THE UNIVERSITY
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EIA Follow-up of Open Cast Coal Mines in India

Thesis Submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor on Philosophy

By

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ORIGINAL COPY TIGHTLY BOUND

Dedicated to my father Mr. Gautam Kumar Jha. He has been my strength and inspiration and without his support and guidance I would not have been able to achieve what I have

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Abstract

EIA was formally introduced in India through an amendment in the national Environmental Protection Act of 1986 that was ratified in 1994. This legislative reform made EIA mandatory for development projects in all the key economic sectors including the coalmining. Since the stipulation of EIA as a regulatory process for environmental decision-making, emphasis has been laid on developing appropriate mechanisms and institutional procedures and capacity to co-ordinate and monitor environmental status and policies. However, project specific follow-up has been neglected. This has not only undermined the role of EIA in aiding environmental management but has actually reduced EIA in many cases to a sheer exercise on paper.

This work aims to study the current practices of EIA follow-up in the open cast coalmines in India and provide recommendations for its improvement. In order to achieve this aim, five objectives have been formulated. The work makes use of three case studies to investigate the Indian follow-up mechanism, which are drawn from three open cast coalmines situated in three different states in India.

The study revealed that even after a decade since EIA has been made mandatory in India, some of the projects are still operating without an EIA clearance. Although there are several authorities shouldering overlapping responsibilities for observing compliance, follow-up is yet to become a reality. EIA follow-up practice in India has been explored under the broad headings of regulation & institutional arrangements, approaches & techniques, resources and capacity and involvement with stakeholders. The research provided valuable insight into the regional variation in implementation of follow-up as a result of economical, political, social and geographical factors. The thesis has also helped in exploring managerial factor, which is not regional in nature but can play a crucial role in overcoming the regional variations that may exist across the states.

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I started my PhD thinking it's a solitary exercise but now looking back at it I realise that without the support and encouragement I have received in doing it, it would have never transformed in to reality.

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Conversion Factors

1 GBP	US$1.95 approx
1 GBP	84 Rs
1 Tonne	1000 Kg
1 Million Tonne	10^7 tonne
1 Lac/lakh	100,000

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Most Frequently Used List of Abbreviations

Abbreviation	Full Term
AEM	Adaptive Environmental Management
BCCL	Bharat Coking Coal Limited
CCL	Central Coalfields Limited
CIL	Coal India Limited
CMPDI	Central Mine Planning Designing Institute of India
CMRI	Centre for Mining Research Institute of India
CPCB	Central Pollution Control Board
CRZ	Coastal Regulation Zone
CSRP	Coal Sector Rehabilitation Project
CS ESMP	Coal Sector Environmental and Social Mitigation Project
DGMS	Director General Mines Safety
DOE	Department of Environment
DMB	Decision-Making Body
DMP	Disaster Management Plan
EAC	Expert Advisory Committee
EA	Environmental Assessment
ECL	Eastern Coalfields Limited
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	Environmental Protection Act
EPAPs	Eligible Project Affected Persons
ESMP	Environmental and Social Mitigation Project
GNI	Gross National Income
IA	Impact Assessment
IAD	Impact Assessment Division
IAIA	International Association of Impact Assessment
IBM	Indian Bureau of Mines
IEMA	Independent Environmental Monitoring Agency
IIT	Indian Institute of Technology
ISO	International Standard Organisation
ISM	Indian School of Mines
IBRD	International Bank for Reconstruction and Development
MCL	Mahanadi Coalfields Limited
MINAS	Minimum Indian National Standard
MOC	Ministry of Coal
MoEF	Ministry of Environment and Forest
MOL	Ministry of Labour
ML	Mining Lease
MLA	Member of Legislative Assembly
MP	Madhya Pradesh
MPCB	Maharashtra Pollution Control Board
Mty	Million Tonnes per Year

NCL	Northern Coalfields Limited
NCDA	National Coal Development Corporation
NEERI	National Environmental Engineering Institute of India
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organisation
NOC	No Objection Certificate
OB	Over Burden
OCP	Open Cast Project
OPCB	Orissa Pollution Control Board
PAPs	Project Affected Persons
PCB	Pollution Control Board
SCCL	Singareni Collieries Coalfields Limited
SECL	South Eastern Coalfields Limited
SEA	Strategic Environmental Assessment
SWOT	Swot Weakness Opportunity Threat
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
UG	Under Ground
U.P	Uttar Pradesh
UT	Union Territories
W.B	West Bengal
WCL	Western Coalfields Limited
WII	Wildlife Institute of India

SECTION A

INTRODUCTORY

I read, I study, I examine, I listen, I reflect, and out of all this I try to form an idea in which I can put as much common sense as I can'.

-Lafayette

Chapter One

Introduction to Research Background

Chapter one introduces the research topic and is sub-divided in to six sections. First, the background of Environmental Impact Assessment (EIA) follow-up is discussed. The rationale of this thesis is presented next. The scope of the thesis is explored in the third section. The fourth section includes a discussion on the aim and objectives of the study along with the research questions. The research methodology is discussed in the following section and finally, section five presents the structure of the thesis.

1.1 EIA Follow-up Background

EIA as a tool has emerged in order to aid the consideration of environmental aspects in decision-making processes. The emergence of EIA started taking shape after the enactment of National Environmental Policy Act (NEPA) in 1969 in the United States. Even during the initial discussion stage of NEPA, it was felt that in order to make environmental protection really effective, an 'action-forcing mechanism' was needed 'to ensure implementation of the environmental policy' which was 'belatedly introduced' as a detailed statement to be known as the Environmental Impact Statement (EIS) (Arts, 1998, p.20). Since then, the main emphasis of EIA has been to ensure environmental factors are considered in decision-making. Most EIA related research have stressed on the procedural stages leading up to the 'Record of Decision' (Hullet & Diab, 2002, p.297). This emphasis no doubt has played an important role in structuring the process of EIA, however, the same emphasis has met with much criticism. One of the main arguments has been that EIA is being used "purely to achieve development consent rather than as a tool for sound

environmental management and protection" (Dipper et al,1998, p.733). Treated as a 'pre-development tool', EIA is of limited use for environmental protection. 'In order to even begin meeting the objectives of EIA, the information in the approved EIS must be used as a basis for the environmental management of the project, and the terms and conditions of the EIS approval must be adhered to' (Fundingsland, 2000, p.15). Thus, EIA has been treated as "means to an end: getting planning permission" (Arts, 1998, p.1).

However, EIA like planning and policy-making is a prospective activity and therefore, uncertainty is intrinsic to its nature (Arts, 1998, p.4). The realisation of the need for some follow-up for EIA always existed. After more than three decades of the inception of EIA, the concept of follow-up has recently gained renewed attention as a result of 'an upsurge of interest in experience in EIA follow-up at recent annual conferences of the International Association of Impact Assessment (IAIA)' (Morrison-Saunders et al, 2001b, p.289). These have led to the usage of the term 'follow-up' which serves as an '*umbrella term* for various activities, which include monitoring, auditing, ex-post evaluation, post-decision analysis and post-decision management'. It has been realised that 'Follow-up provides feedback to the EIA activities, which then provides an opportunity to improve EIA practice' (Arts et al, 2001, p176). It is viewed as 'the final step in a full-blown EIA process' (Lamoen & Arts, 2002, p.1) and 'without follow-up' EIA may be little more than a paper based exercise to obtain project approval' (Morrison-Saunders et al, 2001a, p.289). With this realisation dawning upon planners, we currently see an effort to strengthen follow-up (Arts, 1998; Hullet & Diab, 2002; Arts et al, 2001;Morrison-Saunders & Arts, 2004, Wlodarczyk, 2000; Morrison-Saunders & Bailey 1999; Jesus, 2000).

1.2 Rationale of the Thesis

A general lack of follow-up both in theory and practice is widely acknowledged in EIA textbooks, and is frequently described as the weakest component of EIA (Glasson et al., 1999, p.23) or a 'missed opportunity' for improving EIA practice by learning from experience (i.e. Dipper *et al.*, 1998, p.744). This study on EIA follow-up will contribute to this growing literature and experience. It focuses on EIA follow-up within the context of a developing country, India. Furthermore, the study looks into the follow-up activities within the open cast coal-mining sector in India. Therefore, this research has combined the importance of follow-up in a developing country, within a specific sector. The rationale for doing so is presented in detail as follows.

1.2.1 Environmental Impact Assessment

This research revolves around EIA Follow-up and particularly with determining its role in ensuring environmental protection within the coal mining industry in India. It is important to note that EIA itself 'is not an environmental protection measure'. It is a 'tool' or a 'systematic process', which helps in ensuring 'that the decision is made on the basis of informed knowledge of the environmental consequences of that decision' (Roberts & Roberts, 1984, p.100). It helps in examining 'the environmental consequences of development actions, in advance' (Glasson et al, 2005, p.4). Thus, by helping to incorporate environmental issues in the decision-making process, EIA paves the way for facilitating the objectives of sustainable development.

Since its inception in 1969 under the provisions of the United States National Environmental Policy Act (NEPA), EIA was more or less limited to placing obligation 'upon the proponents of an action to make specific assessments of

environmental consequences of their proposal'. This role however, has broadened and now EIA circumscribes a broad range of issues. Although there is no universal agreement regarding the subject matter of EIA, it can broadly be categorised into four distinct types of impacts which are- ecological impacts, social impacts, technology impacts and risks or hazard impacts (Clark & Herington, 1988, p.4).

Although EIA was initiated in the developed world, it has been applied and adapted in several countries across the globe despite considerable cultural, political and social differences. The level of success of EIA in ensuring environmental protection of course varies. However, it has played a crucial role in raising environmental awareness and giving environmental considerations a chance in the decision-making process. EIA has been adopted by India since 1986 and has been made mandatory since 1994. This study is therefore looking into this already existing process of EIA in India and will help in realising the extent to which EIA's potential has been exploited in delivering environmental protection within the coal mining industry in India.

1.2.2 EIA Follow-up

After three decades of existence, 'many practitioners would agree that the methodologies for conducting EIA are well developed', however, with the 'exception of the element of follow-up' (Baker, 2004, p.1). The rationale for conducting follow-up has been discussed in works of Holling, 1978; Bisset, 1980; Arts ,1998; and Dipper et al, 1998. However, the importance attached to the role of follow-up in the success of EIA is highlighted strongly in recent works so much so that 'applying EIA Follow-up within EIA is' considered 'no longer an option but a sound precaution and a proactive measure' (Marshall, 2003, p.1). It has the power to make or mar the EIA itself as 'the ultimate success of EIA is determined by the outcomes

of the proposals' (Morrison-Saunders & Arts, 2004, p.1) and follow-up helps to understand and improve these outcomes.

The rationale for conducting follow-up is similar to that of conducting an EIA, which is 'getting a grip on uncertainties' (Arts et al, 2001, p.176). Follow-up complements EIA, it helps in achieving environmental protection at post-decision stage of a developmental process. Follow-up takes into account any adjustments that might be needed in order to accommodate any unforeseen uncertainties. These adjustments are necessary due to the nature of EIA, which can be said to be a 'thorough pre-decision analyses' and thus, is bound to have 'uncertainties and gaps in knowledge'. Dunsire, 1978 has also referred this, as the 'implementation gap' (in Arts et al, 2001, p.177). Planning is a 'goal-oriented activity'; it cannot and should not provide 'a blue-print for future developments' (Arts, 1998, p.67). Holling has discussed the concept of adaptive environmental assessment and management in his work dated 1978, which offers one of the earliest attempts in providing the rationale for follow-up.

The 'rationale-comprehensive planning approach', which offers a simplistic and linear account of planning is criticised due to its inability to accommodate real life complex issues, which are dynamic and not static in nature. Planning, which is but a predictive activity cannot be comprehensive and absolute as uncertainties are inevitable. Various parties exert influences and implementation failures can occur (Arts & Morrison-Saunders, 2004, p28). In this respect follow-up plays a crucial role to translate 'theoretical perspective on a proposal to actual understanding and knowing of the real situation' (Morrison-Saunders & Arts, 2004, p. 3). Thus, 'EIA Follow-up can be seen as the missing link between EIA and the project implementation' (Arts et al, 2001,a), between theory and practice. 'Unless there is a minimum follow-up capability, EIA operates as a linear rather than iterative process and lacks continuity. (Larmine, 1984; in

Sadler, 1988, p.131). By providing feedback, follow-up will 'extend environmental impact assessment statement beyond a cautionary or action-forcing device into a continuing tool of management and evaluation (Caldwell, 1982 in Wathern, 1988, p.82). Follow-up therefore, helps in 'keeping an eye on the real effects of the project' (Arts et al, 2001, p.175).

The rationale for conducting such an exercise is closely linked with the usefulness or benefits it provides in delivering effectiveness of EIA. There is no doubt that an extensive amount of work has already been dedicated in emphasising the importance and rationale for follow-up in making EIA a more purposeful exercise. To summaries it, follow-up is needed as little attention has been paid till date to actual affects arising from project construction; without follow-up, EIA will become a paper chase to secure permit; and with more and more money, time and manpower being invested in conducting EIAs, there is a need to safeguard its returns (Au & Sanvicens, 1996, p.1).

1.2.3 Problem with EIA in India

India is the seventh largest country in the world and Asia's second largest nation with an area of 3,287,263 km^2. The Indian mainland stretches from $8^0$4 to $37^0$6'N latitude and from $68^0$7' to $97^0$25'E longitude. Being the fourth largest country in terms of purchasing power parity, 'India's huge industrial capacity and growing affluence have made it one of the world's fastest-growing economies'. The country achieved a growth rate of 8.1% in the first three months of the financial year of 2005 (BBC News, 2005). With a population of more than a billion, ranking second only to China, it is predicted that India will overtake China to become the world's most populous country by 2050 (BBC News, 2004). Thus, with a booming economy and exploding population, there is immense pressure on the Indian environment. The country faces a tricky challenge of tackling environmental degradation induced by

poverty at one hand and growing economy and affluence on the other (GoI, 2004, p.3).

India faces various problems in the field of environmental impact assessment. While some of these are common to most developing countries, others are more unique. Developed countries themselves have witnessed a slow adoption of formal EIA principles. Its adoption in developing countries has thus, also been slow (Sankoh, 1996, p.186). Although international efforts like the Stockholm Conference have persuaded developing countries to adapt sound environmental management for long-term and sustainable development, it has been major ecological disasters and experiences in the third world that has put the message through (Ahmed, 1985, p.vii). In the case of India, following the 1984 Bhopal disaster - in which a toxic leak from the city's Union Carbide chemical plant resulted in the deaths of more than 3,000 people - environmental awareness and activism increased significantly, as a consequence of which the Environment Protection Act (EPA), was passed in 1986 (eia, 2004).

However, it was only in 1994, that full legislative requirement for EIA was spelled out in the Constitution. A study on a review of the development of EIA in India during the year 1996 revealed that 'the main emphasis' in India had been 'on developing appropriate regulations and the institutional procedures necessary to implement them' (Benham & Brew, 1996, p.2002). The study also mentions the need to give more attention to 'monitoring and maintaining the quality of EIAs and ensuring proposed mitigation measures are actually being implemented' (Benham & Brew, 1996, p.2002).

Recently Singh & Sinha (2003, p.17) have criticised the EIA process in India to be largely 'post planning exercise usually carried by a proponent-appointed consultancy

firm with the sole objective of getting environmental clearance'. The work also stresses the need to 'translate the rhetoric' of sustainable development 'into a concrete action program which would, at the least, require EIA systems to ensure adverse impact compensation' (Singh & Sinha, 2003, p.17-18). Prevalence of common myths in developing countries also hinders in the implementation of EIA. These include 'EIA being expensive, anti-developmental and a paper tiger' (Ahmed & Sammy, 1985, p.6-8). Furthermore, economic constraints put a strain on the process (Sankoh, 1995, p.186).

Follow-up can play a key role in actually studying the effectiveness of an EIA. Evaluation process, which is a component of EIA follow-up has a 'backward looking nature. It concerns the appraisal of a project that has been or is currently being implemented' (Morrison-Saunders & Arts, 2004, p.4). Thus, strengthening follow-up activity can play a crucial role in realising the benefits of conducting EIA or help in the improvement of the EIA practice as well. A framework for follow-up will also ensure a feedback process in to system avoiding re-inventing the wheel. Communication of this knowledge can play a vital role in involving public participation, exchanging local knowledge and all this will eventually aid in translating the essence of EIA beyond paper on ground reality.

1.2.4 Open Cast Coal Mining in India

Mineral industry in India plays an important role in the economy of the country. 'The country produces 89 minerals, including four fuel minerals, 52 non-metallic minerals, 11 metallic minerals and 22 minor minerals (Singh & Kaliranjan, 2001, p.3). During the year 1999-2000, the value of aggregate mineral production in India 'was over U.S $9.6 billion, contributing some 3.5 percent of India's gross domestic product (GDP)'. However, in 'terms of value of minerals production by mineral groups, fuel minerals

dominate the total production with a share of more than 82 percent' (Singh & Kaliranjan, 2001, p.4).

At present, fossil fuels dominate the scene especially 'to supply much of the increment in marketed energy use worldwide'. 'Oil is expected to remain the dominant energy source with its share of total world energy consumption declining only slightly, from 39 percent in 2002 to 38 percent in 2025'. Natural gas as well is projected to 'maintaining average growth of 2.3 percent annually over the 2002 to 2025 period'. Coal use worldwide is projected 'to increase by 2.0 billion short tons between 2002 and 2015 and by another 1.0 billion short tons between 2015 and 2025. There will be rise in coal use all over the world except for Western Europe'. However, the largest increases in coal use worldwide are projected for China and India. Together, 'China and India account for 87 percent of the projected rise in coal use in the emerging economies region and 72 percent of the total world increase in coal demand by the year 2025 (eia, 2005). These figures no doubt are disturbing when considering environmental problems, particularly in the light of climate change. However, efficient mitigation of negative impacts of these activities can help in ensuring that environment is not ignored completely in the race for development.

'Coal is the most abundant fuel resource in India and it meets over 60 percent of total commercial energy requirement of the country' (Jha, 2002). India is currently the third-largest coal consuming country as well as third-largest coal producing country in the world (behind the China and the United States), accounting for '7.5% of the world's annual coal production' (CSLF, 2005). The key energy challenge facing India today is preventing bottlenecks in energy supply from constraining economic growth (Jha, 2002).

Within the coal-mining sector itself the global trend is more favourable for open cast (OC) mining as compared to its counterpart of underground (UG) mining. 'Of the total production in U.S, 61 percent was from open cast mines' (Mining India, 1998). Currently in India, OC mining is the predominant method. The share of OC mining in coal production in India was 80 percent in the year 2000-01 (GOIa, 2005). The emphasis on OC mining in the country's coal development will likely to continue. This is because OC mining has facilitated faster increase in coal production and better returns on investments since nationalisation of Indian coalmines in the early seventies (Mining India, 1998). The factors, which have resulted OC mining technique to dominate the coal-mining scene in India have been discussed in greater details in Chapter 6.

1.3 Scope of the Thesis

This work aims to study follow-up practices in a developing country, which in this case is India. Follow-up study has been recently emerging as an important aspect in the sphere of Impact assessment (Morrison-Saunders & Arts, 2005, p.170). However, evidence from developing countries is comparatively sparse. Some work done in developing countries shows that the situation can be much more complex and 'may pose additional challenges, which have not been addressed previously' (Arts et al, 2001, p.182). This study intends to contribute in this under researched area of Impact Assessment and explore some of these additional challenges. EIA has been made mandatory in India since 1994 and much of the research done so far have emphasised on the pre-decision phase. There is a need in training and capacity building in countries with little experience and India may be placed in this category.

The study will look into different contexts, which will perhaps play an influencing role in shaping follow-up procedures and its implementation. The research will also

construct a good practice list based on worldwide follow-up practices and theory. The Indian EIA system and environmental impacts associated with mining will also be taken into consideration in making the good practice list. The collation of ideas related to good practices will contribute in structuring a model. Finally it will lead to the contribution in the application and development of the notion of different contexts effecting EIA follow-up and will explore the different aspects of these contexts and their relationship to the good practice model.

1.4 Aim, Objectives and Research Questions

The research attempts to fulfil one aim as presented in Box 1a

Box 1a: Aim of the Study

To evaluate the practice of EIA follow-up in Indian open cast coalmines and to develop recommendations for its effective implementation.

In order to realise the aim of the work, five objectives have been formulated. These are summarised in Box 1b

Box 1b: Objectives of the Research

1. To construct a list of good practice list for conducting EIA follow-up
2. To review the status of EIA in India and its deficiencies.
3. To review EIA follow-up considerations in the pre-decision stage of the Indian open cast coal sector.
4. To examine in detail the implementation of EIA follow-up in open cast coal mining in India through case studies.
5. To develop recommendations suitable for implementation of EIA follow-up within OC coal mining in India.

