long Term in years.

Objective of EIA is to Determine the extent of the short term and the long term Impact of the liquid, gases and solid Pollutants discharged from the operations under study on the following :

- Impact on Air quality as compared to the existing environment quality and impact on animals and plants (Flora and Fauna). This includes the various gases pollutants and SPM.
- Impact on Water quality and damage to the Eco-system in terms of effect on the potable natural over ground and under ground water resources, impact on aquatic and marine life

and flora and fauna (bacteria, fungus etc.). Rivers, water streams, actuaries, lakes and sea as well as underground water resources are considered.

- Impact on land including impact on plants and soil flora.

DATA REQUIRED FOR EIA STUDY :

- Data on all the chemicals hazardous and non hazardous procured, use processed, products and byproducts including the quantities stored, quantity in process and quantities produced and transported.
- Fugitive and stack emissions of various gases with special reference to SOXes, NOXes and COXes. as well as SPM. Flare stack illumination etc.
- Employment generation and economic benefits in terms of ancillary industry development, local trade improvement and other employment opportunities.
- Actual air quality monitoring for 3-months under Rapid EIA.
- Data on population density, standard of living, food habits, professions, age groups, income levels, educational levels, cultural habits, nature of common diseases, domestic animals and so on. Such data is collected from census data and some sample surveys in selected villages and towns nearby within the affected zone of about 10 km.
- Flora and fauna in the region including and, water and air – Forest animals, trees, water plants, aquatic life, bacterial and fungal species in soil water.
- Meteorological data including wind roses, rain fall, temperatures, humidity etc.

The above data need to be extensively analyzed, processed, computer modeling done and results arrived which need to be interpreted to determine Environmental impacts on air, land and water quality, impact on human beings, animals, flora and fauna. Effect of the industrial activity on employment, ancillary industry, trade and so on. The results are to be provided in tabular and graphic form. The results are to be interpreted and conclusions arrived at. Recommendations for reducing adverse impact on the environment and the life and culture need to be developed and given.

CHAPTER 2

2.1 ENVIRONMENT PROTECTION LAWS IN INDIA that support EIA :

According to the State of Environment Report India 2009, made public by the Minister of Environment and Forests, Jairam Ramesh, India faces many important environmental challenges which currently threaten both the development of India and the outlook for its future. The state of India's environment is in upset at the hands of uncontrolled human activities, and these ecological ailments are affecting social growth potential. Degradation of land, increasing air pollution, depletion of water resources, loss of indigenous species of flora and fauna and the background of overwhelming poverty are depicted in the report to detract from the positive growth of Indian people and the country as a whole.

The Government of India has established an environmental legal and institutional system to meet these challenges within the overall framework of India's development agenda and international principles and norms

Legal Framework

India has an elaborate legal framework with over two hundred laws relating to environmental protection. Key national laws for the prevention and control of industrial and urban pollution include the following:

Water (Prevention and Control of Pollution) Act, 1974: prohibits the discharge of pollutants into water bodies beyond a given standard, and lays down penalties for non-compliance.

Water (Prevention and Control of Pollution) Cess Act, 1977: provides for a levy and collection of a cess on water consumed by industries and local authorities. It aims at augmenting the resources of the central and state boards for prevention and control of water pollution.

Air (Prevention and Control of Pollution) Act, 1981: ambient air quality standards, means for the control and abatement of air pollution, prohibits the use of polluting fuels and substances and regulates appliances that give rise to air pollution.

The Air (Prevention and Control of Pollution) Rules, 1982: defines the procedures for conducting meetings of the boards, the powers of the presiding officers, decision-making, the

quorum; manner in which the records of the meeting were to be set etc.

The Wildlife (Protection) Act, 1972: The WPA (Wildlife Protection Act), 1972: provides for protection to listed species of flora and fauna and establishes a network of ecologically-important protected areas. The WPA empowers the central and state governments to declare any area a wildlife sanctuary, national park or closed area.

The Forest (Conservation) Act, 1980: restricts the powers of the state in respect of de-reservation of forests and use of forestland for non-forest purposes.

Environment (Protection) Act, 1986 (EPA): provide a framework for the co-ordination of central and state authorities established under the Water (Prevention and Control) Act, 1974 and Air (Prevention and Control) Act, 1981 and the central government is empowered to take measures necessary to protect and improve the quality of the environment by setting standards for emissions and discharges; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare.

The National Environment Appellate Authority Act, 1997: establishment of a National Environment Appellate Authority to hear appeals with respect to restriction of areas in which any industry operation or process or class of industries, operations or processes could not carry out or would be allowed to carry out subject to certain safeguards under the Environment (Protection) Act, 1986.

Factories Act, 1948 and its Amendment in 1987: The Act contains a comprehensive list of 29 categories of industries involving hazardous processes, which are defined as a process or activity where unless special care is taken, raw materials used therein or the intermediate or the finished products, by-products, wastes or effluents would:

- Cause material impairment to health of the persons engaged
- Result in the pollution of the general environment

Public Liability Insurance Act (PLIA), 1991: The PLIA was amended in 1992, and the Central Government was authorized to establish the Environmental Relief Fund, for making relief payments.