Based on the objectives, ten questions are addressed. These are summarised in Box 1c. Research questions 1, 2 and 3 help in establishing the factors that need to be incorporated in the good practice list. They help in establishing Objective 1. Research questions 4, 5 and 6 reviews the status in EIA practice in India especially

within the open cast coal mines and helps in fulfilling objective 2. Questions 7 & 8 aim in understanding to what extent follow-up considerations are incorporated in the pre-decision stage of EIA in India when considering open cast coal projects. Existence of regional variation is also explored. These two questions therefore, help in achieving objective 3. Research questions 9 & 10 help in reviewing follow-up practices within the case studies in detail and with this regard explores regional

Box 1c: Research Questions

1. What factors should be taken into consideration in formulating a good practice list?
2. What are the broad categories under the good practice list?
3. What are the internal factors which influences follow-up implementation in India?
4. What are the major impacts on environment of open cast coal mines in India?
5. How far is the Indian system (legislative, institutional, attitudinal, organization, technical), equipped to support EIA Follow-up activities?
6. What are the strength, weakness, opportunities and threats for EIA system in India?
7. To what extent is follow-up considered at the pre-decision stage of EIA?
8. Is there any evidence of regional variation in follow-up implementation?
9. To what extent is follow-up actually implemented in practice?
10. Is there any regional variation established in the case studies?
11. What should be done in India to improve follow-up practice in OC coal mines

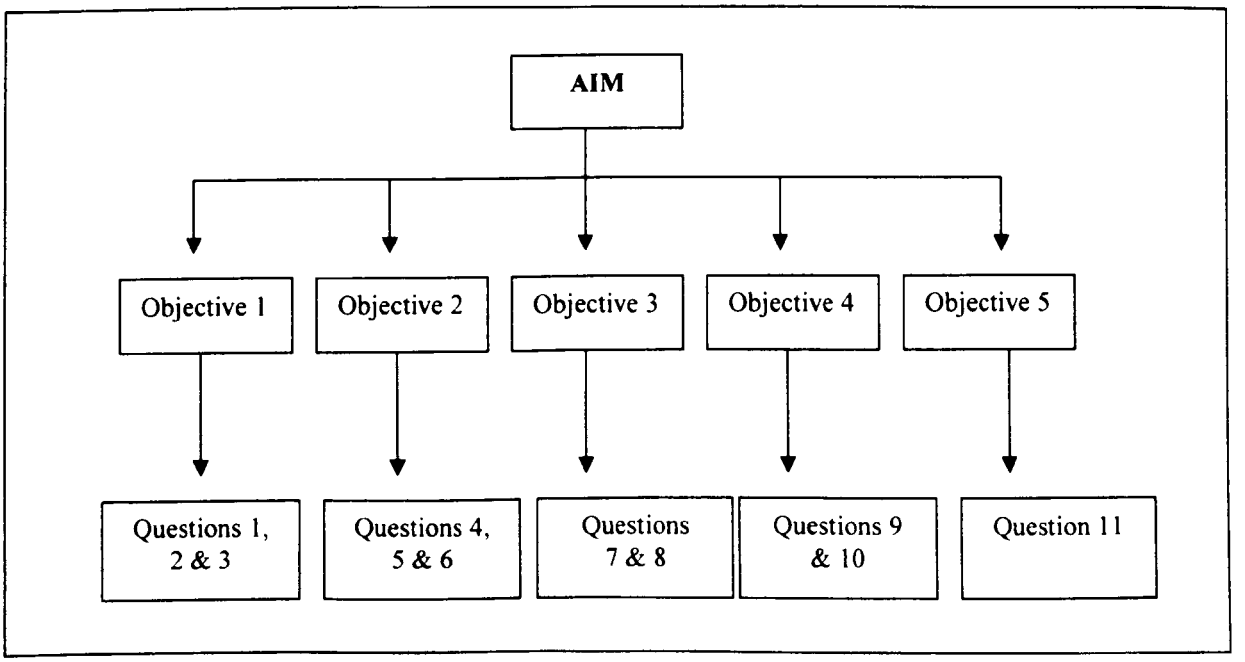


Fig 1.1 Relationship of Aim, Objectives & Research Questions

variation and fulfils objective 4. Finally objective 6, which is to develop recommendations, is established in research question 11. The relationship between the research questions, objectives and aim has been illustrated in Fig 1.1.

1.5 Research Methodology

The strategy adopted to undertake this research is qualitative in nature, as the nature of the study is exploratory. The aim of this work is towards developing an approach for an area of planning within a developing country context, namely India, which has gained very little attention to date. As there is very little information available on current practice related to follow-up, a purely quantitative approach couldn't be undertaken. Methods that have been adapted for conducting this study are very typical of qualitative research. These include literature review, interviews and case studies.

The first objective is comparatively broad in nature. Substantial research has already been carried out in this area and therefore, literature review is the most suitable method to achieve this objective. Objective two and three narrow down with their scope and the focus is on Indian experiences. This is comparatively less researched. Generally speaking, pre-decision EIA has been researched more widely than its follow-up. Literature review is carried out for fulfilling objective two while for objective three the main emphasis is on documentary review. The documents taken into consideration are mainly governmental documents, including existing guidelines, unpublished materials, EIA reports and legislative requirements. Other organisations related to coal mining in India would also have to offer specific documents. This will help to give a general insight into the process. Interviews have been conducted with people who are dealing with the process at national levels. This

will help in providing a general insight into the obstacles and limitation; additionally it will help in understanding different perspectives of the stakeholders.

Objective four is 'to examine in detail the working of follow-up in open cast coal mines in India'. This requires in-depth analysis of the actual working of the EIA follow-up process. Case study seems to be the best option to achieve this objective. The reasons for choosing case study as a methodology are discussed in detail in the next chapter. Three cases of OC coal mining will be studied and care has been taken to avoid differences in the nature of these thus, reducing the chances of any exaggerated results. They were kept similar to each other in respect with their production capacity, mine age, parent company and involvement of any funding agency. The final objective is recommending good practices for Indian open cast coal mining. This is based on the findings of the first four objectives of the dissertation and relies collectively on all the strategies that have been adopted for the research in general. Fig 1.2 outlines the research methodology adopted.

1.6 Structure of the Thesis

The work can be broadly categorised into four broad sections. Section A is the introduction to the research area along with its background. It puts forward the Aim and Objectives of the study as well as the research questions. The research methodology is discussed in details within this section and the list of good practice is also presented. Chapter one and two will cover this part of the thesis.

Section B constitutes building of the theoretical framework for the research and can be divided in two parts. The first part constitutes of chapter three and four and covers the working of EIA follow-up worldwide and contributes in the making of the list of good practices based on best practices available worldwide. Chapter five and six is the

second part of Section B, which contributes in the good practice list by taking into consideration the existing EIA system within India and the environmental practices within the coal mining industry in the country. Section B thus, helps in establishing objective one and two.

Research Methodology

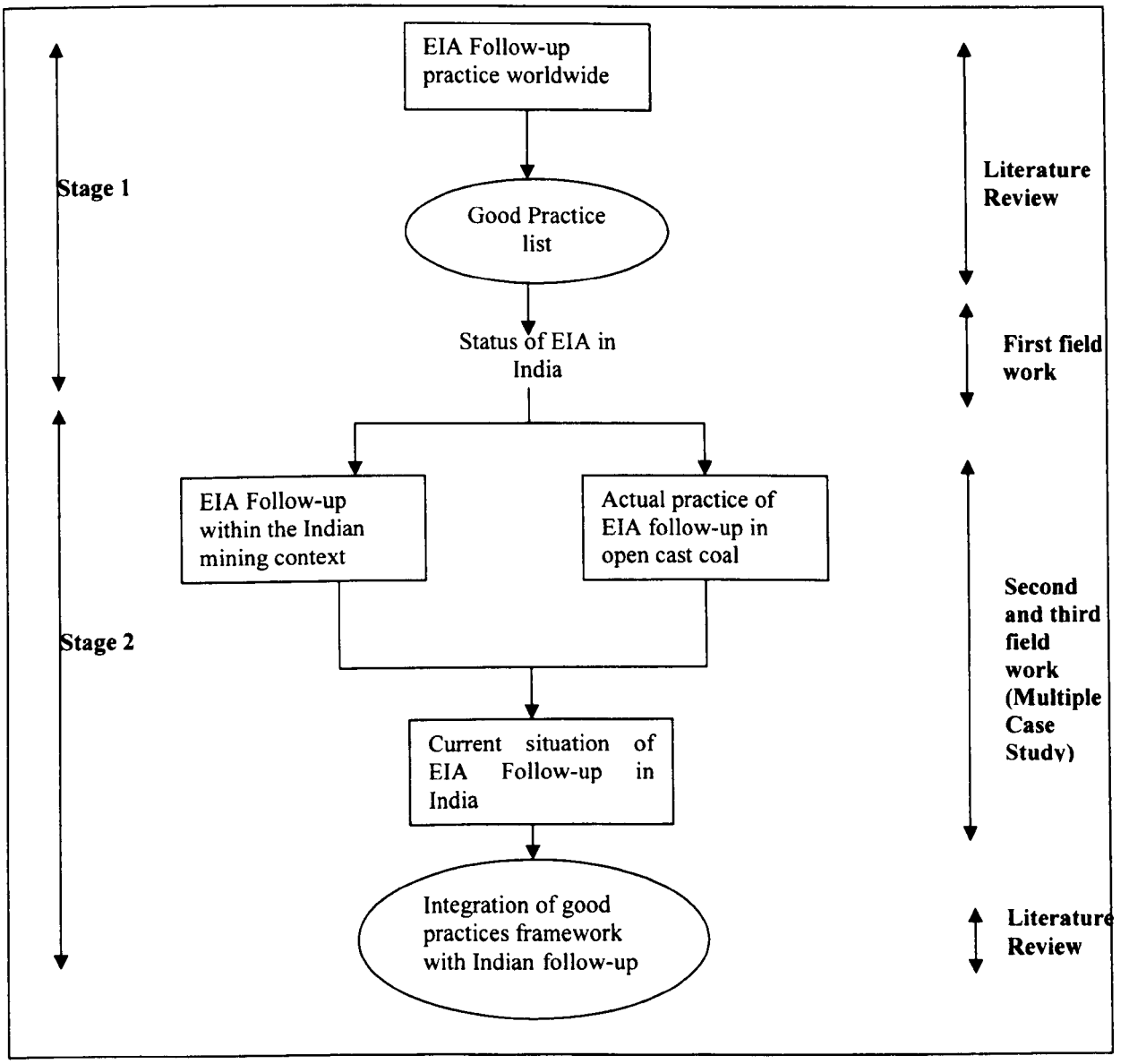


Fig. 1.2 Research Methodology

In Section C the focus is narrowed down to EIA follow-up practice in the Indian coalmining context. This consists of empirical nature of work. The pre-decision EIA follow-up practices within the open coast coal mining in India, which is objective three is studied and presented in chapter seven. The in-depth case study analysis, which is essentially empirical in nature, establishes objective four and is discussed in chapter eight and nine. Section D is the concluding section of the dissertation, which accomplishes objective five by providing recommendations to improve EIA follow-up in open cast coal mining in India through a list of good practice criterion based on the best practices world wide and tailored according to the Indian needs. The conclusions drawn from the study are presented in this section in chapter ten and eleven.

The research structure has adopted a funnel approach. It starts with broad worldwide EIA follow-up practice, narrows down to the follow-up practices in open cast coal mining within the Indian context and finally focuses on the list of good practices criteria for EIA follow-up suitable especially for the open cast coal mining in India. The thesis is divided into four sections as shown in table 1.1. The chapter outlines within these are discussed as follows: -

Section A: Introductory

Chapter one: Introduction to Research Background

This chapter introduces the research background. It sets the aim and objectives and discusses the research questions. The topic of the research is also introduced in this chapter and it sets the background to the study.

Chapter Two: Research Methodology

This chapter discusses the research methodology for the study in detail. The research framework is established and the research questions are refined. The rationale for

adopting different methodologies is justified within the context of the study undertaken.

<table>
<tr><th>Sections</th><th colspan="2">Nature</th><th colspan="2">Objectives</th><th>Chapters</th></tr>
<tr><td>Section A</td><td colspan="2">Introductory</td><td colspan="2"></td><td>Chapter 1
Chapter 2</td></tr>
<tr><td rowspan="2">Section B</td><td rowspan="2">Theoretical Framework</td><td>Worldwide follow-up literature & practices</td><td rowspan="2">Objective 1 &</td><td></td><td>Chapter 3
Chapter 4</td></tr>
<tr><td>Indian EIA deficiencies & environmental practices within Mining sector</td><td>Objective 2</td><td>Chapter 5
Chapter 6</td></tr>
<tr><td>Section C</td><td colspan="2">Empirical</td><td colspan="2">Objective 3

Objective 4</td><td>Chapter 7
Chapter 8
Chapter 9</td></tr>
<tr><td>Section D</td><td colspan="2">Concluding</td><td colspan="2">Objective 5</td><td>Chapter 10
Chapter 11</td></tr>
</table>

Table 1.1 Structure of Thesis

Section B (Part One): EIA Follow-up Worldwide

Chapter Three EIA Follow-up: A Theoretical Perspective

The chapter discusses the theory of EIA follow-up and in doing so presents various definitions and benefits of follow-up. The rationale for conducting follow-up in EIA is portrayed in detail. The different components of follow-up are also discussed and the relationship between Environmental Management Systems and Environmental Management Plans are explored. The chapter lays the theoretical foundation of EIA follow-up.

Chapter Four: Learning from the International Experience

Practices worldwide of EIA follow-up are discussed in this chapter. The different stages of conducting a follow-up are presented along with some country-specific follow-up frameworks. Different cases of best practice instances worldwide are discussed in this chapter.

Section B (Part Two): EIA in India

Chapter Five: Introduction to EIA in India

This chapter studies EIA system in India. Sadler (1996) identified five main deficiencies within EIA practice in any country. These are attitudinal, structural, institutional, procedural and technical. These factors are explored in the Indian EIA and the strength and weaknesses of it are identified.

Chapter Six: Coal Mining in India

In order to construct the good practice list for EIA follow-up especially within coal mining in India, it is important to understand and appreciate the complexities within the coal mining industry in India. This chapter presents the coal-mining scenario within India and explores the environmental impacts associated with open cast coal mining in the country.

Section C: EIA Follow-up in Open Cast (OC) Coal Mining in India

Chapter Seven: Consideration of EIA Follow-up in Pre-decision Stage of OC Coal Mining in India

EIA Follow-up considerations in the pre-decision stage, especially within the context of OC coal mining in India are discussed in this chapter. Minutes of the expert committee while considering OC Coal mining projects were studied along with the

EIA reports of the projects submitted. Forty-five interviews were also conducted amongst key players in the environment and coal industry at national level.

Chapter Eight: Introduction to Case Studies

The three case studies that are undertaken for this study are introduced in this chapter. A general introduction of the respective case is given, followed by a brief background of the project. The pre-decision stage is explored and the follow-up conditions to be complied with are identified. A gist of the ongoing follow-up mechanism is explained and finally the chapter presents findings from observations carried out during case visits. This chapter draws out some of the key emerging issues from the case studies.

Chapter Nine: Case Study Analysis

Chapter nine critically analyses the three case studies. The analysis is based on the good practice list presented in chapter 2, which includes broad contextual factors. These are regulations and institutional arrangements; approaches and techniques; resources and capacity; involvement with stakeholders and regional variation.

Section D: Conclusions

Chapter Ten: Summary & Recommendations

This chapter summarises the performance of EIA follow-up in India based on the five broad categories of the good practice list, which include regulations and institutional arrangements, approaches and techniques, resources and capacity, involvement with stakeholders and finally regional variation. This chapter also suggests the criteria set for regional variation to be incorporated within the tailored good practice list. Recommendations to improve the implementation of EIA Follow in India are also provided.

Chapter Eleven: Conclusions

This chapter summarises the findings of the five objectives of the research. It also identifies the limitations of this dissertation and puts forward further scope of research.

Chapter 2

Research Methodology

Chapter two presents an outline of the research strategy developed for meeting the aim of the research. The chapter further goes on exploring the detailed methodology that is adopted to satisfy the objectives of the research. It consists of six parts. First, the strategy is presented followed by the methodologies adopted. The research plan is discussed in the third section while the framework for conducting the research is presented in the fourth section. The following section identifies the implications of the pilot interviews on the research strategy. The rationale for the case studies is explored in the fifth section and finally the problems encountered in conducting the research are discussed.

2.1 Research Strategy

There are two broad stages in the research. The first stage involves studying EIA follow-up as practiced in OC coal mining in India. Recommendations for its improvement are given during the second stage. In order to accomplish stage one, the literature that is available is studied and interviews are conducted and case studies are undertaken.

For evaluating the Indian performance, a benchmark is essential in order to measure performance. This benchmark is constructed on the basis of international literature and examples of best practices that are available across the world. A list of good practice criteria is developed with the help of a literature review against which the Indian practice can be evaluated.

After evaluating EIA Follow-up practices in the open cast coal sector of India, the good practice list is to be adapted to the Indian circumstances. As Sadler 1994 states,

the point of research is not to 'grasp a theory of the impossible but to promote the art of the practical'. However, there is what may be called internal factors that have an effect in the follow-up procedure. These factors need to be studied and their influences on the follow-up mechanism have to be understood. This will eventually help to appreciate the Indian set-up and help to construct recommendations for the Indian OC coalmines benefiting from an international perspective.

2.2 Factors Influencing EIA Follow-up Implementation in India

Three kinds of factors are taken into account in this study, which can influence EIA follow-up implementation. These will be studied at three different stages within the research. The first one to be discussed is the strength and weaknesses of the existing EIA system. The second factor consists of the group of contextual factors (Chapter 4), which affects follow-up outcomes. Finally, the third factor is regional variation, which might influence follow-up implementation across the country.

2.2.1 EIA Deficiencies in India

In order to understand follow-up practice in India, understanding of the underlying EIA system is crucial (See chapter 5). It has been established that feedback from EIA follow-up can help in improving the effectiveness of the EIA system itself (Arts et al, 2001). In India, the pre-decision stage has been more emphasised than the post-decision stage, which to a great extent has been a neglected area. Eventually an improved follow-up practice should help in making the overall EIA process in India stronger and again the EIA process in general will have a profound influence on how follow-up is currently practiced in India. In order to understand follow-up, the study of the EIA process is essential as "ideally, if more thought and effort is put into the design phase, then it is expected that fewer problems should arise in the latter part of the

follow-up program" (Baker, 2002, p.5). The influence of this factor will be examined in chapter five where the context for EIA follow-up in India has been presented. The existing deficiency of the system is an important factor that will play a major role in shaping follow-up practice.

Sadler (1996) identified five main deficiencies within EIA practice in any country. The foundations of follow-up are laid in the pre-decision stage itself and thus, being an ongoing component of EIA, these deficiencies affect follow-up implementation as well. These broad areas of deficiencies pointed out by Sadler have been identified in many countries, they include: -

Attitudinal: project proponents and development agencies resist or circumvent the EIA or apply it as a pro-forma or narrowly defined technical exercise;

Structural: the EIA is poorly integrated with decision-making, especially with project implementation and/or with other supporting policy, planning and regulatory processes;

Institutional: the scope of the EIA is narrowly defined or applied, so that social, health factors and cumulative effects are inadequately covered;

Procedural: inadequate guidance and inconsistent enforcement of the EIA process is the root of many 'user' complaints about fairness, timeliness and efficiency; and

Technical: the quality of EISs, the accuracy of impact predictions and the suitability of mitigation measures are often highly variable (Sadler, 1996, p.41).

The EIA deficiencies within the Indian context will be investigated. This will help in getting an insight of its effect on follow-up procedures and will especially help to gauge the strength and weaknesses of the process.

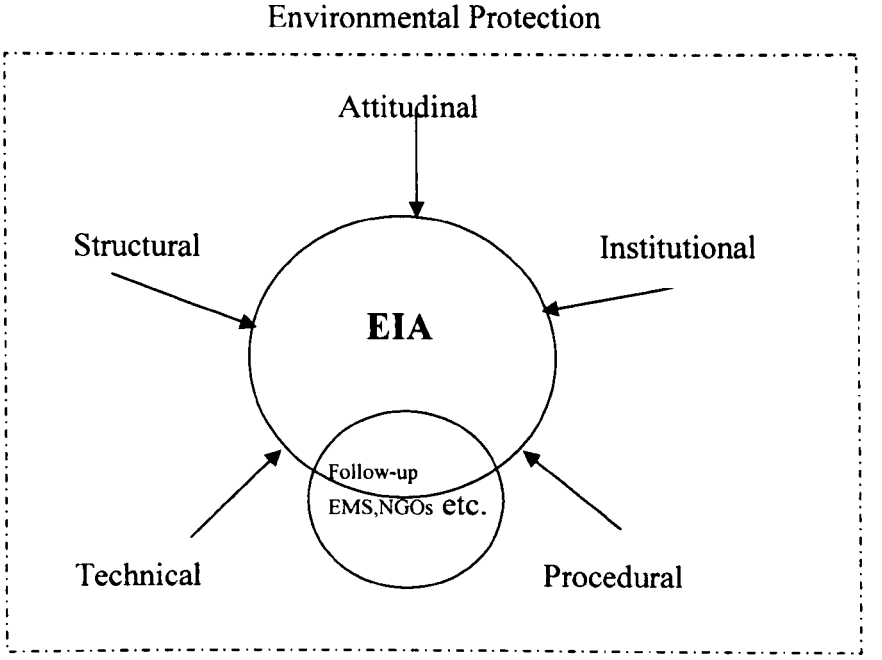


Fig 2.1 EIA deficiencies and its relation to follow-up

However, not all project follow-up is formally required and EIA related follow-up undertaken as part of Environmental Management Systems (EMSs) or initiated by Non Governmental Organisations (NGOs), may not be requirements of EIA regulations. Nevertheless, these are usually complementary to EIA follow-up. Therefore activities affecting and influencing the open cast coal sector will be studied. This might help in using existing mechanisms to support EIA follow-up rather than creating new ones, as they share the common goal of protecting the environment.

2.2.2 Contextual Factors

EIA follow-up occurs as a function of the interplay of four factors, which are: -

- "Regulations and institutional arrangements that have been put in to place
- Approaches and techniques utilized in follow-up practice
- Resources and capacity to undertake follow-up
- The type of activity that is being followed up" (Morrison-Saunders & Arts, 2004, p.45-53).

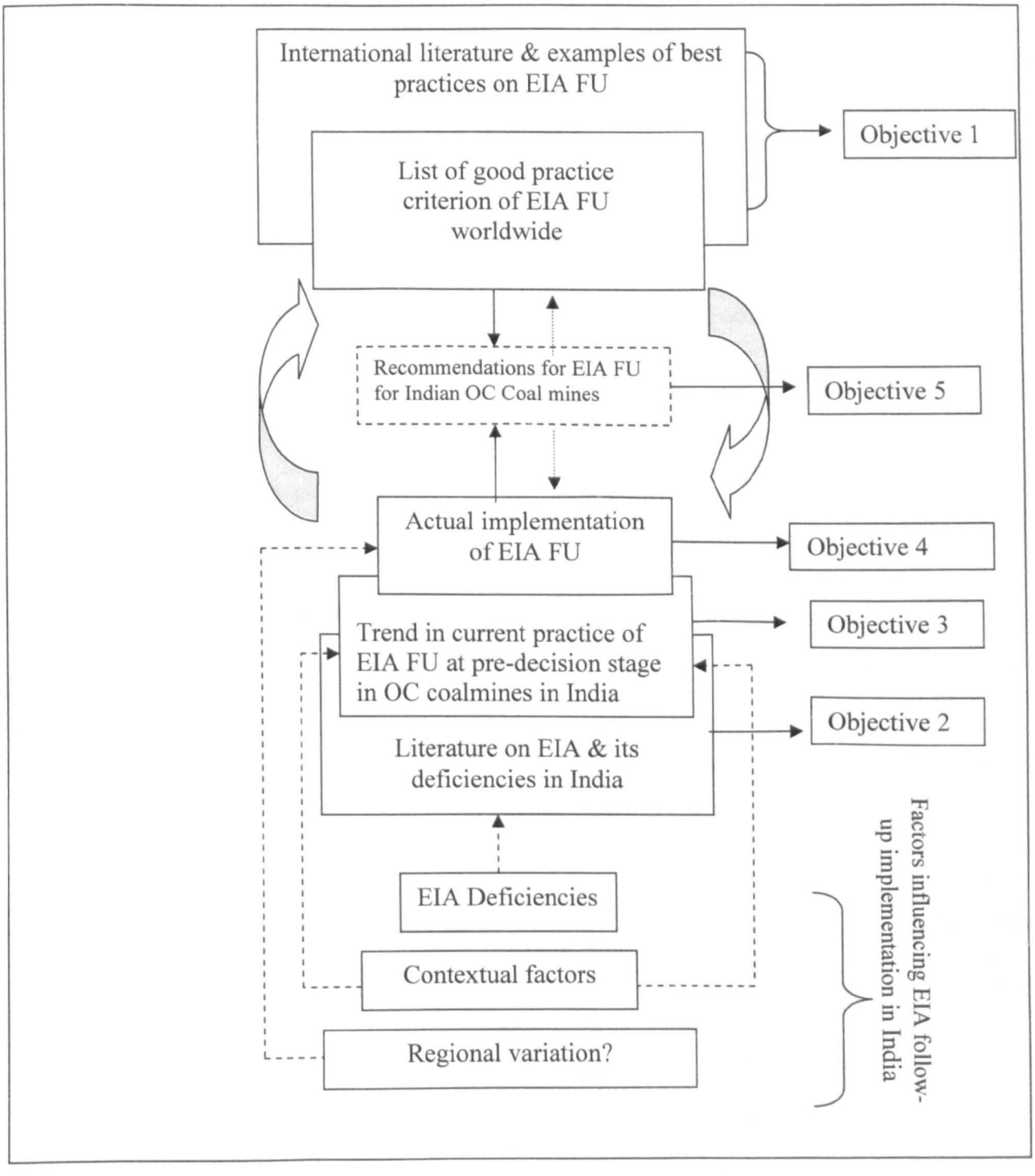


Fig 2.2 Overall Research Strategy

The influence of these contextual factors will be studied on the EIA follow-up practice in India, especially while analysing the role of follow-up in pre-decision EIA. These have been discussed in detail in chapter four.

2.2.3 Regional variation

Although contextual influence will continue to play a key role in studying the follow-up implementation in India in detail, the third factor within India that is regional variation will be specifically examined while conducting the case studies. This will help to understand as to what extent, regional variation may have an impact on the outcome of follow-up. It has already been established in the follow-up literature that no two follow-ups will be same even under the same jurisdiction due to the influence of these contextual factors (Morrison- Saunders and Arts, 2004b, p.11). It is still of interest to identify which of these contextual factors play a dominant role within the Indian context, in terms of influencing the effectiveness with which follow-up is implemented. Thus, 'where' the follow-up activity is taking place will be crucial in determining how these contextual factors will work.

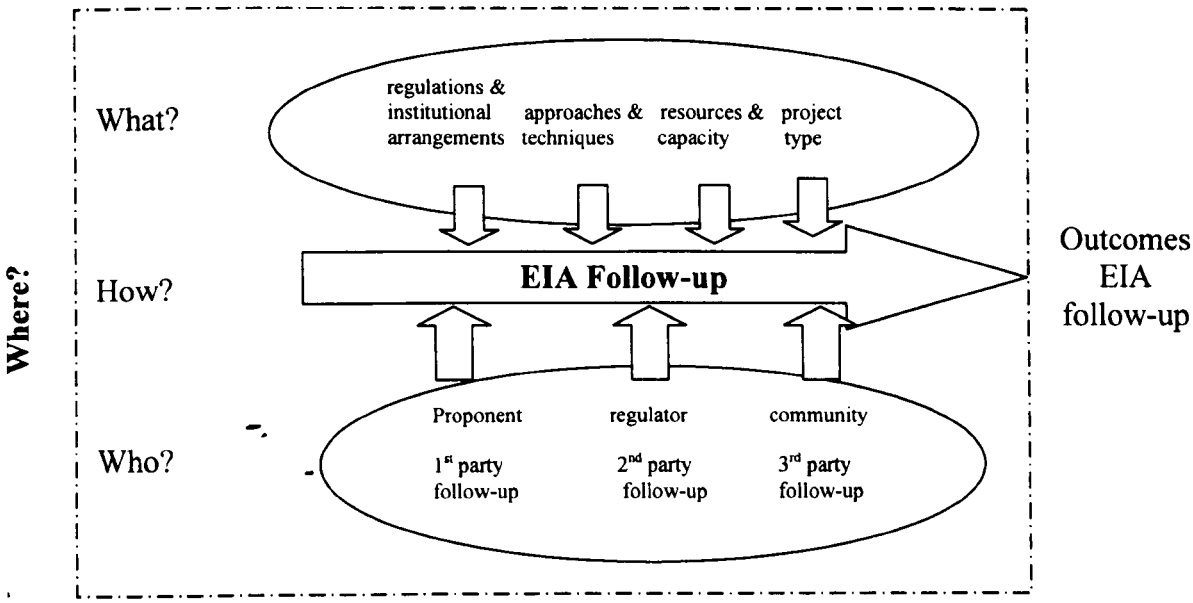


Fig 2.3 Influences of Contextual Factors on Follow-up (Adapted from Morrison-Saunders et al, 2003) (Also see Fig 4.2 & 7.7)

The existing framework of contextual factors affecting follow-up has been provided in chapter 4 (See Fig 4.2) and it has been developed further in Chapter 7 (See Fig 7.7).

However fig 2.3 has added on to this existing framework by an additional question, which is 'where?'.

2.3 Research Methods

In order to meet the overall research aim and objectives, the methodology has been designed to examine the existing framework of EIA follow-up in India and to also see its defects in order to suggest an improvement. In order to do this, questions have been framed as will be discussed later. However, in order to establish the framework for the research, it is important to discuss how the information is obtained. The adopted methodology is more qualitative than quantitative. The reason lies in the exploratory nature of the study. Limited experience in follow-up studies within India precludes analysis of current practice in a purely quantitative manner. Therefore, the methods used in this research are restricted to those that are usually associated with qualitative research, such as literature review, interviews and case studies. These divergent sources help in providing general insight into the obstacles and limitations. They also provide an insight to the value and potential of the existing practice of EIA and its follow-up in India. In addition to these, the case study analysis is equipped to lead to a more in-depth analysis of the specific circumstances within which the follow-up practices are carried out and exert an influence over it. The following paragraphs will discuss these research methodologies in more details and will also explain why they have been chosen for this research.

2.3.1 Literature Review

'The main goal of literature review is developing knowledge and understanding previous work or activity in regard to the topic being researched' (Adams and Schvaneveldt, 1985, p.51). In order to establish the practice of EIA Follow-up

worldwide and to structure a list of best practice criteria, the research is based on the existing literature. This helps to investigate the practice of worldwide follow-up and the different approaches in carrying it out. Therefore, the dissertation can benefit from the existing know-how. The literature review has also helped in analysing the current EIA follow-up practice in India. Other than journal papers, conference proceedings, related books and Internet sites, the work has used different documents. These include legislation, EIA reports, Environmental Management Plan (EMP) and other relevant documents of various environment and coal related Indian institutions like that of Coal India Ltd. (CIL), Ministry of Coal (MOC) and the Ministry of Environment and Forest (MoEF) in India.

2.3.2 Interviews

The term 'qualitative interviewing' is usually intended to refer to in-depth, semi-structured or loosely structured forms of interviewing (Mason, 1996, p.38). As suggested by Mason, the questions that need to be asked for qualitative interviewing are, 'why might I want to use interviews?' 'Why might I want to speak or interact with people to generate data?' 'Why might I want to use qualitative interviewing? Why this style of approach rather than a more structured form of interviewing or questionnaire?' The answers to some of these questions in relation to this study undertaken suggest that people's knowledge, views, understandings, interpretations and interactions will prove meaningful in answering the research questions. As already mentioned earlier, contextual evidence or knowledge is of special relevance in this study. This demands a flexible approach in each interview (Mason, 1996, p.39). The pilot interviews, which were carried out during the first field trip to India also aimed at getting clues during the interviews that aided in formulating questions for the case studies and a second set of interviews. Qualitative semi-structured interviews best serve this purpose. During the

second set of interviews the same approach has been adopted due to the exploratory nature of the study. This will also help to formulate structured framework for conducting the case studies.

2.3.3 Mine Visits

Apart from literature review and interviews with the stakeholders, the author has also visited the mines to verify data during the field studies. In order to check the extent to which environmental monitoring conditions were actually implemented on the ground, observations were carried out. All three mines were visited and evaluated as follows: -.

1. A list of overlapping criteria was designed based on the conditions stipulated by the regulatory authority that were the same in all three cases.
2. Care was taken to include mostly such conditions, which could be inspected easily during the visits without assistance of external expertise. However, for some of these conditions chosen, assistance was necessary, because of the technicality of mining activity. These were obtained from the proponents.
3. It was attempted to include monitoring conditions of those aspects of the environment, which are affected by OC mining, namely land degradation, air pollution especially caused by dust and impacts on health of workers (See chapter 6)

The evaluation of the monitoring conditions based on the mine visits has been provided in chapter eight.

2.3.4 Case Study

According to Yin (1994, p.4) there are three conditions encouraging using case studies as a strategy. These are '(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioural events and (c) the degree of focus on contemporary as opposed to historical events'. To start with the first criterion, the

question type posed in this research is mainly 'How?' 'How is EIA Follow-up carried out in India?' 'How is it different from the best practices reported elsewhere in the world?' 'How can the implementation of follow-up improve in the Indian context?' According to Yin, 'case studies are the preferred strategy when "how" or "why" questions are being posed. However, experiments and historical studies have also been considered to favour "How" and "Why" questions (Yin, 1994, p.1).

The second relevant situation, favouring case study research is the degree of control an investigator has on the behavioural events. In case of this research, the researcher exerts practically no control on the behavioural events and is but only an observer. The last criteria for case study are focus on contemporary events as against historical events. This particular research intends to study the contemporary practice of EIA follow up in India. In order to do so the worldwide literature is studied. These are but all contemporary events rather than historical events. Considering all three aspects of the study it can be derived that case study is best suited for this research. Table 2.1 explains relevant situations for different research strategies. The different situations relevant to the study undertaken in this research have been highlighted accordingly.

Strategy	Form of research question	Requires control over behavioural events?	Focuses on contemporary events?
Experiment	**How, why**	Yes	**Yes**
Survey	Who, what, where, how many, how much	**No**	**Yes**
Archival analysis	Who, what, where, how many, how much	**No**	**Yes/no**
History	**How, why**	**No**	No
Case study	**How, why**	**No**	**Yes**

Table 2.1 Relevant situations for different research strategies, adapted from COSMOS Corporation in Yin, 1994, p.6)

However, a common concern usually associated with case studies is 'that they provide little basis for scientific generalisation' (Yin, 2003, p.10). In order to address this, a multiple case study approach has been adopted. A total of three cases are studied. These are examined in detail. While providing recommendations for improving follow-up practice, care is taken to ensure these recommendations are suitable for understanding the work of similar open cast coalmines in India. Thus, the findings will not be generalised to represent follow-up in India as a whole, or even to follow-up in Indian coalmines. The case studies will nonetheless contribute to a deeper understanding of follow-up practice associated with open cast coalmines in India as they all are guided by similar regulations and regulating bodies.

2.3.5 Data Analysis and Interpretation

A scoring system has been adopted according to which the Indian performance can be graded against the good practice list. This scoring system has been adapted from the review procedure developed by Fischer for reviewing the quality of SA report (Fischer, 2005). The symbols used for grading range from A (well performed) to G (task not attempted). The good practice list has five broad categories, which are further sub-divided into a number of questions. Based on the individual grades given against each question under the good practice list, an overall grade is achieved for the broad category. While analysing case studies, based on the performance of the broad category the performance of the overall case is marked. This reflects the author's overall impression and is not strictly an average grade.

The scoring system is used at different levels for the analysis of the interviews, as well as the case studies. Finally, the grades obtained for each broad category at the different levels are compared with each other. An overall grade is then given to the Indian follow-up practice on that category.

Scoring System	
Grade A	Generally well performed with no important omissions
Grade B	Is performed satisfactorily and complete with only minor omissions/inadequacies
Grade C	Just satisfactory despite some omissions or inadequacies
Grade D	Indication of parts being well attempted but, on the whole, performance is unsatisfactory because of omissions or inadequacies
Grade E	Not satisfactory. Revealing significant omissions or inadequacies
Grade F	Is very unsatisfactory with important tasks poorly attempted
Grade G	Task not completed at all
N/a	Not applicable
?	Unclear

Table 2.2 Scoring System (Fischer, 2005)

2.3.6 SWOT Analysis

A Strength, Weakness, Opportunity and Threat analysis has been used here to evaluate the EIA system of India. SWOT analysis is a structured approach, which helps in evaluating the strategic position of a business, system or organisation (Jobber, 1998, p.37). In this case the analysis has been used to evaluate the EIA system in India. Strength and Weakness are internal factors while Opportunities and Threats are external factors (Kotler, 2001, p.76). In case of the EIA system the external factors constitute of macro environments forces including demographic, economic, technological, political-legal, socio-cultural factors. Internal factors within the EIA system constitute of the EIA structures, procedures, technical quality, institutional mechanisms and attitude of the various stakeholders involved. EIA follow-up is a continuation of what is decided in the EIA during the pre-decision stage. Thus, the strength and weaknesses of pre-decision EIA will influence in how its follow-up is conducted (Baker, 2002, p.5). Detail SWOT analysis of the EIA system has been presented in chapter five.

2.4 Research Plan

The research programme is divided into four parts. First, an extensive desktop survey was conducted. The literature review is an essential component of the research and plays an important role in achieving some of the objectives. Objectives 1 and 2, which are 'to construct a list of good practice criteria for conducting follow-up' and 'to study the status of EIA in India and analyse its deficiencies' rely to a great extent on the literature review.

However, objective two along with objectives three and four, which are 'to review the trend in the current practices of EIA follow-up in the pre-decision stage of the Indian open cast coal sector' and 'to examine in detail the implementation of EIA follow-up in open cast coal mining in India through case studies' are constructed within the Indian context. Information to satisfy these objectives was obtained by three field visits to India. The literature review and the document analysis also supplement the data collected. The first field visit was carried out in autumn 2003. This field visit was intended to give a general idea regarding the status of EIA in India and pilot interviews were undertaken at this stage. The second field visit was carried out in summer 2004. Objective three was fulfilled during the second field trip. It is essentially a combination of literature review and interviews. This field visit undertook a more detailed study of the follow-up procedure of EIA in India through document review and interviews. The final field trip was undertaken during summer 2005. The aim of this field trip was to accomplish objective 4, which essentially consists of conducting the case studies. A total of three case studies are undertaken for a period of three months during June 2005 to August 2005. After the completion of all the field visits Objective 5 was accomplished, which is 'to develop a list of good practices criteria suitable for implementation of EIA follow-up within OC coal mining in India'.

2.5 Framework of Analysis

Based on the existing EIA follow-up literature and evidence of practices reported around the world, a list is constructed. This list is called 'good practice list' in this work and will serve as a benchmark to be used in later chapters against which the Indian follow-up practices will be compared and contrasted with. Chapter three and four helps in constructing the good practice list. Chapter 5 and 6 further help to integrate environmental practices of Indian mining industry in the list. According to the existing 'best practice list' by Morrison-Saunders and Arts (2004, p. 287-298) the list consists of five categories, which are regulations and institutional arrangements; approaches and techniques; resources and capacity; project type and involvement with stakeholders. In this study we have not included project type as in the case studies the project type has been kept constant.

A sixth category of 'regional variation' was added to this existing best practice list based on the pilot interviews conducted during the first field trip. The pilot interviews were carried out initially to construct a set of questions for the final interviews. The aim of the pilot interviews was to develop understanding of the general EIA system and then to proceed with the know-how regarding follow-up. In this respect the interviews have a funnel shaped approach. Questions for this set of interviews have been based upon a similar study carried out by Diab and Hulett (2002) in understanding the status of follow-up in South Africa. These questions seemed appropriate because similar to Diab and Hullet's approach in the African context; a general know-how of EIA in India needs to be investigated. The questions, which are of broad nature, allow the interviewee to express his or her ideas in a flexible manner. The pilot interview, which was undertaken at the initial stage, is of an exploratory nature.There are six questions that have been used and these can be further categorised under four broad categories as is shown in table 2.3.

Topic	Questions
Understanding of EIA	1. How would you define EIA? 2. What according to you are the different stages in EIA?
Barriers to EIA	3. What are the factors you think Hindering the process of EIA in India?
Experience with EIA if any	4. What is your role in the process? How do you ensure EIA is implemented?
Understanding of EIA follow-up	5. What do you understand by follow-up? 6. What is the purpose of carrying out a follow-up?

Table 2.3 Semi-structured questions for pilot interviews

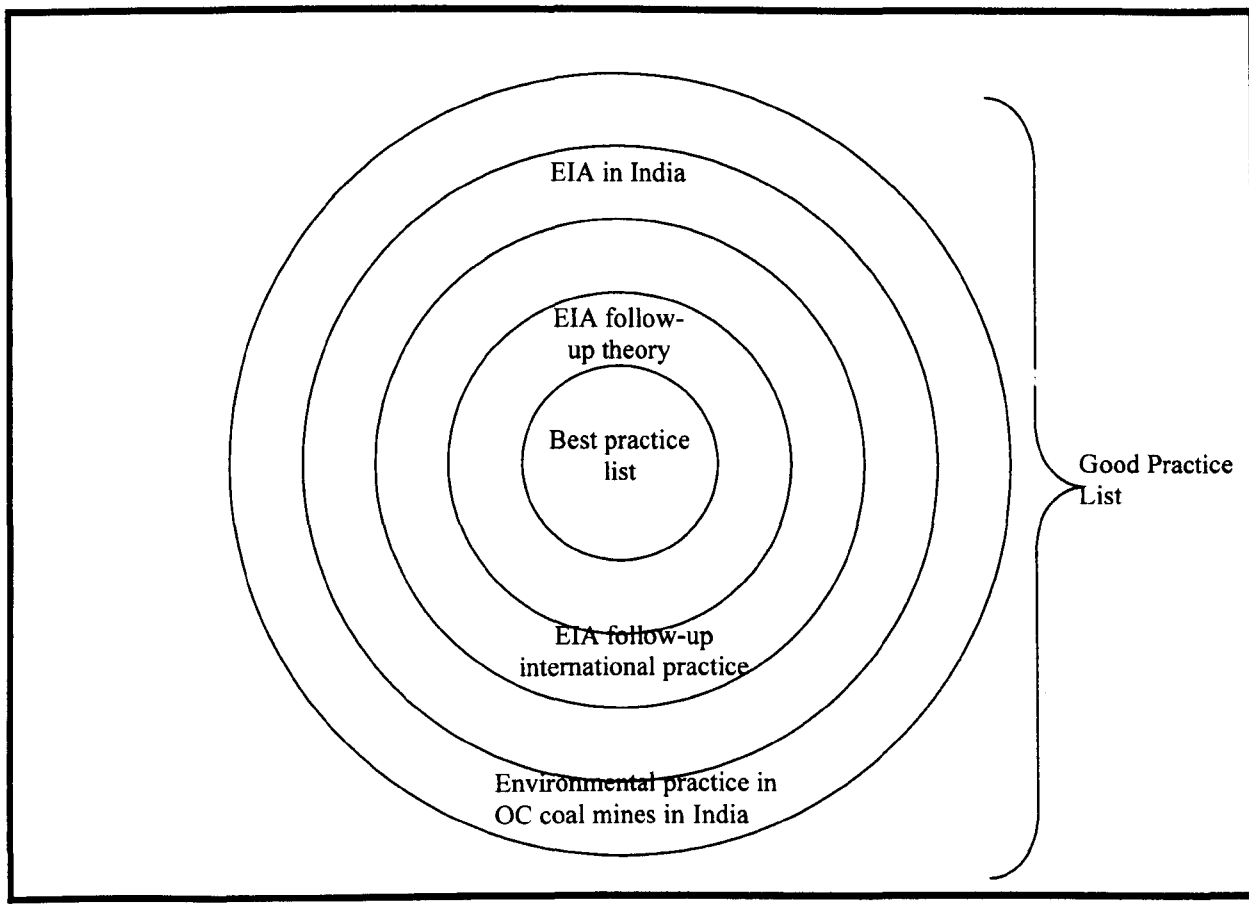


Fig 2.4 Layers in Good Practice List

During the first set of interviews, evidence of regional variation was found. Subsequently this factor was included as an element of influence on EIA Follow-up practices. In order to gather evidence and confirm regional variation in follow-up

practice, questions on this were included for the semi-structured interviews that would finally be taken. Variation of the different states in India to a great extent might also depend on the State pollution control boards of the respective states (Priyadarshini & Gupta, 2003).

Firms take advantage of lax enforcement of environmental standards, which remains mainly on paper and this result in wide variations in enforcement across states (Priyadarshini & Gupta, 2003). Having found such evidence in the literature it will be important to include related questions to the key players within the system, which eventually might help in gathering more in depth knowledge about such variations. The possibility of having regional variation was established as a result of the first field trip and was adapted in the good practice list.

Further questions have been added to this list based on the Indian experience of EIA and environmental management in coal mining, presented in chapter 5 and 6. Thus, the construction of the good practice list, which is objective one, was done by blending theory and principles of EIA follow-up (Chapter three) with the existing best practice list and international follow-up experience (Chapter 4) along with Indian experience of EIA (Chapter 5) and also by incorporation of environmental impacts and management experience of open cast coal mines in India (Chapter six). It has further combined the possible factors causing regional variation in EIA follow-up implementation in India. The good practice list is presented in the following table 2.4.

Broad Category	Questions
Regulations & Institutional Arrangements	1. Is the follow-up system based on clear and specific legal provisions? 2. Are there any stages specified in legal provisions? 3. Are any time limits for the various steps in the follow-up process? 4. Is there any strong commitment by EIA regulators to undertake EIA follow-up? 5.Are there any independent bodies responsible for reviewing follow-up programmes and results? 6. Is there any integration of self-regulation tools of the particular industry with the follow-up mechanism? 7. Is proponent voluntarism encouraged (Example by giving rewards for good practice)?
Approaches & Techniques	1. Does follow-up start at an early stage of the EIA process? 2. Is follow-up designed according to the life cycle stage of the project? 3. Is there any screening mechanism for it? 4. Is there any scoping done for it? If yes, is it objective-led and continuous throughout the project cycle? 5. Is follow-up design documented? 6. Is existing data used? 7. Is monitoring practiced in a comprehensive manner? 8. Is there any provision of rigorous monitoring data? In case rigorous methods not possible, is there any provision for simple techniques for conducting follow-up? 9. Does the proponent have any formal EMS in place? If yes, is it well integrate with follow-up? 10. In case of too many environmental issues, is there any quick scan approach adopted to determine issues, which require in-depth study? 11. Does follow-up serve all its purposes (conformance, performance, dissemination, tackling uncertainty)? 12. Does follow-up have all the components? 13. Is any dominant approach adopted for follow-up in the Indian context? 14. Does follow-up cover environmental, social and health issues? 15. Does follow-up deal with indirect effects (boom-town effect)? 16. Are the approaches adopted in accordance with the local 'EIA culture'? 17. Is consistency maintained in the procedure by the regulators for reviewing the environmental reports? 18. Are the efforts of the regulators (if there are more than one) well integrated?
Resources & Capacity	1. Is responsibility clearly allocated for someone to pay for follow-up? 2. Is responsibility clearly allocated for someone to conduct follow-up? 3. Is responsibility clearly allocated for someone to evaluate follow-up? 4. Is responsibility clearly allocated for someone to manage the changes required? 5. Is responsibility clearly allocated for someone to prepare the report? 6. Is responsibility clearly allocated for someone to whom the results are report to, or, who checks compliance? 7. Is finance allocated for conducting follow-up? If yes to what proportions? 8. Is local knowledge taken into account for designing follow-up? 9. Is there any provision of 'institutional memory' and knowledge broker (contract with universities or research institutes for knowledge sharing)? 10. Is there any kind of training or education and capacity building imparted follow-up? 11. Is the strength for follow-up team clearly stated? 12. Is there any independent monitoring agency?
Involvement of Stakeholders	1. Does community participation take place at an early stage? 2. Are the results of the follow-up available to the public? 3. Are public concern represented in follow-up?