National Environment Tribunal Act, 1995: The Act provided strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accident, with a view to give relief and compensation for damages to persons, property and the environment and for the matters connected therewith or incidental thereto.

The primary institutions responsible for the formulation and enforcement of environmental acts and rules include the Ministry of Environment and Forests (MOEF), the Central Pollution Control Board (CPCB), State Departments of Environment, State Pollution Control Boards (SPCBs) and Municipal Corporations.

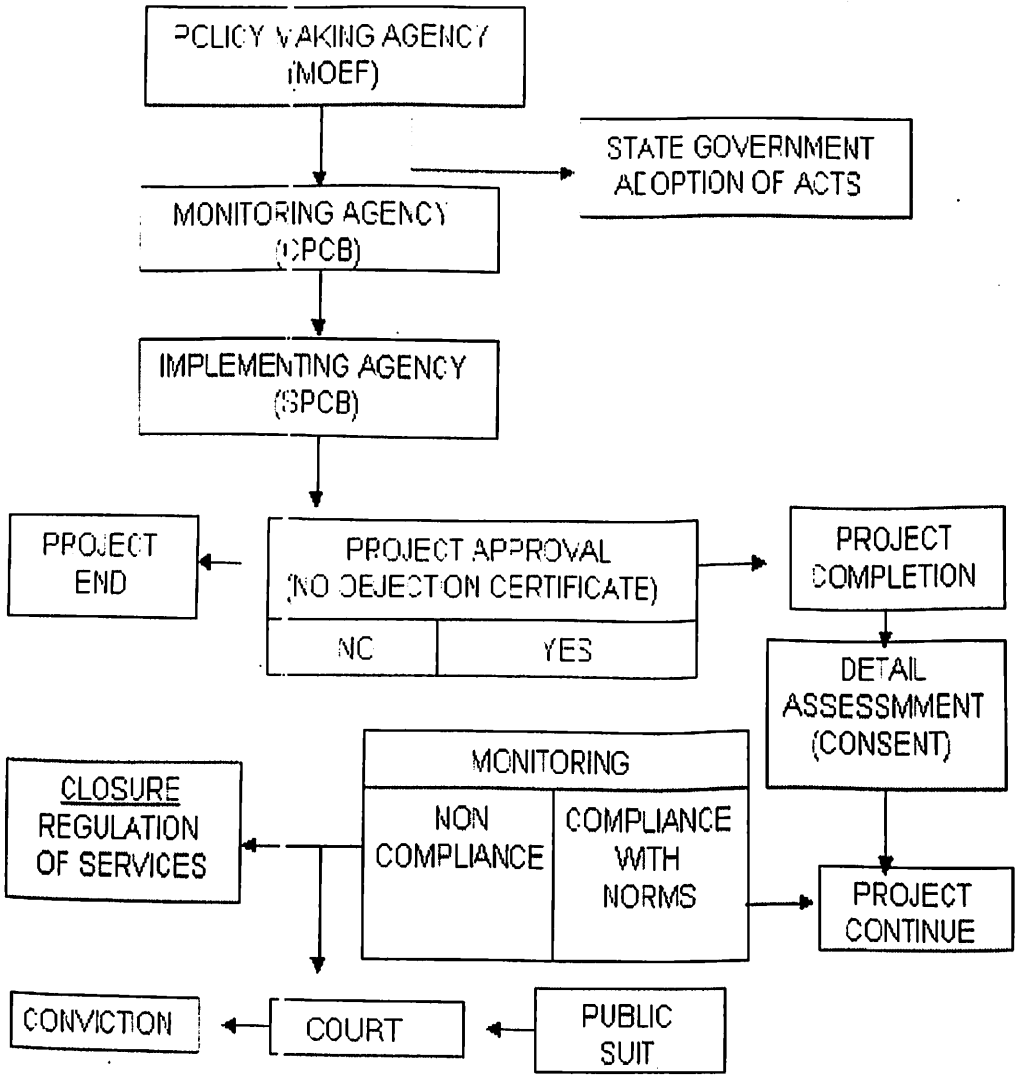


Fig 1 The Pollution Abatement Policy Enforcement Mechanism in India

source -

Environmental Governance and State Pollution Control Boards

Mrutyunjaya Mishra (1) and Nirmal Chandra Sahu (2)

2.2 SCOPE

There is scope to conduct EIA for grantin permission from regulatory boards.The investigator choosen BHEL Block-8 for his study

Objective :

- Determine the extent of the short term and the long term Impact of the liquid, gases and solid
- Impact on Air quality as compared to the existing environment quality and impact on animals and plants (Flora and Fauna). This includes the various gases pollutants and SPM.
- Impact on Water quality and damage to the Eco-system in terms of effect on the potable natural over ground and under ground water resources, impact on aquatic and marine life and flora and fauna (bacteria, fungus etc.). Rivers, water streams, actuaries, lakes and sea as well as underground water resources are considered.
- Impact on land including impact on plants and soil flora.
- Impact on social cultures, habits, profession and sports are considered.
- Review their conformance to Laws and standards, and
- Recommend measures to improve the conformance of the Environmental Impact to the Laws and Standards.