	4. Does follow-up take into account the interaction between the project and local communities? 5. Do regulators insure that follow-up is carried out in accordance with regulations? 6. Is follow-up viewed as a useful exercise? 7. Is follow-up regulator, proponent or community driven?
Regional Variation	1. Does the economic situation of the region affect the follow-up implementation? 2. Does local politics influence follow-up implementation? 3. Does management influence in the effectiveness of follow-up implementation? 4. How far does cultural values have an influence on follow-up implementation? 5. Does occupational pattern have an influence on the follow-up? 6. Is there any variation in the frequency and procedure in which the respective SPCB (State Pollution Control Boards) provide feedback o the proponents? 7. Is there any variation in the frequency and procedure in which MoEF provides feedback to the proponents?

Table 2.4 Good Practice List Criterion

The second field trip conducted documentary analysis and was based on the good practice list created. Three sets of documents were evaluated which are as follows: -

- The first set consisted of unpublished minutes of the meetings held by the expert committee for mining constituted by the MoEF while considering open cast coal projects from 1997 to 2004. This analysis helped to evaluate the importance given to follow-up consideration in pre-decision stage by the decision makers.
- The second set of documents was the Environmental Management Reports that were assessed by the expert committee during 1997 to 2004. This helped to understand the follow-up conditions set by the proponent in the pre-decision stage of the project.
- In order to choose the case studies, a third set of information was analysed based on the data collected from Coal India Limited (CIL). The data helped to choose the case studies to be undertaken based on the criteria set which has been presented during the discussion of the rationale for the case studies.

The second field trip enabled to review follow-up considerations in the pre-decision stage as this is essentially the design phase of follow-up and has important consequence on its implementation. It also unveils the formal requirements for follow-up in the open cast coalmines in India.

Semi-structured interviews were also conducted during the second field trip. These were conducted at a national level and included key players who were related to environmental protection or coal mining in India. This also included ex-coal ministers and their vision for the coal industry in relation to environmental protection. Other interviewees included members from the Ministry of Environment and Forest (MoEF), National Environmental Engineering Institute of India (NEERI), Wildlife Institute of India (WII), Centre for Mining Research Institute of India (CMRI), Central Mine Planning Designing Institute of India (CMPDI), Coal India Limited (CIL), Ministry of Coal (MOC), media personals who are related to journalism within the mining sector, Central Pollution Control Board (CPCB), and Director General Mines Safety (DGMS). These interviews helped in understanding how the key players co-ordinate amongst each other and their understanding of the follow-up system in India. Unlike the document review, which revealed the formal requirements, these interviews revealed the actual practice of EIA follow-up in India based on their experience as key players in the mining and environment sector.

2.6 First Field trip

As discussed previously, the first field trip intended to develop an understanding of the general status of EIA in India before studying its follow-up. Face-to-face semi-structured interviews were conducted. The interviewees were selected from a range of backgrounds who were directly or indirectly related to the EIA process. These include, members from the expert committee who review the EIA reports, academics, government officials and

government-undertaking consultants, officers working on World Bank projects and some senior members of Coal India Ltd. The reason for choosing personnel's from a variety of backgrounds was to understand various perspectives of EIA and its follow-up. As the interviewees were actors at different levels, their know-how reflected the clarity of the process and co-ordination between the different actors. The interviews were semi-structured; however, some informal discussions were also carried out. A total of 10 interviews were undertaken at this stage. The details of these are attached in Appendix 1.

2.7 Implications of Pilot Interviews on Research Design

It is important to present the implications of the pilot interviews in this chapter, as these play a crucial role in formulating the main research questions and can be broadly categorised under three headings, which are: -

- Understanding of EIA
- Current Problems within EIA
- Understanding of EIA Follow-up

In order to get an insight into the understanding of EIA in India, the interviews focused on two aspects. First, what do the key players understand by the term 'EIA' itself and secondly what stages does EIA consist of. Six interviewees had a clear understanding of the EIA process. However, the other four did know about the process but there were inaccuracies in their understanding. EIA was substituted in the form of EMP (Environmental Management Plan) and both these terms are used synonymously. These terms have been discussed later in Chapter seven.

As far as stages are concerned, only three interviewees actually mentioned about follow-up. The term that was used was mainly monitoring as well as 'judging actual impacts' and 'mitigation'. Two interviewees mentioned public participation. It was interesting to note that the stages identified by the interviewees as EIA stages reflected

more of what they had to do in their respective roles. For example for an officer in the coal company EIA stages consisted of identification of the coal mine, giving the responsibility to the consultant to prepare the EMP and finally getting the project cleared.

It was also evident that consultants who prepared the main document are not responsible for the follow-up. As suggested by Kenny (2004), 'When IA (impact assessment) is outsourced it may not be an integral part of the business process and company learning'. This also creates a gap in know-how amongst the people who actually create the document and the people who are responsible in carrying out the procedures mentioned in it. Subsequently the overall picture of the EIA process was missing. It was also mentioned that projects, which were funded but the World Bank fared much better in their effort in environmental protection.

As far as problems are concerned, nine of them agreed that the documents produced are of low quality. Time was an important factor responsible for this. Although eight of them said that the process was extremely time consuming (requiring 2-4 years and at times 6 years), some consultants provided with yet another aspect. According to them, there is always pressure from the proponents for fast completion of the document itself for which the consultants are directly responsible. Hence quality is compromised, as in most cases, the data required are missing and time does not permit them to actually gather the data themselves. As a result, the data based on which the documents are prepared are mostly inaccurate.

Lack of co-ordination amongst key actors was sighted as a problem by five of the interviewees. It was also pointed out that the performance varied, depending on the size of the projects. Although there was no question posed on evidences of regional variation, this was suggested strongly during the interviews.

The term that is usually used for follow-up in India is monitoring as six out of the interviewees addressed it by that name. However, only four emphasised that the data need to be monitored while for the rest, the process involved submission of monitored data to the responsible authority. As far as the purpose of follow-up is concerned, all the interviewees agreed that within the Indian context, it was compliance. Perhaps EIA follow-up in India has to go a long way before it can actually perform to its fullest potential in delivering its other functions of improving performance, dissemination of knowledge and tackling uncertainty.

2.8 Rationale for Case Studies

Case studies are used here to get an in-depth understanding of the follow-up practices within the open cast coal sector in India. The reasons for choosing this methodology have already been discussed earlier in the chapter but this section presents the rationale for choosing the type and specific cases for the study. The evidence that has been gathered through the literature review complemented with the pilot interviews undertaken has influenced the choice of the case studies. The basic characteristics that have been identified for a project in order to be appropriate for this study are discussed as follows: -

Mining Technique: First of all it should be an open cast coal mine in India.

Parent Company: Secondly, it should be under the parent company of Coal India Limited (CIL). This is because CIL is synonym of coal sector in India contributing 86 percent of coal production (GOI, 2002). Thus, mining projects within CIL will be fairly representative of the Indian coal-mining sector and it would also make the cases more comparable and homogenous.

External Funding Agency: Both the literature review and the pilot interviews have suggested that there is a strong influence of World Bank as a funding body on environmental protection measures. Under the World Bank guidelines, the companies are abided to follow special programs like the Environmental and Social Mitigation Project (ESMP) and Coal Sector Rehabilitation Project (CSRP) (World Bank, 2002). Therefore, a World Bank aided project compared against a non-funded project may lead to an exaggerated difference. It will also not be a true reflection of the requirements of an Indian coalmine. Selecting such a case proved difficult because most of the open cast mines, which met the other criteria, have been at some time or the other World Bank funded. The mines that were finally chosen for the case studies were ones, which were currently not being funded but might have received financial aid previously. While evaluating the results of the case studies, this factor has been taken into account as World Bank influence at some point of time is expected to cause variation from the beaten track of follow-up implementation in Indian coalmines.

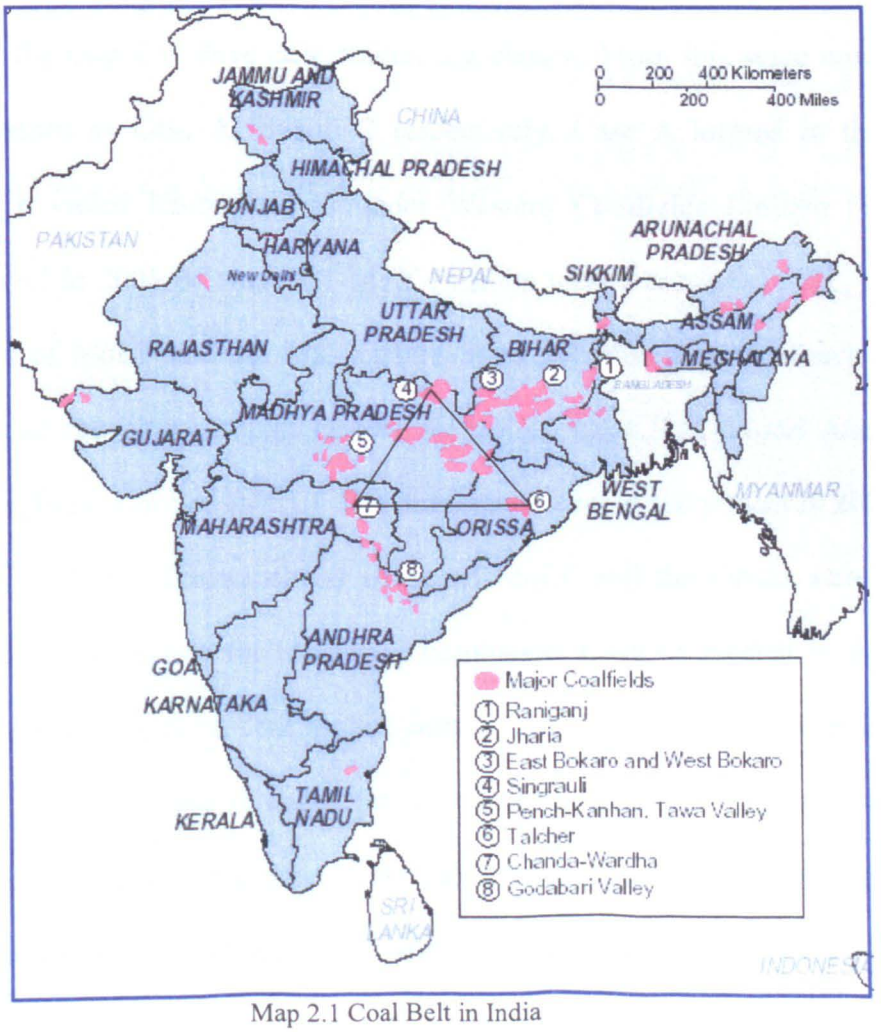
Production Capacity: The size of the project may also reveal different patterns in relation to attitude and efficiency in environmental performance. Effort has been made to keep the cases as similar as possible as far as the production capacity is concerned.

Mine Age: The age of the mine in its life cycle is also a crucial factor. A new project may lack prominent evidences of compliance. Large open pits and over dumps are created as a result of open cast mining operations, which need to be dealt with by land restoration. Thus, a mine has to be old enough to have these features. The middle stage or rather a prominent implementation stage will be ideal for the case studies.

Mine Location: The final and yet one of the crucial factors for considering a case study will be the location of the project. As mentioned earlier, there are evidences of regional variation. Keeping other factors as similar as possible (production capacity,

absence of external funding, life of mine, the same parent company), mines from different locations within India was selected. This helps to check whether variations in performance can be attributed due to regional differences. Different states will also have their respective state pollution control boards (SPCB) and may fall under separate jurisdictions of the regional offices of the Ministry of Environment and Forest (MoEF).

However, it should be made clear that the distribution of coalmines in India are not scattered all over the country but are arranged more or less in a belt stretching from East-Central-South. As is clear from the following map, the main states with presence of coalmines are Madhya Pradesh (M.P), Maharashtra, West Bengal (W.B), Bihar, and Orissa. The mines located in this belt are mostly under Coal India Limited (CIL).



Map 2.1 Coal Belt in India

There are some mines in the extreme eastern, southern and northern areas. These are not under CIL and their production capacity is low. Recently the states of Bihar and M.P and Uttar Pradesh (U.P) have been divided resulting in three new states of Chhattisgarh, Jharkhand and Uttaranchal respectively.

In order to choose the case studies, data was collected from CIL head office Kolkata. All open cast coalmines under CIL were listed along with their current annual production level, total coal produced till date and the state in which they are located. Other factors, which were included in the list, are the subsidiary company of CIL under which the mine is operated (See Chapter six), the regional office of the MoEF which is responsible for checking compliance for the mine (See Chapter five) and the presence of any external funding body.

As shown in the map 2.1, three case studies are chosen. From this stage onwards they will be addressed as Case A, B and C respectively. Case A located in the state of Maharashtra is called Umrer and is under Western Coalfields Limited (WCL). Its production level in 2003-04 was 2.31 MTY (million tonnes annually) (CIL, 2004) and Bhopal office of MoEF and the Maharashtra State pollution control boards share the responsibility of checking compliance for this project. Case B is project Ananta under Mahanadi Coalfields Limited (MCL). The production level of the project in 2003-04 was 8.0 MTY (CIL, 2004). Bhuwanshwar office of MoEF and the Orissa state pollution control board is responsible for checking compliance. Case C, located in the state of Uttar Pradesh is the open cast coal project named Kakri. Its production level in the year 2003-04 was 3.0 MTY and is under the subsidiary company of Northern Coalfields Limited (NCL). The age of the mine under the current capacity is approximately seven years. The Lucknow office of the MoEF and Uttar Pradesh Pollution Control Board is responsible for checking compliance. All the projects currently are devoid of any

external funding agencies (CIL, unpublished). The criterion for choosing case studies and the performance of the cases selected have been provided in table 2.5.

Case	Name	Company	State	Annual Production(2003 -04)	MineAge (approx)	Current W.B funding	MoEF regional office
A	Umrer	WCL	Maharashtra	2.31 MT	8	No	Bhopal
B	Ananta	MCL	Orissa	8.00 MT	9	No	Bhuwaneshwar
C	Kakri	NCL	Uttar Pradesh	3.0 MT	7	No	Lucknow

Table 2.5 Criterion for choosing case Studies (Data compiled by author, 2004)

2.9 The problems in carrying out the research in India

EIA Follow-up is a neglected area in India and thus, not much was available in this field. The EIA related literature that was used at times reflected biased opinions. This had to be dealt by keeping a critical approach and collecting enough primary data to create a substantiate background. The terminology used for EIA was often EMP and both the concepts have been taken to be synonymous (See Chapter 7 for detail discussion). Questions asked regarding EIA follow-up were often answered in relation to pre-decision EIA. The author had to informally discuss and explain about follow-up to encourage interviewees to speak about it. The need to explore the relationship between EIA and EMP within the Indian context was also felt.

The process of gathering information was done to a great extent by using the method of 'semi-structured interviews'. However, this term does not seem to be appropriate in the Indian context. Most of the interviewees were officials of high rank and it sounded absurd to them that a research student should interview them! Therefore, the term informal consultation was proposed.

The research topic was sensitive as it meant analysing the role of government offices as well as proponents commitment. The central government as well as state government

was involved including many different types of ministries and offices. It was therefore challenging to gain the interviewee's confidence. Although the initial plan was to record the interviews, later this did not seem to be appropriate because the recording would alter the tone of the interviews and as result frankness was not exhibited. Thus, in order to get real insight into situations, use of tape recorders was discarded and interviewees were encouraged to present their views without the danger of being exposed. The names of the interviewees are also not mentioned in many cases to respect their wish of privacy.

Record keeping and availability of reliable data proved to be more difficult than imagined. This caused major changes in the choice of the case studies. Some changes had to be accommodated even during the field trip. For example, the data collected from CIL was not accurate as far as the mining age or the funding status was concerned. Some cases revealed during the study that they had been receiving World Bank funding earlier. Although it was intended to choose case studies without any influence of funding agencies, this requirement had to be relaxed to some extent. The projects continued to serve as case studies as long as they were not currently receiving aid and thus, were not being required to take environmental and social actions guided by the requirements of funding agencies. Another major factor that influenced last minute changes with case studies was that once the author was in field, it was only then realised that some of the mines, which were initially chosen for case study did not have an environmental clearance yet! In the absence of any requirement of follow-up, the study regarding follow-up implementation could not be carried out. Although Jaganath mine was chosen in MCL, it was later replaced by Ananta mine as Jaganath mine was operating for a decade without its EIA being accepted. The author had to allow more flexibility with the production capacity, as originally Jaganath was selected which had a production capacity of 4.00 MTY, which was later replaced by Ananta with a production capacity of

8.00MTY (CIL, 2004, unpublished). These variations of the data that was collected initially with that of what was found in the field itself proves to a certain extent that what exists formally is not always what is practiced.

2.10 Summary for Introductory Section (A)

The research has one aim and five objectives and the research methodology adopted is qualitative in nature and includes: -

- Semi-structured interviews,
- Case studies
- Document analysis
- Mine visits.

A list of good practice criteria is constructed against which the Indian follow-up practice is evaluated. This list is prepared on the basis of the existing best practice list of follow-up and combines other factors, which includes: -

- EIA follow-up theory
- Follow-up practice
- EIA system in India and
- Environmental practices within the open cast coal mines in India.

Three field trips have been carried out to collect data for the research. Pilot interviews were conducted during the first field trip in which regional variation was suggested. Document analysis and semi-structured interviews were carried out during the second field trip to evaluate the importance of follow-up considerations in the pre-decision stage of the open cast coalmines in India. The case studies were undertaken in the final field trip. Data on basis of which the case studies were selected was collected from CIL office in the second field trip.

The case studies are chosen against a set of criteria, these are as follows: -

- Mining technique,
- Age of mine,
- Parent company,

- Funding agency and
- Location of mine.

Problems were faced in conducting research in India especially in the field of EIA follow-up. These are as follows: -

- Lack of literature on EIA follow-up in India
- The terms EIA and EMP are used very loosely. It was difficult to obtain answers related to follow-up, as the emphasis was predominantly on pre-decision stage only.
- The term informal consultation was used rather than semi-structured interviewing, as according to the interviewers it was not appropriate for a research student to interview officers of their rank.
- Due to the sensitive nature of the subject, recording the interviews was not appropriate as this discouraged the interviewers to exhibit frankness.
- Data collected during the second field trip did not match when the author went to conduct the field trips. As a result last minute adjustments had to be made in the field with the choice of case studies.

SECTION B

THEORETICAL FRAMEWORK

EIA FOLLOW UP WORLDWIDE

SECTION B (PART1)

Nature has enough to satisfy everyone's need but not everyone's greed

- Mahatma Gandhi

Chapter 3

EIA Follow-up: A Theoretical Perspective

This chapter provides the theoretical background to follow-up. First, various definitions associated with EIA follow-up is presented. The different types of follow-up are explained along with its components in the following section. The chapter then goes on to explain the various objectives of follow-up and the approaches adapted to follow-up. The relationship of follow-up with EMP and EMS is discussed. Finally, the implementation problems of follow-up identified in the literature are highlighted and its future prospects are presented.

3.1 Defining EIA Follow-up

EIA follow-up is a generic term that encompasses various activities. These activities include 'monitoring, auditing, ex-post evaluation, post-decision analysis and post-decision management' (Morrison-Saunders & Arts, 2004, p.3). 'Follow-up' as a term has perhaps played a major role in unifying various terminologies that have been used across the globe for post-decision activities and has provided a common platform to discuss, share and enrich knowledge in this area. Terms that have been used include 'post-decision analysis by United States Environmental Protection Agency, follow-up program in Canada, environmental management and audit in Western Australia and Hong Kong, ex-post evaluation in Netherlands, or post-project environmental management and evaluation (Au & Sanvicens, 1995, p.1). All these terms have again been defined individually.

A considerable body of literature exists on follow-up and there is a range of definitions. These can be broadly categorised into two types. The first type deals with the definitions of the activities within follow-up (Munro et al, 1986; Tomlinson and Atkinson, 1987; Thompson and

Wilson, 1994; Arts and Nooteboom, 1999), while the second type defines the term 'EIA follow-up' itself (Arts et al, 2001; Hullet & Diab, 2002, Wlodarczyk, 2000; Au & Sanvicens, 1996, Morrison-Saunders et al, 2001). Although the term 'follow-up' has only recently gained some significant attention, it has been in use since 1982 (e.g. Caldwell et al, 1982; McCallum, 1985 and 1987).

EIA 'is a process having the ultimate objective of providing decision makers with an indication of the likely consequences of their action' on the environment (Wathern, 1988, p.6). Follow-up takes EIA a step further. If we look at the Chambers dictionary (1988, p.623), the term 'follow-up' is defined 'to pursue a question that has been started', In case of environmental planning, EIA initiates the process of environmental management by giving environmental considerations a chance in the decision-making process. Follow-up pursues the question started by EIA and provides feedback on EIA outcomes by answering questions like 'How did the actual impacts of a project compare with the predictions in the EIS? Were impacts mitigated and managed in accordance with approval conditions set by decision-makers? How effective was the EIA process itself?' (Morrison-Saunders et al, 2001(a), p.2). Thus 'follow-up is defined as a programme for verifying the accuracy of the environmental assessment of a project, and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project' (Morrison-Saunders et al, 2001(b), p.294). 'In its simplest conception, EIA follow-up seeks to understand EIA outcomes' (Morrison-Saunders & Arts, 2004(a), p.1).

As mentioned earlier, in order to understand follow-up, it is important to understand the activities which follow-up comprises. According to Arts et al (2001, p.1) 'Environmental impact assessment (EIA) follow-up refers to the activities undertaken during the post-decision

stages of the process to monitor, evaluate, manage and communicate the environmental outcomes that occur in order to provide for some follow-up to the environmental impact statement'. It has also been defined as 'the monitoring and evaluation of the impacts of a project or plan (that has been subject to EIA) for management of, and communication about, the environmental performance of that project or plan' (Morrison-Saunders & Arts, 2004(a), p.4).

Apart from the actions it comprises of, the other aspect that stands out in most definitions is the stage in which follow-up begins in the EIA process. EIA follow-up has been defined as 'a set of systematic activities or studies undertaken during and following the implementation phase of a project after the decision to proceed has been made' (Au & Sanvicens, 1996, p.1). The EIA process is normally divided into two stages based on the consent decision. These are pre-decision stage, which comprises the early stage within EIA like screening, scoping and impact prediction. The latter stage, which is usually termed 'follow-up', is the post-decision stage of EIA (Morrison-Saunders & Arts, 2004(a), p.3). Although follow-up generally comprises the latter stage, the effectiveness of it depends substantially on the pre-decision stage in which the design for follow-up takes shape. Screening and scoping for follow-up should be undertaken early in the EIA process to identify follow-up requirements (Meijer & van Vliet, 2000, p.181). Again, in order to identify actual impacts of the project during the implementation phase, it has to be compared with pre-decision data. Thus the foundations of follow-up are laid during the pre-decision stage itself.

Follow-up has been defined 'as controlled activities undertaken during and following the construction and implementation phases for new development' (Marshall, 2003, p.1). This definition perhaps indicates that follow-up is a finite process, which takes place for new

projects and is expected to be time-bound. However 'although EIA follow-up is a finite process, it may be continued by blending the EIA project specific follow-up into ongoing project management' (Arts & Meijer, 2004, p.93-94). Arts and Nooteboom (1999, p.232) have provided a definition of follow-up according to which 'EIA follow-up is a generic term referring to post-decisions of proponents or environmental authorities in relation to previous consent decisions and EISs prepared'. This emphasises on the proponent's role in the follow-up process. However, there are other stakeholders participating in the follow-up process, which include regulatory authorities and the community. 'Each party may also have specific knowledge relevant to their particular role in the process' and therefore play an active role in influencing follow-up activities (Morrison-Saunders et al, 2001, p.292). Therefore, we can say that EIA follow-up is a process, whose foundations are laid with pre-decision EIA, and which through various activities like monitoring, evaluation, communication and management combines the effort of various stakeholders, translating EIA into reality and adapting it to ongoing project development.

3.2 Types of Follow-up

Follow-up can be categorised based mainly on two criteria. Based on the functions it performs or the scale in which it performs. Furthermore, there is another classification, which is based on the roles played by the stakeholders in the process. Possibilities are more but the following section aims to put forward these three different modes of classification and presents the different types of follow-up activities that may be undertaken.

3.2.1 According to Scale

Follow-up can be classified depending on the level at which it is carried out i.e. on project, programme, plan and policy. Arts (1998), identifies two main types of EIA follow-up; the

analysis of the overall performance of EIA systems and the quality of EISs (evaluation of EIA systems), and the systematic, structural, ex post evaluation of projects and their environmental consequences (evaluation of EIA activities). Table 3.1 presents these two type of EIA follow-up in detail. However, the first type of follow-up identified by Arts i.e. evaluation of EIA systems has been further categorised by Sadler (1998), into six types of effectiveness reviews. He has called it ex-post evaluation by which he has referred to a 'generic process of review, analysis and policy-institutional interpretation of all aspects of EA effectiveness, encompassing the process as a whole and its components, methods, procedures, activities, products and results'. These categories are overlapping in nature and consist of: -

- Auditing and reporting for EA systems;
- Implementation review and follow-up studies;
- Effects monitoring and impact auditing;
- Review of EIS quality;
- Decision-centred analysis and
- Post-project analysis.

Description	Evaluation of EIA activities	Evaluation of EIA systems
Definition:	The ex post evaluation of particular projects or plans.	The ex post evaluation of the overall EIA practice and regulations.
Directed towards:	Project management.	Improving the EIA process, its procedure and its products.
Purpose:	To control and manage environmental impacts by monitoring and analysing specific aspects of the environment and of the EIA activity, and applying the findings to manage the activity.	To gain insight into the implementation and performance of the EIA system from evaluating individual EIA activities and processes.
Evaluation may focus on:	• Compliance monitoring & auditing • Effects monitoring & auditing (Includes baseline monitoring) • Other elements of a particular EIA activity (i.e. accuracy of predictions, effectiveness of mitigation measures, or the environmental management of project implementation or operation)	• The accuracy of impact prediction and the technical suitability of mitigation measures (more thematic than related to individual projects or plans) • Auditing and reporting for EA systems; • Implementation review and follow-up studi • Effects monitoring and impact auditing; • Review of EIS quality; • Decision-centred analysis and • Post-project analysis.

Table 3.1 EIA follow-up: the two main types of evaluation (Adapted from Arts, 1998; Sadler, 1998; Fundingsland 2001, p.22)

These provide a 'basis for a broad, comprehensive approach to EA effectiveness' and aims at 'problem solving, not finding fault' (Sadler, 1998 in Porter and Fittipaldi (ed), 1998, p.31-34).

Morrison Saunders and Arts have classified EIA follow-up at three different abstract levels as shown in Fig. 3.1. The first two, which is referred to as Micro and Macro scale, focuses on individual projects and EIA jurisdiction/system level respectively. The meta-scale, focuses on multi-jurisdictional level 'examining the utility of the EIA (or SEA) concept overall (Morrison-Saunders & Arts, 2004, p2). SEA (Strategic Environmental assessment) follow-up is carried out at a strategic level. Although the importance to carry out follow-up at the strategic level as been clearly emphasised in the literature (Fischer, 2002a, b), certain factors that 'seriously hamper post-evaluation at strategic levels' (Partidario & Fischer, 2004, p.230), have been identified by Arts (1998). These factors include the 'high level of abstraction at the strategic level; importance of after-linked decision-making and parties other than the leading

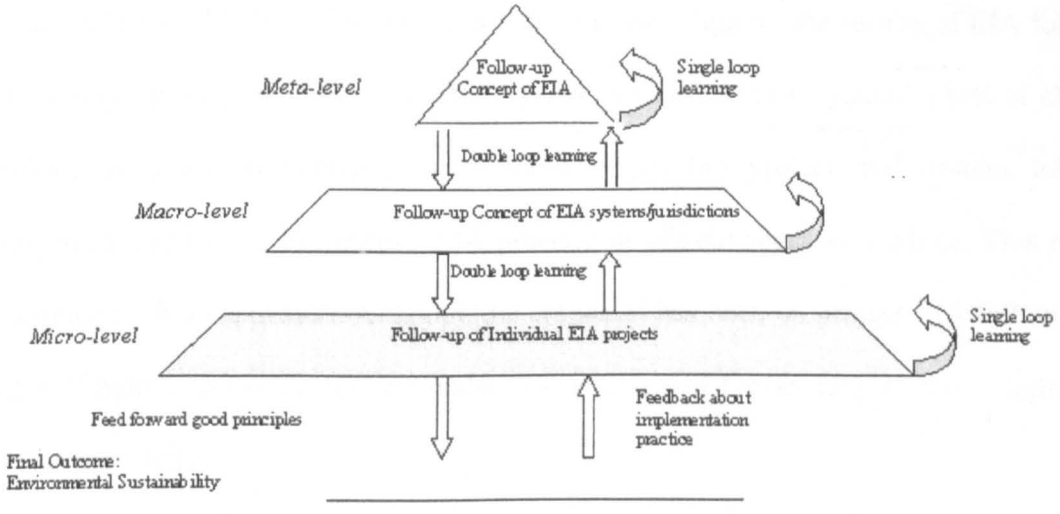


Figure 3.1 EIA follow-up at different levels and their relationships (Adapted from Morrison-Saunders & Arts 2004(a), p. 2)

authority; uncertainty; ambiguity in the relationship between the contents of strategic plan with that of the environmental impacts; limited value of conformance as an evaluation criterion and finally the dynamic contextual influences like political administrative on strategic planning (Partidario & Fischer, 2004, p.230).

Future directions for follow-up include area oriented and sector specific follow-up, i.e. follow-up can also be region-based or based on area or on similar industries. It may also be practiced on the basis of thematic similarities (Morrison-Saunders & Arts, 2004(a), p.8).

However, as is evident from table 3.1, follow-up of project planning and follow-up of EIA and projects are overlapping in nature. Although significant meta-scale and macro-scale follow-up studies are undertaken, the most common type of follow-up practice to date is at micro-scale i.e. follow-up of individual plans or projects that have been subject to EIA. The purpose of evaluating EIA systems is to improve the EIA process in general and in order to do so, it may need to evaluate individual EIA activities and processes. Again, 'the results of EIA follow-up for EIA projects may be of use for the improvement of an EIA system' (Arts et al, 2001, p.176). Thus a mixed approach is common where the project and system follow-up complements each other to improve EIA practice or effectiveness as a whole. This research has adopted such an approach. Although the emphasis has been on project EIA follow-up, the result will help to construct recommendations, which will further help to throw light on the EIA system in India.

3.2.2 According to Functions

Based on the key tasks, which a follow-up performs, Partidario and Fischer (2004, p. 232) have categorised four types of follow-up. Although their work is primarily on SEA follow-up, 'there are currently no indications that SEA follow-up includes fundamentally different

elements from EIA follow-up'. According to their classification, the four types of follow-up are: -

- Conformance follow-up
- Performance follow-up
- Uncertainty follow-up
- Dissemination follow-up.

The first type of follow-up, also called conformance follow-up, verifies whether the project is working in compliance with objectives, regulatory requirements and applicable standards of criteria. The main component of follow-up, which helps in achieving this task is monitoring, especially compliance monitoring. Thus by recording and maintaining periodic samples of monitored data, they can be compared with permissible thresholds. This method is usually re-active in nature and has long feedback cycles. The second type is named performance follow-up. This includes, effects monitoring through which regular observations and measurements of environmental and sustainability parameters are recorded. It is pro-active in nature. This type is more suitable for adaptive management and has short feedback cycles. The third type also known as uncertainty follow-up helps in getting a grip on uncertainty and is especially important in risk assessment and management. It proves particularly fruitful in policy situations. Dealing with special and unpredicted circumstances, it paves the way for adaptive management. Experience gained needs to be disseminated and this is the chief function of the last category of follow-up, known as Dissemination follow-up. The feedback helps in improving impacts prediction and mitigation practices thus increasing efficiency in future projects. (Partidario & Fischer, 2004, p.233). The research will help in identifying the type of follow-up practices within the Indian context.

3.2.3 According to Role Played by Stakeholders

Although in some of the earlier definitions offered for follow-up, proponent has been identified as the key stakeholder and perhaps the soul stakeholder in project follow-up, there has been a shift and acceptance of the fact that in order to achieve sustainable outcomes and even to legitimise the process, community involvement and regulators play a key role. In the discussion presented by Morrison-Saunders et al, (2001b, p.289-296), the key emerging theme has been the identification of these three stakeholders as well as the role these particular stakeholders play in the follow-up process. The Stakeholders along with contextual influences determine the success of follow-up (See chapter 4).

According to the role played by the stakeholders, follow-up can be classified as 'proponent driven; community-driven and regulator-driven follow-up'. A closer inspection of these types will reveal that they share common boundaries with the approaches to follow-up proposed by Hullet & Diab, (2002). Proponent oriented follow-up plays an important role in managing cumulative effects. The example of the Ecuadorian gas-well project (Morrison-Saunders et al, 2001b, p.290), where the proponent used follow-up to safeguard its position and to be able to defend itself and to protect itself 'from paying compensation in the event that others caused a problem' exemplifies the role of follow-up in 'managing liability avoidance' (Marshall, 2003, p.5). Community driven follow-up maybe more reactive in nature where due to public complaints, the proponent may be compelled to undertake follow-up. In case of the Map Ta Phut Industrial estate in Thailand, the follow-up program actually involved the participation of the community who used their nose as the monitoring device to check odour (Morrison-Saunders et al, 2001b, p.292). Regulator-driven follow-up is more closely linked to command

and control approach as in the case of Hong Kong where regulators are the 'major driving force to undertake follow-up' (Au, 2001).

The role or the type of follow-up cannot be exclusively compartmentalised according to the role of the stakeholders. Any given project usually has an overlapping influence of all the three types of stakeholders mentioned above. However, their dominance or the extent to which they influence the outcomes of the project or establish trade-offs will be variable depending upon the various contextual influences. As illustrated in Fig. 3.2, some follow-up activities are a result of regulator and community initiatives (A), while some a result of regulator and proponent initiatives (C). The area represented as (D) results in follow-up involving all three parties of stakeholders. It will be interesting to see follow-up in India is regulator, proponent or

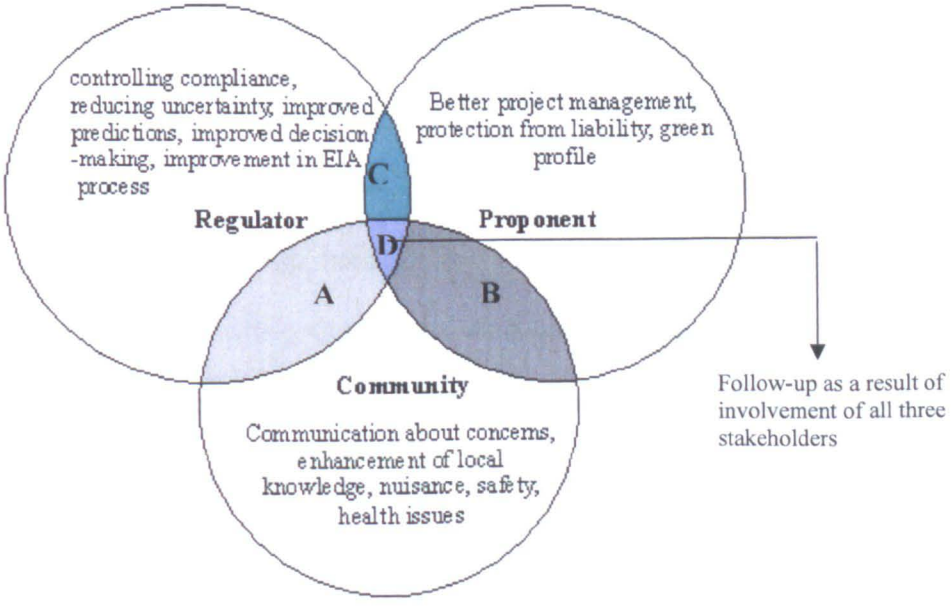


Figure 3.2 Outcomes of EIA follow-up for different stakeholders (adapted Morrison-Saunders et al, 2001b, p.293)

community driven? (See Table 2.4). Each party will attempt to maximise their own interest from the follow-up program and thus in turn will influence the outcomes of EIA follow-up.

Although a combined approach of all stakeholders seems to be beneficial in making the overall follow-up process useful, it will perhaps be interesting to see, what effect can negotiations and tradeoffs inflict on follow-up in a developing country context where resource distribution amongst stakeholders are heavily imbalanced.

Follow-up can further be classified as 'multiparty follow-up' and 'sustainability assurance approach to follow-up'. The former is a participative and an integrated approach to follow-up. It moves beyond a proponent driven follow-up. While the latter is an important area used in appraising projects and which offers follow-up to expand further (Morrison-Saunders & Arts, 2004, p.8).

3.3 Components of Follow-up

As stated earlier, the term Follow-up embraces many other activities. These activities are overlapping in nature and may serve more than one purpose. However, it is argued that follow-up comprises of four main activities or components, which are considered to be the building blocks for EIA follow-up and participation. These were discussed and debated upon during a workshop defining EIA follow-up held in Hong Kong during the IAIA 2000 conference. These activities are monitoring, evaluation, management and communication. The components of follow-up are similar to the types of follow-up as stated by Partidario and Fischer (2004) and illustrated earlier. But these components can be further categorised according to the specific nature of the tasks performed by them.

3.3.1 Monitoring

Monitoring is one of the most basic components of an EIA Follow-up. It implies the collection of data and comparison with standards, predictions or expectations. Monitoring

can be defined as "the systematic, repetitive collection of data (measurements or observations) to provide information on environmental variables (in space and time)" (Morrison- Saunders et al, 2001a, p.2). Monitoring can be discussed under various headings depending on the purpose for which it is carried out. Some of the basic types of monitoring practices for conducting an EIA follow up are as follows-:

Baseline Monitoring- refers to the measurement of environmental parameters during pre-project phase for the purpose of determining the nature and ranges of natural variation and to establish, where appropriate the nature of change. Problems with baseline monitoring are that most of the times they are 'undertaken without clearly defined objectives' (Beanlands, 1988).

Effects or Impact Monitoring - refers to the measurement of parameters during construction and/or operation to detect changes in these parameters which can be attributed to the project, for verifying the accuracy of predictions and effectiveness of measures (Au et al, 1996). These help in understanding the cause-effect relationship.

Compliance Monitoring - involves the periodic sampling and/or continuous measurement of environmental parameters, levels of waste discharge or process emissions to ensure that regulatory requirements are met (Au et al, 1996). Surveillance and inspection may also form a part of this activity but need not necessarily involve measurement of a repetitive activity.

Scientific Monitoring: This type deals with understanding cause-effect relationship. It 'checks EIA accuracy and explains errors' (Wilson, 1992; in Shephard, 1998; in Porter & Fittipaldi, 1998, p. 167).

Management Monitoring: This kind of monitoring determines the effectiveness of the recommended mitigation measures (Wilson, 1992; in Shephard, 1998; in Porter & Fittipaldi, 1998, p. 167).

Effectiveness Monitoring: This type of monitoring 'is a scientific, quantitative investigation' through which it investigates the success of mitigation measures. 'Qualitative measures are not acceptable' (Canter, 1996; in Shephard, 1998; in Porter & Fittipaldi, 1998, p. 167).

Enforcement Monitoring: According to Canter, this mechanism 'ensures that mitigation is being performed as described in the EIA document' (Canter, 1996; in Shephard, 1998; in Porter & Fittipaldi, 1998, p. 167).

State of the Environment Monitoring- This is also known as area-wide monitoring, where the general state of the environment of the area is reviewed (Arts & Nooteboom, 1999, p.247).

The good practice list helps to understand the kind of monitoring which is practiced within the Indian context (See Table 2.4). This further helps to understand the orientation of follow-up in the country.

3.3.2 Auditing

Monitoring and Auditing bring forward data, both raw and comparative, but evaluation has an added ingredient of value, which makes sense of the data collected and thus adds on to the first two components of Follow-up. As evident from Fig 3.3, auditing is the intermediate stage between monitoring and evaluation. It is the linkage between the two components of follow-up and thus needs to be discussed here. 'An environmental impact assessment audit evaluates

the performance of an EIA by comparing actual impacts to what was predicted' (Wilson, 1998, p.59). Auditing has two core objectives, which are scientific and management. Through science it checks accuracy of predictions and explains errors, which in turn help to improve methods for future EIAs, while management helps 'to assess the success of mitigation in reducing impacts' this in turn makes future actions more effective (Wilson, 1998, p.59-60).

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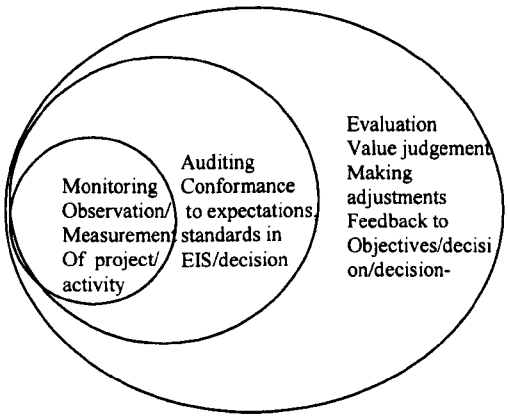


Figure 3.3 Differences and relationships among post-decision analyses, Arts, 1998, p.75

explains errors, which in turn help to improve methods for future EIAs, while management helps 'to assess the success of mitigation in reducing impacts' this in turn makes future actions more effective (Wilson, 1998, p.59-60).

3.3.3 Evaluation

The term Evaluation is used in planning and policy for the generic process of gathering, structuring, analysing and appraising information. It involves judgements based on

information available. It often relates to subjective policy-oriented judgements rather than purely scientific and technical analysis (Arts & Nooteboom, 1999, 232). It relates to the appraisal of the conformance with standards, predictions or expectations as well as the environmental performance of the activity (Arts et al, 2001, p176).

3.3.4 Management

Management involves making decisions and implementing appropriate project and environmental management actions in response to the data collected by monitoring and the evaluated findings (Morrison-Saunders et al, 2004, p.154-175). In case of EIA, Environmental Management Systems (EMSs) can play a key role in the management of environmental outcomes and in 'taking appropriate action in response to issues arising from monitoring and evaluation activities' (Arts et al, 2001, p.177). The managerial objectives of EIA follow-up have been further explored by e.g. Culhane, (1993), who states that follow-up may be a useful tool for project managers to assess the achievement of management objectives, and to ensure that the project outcomes correspond to the predictions underlying the pre-project decision analysis.

3.3.5 Communication

Communication is sometimes included within the general term of post project analysis, which is used to refer to research and support activities, which take place after a project has been built. The term communication in EIA Follow-up can be defined as 'informing the stakeholders as well as the general public about the results of EIA follow-up' (Morrison-Saunders et al, 2001a, p.2). Communication is an important post-project analysis component as it serves in achieving community participation in the EIA Follow-up process. This also leads to transparency and more openness to public. Without communication 'there would be

no mechanism of passing on the lessons learned to others' (Baker, 2002). Public participation can enable cumulative, health and local community effects both social and cultural to be successfully addressed in EIA follow-up.

3.4 Objectives of Follow-up

Various objectives of follow-up have been identified in the literature of Arts & Nooteboom, 1999, p.236-238; Arts et al, 2001, p.1777, Partidario & Fischer, in Morrison-Saunders & Arts, 2004, p.232; Arts, 1998, p.63-70; IAIA, 1999; Shephard, 1998, p165-166. While discussing them, it has to be kept in mind that the various benefits associated for conducting follow-up along with its rationale have an overlapping boundary with its benefits. These are presented below: -

Control Mechanism: Follow-up cannot only help in checking compliance but also controlling the environmental outcomes of the project. Thus it provides information about the consequences of a particular activity and also compares it with the implementation requirements. Compliance audit can play a key role in performing this function.

Promoting Adapting Management: Follow-up encourages adaptive environmental management (AEM), which deals with uncertainties by continuously modifying management practices. 'Monitoring allows an agency to continually adapt, evaluate and improve impact management activities' (Leistritz & Chase, 1982). This also helps in maintaining decision-making flexibility 'by affording explicit opportunities to intervene in developments when changes in the activity or in the environmental and socio-political environment warrant' (Arts et al, 2001, p.177).