CHAPTER 3 :

3.1 The Need for EIA

Every anthropogenic activity has some impact on the environment. More often it is harmful to the environment than benign. However, mankind as it is developed today cannot live without taking up these activities for his food, security and other needs. Consequently, there is a need to harmonise developmental activities with the environmental concerns. Environmental impact assessment (EIA) is one of the tools available with the planners to achieve the above-mentioned goal.

It is desirable to ensure that the development options under consideration are sustainable. In doing so, environmental consequences must be characterised early in the project cycle and accounted for in the project design.

The objective of EIA is to foresee the potential environmental problems that would arise out of a proposed development and address them in the project's planning and design stage. The EIA process should then allow for the communication of this information to:

(a) the project proponent;

(b) the regulatory agencies; and,

(c) all stakeholders and interest groups.

EIA integrates the environmental concerns in the developmental activities right at the time of initiating for preparing the feasibility report. In doing so it can enable the integration of environmental concerns and mitigation measures in project development. EIA can often prevent future liabilities or expensive alterations in project design.

Indian Policies Requiring EIA

The environmental impact assessment in India was started in 1976-77 when the Planning Commission asked the then Department of Science and Technology to examine the river-valley projects from environmental angle. This was subsequently extended to cover those projects, which required approval of the Public Investment Board. These were administrative decisions, and lacked the legislative support. The Government of India enacted the Environment (Protection) Act on 23rd May 1986. To achieve the objectives of the Act, one of the decisions that were taken is to make environmental impact assessment statutory. After following the legal procedure, a notification was issued on 27th January 1994 and subsequently amended on 4th May 1994, 10th April 1997 and 27th January 2000 **(Annex 1)** making environmental impact assessment statutory for 30 activities. This is the principal piece of legislation governing environmental impact assessment.

Besides this the Government of India under Environment (Protection) Act 1986 issued a number of other notifications, which are related to environmental impact assessment. These are limited to specific geographical areas.

- Prohibiting location of industries except those related to Tourism in a belt of 1 km from high tide mark from the Revdanda Creek up to Devgarh Point (near Shrivardhan) as well as in 1 km belt along the banks of Rajpuri Creek in Murud Janjira area in the Raigarh district of Maharashtra (6th January 1989)
- Restricting location of industries, mining operations and regulating other activities in Doon Valley (1st February 1989)
- Regulating activities in the coastal stretches of the country by classifying them as coastal regulation zone and prohibiting certain activities (19th February 1991)
- Restricting location of industries and regulating other activities in Dahanu Taluka in Maharashtra (6th June 91)
- Restricting certain activities in specified areas of Aravalli Range in the Gurgaon district of Haryana and Alwar district of Rajasthan (7th May 1992)
- Regulating industrial and other activities, which could lead to pollution and congestion in an area north west of Numaligarh in Assam (5th July 1996)

3.2 The EIA Procedures for BHEL Block-8

The EIA process by PCRI made up of the following phases:

- Screening
- Scoping
- Baseline data collection
- Impact prediction
- Generating report to CPCB for Approval of Project/Alternatives

Screening :

Screening is done to see whether a project requires environmental clearance as per the statutory notifications. Screening Criteria are based upon:

Requirement:

Due to current Demand in Heavy Industrial Equipment , Expansion of HEEP block was very essential to increase production of turbines. Instead of building new plant in nearby location, expansion of Turbine Shop Block-8 was done so that there is no negative Impact on environmental Happen and also reducing coast of Material management and Logistics.

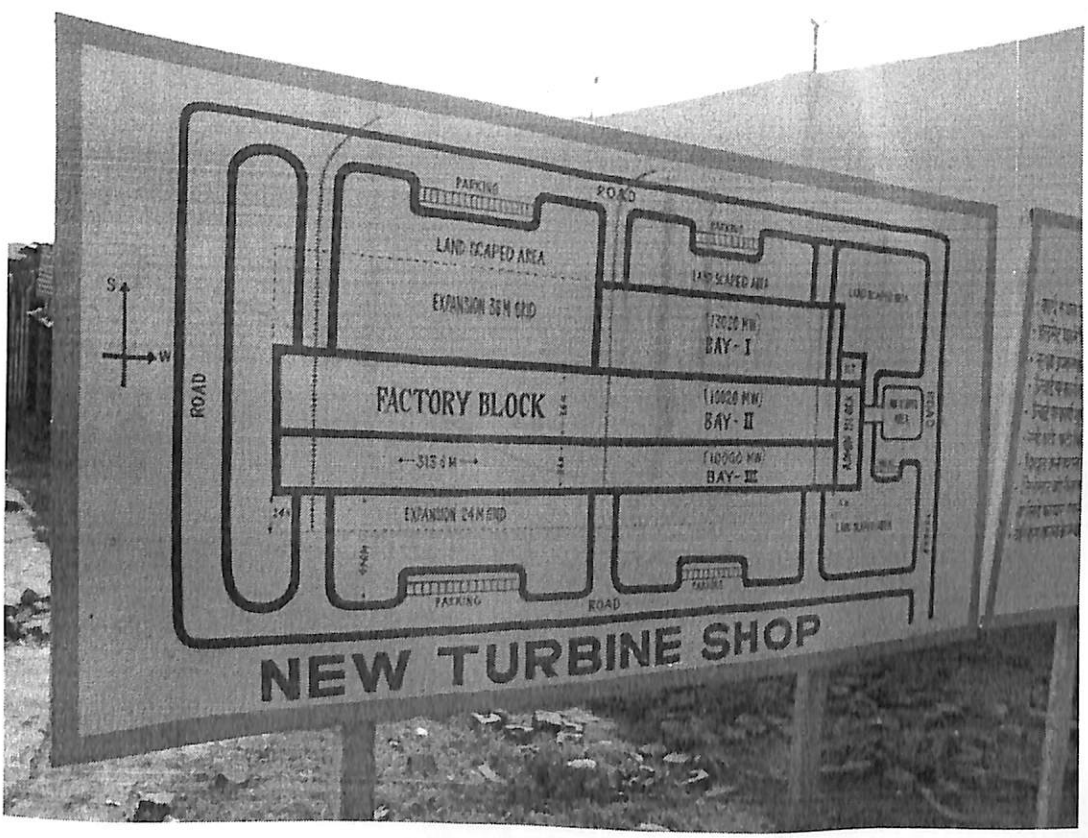
However PCRI also monitored all the environment data for any environmental Impact during construction phase of block-8. in series of this a Rapid Environment Impact Assessment is also carried out to show that there is no negative impact on environment .

Type of development:

Construction using standard materials like metal sheets, cement, cranes was carried out . There is no use of hazardous material and also there was no use of inflammable materials like wood, paper etc

Location of development:

Expansion of block-8 is carried out near to HEEP block so that there is no pollution due to transportation of material , Good land management and also There is low utilization of Resource both natural and man made.



3.3 Project Impact Areas: Following are the project Impact areas as decided by PCRI-

1. BHEL HOSPITAL	Site NO: 92158
2. SECTOR 1 MARKET	Site NO: 92159
3. HEEP TURBINE SHOP	Site NO: 92160
4. SECTOR-2 HOUSES	Site NO: 92161
5. BHEL CANTEEN	Site NO: 92162

Scoping :

Scoping is a process of detailing the terms of reference of EIA. It has to be done by the consultant in consultation with the project proponent and guidance, if need be, from Impact Assessment Agency.

The Ministry of Environment and Forests has published guidelines for different sectors, which outline the significant issues to be addressed in the EIA studies. Quantifiable impacts are to be assessed on the basis of magnitude, prevalence, frequency and duration and non-quantifiable impacts (such as aesthetic or recreational value), significance is commonly determined through the socio-economic criteria. After the areas, where the project could have significant impact, are identified, the baseline status of these should be monitored and then the likely changes in these on account of the construction and operation of the proposed project should be predicted.

For this project following parameters are considered by PCRI for EIA study-

- Changes in Ambient air quality parameters due to construction and comparison with standards provided by CPCB.

Table 1.1 Parameters for Ambient air quality

S.NO.	Attributes	Sampling Network	Sampling Frequencies	Measurement Method	Remarks
1.	Wind speed Wind Direction Humidity Temperature	Minimum 1 site in the project impact area (Site of weather station Near sports stadium BHEL)	1 hourly continuous	automatic weather station	CPCB guidelines Are used

2.	**Pollutants** SPM	5 locations in the project impact area	24 hourly thrice a week	Gravimetric (High-Volume)	**Monitoring Network** Minimum 2 locations in upwind side, more sites in downwind side / impact zone
3. •	RPM	5 locations in the project impact area	24 hourly thrice a week	Gravimetric (High-Volume)	All the sensitive receptors need to be covered
4.	SO_2	5 locations in the project impact area	24 hourly thrice a week	EPAModified West and Gaeke method	
5.	NOx	5 locations in the project impact area	24 hourly thrice a week	Arsenite modified Jacob and Hochheiser	As per CPCB standards for NAQM, 1994
6.	CO(ppm)	5 locations in the project impact area	24 hourly thrice a week	NDIR technique	

- Changes in Ambient noise level due to construction and comparison with standards provided by CPCB.

Table 1.2 Noise level monitoring

S.NO.	Attributes	Sampling Network	Sampling Frequencies	Measurement Method	Remarks
1.	Hourly equivalent noise levels	5 locations in the project impact area	Thrice a week both at Day time and Night time	Instrument Noise level meter	IS:4954-1968 as adopted by CPCB

- Study of change in water quality parameters due to construction and comparison with standards provided by CPCB

Table 1.3 Water quality parameters

S.NO.	Attributes	Sampling Network	Sampling Frequencies	Measurement Method	Remarks
1.	**Parameters for water quality** pH Color Hardness magnesium total alkalinity nitrate fluoride sodium Phenol Cadmium Calcium Chromium Iron Led Mercury	5 locations in the project impact area	One sample from each location weekly	Samples for water quality should be collected and analysed as per : IS : 2488	

- Social Impact Assessment using survey checklist methodology.
  Survey has been carried out from Sector-5 houses, BHEL Hospital and BHEL Canteen
  All parameters are taken and a checklist has been prepared to show the effect on environment due to construction.

Baseline Data :

Baseline data describes the existing environmental status of the identified study area. The site-specific primary data should be monitored for the identified parameters and supplemented by secondary data if available.