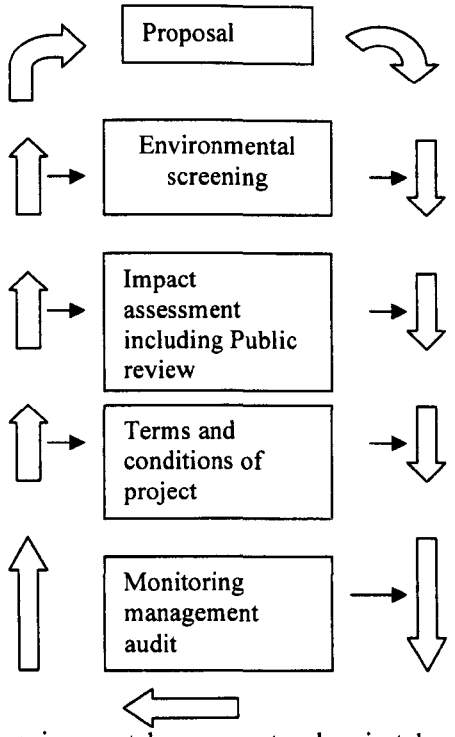


Fig 3.4 Building continuity into environmental assessment and project development (Sadler, B. in Wathern, 1988, p.132)

Enhancing Knowledge: Feedback mechanism provided by follow-up plays an important role in improving EIA predictions for future projects. It can help in having a better understanding of cause-effect relationships. EIAs tend to do best with predicting the direction of the impact.

However, the magnitude, indirect and cumulative impacts may be less precisely predicted. Monitoring can improve such forecasting capabilities. Thus it acts as a feedback mechanism, which helps in making the whole process dynamic and not linear and static.

Legitimisation: Follow-up involves public opinion and by doing so not only engages the public with the project but also raises their awareness and improves their know-how about the actual effects of the development. This in turn enhances public support and acceptance.

Integration: The objective of integration is related to the legislative and administrative context of a project. EIA follow-up may serve as an "umbrella under which various monitoring and evaluation activities can be integrated and managed" (Arts, 1998, p. 340). This encompasses all monitoring and evaluation related to an EIA activity, for example compliance monitoring of environmental permits by the competent authority, or monitoring and auditing under the developer's environmental management systems. This promotes in the understanding of area-wide effects and proves beneficial for resource managers, environmental regulatory agencies and proponents alike.

Dissemination: This is particularly important for a politically or socially sensitive project. It may serve to communicate the environmental performance or the management of environmental impacts, and thus enhance the transparency and accountability of planning and decision-making.

3.5 Different Approaches to Follow-up

Different approaches can be adopted in order to carry out follow-up activities. There is no one right type but the diversity with which EIA follow-up can be conducted in different jurisdictions highlighting different cultural approaches to EIA (Arts &Morrison-Saunders, 2004, p.287). The Indian approach will be identified later and thus, this criterion has been incorporated in the good practice list (See Table 2.4). Based upon prevailing international views, four models of EIA Follow-up were proposed by Hullet and Diab (2002).

Legal based approach: According to this approach, in order to be successful EIA Follow should be based on legal requirements. At this point it is interesting to note that countries, which have successfully implemented EIA Follow-up, generally have a legislation system enabling them to do so (Wood, 1994; Wood & Coppell, 1999). 'The experience in

the EC and member states has clearly been that if post-project monitoring analysis is not contained in legislation, it is unlikely to happen or be effective' (Sheate, 1996, p.113, in Woods, 2003, p.241). Hong Kong has perhaps adopted this approach as it has various permits and contracts, which are specially designed for follow-up (Morison-Saunders et al, 2004). A legal based model is a command and controls approach. Although it represents a clear division of task at times it may prove to be not so flexible.

Partnership Approach: U.K examples follow more of this approach. Partnership agreements can emerge both as formal statutory requirements of legal authority and as voluntary agreements. In case of the latter, it is usually the pressure of public concern and sensitive issues, which initiate such partnerships to take place.

Self-regulatory Approach: 'Green Image' has become an important component in today's market scenario and such an image can be achieved by adapting environmental management systems and by internal auditing systems. International pressure and specification standards compel companies to adapt such an image and to also deal with companies, which are internationally certified. Although ISO 14001 does not make explicit reference to EIA or EIA follow-up measures, if an organisation is certified with it, it implies effective facilitation of EIA Follow-up activities. This is a result of an overarching framework within which follow-up can be placed (Hullet & Diab, 2002 p. 305,).

Incentive and Disincentive Approach: This type acts like a compensation for cases where legislative requirements are absent. Although to a certain extent, mitigation measures can be encouraged this way, it does so to a minimum standard and offers scope of discrimination. This particular approach mainly concentrates on the construction phase

and thus does not run throughout the life cycle of the project. Examples of such approaches are found in the 'bonus-penalty system as well as in contractual agreement'. The first type consists of different bonuses and penalties awarded to developer to encourage environmental compliance. In case of the latter, the agreement establishes binding responsibilities for follow-up (Hullet & Diab, 2002).

3.6 Relation of EMS, EMP & Follow-Up

It is important to understand and distinguish between these terms before evaluating them within the Indian context. It is true to say that a mandatory requirement is a sound way to ensure the desired result. However, 'even without a legislative mandate for EIA follow-up, it can be economically and financially wise for a proponent to' conduct it (Morrison-Saunders et al, 2001, p.290). Perhaps in today's competitive business environment, proactive management approach is the mantra to stay ahead in the race. Public concern and community acceptance is key agenda for any business. The companies reflect their concern for the environment with 'the willingness to adopt a system of management that considers and balances environmental aspects' (Marshall, 2002, p.287) and Environmental Management Systems (EMS), serve this purpose. Authors like Holling (1978), Lee (1993), Marshall (2004), Morrison-Saunders et al, (2004) and others 'have explained the concept of adaptive environmental management as a systematic response to scientific uncertainty and how best to deal with such uncertainty in a decision-making context' (in Morrison-Saunders et al, 1999, p.281). 'Business-oriented EMS has developed in direct response to increasing internal and external awareness of environmental risk' and it demonstrates the business's 'control of its environmental aspects' (Marshall, 2002, p.287).

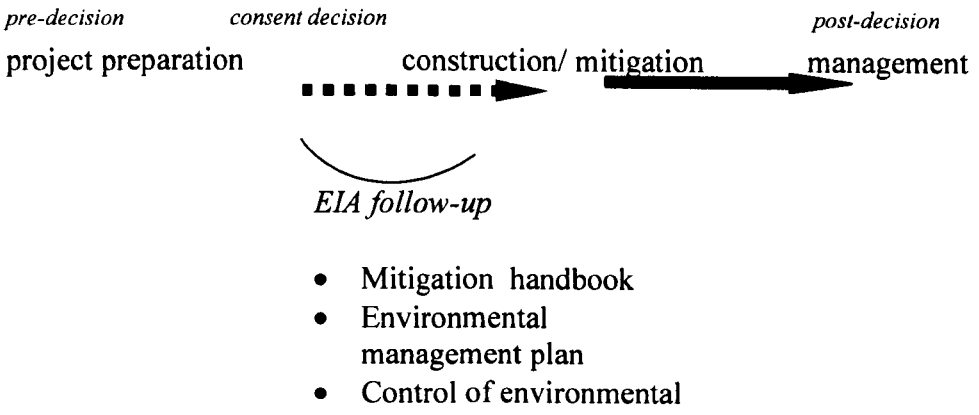


Fig 3.5 EIA follow-up linking EIA and environmental management (Marshall, 2001, in Morrison-Saunders et al, 2001, p.291)

There are fundamental differences between both the systems. The EIA process should be anticipatory while EMS is reactive. EIA is predominantly driven by consenting authority and includes public participation as well. On the other hand, EMS is specific to business's objectives (Marshall et al, 2001, p.3).

An EMS perhaps may be broader in its perspectives than an EIA as it may play a dual role by combining the company's effort in environmental enhancement along with the legal requirement of environmental protection. However, this can be done only if both the mechanisms are linked with each other and this may be achieved with the help of EIA follow-up (Marshall et al, 2001).

Morrison-Saunders et al, (1999, p.282) did a study on the relationship with EIA and environmental management focussing on the effect EIA had on the project's environmental management activities. Although such a relationship is said to be desirable, it may not always work like this in practice. 'The basic challenge with integrating the EIA process into an existing EMS is to provide "adequate control" and 'Environmental Management Plan (EMP) are one way of controlling environmental effects as these contain project specific protocols

that act as an EMS interface between the EIA and subsequent project phases' (Marshall et al, 2001, p.4). It is EMPs, which have been used as a mitigation tool in construction projects and has helped constructors in auditing programmes as well as in ensuring management controls (Marshall, 2001a, p.1). EMS of the company thus will be the overall management environmental management system, however EMPs are more project specific. EMPs should also be able to show that it has led to improvements within the core EMS over time (Marshall, 2002, p.288).

3.7 Current Problems and Future Prospects of EIA Follow-up

As discussed in this chapter, EIA follow-up offers various benefits and is considered to be a 'beneficial and logical capstone' of EIA (Culhane, 1993, p.66). Yet follow-up is cited as 'one of the worst performed activities in the EIA process' and has 'tended to be the runt of the EIA litter of activities' (Sadler, 1996; Sheate, 1996, p.111; in Woods, 2003, p.241). There are a number of factors, which have led to the neglect of this vital component of EIA. Some of the factors hindering in the implementation of EIA follow-up have been discussed below.

Uncertainty and Limited Information: Uncertainty is a problem, which EIA as a planning tool faces and the rationale for follow-up is to 'get a grip on uncertainty'. However follow-up itself faces this as a problem. Uncertainty reappears during the process of collecting data as well as during its appraisal (Arts & Nooteboom, 1999, p.245; Morrison-Saunders & Arts, 2004, p17).

Deficiency in EISs: EIS is the most direct source of information to conduct follow-up and yet in most cases 'they are descriptive' and the predictions are 'vague and qualitative' (Arts & Nooteboom, 1999, p.246). However 'ideally if more thought and effort is put into the

design phase, then it is expected that fewer problems should arise in the latter part of the follow-up programme' (Baker, 2002, p.1). But a weak design phase i.e. deficiencies in the EIS itself inhibits effective follow-up implementation.

Lack of Guidance: 'The focus of EIA has traditionally been on the pre-decision stages leading up to project authorisation' (Glasson, 1994; Sadler, 1996). Guidance on conducting EIA is in plenty whereas there is a lack on guidance for conducting follow-up. Especially in countries with little experience, training and capacity building is essential (Morrison-Saunders & Arts, 2004, p.16).

Financially demanding: Follow-up is an activity, which demands time, money and staffing both for proponent as well as for regulatory authorities (Morrison-Saunders & Arts, 204, p.16). According to Shepherd (1998, in Porter & Fittipaldi, p.165), some of the reasons due to which, monitoring and follow-up is not well established in US is, it is expensive, difficult to collect and time consuming. This may further discourage follow-up activity in developing countries where scarcity of resources is more acute.

Legislative Deficiencies: There are fewer legislative requirements for follow-up and this in turn results in lack of guidance (Morrison-Saunders & Arts, 204, p.16). Numerous environmental laws usually hold monitoring requirements, which leads to monitoring activities being 'duplicated, uncoordinated, or not conducted' (Shepherd, 1998; in Porter & Fittipaldi, p.165).

Lack of Stringent Penalty: This is one of the factors identified in the US practices where little pressure is legally exerted to conduct monitoring and 'the courts have not traditionally held for the plaintiff seeking to ensure mitigation monitoring (Shepherd, 1998; in Porter & Fittipaldi, p.165).

Fear of self-incrimination: Proponents may be discouraged to collect data as the same maybe used by regulatory bodies to act against the proponents and collect fines.

As the need to follow-up is increasingly becoming evident, future prospects to follow-up are continually evolving as a result of research and emerging experiences from around the world. Some of these evolving prospects for the future of follow-up have been discussed below.

Strengthening follow-up consideration in pre-decision stage: As mentioned earlier, the success of follow-up depends on how well it is planned and the planning should take place during the EIA preparation stage itself. 'Early and explicit screening and scoping should be undertaken to identify follow-up requirements' (Arts et al, 2001, p.183). In the Netherlands, such a practice has proved to increase the efficiency of follow-up.

Moving beyond project follow-up: Project oriented follow-up runs the risk of making the scope of the follow-up study narrow. There may be other ongoing developmental activities and together they may result in cumulative impacts, which are beyond the scope of project follow-up. As a solution, it is recommended that follow-up should widen its scope adapting itself as 'area-oriented follow-up'; 'strategic level follow-up'; 'environmental management as follow-up '; 'sector-oriented follow-up'; 'multiple-party follow-up' and sustainability assurance approach to follow-up' (Arts & Morrison-Saunders, 2004, p.304). These approaches will help follow-up to overcome the barriers of spatial, time and organizational limitations of project level follow-up.

Follow-up in Developing countries: Most of the literature that has emerged in follow-up originates from the developed world. 'The issues faced in developing countries my pose additional challenges that have not been addressed previously' (Arts et al, 2001, p.182). In

the work of O'Beirne, some of these types of examples have been identified in Mozambique where development of new smelter may create a 'boom-town effect', attracting new workers and further spreading HIV/AIDS among the local community (O'Beirne et al, 2000). More work needs to be done in developing countries as this will enrich the follow-up literature making it broader and more representative of the situation worldwide.

Integrated Follow-up: The evaluations at all the three levels of meta, macro and micro are closely related. However both SEA and EIA 'fall short as effective and efficient means of achieving their objectives- that is, to support informed decision-making'. Thus it is advocated that better integration is required in future applications amongst-'social, economic and environmental aspects; the various environmental management tools currently used with the various stages in the planning process' i.e. from strategic to project level and to implementation stage (Arts & Morrison-Saunders, 2004, p.311).

Follow-up is an emerging field and as more and more follow-up experience is being reported from across the globe, the literature for follow-up is still evolving. EIA has been practiced for more than 30 years and although its follow-up has been neglected in the past, but now increasingly the emphasis is being placed on its outcomes. 'EIA follow-up is viewed as the final step in a full-blown EIA process' (Lamoen & Arts, 2002, p.1). There are numerous avenues in which follow-up can expand itself and eventually a sound follow-up will ensure a successful EIA.

Chapter Four

EIA Follow-up: Learning from International Experience

This chapter introduces the distinct stages of follow-up and discusses the practice of EIA follow-up worldwide. In the first section, the various stages within EIA follow-up are identified. Follow-up principles are presented next. Contextual factors influencing follow-up practices will be addressed in the following section. The fourth section explores follow-up practices based on contextual influences across both, developed and developing countries.

4.1 Follow-Up Framework

The EIA process involves a number of steps (Figure 4.1). The initial stages involve determining whether an EIA is required (project screening), and which issues should be considered (scoping). The following stages involve predicting and evaluating potential impacts, and identifying necessary mitigating measures. The results of the environmental impact study are presented in a report, commonly referred to as an Environmental Impact Statement (EIS), which is subject to review and public consultation. Finally, the effects of the development are monitored and the EIA is subject to audit and evaluation (Wathern, 1988; Glasson *et al.*, 1999). Therefore, EIA follow-up is a stage within EIA. 'Like EIA itself, EIA follow-up will always have to be tailored to specific project circumstances'. Like EIA, distinct stages within follow-up like screening and scoping are essential' (Arts & Morrison-Saunders, 2004, p.287). These stages, which constitute the framework for conducting follow-up, are still evolving. The following framework is based primarily on the works of Baker and Dobos, 2001; Arts 2001a; Baker, 2002; Baker, 2004 and Arts and Meijer, 2004.

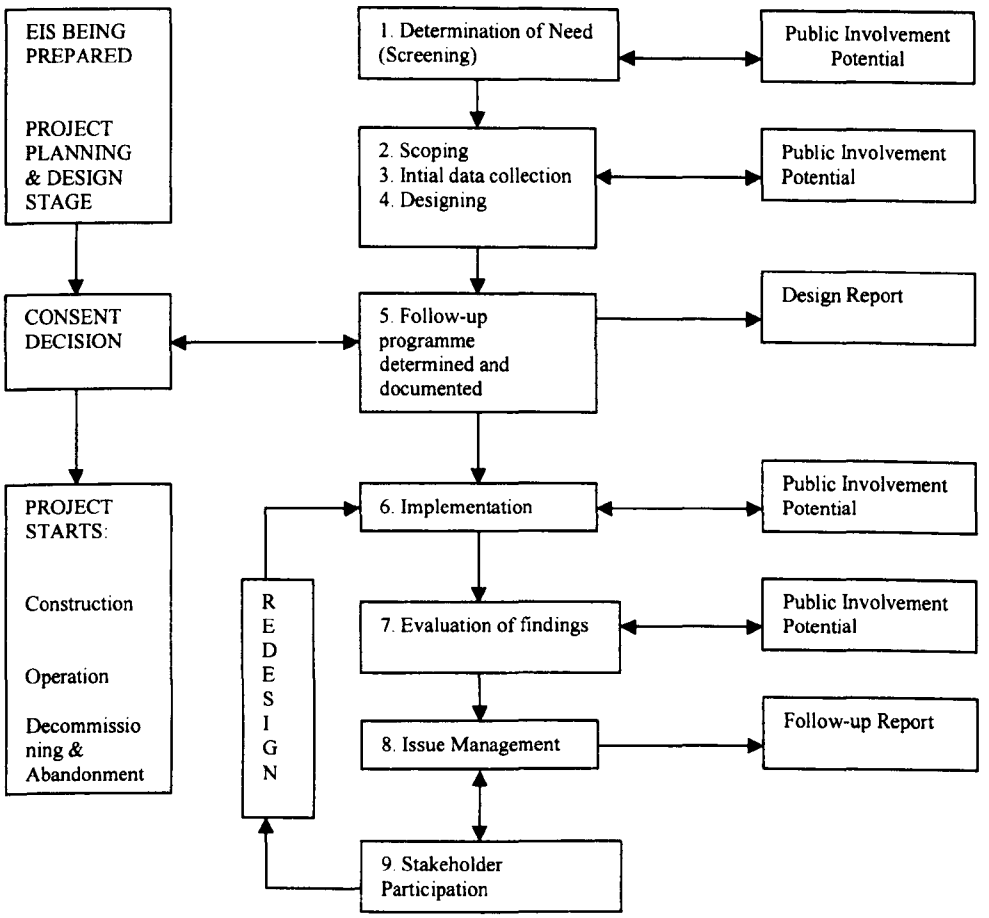


Figure 4.1 Environmental Impact Assessment Follow-up Framework (Adapted from Baker, 2004, p.46)

As Fig 4.1 illustrates follow-up starts during the initial phases of EIA. Pre-decision follow-up considerations and EIA needs to be working simultaneously, however, they differ in the sense that follow-up is more narrow in approach than EIA as it focuses on mitigating impacts.

4.1.1 Screening

Screening establishes whether a project requires an EIA. In case of follow-up it helps in answering the question 'Why should EIA follow-up be done?' (Arts and Meijer, 2004,

p.68). Thus screening helps in determining the need for follow-up. There can be two extreme situations in the screening stage of follow-up. This includes projects, which never require follow-up, and projects that always require follow-up (Arts, 2001a). There can be another situation where the projects always require screening for the need of follow-up, as is the case in Netherlands (Arts and Meijer, 2004, p.70). There are different criteria for deciding on the need for follow-up.

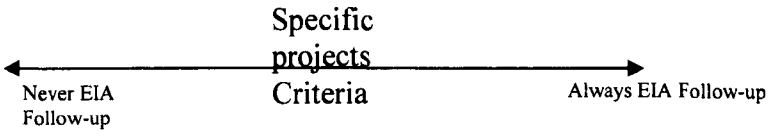


Fig 4.2 Extremes of Screening Process (Arts, 2001a)

Baker and Dobos (2001, p.2) listed twelve criteria in their follow-up framework proposal. As quoted by Arts, "EIA follow-up may generally be appropriate if it can achieve one or more of several objectives" (Arts and Meijer, 2004, p.68), (See Chapter 3). There are of two types of needs, essential needs and complementary needs (Baker & Dobos, 2001; Arts & Meijer). Essential needs are crucial in deciding on follow-up requirements. These can be discussed under four headings, which are: -

- Existing requirements
- Uncertainty
- Sensitivity and
- Risk

Complementary needs may not in themselves be a reason to initiate EIA follow-up, however, they may help in adding value to follow-up by enhancing knowledge, improving public awareness or by providing the means to integrate follow-up with existing systems. It will be useful to identify the need of follow-up within the Indian context as it will indicate

the role of the various stakeholders in identifying the needs and the proponent's role in establishing credibility not only with the regulatory body but also with the affected public (Marshall, 2001).

Existing requirements are legal requirements or proposed adaptive management in EIAs. Existing legal requirements for follow-up for any specific type of projects or for all projects is in itself an important cause to initiate the follow-up study. Screening requirements can take different forms (Arts and Meijer, 2004, p.68). In case of EIAs where adaptive management is mentioned, follow-up studies will play a crucial role.

Tackling uncertainty is a function of follow-up and this factor is important enough to initiate follow-up activities. In case of projects where there is limited experience by the proponent in implementation, follow-up is essential. Uncertainty can also be associated with the accuracy of analysis and predictions, raising the need to conduct follow-up.

Determining Needs for EIA Follow-up	
Essential Needs	***Complementary Needs***
Existing Requirement	Enhancing Knowledge
Uncertainty	Improving public awareness
Sensitivity	Integration with existing mechanisms
Risk	

Table 4.1 Determining Needs for EIA Follow-up

Technical uncertainty is present in cases where new or unproven technology is used making follow-up crucial in project implementation (Baker, 2004, p.47).

Projects can be sensitive and the type of sensitivity may be political, environmental or social. In socially sensitive projects, there will be high public concern and thus, latest

developments and exact impacts of the projects will need to be documented and reported. In environmentally sensitive areas, careful monitoring will have to be conducted to ensure that environment is protected. Politically sensitive projects will demand justification and impact of project and thus follow-up will be indispensable for its success.

Calculated risks in projects require systematic monitoring to avoid or manage risk associated factors. Risk associated with failure of proposed mitigation measures in case of sensitive projects or big scales project will initiate the need for follow-up study (Baker, 2004, p.47).

As mentioned earlier, complementary needs add value to a project follow-up. These needs are closely associated with the objectives of EIA follow-up. Improving scientific or technical knowledge, improving public awareness or acceptance and integration of follow-up with other existing mechanisms all add value to the follow-up process (Arts and Meijer, 2004, p69).

4.1.2 Scoping

Having answered the question, 'Why do EIA Follow-up?' the next question that has to be dealt with is 'What needs to be followed up?' Scoping helps in determining the relevant issues of EIA follow-up. It can have two extreme situations; comprehensive scoping and issue oriented scoping (Arts, 2001a). As the name suggests, in case of comprehensive scoping an overall impact of the project is monitored and analysed. However, issue oriented scoping is more objective in approach and takes in to account only selective issues determined on the basis of importance to the project. Thus a focus is maintained on crucial issues and not necessarily on all issues. The scope of the follow-up program may depend on

the potential significance of the impacts and the uncertainties about predictions and outcomes (Sadler, 1996).

The decision of what issues need to be selected for follow-up is guided by many factors. Arts, 2004 (p.76) has listed four such factors, which are: -

- Relevance to decision-making;
- Relationship of the issue with the environment;
- Phase of project development and
- Relevance to future issues.

These four factors are comprehensive in encompassing the crucial issues related to the project. Furthermore, he has also listed several sources that can be used to generate possible issues for follow-up (Arts and Meijer, 2004, p.74). The most important source is the EIS as it has the predicted impacts on the basis of which consent decisions is given. Gaps in existing knowledge are also identified in the EIA, which needs to be followed up. Mitigation and compensation measures indicated in the EIS are relevant issues as well, especially if the methods are complicated and there is uncertainty. Environmental Management Plans (EMP) is yet another source of follow-up issues, which the proponent itself undertakes to elaborate on mitigation measures. Changes in pre-decision conditions like expansion of projects or modification of original plan may also generate additional follow-up issues. Change may also be initiated externally by new events in the vicinity of the project. Auditing may give rise to new issues as well, that may require attention.

However, it has to be kept in mind that it may not be possible to take into consideration all issues arising. This is because different stakeholders will have different interests and concerns. In order for a project to function smoothly a balance will have to be achieved in order of priority and urgency. Thus, having selected the issues that will need to be addressed during

follow up the next step involves in designing the follow-up study. But even before this the initial data collection or baseline monitoring is required to be done. This has been discussed here as the third stage of follow-up.

4.1.3 Initial Data Collection

Before a project commences the existing data needs to be collected in order to provide as a benchmark for comparing with data collected after the projects starts. This is known as baseline monitoring. This helps later in identifying the impact of the project. If there are concerning findings in baseline monitoring itself, the proponent can take the initiative not only to avoid the impact of the project but to also improve existing environment and thus can exhibit leadership in managing issues. This can be a great strength for the project and may attract favourable decision.

4.1.4 Design

As mentioned earlier, this work follows the view that although follow-up is considered to be a post-decision stage; its foundations are laid in the pre-decision stage. As Baker, (2002, p.5) puts it "if more thought and effort is put into the design phase, then fewer problems should arise in the latter part of the follow-up programme". Design phase is the last stage within the pre-decision stage of follow-up. The questions that need to be answered at this stage are; how is the follow-up going to be carried out? What and how much resource is allocated for different tasks? When will it be carried out? These answers help in designing the follow-up process for implementation. In order to answer the question of 'how follow-up should be carried out?' various tools and methodologies exist. The selections of these are project specific, as there is no evidence to suggest that one is superior to other and may result in better follow-up (Baker, 2004, p.51-52).

Resource allocation is a crucial element in the design phase of a project. Organisational set-up or allocation of responsibility to specific stakeholders constitutes an important aspect of resource allocation and answers the question of 'who is responsible for what?' The regulatory set-up often influences this decision. Although there will be legal requirements of some responsibilities to be carried out by specific bodies, others might evolve with the project. For example, 'if follow-up is a requirement of a project approval, then the regulator will play a significant role in all aspects of the follow-up' (Baker, 2004, p.48) which, in such a case is more of a legal requirement. But in case of sensitive projects, the proponents may wish to include local public or NGOs (non-governmental organisations) to win public confidence. In such cases 'self-regulatory initiatives of proponents may fill the gap in EIA regulations' (Morrison-Saunders et al, 2003, p.46).

Roles and responsibilities may be given special attention in Environmental Management Plans (EMP). Organisations may maintain their own environmental department and thus may have internally specified responsibilities concerning for environmental impacts of the projects undertaken. Although it may not be possible to encompass complete determination of roles and responsibilities, a fair planning needs to be done to insure proper implementation and compliance of follow-up measures.

The other dominant resource in need of allocation is cost. How much money has been allocated for specific tasks for follow-up needs a clear mentioning in the design phase. This question has been incorporated within the good practice list (Table 2.4). Funds need to be allocated separately for the machines that will be required to carry out monitoring. Maintaining database, collection of data need to be addressed as these incur costs as well. In some projects as in mining, huge costs may be incurred if villages are to be rehabilitated.

Compensations may need to be given in such sensitive cases. All these factors should be dealt with as explicitly as possible in this stage.

Time is an important dimension of follow-up. Follow-up should not be conceived to be an activity, which is indefinite and continuous. Time limits should be incorporated in the design phase and this issue has been included in the good practice list (Table 2.4). In case of projects, which are conducted phase-wise, the time factor in follow-up may be quite prominent. However, in other cases as well, this feature should not be ignored. Issues may become less or more dominant in respect to the phase of the life cycle of the project. As pointed by Arts and Meijer (2004, p.84), there can be 'several phases and related evaluative moments' in the life cycle of an EIA project. These are: -

- Pre-construction phase,
- Construction phase,
- Operational phase and
- Decommissioning phase.

As mining is a project with distinct stages in its life cycle, such an approach may be useful (See Chapter 6). This importance of stage wise follow-up has been incorporated in the good practice list (Table 2.4).

The design for follow-up in pre-decision stage needs to be documented, which will later help to ensure accountability (included in good practice list, table 2.4). This documentation should be done before the decision is given so that it can be considered before the consent is given. It can be included along with EIS submitted or as a separate document. However, the follow-up programme is finalised only after the consent decision is given. Recommendations given by the responsible authority can be incorporated in to the document. As mentioned earlier, the scoping

in follow-up is a continuous activity and thus this document may be amended as and when the need arises with prior consent to stakeholders.

4.1.5 Implementation

This stage in follow-up is the beginning of the post-decision stage and usually 'this is the phase that most practitioners identify as follow-up' (Baker, 2004, p.52). Implementation involves predominantly data collection, which can later be verified and evaluated. This phase usually correspond with the implementation phase of the activity. However each follow-up mechanism is project-specific and can be unique.

4.1.6 Evaluation

Evaluation is one of the four components of follow-up and as a stage it serves the same purpose of evaluating the collected data. Data on its own can make little or no sense unless evaluated. However this is the stage that is in reality often neglected and ignored. As Baker puts it 'the submission of EIA Follow-up reports is often where the follow-up process stops' (2002, p.9). The objectives that evaluation should achieve can have several dimensions. For example, the collected data can be compared with the baseline data to evaluate any change as a result of the developmental activity. The accuracy of the predictions in the EIA can be evaluated and outcome that is beyond the EIA should be studied and reported. Such a mechanism can help to establish cause-effect relationship and can help in enhancing knowledge. Baker, (2004, p.54), has identified four steps in ensuring complete evaluation. The Indian evaluation component will be compared with this in chapter 10. These steps are: -

- The responsible authority needs to insure that the proponent has submitted all the required data and they abide to the time schedule.

- The responsible authority also needs to make sure that the experts review the data submitted.
- Once the material has been reviewed, it should be determined as to whether further measures are required. This should be done in consultation to stakeholders.
- Outcomes of this evaluation should be documented and discussion should be carried out with proponent and stakeholders regarding any further mitigation if required (Baker, 2004, p.54).

4.1.7 Issue Management

If there are any issues, which originate during the evaluation stage, then these need to be managed during this stage. However, in case where there is absence of any issues, this stage maybe omitted. In order to mitigate or rectify any issue that may emerge, adaptive management can act as an important tool. A flexible approach is helpful in introducing modifications to combat any negative impact or to accommodate any new method.

4.1.8 Stakeholder Communication

Although stakeholder participation is encouraged at various stages within the follow-up process itself, communication is a stage on its own right. Any changes that are introduced or managed need to be communicated to the stakeholders. This can be done with the help of verbal communication. However, reporting in a written document can be advantageous in keeping a record of these changes.

4.2 Principles of EIA Follow-up

During the IAIA '03 Conference, in Marrakech, the need for principles of follow-up was specifically highlighted (Marshall et al, 2005, p.175). However, EIA follow-up is still at an

evolving stage and is adapting itself according to the needs of the practitioners. This is reflected in the recent works on principles of follow-up by Marshall et al, (2004); Arts and Morrison-Saunders, (2004); Marshall et al (2005). The principles for EIA follow-up are closely related to the principles of EIA. In fact, some of them are the basic principles of EIA (Baker, 2002, p.2) and have been discussed by IAIA (1999). In the works mentioned above, the principles for EIA follow-up have been categorised under separate headings but they share similar essence. This reflects that there is an attempt to organise these principles to make them user-friendly. Marshall et al (2004) have discussed it under four headings, representing the four fundamental contexts of EIA follow-up, which are as follows: -

- Practitioners and Stakeholders
- The Content of EIA Follow-up
- The Process of EIA Follow-up
- Procedural Implementation of EIA Follow-up

According to Arts and Morrison-Saunders (2004), the categories of these principles are-:

- Content of EIA follow-up
- Process of EIA follow-up
- Procedural steps for EIA follow-up

Marshall (et al, 2005) has later chosen to present these principles based on four questions which are: -

- Answering the question 'why? – This presents the core values.
- Dealing with the question 'who?'- This concerns with the roles and responsibilities of the follow-up participants.
- Addressing the question on 'what?'- Presenting the nature of follow-up.
- Answering the question 'how?'- This deals with the techniques for carrying out follow-up.

While discussing the principles of EIA (IAIA and IEA, 1999), the principles were divided as basic and operating principles. Basic principles included follow-up being purposive, rigorous, practical, relevant, cost-effective, efficient, focused, adaptive, inter-disciplinary,

credible, integrated, transparent, and systematic. The operating principles on the other hand dealt with the various stages that should be an integral part of EIA.

Although the principles play an important role throughout the follow-up process, they serve definite purposes within certain specific stages of follow-up. A detail discussion of principles can be found in the works of Marshall et al (2005, p.178-180), IAIA (1999) and Marshall et al (2004). Based on their work, the principles for follow-up are categorised here, depending on the operating stage within follow-up, in which the principles play a dominant role. However, it should be made clear here, that such categorisation cannot be strictly compartmentalised but it helps in realising the potential of these principles in delivering effective follow-up.

Screening: As discussed earlier, the first operating stage for EIA follow-up is screening. The principles that need to be emphasised within this stage are as follows-:

***i) EIA should include a commitment to follow-up*:** This principle is important at the screening stage as the provision for follow-up programme needs to be made in the pre-decision stage itself. Thus, during screening, this need is identified and a clear commitment is to be undertaken by all parties accountable.

***ii) Regulators should ensure that EIA is followed up*:** The requirement to conduct a follow-up should be identified by the regulators at the screening stage. However these requirements should strike a balance between the interests of the proponent as well as the community.

iii) EIA follow-up should consider cumulative effects and sustainability: In cases where there are multiple-projects, follow-up at the individual project level is limited in dealing with cumulative effects or sustainability issues. Thus follow-up should be carried out at a

strategic level or area-oriented approaches. However, in case such arrangements are not initiated, a proponent can protect the interest of the company by conducting project level follow-up system. This will help in keeping the company's record clear in case of future allegations that may come up. All these considerations will have to be taken into account during the screening stage.

Scoping: Scoping will help to focus the follow-up programme for EIA and the principles that should dominate this stage are as follows-:

iv) Transparency and openness in EIA follow-up is important: During scoping, the issues that need to be followed up are identified and in order to do so, active engagement of stakeholders should be encouraged. This will enhance transparency and will make the follow-up process truly representative.

v) EIA follow-up should be objective led and goal oriented: In order for follow-up to be effective, the objectives or goals for follow-up should be clearly defined. This is the task of the scoping stage within EIA follow-up. The objectives may include controlling projects and their environmental impacts; maintaining decision-making flexibility; improving scientific and technical knowledge; improving community awareness and integrating with other state-of-the-environment reports or EMS.

vi) EIA follow-up should be fit-for purpose: To maintain focus in EIA follow-up, on-going scoping is necessary. Each project is unique and different and their particularities need to be accommodated with the help of a scoping exercise, which helps in making the follow-up programme a 'fit-for purpose' exercise.

Initial data collection: Even before the project is implemented, the base for follow-up is laid and initial data collection is particularly important as it is the data against which impacts may be compared. The principles, which may help to make this stage effective, are discussed below-:

vii) All parties should seek to co-operate openly and without prejudice in EIA follow-up: During baseline monitoring, data that may already exist with other authorities and stakeholders can be shared. This will avoid re-inventing the wheel and will introduce a shared sense of purpose to avoid or reduce environmental impacts.

Design: This phase sets the sage for follow-up implementation and perhaps is one of the most crucial stages in order to ensure effective follow-up. The principles to be considered at this stage are discussed undersigned.

viii) The proponent of change must accept accountability for implementing EIA follow-up: During the design phase the proponent needs to give careful consideration of their actions and the likely impacts, which they may cause on the environment. The design phase needs to take all this into account so that adverse impacts caused may be effectively mitigated.

ix) Follow-up should be appropriate for the EIA culture and the societal context: During the design phase, care should be taken to design the follow-up process taking into consideration the legislative, administrative, socio-economic and cultural circumstances. This is because there is no single recipe for the success of EIA follow-up that can be applicable to all projects.

x) EIA follow-up should be timely, adaptive and action-oriented: In order for the follow-up to be adaptive, it needs to be incorporated into existing systems like EMS. This too needs to be taken care of in the design phase. Monitoring frequencies, monitoring locations need to be determined in order to deliver effective follow-up.

xi) EIA follow-up should have a clear division of roles, tasks and responsibilities: Clear demarcation of roles and duties is crucial for the performance of follow-up and needs to be clarified in the design phase.

xii) EIA follow-up should include clear performance criteria: Well-defined methodology and approach is required for the enactment of rigorous performance criteria. This will help in measuring impact without ambiguity.

xiii) EIA follow-up should be sustained over the entire life of the activity: EIA follow-up should not be restricted to one specific stage of the activity but should be conducted throughout the different stages of the production. This factor needs to be considered in the design phase and has to be suitably accommodated at the beginning so that it can be implemented in the decommissioning phase of the developmental activity.

xiv) Adequate resources should be provided: As discussed earlier, during the design stage resource allocation is an important task that needs to be taken care of and thus, this principle fits perfectly within this stage of follow-up.

All the principles, which have been discussed, are crucial for delivering an effective follow-up programme. Their application in the pre-decision consideration of EIA follow-up is pre-requisite for the success of follow-up but the ultimate challenge is the application of what was planned. This is the very essence for having a follow-up and thus all principles are in

some way or the connected during the post-decision follow-up stage. However, some of the key principles dominating post-decision EIA follow-up are presented below.

Evaluation: Once the project starts, the actual impacts start surfacing and these may not be always as predicted. This needs constant attention and readiness to initiate changes in order to adapt to situations that may arise. The principles that need to be emphasised during this stage are as follows-:

xv) EIA follow-up should promote continuous learning from experience to improve future practice: During evaluation cause-effect relationships may become clearer and such knowledge needs to be transferred as this can go a long way in the betterment of impact prediction in EIA thus, leading to better EIAs in future.

xvi) Follow-up is essential to determine EIA outcomes: Evaluation stage helps in understanding the actual impacts of projects and therefore helps in evaluating the accuracy of the EIAs. This knowledge can be used in order to minimise the negative and maximise the positive outcomes of EIA.

Issue management: Once any issues emerge after evaluation, this need to be tackled. The principles that can help achieve this are presented below-:

xvii) The proponent of change must accept accountability for implementing EIA follow-up: Once any negative impacts are identified during the project implementation, the proponents need to take active part in mitigating these and should take full responsibility in solving any disputes.

Stakeholder Communication: Communication should be encouraged throughout the follow-up process but it has been separately treated here as this can form an important stage in follow-up. The underlying principles in this stage are as follows-:

xviii) The community should be involved in EIA follow-up: 'At the least, the community should be informed of EIA outcomes'. However it is desirable that the community is involved throughout the process as this goes a long way in achieving sustainability.

4.3 Influence of Contextual Factors on Follow-up Implementation

Understanding the theory and appreciation of the practicalities help in listing down criteria that may denote good practice. However, there is no single best way of doing EIA follow-up. This is because follow-up will need to adapt itself within the country context in which it is practiced. What seems to work out in one particular country may not be suitable in another one. In fact 'no two follow-up programmes will be identical, even if undertaken in the same jurisdiction, owing to variation in these contextual factors' (Morrison-Saunders and Arts, 2004b, p.11). In order to incorporate such differences within follow-up implementation, an additional question of 'where?' has been added to the existing framework (See Fig. 2.3). To tailor down good practices to a country or local area context, a sound understanding of the contextual factors of the country or place is essential where these good practices are intended to be implemented. According to Morrison-Saunders and Arts (2004b, p.10-14), the context within which EIA follow-up occurs is a function of the interplay of four factors, which are Regulations and Institutional arrangements; Approaches and Techniques; Resources and Capacity and Project Type. Stakeholders also play an important role in answering the question of who is involved in the follow-up process (See chapter 3). Thus contextual factors and stakeholder groups influence

in follow-up implementation. This framework has been further developed in chapter 7 (See Fig 7.7). The contextual factors have been presented here in more details.

4.3.1 Regulations and Institutional arrangements

Regulatory and institutional arrangements include legal requirements and administrative framework for follow-up, which is determined by wider social norms (Morrison-Saunders and Arts, 2004b, p.11). The different approaches that can be adopted for follow-up include self-regulation by proponents; command and control by government regulators; public pressure by community stakeholders; partnership approach and incentive and disincentive approach (Morrison-Saunders and Arts, 2004b, p.11; Hullet and Diab, 2002). The success of these approaches is dependent on political and social contexts. The approach that will suit a democratic country may not suit a country with centralised governments. Again countries with environmental awareness amongst public may experience community-driven follow-up.

4.3.2 Approaches and Techniques

Approaches and Techniques for conducting follow-up can vary from rigorous and expensive methods to simple and not so expensive techniques. The choice of this will depend on what objectives are to be achieved through follow-up, the kind of impact that needs to be monitored as well as the resources that are available for follow-up studies. In case of an activity like mining, follow-up may have to be designed and implemented according to the particular phase of the activities' life cycle. The scope of follow-up i.e. environmental, social and economical along with the approach adopted i.e. partnership approach, self-regulatory or incentive and disincentive approach are also part of this component.

4.3.3 Resources and Capacity

Follow-up needs to be backed up by sufficient resources, which can be number of staff, cost, time and know-how. However, the success of follow-up depends a great deal on striking the right balance amongst the various resources in an optimum manner in order to make the follow-up program more efficient. For example, with more know-how and better techniques, it might be possible to reduce cost and yet achieve desired results. However, the choice for resource may not always exist, as due to lack of finance number of staff may have to be reduced.

4.3.4 Project Type

Follow-up will get influenced depending upon the type of project for which it is designed. The type usually depends upon the size of the project and the project initiator. It may also be influenced by external funding bodies. For example the proponent may be the initiator but

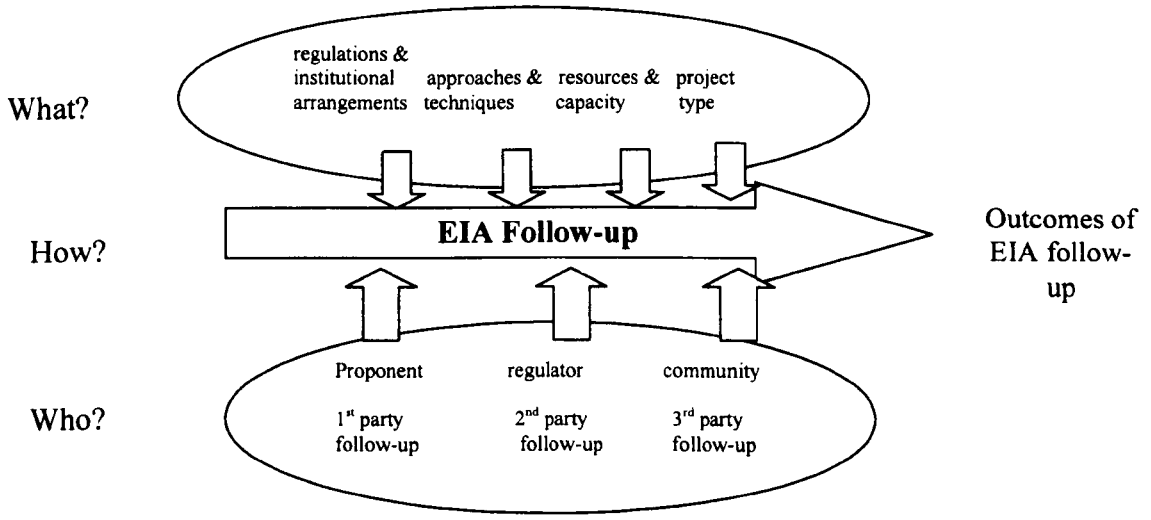


Fig 4.3 Contextual Factors and Stakeholder Groups for Successful EIA Follow-up (Morison-Saunders et al, 2003) (Also see Fig. 2.3 & 7.7)

the follow-up programme might be dictated by funding agencies. The proponent needs to abide by the conditions laid by the external funding agencies in order to secure the funds. Follow-up can also depend on the planning level on which it occurs. Based on this classification, follow-up can be at strategic level, spatial level and operational level.

4.4 International Experience of EIA Follow-up

The experience of EIA follow-up from countries around the globe is discussed here based on the classification of the economies by the World Bank. The World Bank classification of countries is based on the Gross National Income (GNI) per capita. Based on this, the World Bank divides economies into low income, middle income (subdivided into lower middle and upper middle), and high income group (World Bank, 2006). However, in this study low-income and middle-income economy has been referred to as developing economies. Thus two broad categories are used, which are follow-up in the developed world (consisting of high-income economies) and follow-up in the developing nations (consisting of the low income and the middle income countries). In order to give a fair representation, examples have been chosen from America, European Union, Asia, Africa and the Pacific region.

The political and economic philosophy of any country will have an influence on the effectiveness of EIA and its follow-up. In this respect no two countries can duplicate the preparation process or implementation of EIA. The distinction becomes even stronger between developed and developing nations. The scope of EIA in developed countries has often focused on ecological goals within the context of sustainable development (Jain et al, 1993), while in developing countries EIA system has played an important role within planning to achieve basic human goals rather than ecological goals (UNDP, 1992; Mitchell,

1995). As pointed by Diab et al (1999, p.243), in case of developing countries, 'EIAs generally function to justify a decision that has already been made'.

Modak and Biswas, (1999, p.52) have identified some of the factors in developing countries, due to which their EIA experience differs from that of developed countries. These factors are-:

- The conflict between pursuing environmental considerations and economic development is severe;
- The cost of maintaining or collecting data is high as a result of which data for identifying and predicting potential impacts are not available at an appropriate level of detail;
- The expertise for conducting a comprehensive EIA is not available;
- EIA is a technology developed in first world countries and therefore includes cultural values that make the transfer of EIA to third world countries difficult.

4.4.1 EIA Follow-up in the Developing World

The experience of EIA follow-up in the developing countries 'may pose additional challenges that have not been adressed previously' (Arts et al, 2001, p.182). Most of the current literature of follow-up has emerged from the developed world and thus the examples used in the discussion below are limited. However, recently this subject has been dealt with in the works of Diab et al, 1999; Sinclair and Diduck, 2000; O'Beirne et al, 2000; Dayo et al, 2002. The developing country experience is categorised and presented under the headings of the contextual influences (apart from project type, see chapter 2) and stakeholder participation.