Impact Prediction:

Impact prediction is a way of 'mapping' the environmental consequences of the significant aspects of the project and its alternatives. Environmental impact can never be predicted with absolute certainty and this is all the more reason to consider all possible factors and take all possible precautions for reducing the degree of uncertainty.

The following impacts of the project were assessed:

Air

- Changes in ambient levels and ground level concentrations due to total emissions from point, line and area sources

Noise

- Changes in ambient levels due to noise generated from equipment, construction activity and movement of vehicles

Water

- Changes in quality

Socio-Economic

- Impact on the local community
- Impact on human health.
- Impact of increased traffic

CHAPTER 4:

Experimental Data methodology

Samples from 5 different locations have been taken and analyzed at PCRI Lab. Date of sampling is from 25/01/2010 to 5/03/2010. Samples are taken thrice a week.

following are the location of sampling

1. BHEL HOSPITAL	Site NO: 92158
2. SECTOR 1 MARKET	Site NO: 92159
3. HEEP TURBINE SHOP	Site NO: 92160
4. SECTOR-2 HOUSES	Site NO: 92161
5. BHEL CANTEEN	Site NO: 92162

4.1 WEATHER DATA:

A weather data has been taken for 24 hours by automatic weather station location PCRI near sports complex, which records following parameters-

DATE	TIME	DIRECTION (DEGREE)	STANDARD DEVIATION	SPPED (Km/Hr)	TEMPERATURE	HUMIDTY	SOLAR
25/01/2010	09.00	-	-	0.1	11.1	36.1	0.00
25/01/2010	10.00	66.1	33.6	0.1	16.8	24.1	0.00
25/01/2010	11.00	63.6	46.1	1.3	23.0	42.1	0.00
25/01/2010	12.00	289.1	69.8	2.1	23.0	39.6	0.00
25/01/2010	13.00	166.1	67.8	2.3	23.0	39.2	0.00
25/01/2010	14.00	190.3	67.9	2.0	23.0	36.4	0.00
25/01/2010	15.00	221.1	68.3	2.8	23.0	38.4	0.00
25/01/2010	16.00	290.3	62.9	3.3	22.0	41.1	0.00
25/01/2010	17.00	197.0	30.1	2.3	21.0	65.0	0.00
25/01/2010	18.00	224.0	30.6	0.5	18.3	66.0	0.00
25/01/2010	19.00	286.0	6.1	0.0	14.9	48.0	0.00
25/01/2010	20.00	288.3	35.2	0.1	13.3	64.0	0.00
25/01/2010	21.00	265.0	17.2	0.0	12.0	44.0	0.00
25/01/2010	22.00	263.0	0.9	0.0	10.0	50.8	0.00
25/01/2010	23.00	239.0	3.5	0.0	8.5	50.8	0.00
26/01/2010	00.00	226.0	0.7	0.0	7.5	64.4	0.00
26/01/2010	01.00	291.8	5.1	0.0	7.9	54.4	0.00
26/01/2010	02.00	279.6	1.4	0.0	7.5	65.6	0.00
26/01/2010	03.00	284.1	3.2	0.0	7.0	40.2	0.00
26/01/2010	04.00	327.2	3.4	0.0	6.5	41.3	0.00
26/01/2010	05.00	267.1	12.4	0.0	6.1	60.1	0.00
26/01/2010	06.00	263.0	10.4	0.0	7.0	53.1	0.00
26/01/2010	07.00	296.5	11.2	0.0	6.5	65.1	0.00
26/01/2010	08.00	254.2	10.1	0.0	9.0	64.1	0.00

4.2 AMBIENT AIR DATA:

For collection of ambient air quality, samples have been taken from 5 different locations with help of Gravimetric (High-Volume sampler) Instrument.

S.NO.	DATE	LOCATION NO.	SPM	RSPM	SO2	NOx	CO(ppm)
1.	25/01/2010	92158	546	378	6	32	2
2.	26/01/2010	92158	478	`346	5	28	2
3	27/01/2010	92158	455	315	4	31	1.5
4	01/02/2010	92159	497	371	BDL	26	1
5	02/02/2010	92159	452	343	4	24	2
6	04/02/2010	92159	458	361	5	22	2
7	08/02/2010	92160	465	302	4	19	2.5
8	09/02/2010	92160	444	323	4	26	2
9	10/02/2010	92160	413	309	BDL	28	2.5
10	15/02/2010	92161	343	256	BDL	21	1
11	16/02/2010	92161	413	287	BDL	18	1
12	17/02/2010	92161	401	260	4	16	1.5
13	23/02/2010	92162	515	378	5	26	2
14	24/02/2010	92162	486	367	6	25	2
15	25/02/2010	92162	458	310	4	21	2

4.3 NOISE LEVEL DATA:

Noise data have been taken from different location to determine pollution due to noise.

S.NO.	DATE	LOCATION	NOISE LEVEL DAY TIME(dBA)	NOISE LEVEL NIGHT TIME (dBA)
1	25/01/2010	92158	74.1	62.8
2	26/01/2010	92158	75.7	64.1
3	27/01/2010	92158	72.6	64.8
4	01/02/2010	92159	73.2	58.5
5	02/02/2010	92159	70.4	57.9
6	04/02/2010	92159	71.7	55.0
7	08/02/2010	92160	67.4	56.6
8	09/02/2010	92160	68.2	57.6
9	10/02/2010	92160	68.0	56.6
10	15/02/2010	92161	64.5	54.1
11	16/02/2010	92161	62.5	51.7
12	17/02/2010	92161	63.5	63.1
13	23/02/2010	92162	75.2	62.8
14	24/02/2010	92162	73.9	64.1
15	25/02/2010	92162	73.8	62.2

4.4 WATER QUALITY DATA:

Water sample has been taken out from five different locations and has been analyzed at PCRI chemistry lab for various parameter analysis.

S.NO.	NAME OF PARAMETER	LOCATION 92158	LOCATION 92159	LOCATION 92160	LOCATION 92161	LOCATION 92162
1.	pH	7.23	7.26	7.27	7.27	7.30
2	Color	normal	normal	normal	normal	normal
3	Hardness	260	232	248	240	224
4	magnesium	17.4	18.8	18.4	24.2	29.1
5	total alkalinity	260	280	280	284	276
6	nitrate	-	-	0.01	0.01	-
7	fluoride	0.481	0.052	0.242	0.041	0.151
8	arsenic	-	-	-	-	-
9	Phenol	-	-	-	-	-
10	Cadmium	-	-	-	-	-
11	Calcium	75.3	67.3	68.9	56.1	48.1
12	Chromium	-	-	-	-	-
13	Iron	0.03	0.04	0.13	0.17	0.02
14	Led	-	0.01	0.01	-	-
15	Mercury	-	-	-	-	-

4.5 SOCIAL IMPACT ASSESMENT:

For social impact assessment a survey methodology has been adapted in which there is a questionnaire which includes total five questions covering all aspects like impact on the local community. Impact on human health. Impact of increased traffic.

Total 50 persons were supposed to fill the questionnaire as given to them which include employees, house wives, workers, shopkeepers, and others.

Following is the format of questionnaire-

QUESTIONNAIRE

Q.ID.....

This survey is a part of M.Tech dissertation program on "A STUDY ON ENVIORNMENT IMPACT ASSESMENT IN BHEL HARIDWAR.

It is requested to provide unbiased information for this survey to arrive at fair analysis. However, the information provided by you will be kept confidential & will be used for academic purpose. Your cooperation in the regard is solicited.

OBJECTIVE:

"A STUDY ON ENVIORNMENT IMPACT ASSESMENT IN BHEL HARIDWAR"

1 Personal Information:

1.1 Name (optional):

1.2 Age in completed years:

1.3 Marital status: Married Unmarried

1.4 Organization & Department:

1.5 Length of job (In years):

1.6 Designation:

1.7 Academic Qualifications:

Upto Graduate Upto Post-Graduate Upto Professional

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2. The following set of statements describes your perceptions towards the

IPMACT ON SOCIAL ENVIRONMENT DUE TO EXTANSION OF BLOCK -8 OF BHEL.

For each statement, please indicate to which extent you feel it is agreeable or Disagreeable. Please Tick (√) on one answer.

Description	YES	NO	Neutral
Do you feel any type of problem regarding pollution due to construction process of BHEL block no-8?	0	48	2
Is there any air bourn problem like breathing problem etc''	6	40	4
Do you feel organization is committed towards its environmental policies?	0	50	0
Is there any noise pollution due to	0	50	0

construction?			
Any effect on water quality in your area due to construction?	**0**	**40**	**10**

Above showing figures state about social environment Impact due to construction work.

CHAPTER 5

5.0 ABOUT ORGANIZATION:

Bharat Heavy Electricals Ltd.(BHEL) Haridwar has two manufacturing plants:-

Heavy Electrical Equipment Plant (HEEP) and Central Foundry Forge Plant (CFFP).

The Heavy Electricals Equipment Plant (HEEP) located in Haridwar, is one of the major manufacturing plants of BHEL. The core business of HEEP includes design and manufacture of large steam and gas turbines, turbo generators, hydro turbines and generators, large AC/DC motors and so on.

Central Foundry Forge Plant (CFFP) is engaged in manufacture of Steel Castings: Upto 50 Tons Per Piece Wt & Steel Forgings: Upto 55 Tons Per Piece Wt.

HEEP & CFFP have been awarded ISO-9001 and ISO-9002 certificates respectively. HEEP & CFFP units of BHEL, Haridwar have also been awarded ISO-14001.

5.1 ABOUT PCRI:

Pollution Control Research Institute (PCRI) along with two manufacturing plants of BHEL at Ranipur. The Institute has been set-up by Bharat Heavy Electricals Limited under the United Nations Development Programme. It started functioning during 1986. PCRI's focus is on providing services in the field of Environmental Management and Pollution Control in the areas of air, water, noise and solid waste. The Institute is concentrating on research and development activities related to protection of environment with emphasis on industrial pollution. PCRI provides consultancy services to industries giving practical methods to reduce pollution levels within permissible limits.

5.2 FUNCTIONS OF PCRI :

- **ENVIRONMENTAL IMPACT ASSESSMENT.**
- RISK ANALYSIS & DISASTER MANAGEMENT PLAN.
- ENVIRONMENTAL AUDIT & RESOURCE CONSERVATION .
- PERFORMANCE EVALUATION OF POLLUTION CONTROL EQUIPMENT.
- SETTING UP OF CHEMICAL AND ENVIRONMENTAL LABORATORY FOR THERMAL POWER PLANT.
- SMALL/MEDIUM SIZE EFFLUENT TREATMENT PLANT ON TURNKEY BASIS .

- SOLID WASTE MANAGEMENT AND FEASIBILITY STUDY FOR WASTE TO ENERGY PROJECTS.
- MONITORING OF SOURCE EMISSION, AMBIENT & WORK PLACE. MONITORING FOR HEALTH, SAFETY ENVIRONMENT PARAMETERS, WATER/EFFLUENT QUALITY.
- FACILITATION FOR ISO 14001 CERTIFICATION AND OHSAS 18001.
- TRAINING & DEVELOPMENT OF PROFESSIONALS.

5.3 ABOUT EIA :

Environment Impact Assessment or EIA can be defined as the study to predict the effect of a proposed activity/project on the environment. A decision making tool, EIA compares various alternatives for a project and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.

EIA systematically examines both beneficial and adverse consequences of the project and ensures that these effects are taken into account during project design. It helps to identify possible environmental effects of the proposed project, proposes measures to mitigate adverse effects and predicts whether there will be significant adverse environmental effects, even after the mitigation is implemented. By considering the environmental effects of the project and their mitigation early in the project planning cycle, environmental assessment has many benefits, such as protection of environment, optimum utilization of resources and saving of time and cost of the project. Properly conducted EIA also lessens conflicts by promoting community participation, informing decision makers, and helping lay the base for environmentally sound projects. Benefits of integrating EIA have been observed in all stages of a project, from exploration and planning, through construction, operations, decommissioning, and beyond site closure.

EIA is one of the successful policy innovations of the 20th Century for environmental conservation. Thirty-seven years ago, there was no EIA but today, it is a formal process in many countries and is currently practiced in more than 100 countries. EIA as a mandatory regulatory procedure originated in the early 1970s. with the implementation of the National Environment Policy Act (NEPA) 1969 in the US. A large part of the initial development took place in a few high-income countries, like Canada, Australia, and New Zealand (1973-74). However, there were some developing countries as well, which introduced EIA relatively early - Columbia (1974), Philippines (1978).

The EIA process really took off after the mid-1980s. In 1989, the World Bank adopted EIA for major development projects, in which a borrower country had to undertake an EIA under the Bank's supervision

5.4 RESULT AND DISSCUSION :

from all data sources that are collected during project duration result is prepared by comparing parameters with previous year data of PCRI and also compared with there standard values limit as directed in guidelines define by CPCB.

1. FINDINGS OF WEATHER DATA:

Comparing result from previous year weather data of same location.

TYPE	DATE	AVERAGE SPPED (Km/Hr)	AVERAGE TEMP ERAT URE	AVERAGE HUMIDTY
CURRENT DATA	25/01-26/01/2010	0.7041	12.66	49.76
PREVIOUS YEAR DATA	25/01/2009-26/01/2009	0.7281	12.02	45.11
RESULT	CURRENT	Change in wind speed is +0.02 that is minor and under limit	Change in temperature is 0.64 degree Celsius which is minor	Change in humidy is 4.65 which is minor

RESULT: From above data it is predicted that there is no major changes in wind attributes hence there is no Impact on weather due to any activity which is carried out between 25/01/2009 to 26/01/2010. While PCRI study all previous year data and compare it with current and found no major changes in weather attributes.

The Indian experience with Environmental Impact Assessment began over 20 years back. It started in 1976-77 when the Planning Commission asked the Department of Science and Technology to examine the river-valley projects from an environmental angle. This was subsequently extended to cover those projects, which required the approval of the Public Investment Board. Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support.

On 27 January 1994, the Union Ministry of Environment and Forests (MEF), Government of India, under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or modernization of any activity or for setting up new projects listed in Schedule 1 of the notification. Since then there have been 12 amendments made in the EIA notification of 1994.

The MEF recently notified new EIA legislations in September 2006. The notification makes it mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbors and airports) and industries including very small electroplating or foundry units to get environment clearance. However, unlike the EIA Notification of 1994, the new legislation has put the onus of clearing projects on the state government depending on the size/capacity of the project.

Certain activities permissible under the Coastal Regulation Zone Act, 1991 also require similar clearance. Additionally, donor agencies operating in India like the World Bank and the ADB have a different set of requirements for giving environmental clearance to projects that are funded by them.

In India Environmental Impact Assessment (EIA) has been formally introduced in 1994. It relied on the institutional framework that has a strong supporting legislative, administrative and procedural set-up. Both central and state authorities together are sharing the responsibility of its development and management..

EIA is included as regular activity of PCRI , the spring session REIA(Rapid Environment Impact assessment) conducted from January 2010.As new block of CFFP & HEEP (Block No. 8) is under construction CPRI performed EIA of block 8 in same month

2. FINDINGS OF AMBIENT AIR DATA RESULT:

S.NO	LOCATION	AVG. CURRENT SPM	AVG. CURRENT RSPM	AVG. CURRENT SO2	AVG. CURRENT NOx	AVG. CURRENT CO(ppm)	RESULT	REMARKS
1.	92158	480	346.33	5	30.33	1.8	BDL	NO
2.	92159	471	358	3	24	1.6	BDL	NO
3.	92160	440	209	2.6	24.3	2.1	BDL	NO
4.	92161	385	267	1.3	18.3	1.16	BDL	NO
5.	92162	486	351	5	24.2	2	BDL	NO

RESULT: From above data comparison it is predicted that there is no air pollutant above the parameter criteria as compared to limit defined by CPCB and previous year results, all the parameters of pollutants are under limit.

3. FINDINGS OF WATER QUALITY DATA REUSLT:

S.NO.	NAME OF PARAMETER	AVERAGE VALUE	RESULT	REMARKS
1	Ph	7.26	BDL	NO
2	Color	NORMAL	BDL	NO
3	Hardness	240.8	BDL	NO
4	Magnesium	21.58	BDL	NO
5	total alkalinity	276	BDL	NO
6	Nitrate	0.04	BDL	NO
7	Fluoride	0.193	BDL	NO
8	Arsenic	NOT PRESENT	BDL	NO
9	Phenol	NOT PRESENT	BDL	NO
10	Cadmium	NOT PRESENT	BDL	NO
11	Calcium	63.14	BDL	NO
12	Chromium	NOT PRESENT	BDL	NO
13	Iron	0.01	BDL	NO
14	Led	NOT PRESENT	BDL	NO
15	Mercury	NOT PRESENT	BDL	NO

RESULT: From above data comparison it is predicted that there is no water pollutant compared to the parameter criteria as defines by CPCB and previous year datas, all the parameters of pollutants are under limit.

4. FINDINGS OF SOCIAL IMPACT ASSESMENT RESULT :

Based on survey methodologies, total no of result obtained are 50 which are showing below-

Description/assessment question	YES	NO	Neutral	Result
Do you feel any type of problem regarding pollution due to construction process of BHEL block no-8?	0	48	2	No impact
Is there any air bourn problem like breathing problem etc?	6	40	4	Very low impact
Do you feel organization is committed towards its environmental policies?	0	50	0	Positive/supportive
Is there any noise pollution due to construction?	0	50	0	No impact
Any effect on water quality in your area due to construction?	0	40	10	No impact

RESULT: From above 50 results it is clear that there is no negative impact on social environment that is impact on public health, impact of pollution on public exposed.

Hence it is very clear that this project is not creating any social environmental damage but also positive for economic development for society.

CHAPTER 6 :

6.1 CONCLUSION OF IMPACT ASSESMENT PROJECT:

As from data obtained and by assessment of these data this is assessed that during construction of expended block of BHEL , there is no sever negative impact on environment and social life during period of construction .

The expansion of block-8 leads to increase the production of heavy industrial equipment hence provide economic growth and also provide social growth to public, however there are always some negative Impacts which are minor and do not have any significant Impact as compared to growth of organization.

BHEL is an organization which committed to growth of nation's economy and also committed towards its corporate - social responsibilities.

PCRI is established by BHEL keeping in mind about environmental concern which regularly monitor and assesses all the activity, plant procedure and provide a meaningful consultancy to organization about environment issues.

From this project PCRI reported to CPCB that there is no negative impact on environment due to construction activity and also there is no need of seeking alternative option for construction i.e Modification, alteration or any type of changes.

As my project was only limited to a short span, PCRI is conducting assessment through out the year for this extension project and will provide report to regulatory bodies time to time.

6.2 SUGGESTION:

As study area is very wast, it was imposible to conduct all the assesments in that less time.

There is scope to conduct EIA in nearby areas and production blocks.Investigator recommends

There should be initiative for creating sustainable enviornment.

APPENDIX 1

QUESTIONNAIRE

Q.ID.....

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It is requested to provide unbiased information for this survey to arrive at fair analysis. However, the information provided by you will be kept confidential & will be used for academic purpose. Your cooperation in the regard is solicited.

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1 Personal Information:

1.1 Name (optional):

1.2 Age in completed years:

1.3 Marital status: Married Unmarried

1.4 Organization & Department:

1.5 Length of job (In years):

1.6 Designation:

1.7 Academic Qualifications:

Upto Graduate Upto Post-Graduate Upto Professional

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2. The following set of statements describes your perceptions towards the IPMACT ON SOCIAL ENVIRONMENT DUE TO EXTANSION OF BLOCK -8 OF BHEL.

For each statement, please indicate to which extent you feel it is agreeable or Disagreeable.

Please Tick (√) on one answer.

Description	YES	NO	Neutral
Do you feel any type of problem regarding pollution due to			

construction process of BHEL block no-8?			
Is there any air bourn problem like breathing problem etc?			
Do you feel organization is committed towards its environmental policies?			
Is there any noise pollution due to construction?			
Any effect on water quality in your area due to construction?			

Thank you very much for your kind co-operation and giving your precious time.

Date:-.....

Signature (Anirudh Kumar)

Signature of Respondents (Optional)

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