4.4.1.1 Regulations and Institutional Arrangements in Developing World

There are at present fewer legislative requirements for follow-up and this in turn results in lack of guidance for implementing follow-up activities (Morrison-Saunders & Arts, 2004b, p.16). This is more so in case of developing countries.

In South Africa, the environmental regulatory framework is weak. In case of Mozambique, follow-up is especially complicated as there are few environmental standards to be followed and thus Mozambique is addressing the situation by employing international or South African environmental standards until basic framework legislation is drafted for the country (O'Beirne et al, 2000). In case of Nigeria, follow-up is still not a mandatory requirement and it has been identified as a 'weak link' in EIA, which needs the support of institutional and technical strengthening. Thus it was stressed in Nigeria that EIA follow-up implementation should become mandatory. This will increase the power of the regulatory agencies and will compel the proponents to make submissions of post-monitoring reports (Dayo et al, 2002, p.7).

In case of Bangladesh, due to absence of legal provisions, it is difficult to monitor and enforce the EIA decisions (Ahammed and Harvey, 2004, p.74). A formal requirement for follow-up exists in Thailand (Pimcharoen, 2001, p.155).

The Ecuadorian legislation does not require cumulative impact assessment, but a case study from the country shows that it was still worthwhile for a gas well proponent to assess cumulative impacts in order to protect itself from any liability in case of an adverse impact. This also proves that even without legislative mandate, it can be economically and financially wise to carry out follow-up studies (Ross et al, 2001).

4.4.1.2 Approaches and Techniques in Developing World

Follow-up is at its early stages in many countries of the world and especially the developing nations. Thus the different stages within follow-up are yet to evolve. It may still take some time before we can see a follow-up process having distinct stages and conducted simultaneously with the project life cycle. Although evidence of such a practice in literature is scarce, it is possible that such a mechanism may already exist although it may not have evolved to any formalised process.

However, evidence of use of simple techniques is already found in the literature. The Thai follow-up program included local people in the follow-up committee like medical specialists and Buddhist Monks in Map Ta Phut. Local people used their noses to detect any odor. If case any odor was emmitted, this was then reported by the follow-up committee and the source of emission was identified. This enabled actions to be taken to deal with the particular industry which was causing the problem (Ross et al, 2001).

4.4.1.3. Resources and Capacity in Developing World

Resource allocation is yet another hurdle in developing countries, which can limit follow-up activities in various ways. Resources include economic constraints as well as lack of expertise. In Angola, the Ministry of Urban Planning and Environment is the competent environmental authority responsible for the monitoring EIA implementation in specific projects. However, this responsibility is usually not carried out 'due to the lack of available resources and professional capacity (Russo et al, 2003, p.35). A similar problem has been highlighted in Mauritius. In this case 'shortage of staff, as well as a lack of understanding, awareness and a sense of urgency on the part of the enforcement institutions' has weakened follow-up implementation (Baissac, 2003, p.119). However, interestingly to remedy this situation, the

Ministry of Environment in collaboration with the Mauritius Police Force has created 'Police de l'Environment'. The unit assists the Ministry of Environment and other enforcing agencies in the protection of the environment by enforcing environmental legislation.

In Mozambique, a lack of capacity was dealt by the authorities by contracting international experts to assist them in reviewing projects in areas where appropriate skills and experience were lacking. Manpower is yet another important resource and in some cases due to disease like Malaria and Aids, productivity can be seriously hampered and outburst of disease can take place if careful monitoring is not done (O'Beirne at al, 2000). A lack of resources and capacity can be managed by innovative arrangements as it was done in Thailand (Ross et al, 2001).

4.4.1.4 Role of Stakeholders in Developing World

As far as roles and responsibilities in follow-up are concerned, these need to be specified at an early stage in EIA. However, tension between economic development and environmental protection in developing countries is stronger and as economic development results in monetary power, the balance of power usually tilts more on the developer's side. This can be explained with the example of Bangladesh where the DOE (Department of Environment), 'is unable to take legal proceedings against the line agencies, as its status is not higher than other Government departments and ministries' (Ahammed and Harvey, 2004, p.74).

Transparency is essential in conducting EIA and its follow-up. There is no legal requirement for public participation in Bangladesh. However, in case of donor-funded projects, some public participation may take place. But in Bangladesh like in many other developing countries, a majority of its population is illiterate and thus the issues that are discussed are more regarding compensation and resettlement rather than environmental protection. Disclosure of information

to the public is not required and even if it had been it is doubtful as to whether it would attract any environmental concern or not (Ahammed and Harvey, 2004, p.74).

Most of the African examples also reflect weak participation. In Swaziland, poor attendance and participation in public participation is very common and this is attributed to a general lack of awareness amongst the population (Keatmilwe and Mlangeni in Tarr, 2003, p. 238). Nevertheless, at least some sort of legal requirement will ensure public participation not being by-passed by developers. This in the long run may also help in improving public awareness on environmental issues.

One of the most important factors differentiating public participation in the developing world from the developed is, that in the poorer countries, developmental projects implies job, money and other basic facilities which the people may be devoid of. Thus the priority of the people is different. As is in the case of South Africa where 'the development needs of the local community and the opportunity to improve their living conditions became the overriding factor in reaching a decision' for a construction of a power line. Concerns on environmental grounds were strong and legitimate but these were ironically from non-resident members who enjoyed the benefit of electricity in their homes. Electricity, which would be the result of the project, would be used for lighting night schools offering adult education. Other priorities for which the local communities listed electricity included electricity for clinics, stores and the Tribal Authority offices (Diab et al, 1999, p. 248). The development projects have an enormous pressure on them for job creation (Ross et al, 2001) and thus the economic gains usually outweigh the environmental loss.

A good example of public participation can be cited in Mexico where emphasis was given to social and cultural impacts of an offshore oil and gas development (Austin, 2000, in Arts et al, 2001, p.183).

4.4.2 EIA Follow-up in the Developed World

Authors from countries like Canada, Australia, The Netherlands, U.K, and to some extent U.S and Portugal dominate the literature of EIA follow-up in the developed world. The discussion below thus is dominated by examples from these countries. However in this discussion Hong Kong has been included along with the developed countries as during the time of the example, which has been cited here, Hong Kong was under the British Empire.

4.4.2.1 Regulations and Institutional Arrangements in Developed World

A need for regulations and institutional arrangements has been felt in the developing world to strengthen follow-up. Surprisingly, in case of the developed world as well, monitoring has been a weak link as many of the regulations in these have been silent on the issue of monitoring. The National Environmental Policy Act 1969, (NEPA) in the US does mention monitoring only in chapter 13, (section 1505.2 (c)) according to which a 'monitoring and enforcement program shall be adopted and summarised (in the record of decision) where applicable for any mitigation'. Thus monitoring here has been treated as a discretionary activity (Wood, 2003, p.246).

Follow-up requirements in the European countries are a result of the EU requirements. In UK's planning process, the Environmental Statement may be a regulatory requirement but legally no further action may be required unless the mitigation measures proposed have been identified by the DMB (Decision-Making Body) on their consenting conditions or within the

site plans approved by them (Marshall, 2001a, p.2). As far as Hong Kong is considered, follow-up operates here based on strong legislative framework (Au and Hui, 2004, in Morrison-Saunders and Arts, p.197). Legal requirement for follow-up seems to be a sound way of ensuring follow-up implementation. Without some form of legislation, follow-up is rarely carried out (Sheate, 1996, p.113).

Portugal has introduced new EIA regulations ((DL 69/2000) in May 2000 (Jesus, 2000). Unlike previous EIA regulations in the country, which allowed for only limited verification of compliance and few monitoring activities in case of major projects, the new regulations include follow-up as a mandatory requirement for all projects submitted to the EIA process (Jesus, 2000).

However, it will not be correct to attribute the success or failure of follow-up implementation, solely on legal requirements. In the case of the Netherlands, the 'legal mandate' for follow-up is 'clear', but an evaluative study conducted by Arts in 1998 revealed that in only 16 percent of the projects, follow-up had actually commenced (Arts and Meijer, 2004, p.67). In countries like New Zealand, parts of Australia, Canada and USA, some useful legislation is present, however in these countries 'practice is lagging behind theory' (Glasson, 1994, p.311). Recommendations proposed in British Columbia to reform EIA system included: -

- Proponent's responsibility for monitoring compliance should be included in project approval certificate and this should be specified in the legislation. In case of breach of conditions, the minister(s) should be able to withdraw certificate.

- Follow-up programmes and safeguards should be considered as part of environmental assessments and thus should be incorporated in the project approval certificate (Province of British Columbia, 1992 in Glasson, 1994, p.311).

4.4.2.2 Approaches and Techniques in Developed World

Much emphasis is now been dedicated in improving the approaches and techniques of follow-up in the developed world. In an attempt to improve follow-up activity in Canada, a framework has been constructed to implement follow-up, which includes the stages of screening, design and implementation, evaluation of follow-up results, management of follow-up issues and reporting the results.

In the case of the Netherlands, as far as screening is concerned, it is a formal requirement to undertake follow-up for every EIA project. The various stages of follow-up including scoping, making issues operational, data collection and evaluation and management, exist in Netherlands. In case of Portugal, follow-up is divided into two different stages which are 'compliance of the detailed project design with the EIA decision and monitoring and auditing' (Jesus, 2000) `.

In New Zealand, general and specific reference to monitoring has been made in the Resource Management Act of 1991. However compliance is weak and it is rarely linked with the earlier stages of EIA (Wood, 2003, p.257).

Adaptive environmental management is an approach for tackling uncertainty and follow-up issues. The emphasis with this approach is on 'management of potential impacts rather than engaging rigorous impact prediction techniques' (Morrison-Saunders et al, 2004, p.168). In Western Australia, this approach has been adopted and has set an example of how proponent

self-regulation and external public pressure can play an important role in achieving adaptive environmental management (Morrison-Saunders et al, 2004, p.175).

4.4.2.3 Resources and Capacity in Developed World

As far as resources and capacity is concerned many departments in Canada do not have the financial or human resources, neither legislative authority to enforce follow-up requirement. Funds are expended or other forms of assistance are provided upfront only in cases where the Act has been triggered by funding or granting of interest in federal land, like Industry Canada and Canadian International Development Agency projects (Wlodarczyk, 2000). In case of USA as well 'some monitoring commitments are not honoured because of budgetary constraints or communication lapses' (Wood, 2003. p.246). Although 'proponents must be committed to carrying out follow-up (Arts and Morrison-Saunders, 2004, p.293), 'some participants observed that assigning responsibility for monitoring to proponent was akin to assigning a fox to guard the chickens!' (Glasson, 1994, p.312).

Alternatively, an integrated approach can be adopted to facilitate the implementation of follow-up. The Independent Environmental Monitoring Agency (IEMA), in Canada is an excellent example of an integrated mechanism to watch over the activities of the various stakeholders under the same umbrella. The agency also required making use of traditional knowledge of the aboriginal groups who were affected due to the Ekati diamond mine project (Ross, 2000).

The EPA (Environment Protection Authority) in Australia also provides a good example. It is a statutory body, which is independent from government and comprises of five members. It is responsible for overseeing the process of EIA in Western Australia (Morrison-Saunders et al, 2004, p.158).

4.4.2.4 Role Played by Stakeholders in Developed World

Involvement of stakeholders is a vital issue, which helps in making the follow-up process transparent. Hong Kong sets a good example in achieving this. The environmental and audit system in Hong Kong is to a large extent community driven for greater public accountability by project proponents. All government owned EIA reports are available to the public and since 1992 the government is required to describe the environmental implications and key mitigation measures in order to secure funds (Au and Sanvicens, 1996). In order to tackle the problem of paper-based systems, which lack transparency and are less accessible, Hong Kong has initiated Web-based system, which contains all project information including the full EIA report. Public can directly communicate with the project engineer through direct email service (Au and Hui, 2004, p.211).

Once again the Independent Environmental Monitoring Agency (IEMA), of Ekati mine of Canada is a good example of involving stakeholder participation under one umbrella (Ross, 2000). Example of involving local communities in EIA projects have been found especially through the case of the Glen Canyon Dam project where 'particular attention' was given to 'the social and cultural impacts of the developments' (Austin, 2000, in Arts et al, 2001, p.183).

4.5 Comparison of Follow-up in Developed & Developing countries

The above discussion shows that follow-up is clearly a weak link in the EIA process both in the developing and developed nations and both types of countries share some common problems. However, it can also be noted from the discussion how other factors like public consciousness and economic situation can influence follow-up effectiveness. There are

plenty of good examples in the developed world, which can be learnt by the developing nations.

However, one has to be careful, as it may not be possible to directly translate some of the innovations from the richer countries to the poorer soils. For example, developed countries have examples where public pressure or proponent initiative have made follow-up successful even though any clear legislation is absent. On the contrary in some developing countries use of force has been essential for follow-up implementation, (Baissac, 2003).

Public know-how and involvement in environmental issues can play a key role. In economically deprived areas, public are more concerned in gaining basic amenities in life like food, clothing, shelter and employment. In such cases the government needs to take a more active stance towards environmental protection.

Use of Internet can be useful for public participation, but in some countries, Internet may not be available to a major chunk of the population and even if it is to some extent, illiteracy can hinder its use. It may be possible to communicate to public in medium, which they can relate to and understand. Such options need to be further explored.

Poverty is yet another demon which will clearly outweigh environmental importance to job creation and so called development. Thus there is a paradigm shift as far as the priority of the affected public is concerned. However, there are examples where environmental protection can be coupled with economic interest as in the Cambodian case where in the absence of effective management, the tourism industry would be short lived (Ross et al, 2001). It may not always be possible to directly quantify environmental benefits to economic gains although in the long run, depletion in natural resources and degradation to environment plays a major role in diminishing the quality of life, which is the very essence of development.

4.6 Summary of Section B (Part One)

4.6.1 EIA Follow-up Theory

Follow-up can be classified depending on the level at which it is carried out i.e. on project, programme, plan and policy level. Arts (1998) identifies two main types of EIA follow-up; the analysis of the overall performance of EIA systems and the quality of EISs (evaluation of EIA systems), and the systematic, structural, ex post evaluation of projects and their environmental consequences (evaluation of EIA activities). Based on the functions of follow-up, it can be classified as conformance follow-up, performance follow-up, tackling uncertainty follow-up and dissemination follow-up (Partidario & Fischer, 2004). Follow-can is also classified based on involvement with stakeholders. It can be regulator driven, proponent driven or community driven follow-up.

Classification Criteria	Types of Follow-up
Level of Follow-up	• Evaluation of EIA Systems • Evaluation of EIA activities
Functions of Follow-up	• Conformance Follow-up • Performance of Follow-up • Uncertainty Follow-up • Dissemination Follow-up
Involvement With Stakeholders	• Regulator Driven Follow-up • Proponent Driven Follow-up • Community Driven Follow-up

Table 4.2 Types of Follow-up

The four main components of follow-up are monitoring, evaluation, management and communication. Auditing bridges the gap between monitoring and evaluation. Within follow-up different kinds of monitoring can be practiced. These are baseline monitoring, effects or impact monitoring, compliance monitoring, scientific monitoring, management

monitoring, effectiveness monitoring, enforcement monitoring and state of the art monitoring.

The main objectives of follow-up were identified, which are as follows: -

- Compliance checking
- Promoting Adaptive environmental management
- Enhancing Knowledge
- Legitimisation
- Integration and
- Dissemination

There can be different approaches adopted in implementing follow-up, these include: -

- Legal based Approach
- Partnership Approach
- Self-Regulatory Approach
- Incentive and Disincentive Approach

Current problems and future prospects of follow-up include: -

- Uncertainty and Limited Information
- Deficiency in EISs
- Lack of Guidance
- Financially demanding
- Legislative Deficiencies
- Lack of stringent penalty
- Fear of self-incrimination
- Strengthening follow-up consideration in pre-decision stage
- Moving beyond project follow-up
- More experience needed of Follow-up in developing countries
- Better integration is required to enhance integrated follow-up

4.6.2 Learning from International Experience

EIA follow-up like EIA itself can have different stages within it. These include: -

- Screening
- Scoping
- Initial Data Collection
- Design
- Implementation
- Evaluation
- Issue management and
- Stakeholder Communication

EIA follow-up is an outcome of four contextual factors which are- regulations & institutional arrangements, approaches & techniques, resources & capacity and project type. Based on these contextual influences, the experience of IA follow-up was discussed in the developed and the developing country. A comparison revealed that both type of countries have some common problems but there are some distinctly different experiences, which should be kept in mind before good practices are imported from the developed to the developing world. These are summarised as follows: -

- Command & Control method may be more applicable for developing countries due to lack of public pressure on environmental issues.

- Government initiative for follow-up needs to be stronger in economically deprived areas as from public point of view the thrust is mainly on gaining basic amenities in life like food, clothing, shelter and employment.

- Medium of communication in developing countries should be adopted taking into consideration local cultural aspects. For example internet may be a good

medium in developed countries but may not be practical in economically deprived regions.

- In developing countries, effort should be given to integrate environmental protection with economic interest, as this will ensure sustainable development in the long run.

SECTION B

THEORETICAL FRAMEWORK

SECTION B (PART 2)

'Laws are like cobwebs, which may catch small flies, but let wasps and hornets break through'.

-Jonathan Swift

Chapter Five

EIA: An Introduction to the Indian System

Chapter five introduces EIA in India and is sub-divided into five sections. First, the historical development of environmental protection in India is described. The second section explores the background of EIA in India, discussing its emergence and format. Current procedural arrangements and steps of EIA are then explained. This is followed by a critical review of Indian EIA practice based on the EIA deficiencies defined in chapter 2. Finally, a SWOT analysis (defined in chapter 2), of the present EIA system in India is carried out.

5.1 Development of Environmental Protection in India

India's constitution and legislation imposes an obligation on the State and its citizens to protect and improve the environment as a primary duty. The 42nd amendment to the constitution made in 1976 specifies through Article 48A, that:-

"The state shall endeavor to protect and improve the environment and to safeguard forests and wildlife of the country" (IGNOU, 1999, AHE-1, p. 23).

The Constitution also imposes a duty on every citizen (Article 51A), according to which the citizens are asked "to protect and improve the natural environment, including forests, lakes, rivers and wildlife, and to have compassion for living creatures" (Jain, 2004, p.3). The 73rd constitutional amendment along with the 74th amendment was incorporated in 1992 and is an important landmark for environmental protection. The former amendment empowered the Panchayat bodies (village councils) with responsibilities in the areas of soil conservation, water management, watershed development, social and

farm forestry, drinking water, fuel and fodder, non-conventional energy resources and maintenance of community assets. The latter amendment empowered urban local bodies to protect environment and the promotion of ecological effects (Jain, 2004, p.3).

Issues related to environmental protection and sustainable use of natural resources was given attention from the early 70s in planning processes. Even before India's independence in 1947, several environmental legislations existed (Jain, 2004, p.3), like the Indian Fisheries Act 1897 (Banham & Brew, 1996, p.196). However, the Stockholm conference played an important role in raising the concern for environmental protection in India. The National Committee on Environmental Planning and Co-ordination (NCEPC) was set up as an apex body in 1972 (Jain, 2004, p.4) and environmental protection and conservation of natural resources emerged as key national priorities and found expression in subsequent legislation, which have been given in chronological order below: -

- Wildlife (Protection) Act 1972;
- Water (Prevention and Control Pollution) Act 1974;
- Water (Prevention and Control of Pollution) Cess Act 1977;
- Forest (Conservation) Act 1980;
- Air (Prevention and Control of Pollution) Act 1981;
- Environment (Protection) Act 1986;
- Public Liability Insurance Act 1991 (Banham and Brew, 1996, p.196).

The Department of Environment was established in 1980, which was later converted to the Ministry of Environment and Forest (MoEF) in 1985. Current national policies, reflecting environmental concerns include the National Wildlife Action Plan (1983); National Forest Policy (1988); the National Conservation Strategy and the Policies

Statements on Environment and Development (1992), brought out by the Ministry of Environment and Forest (MoEF) (Mathur & Rajvanshi, 2001, p14). Other than these policies, environmental management and considerations have also been incorporated in National Industrial Policy (1991), Policy Statement for Abatement of Pollution (1992) and the National Mineral Policy (1993) (Sinha, 2001, p.68).

5.2 Emergence and Adaptation of EIA in India

EIA became mandatory in India in 1994. However, as an informal instrument, it had been in existence in India since the late 70's when it was introduced as an administrative measure in 1978-79, initially for river valley projects and later extending to industrial projects (CII & MoEF, 1999, p.1). These EIAs had been carried out in India mostly as a requirement to foreign donor agencies. During the 1980s, EIA became a requirement for all public sector projects seeking investment from the Public Investment Board (PIB) (Sinha, 2001, p.77). The so-called PIB rule was issued for this purpose. The Planning Commission undertook this initiative during the sixth five-year economic plan. During this five-year plan the Planning Commission of India adopted a system according to which all large projects also termed as 'mega' projects which required approval from the commission, also required to be pre-reviewed by the then Department of Environment.

During the 1980s, requirements for EIA were implicit for 'mega' projects and public sector projects (Singh & Sinha, 2003, p.7). However, EIA during this time was not a legal requirement and its chief role was to facilitate environmental clearance in order to get funding for the development. As a result, once clearance was granted there was little that could be done to ensure compliance of the conditions imposed. It is also worth noting that EIA as a process was initiated due to requirements of foreign and national

funding. This initial start perhaps, may have had a profound influence in shaping the attitude of developers towards EIA, which then, served more as a fund-aiding tool.

The need for developing legislative instruments for enforcing good environmental management practices was a result of major environmental crisis, which the country faced. The Bhopal Gas Tragedy (1984) was a major incident, which pressed the need for better environmental management and as a response to which the Environmental Protection Act (EPA) was passed in 1986 (Mathur & Rajvanshi, 2001, p. 14). The tragedy occurred due to the leakage of methyl isocyanate gas from the industrial unit of Union Carbide Corporation in the city of Bhopal in Madhya Pradesh State and resulted in the death of about 5,000, affecting another 200,000 persons (IGNOU, 1999). This incident highlighted gross environmental negligence in industries and although EPA was passed soon after the accident, it still did not make EIA a mandatory requirement.

5.2.1 Environment Protection Act 1986

The Environment Protection Act is considered as an umbrella legislation in the Indian Parliament. It empowered Central Government to frame rules and regulations and to prescribe standards (Singh & Sinha, 2003, p.4). According to the Act, there was no direct requirement for EIA but it required certain projects to be assessed to ascertain whether an Environmental Clearance was required from Central Government. There were eleven categories of project, which required an environmental clearance. These are stated as follows: -

1. River Valley Projects (including hydel power, flood control)
2. Major irrigation
3. Hydropower
4. Industrial

5. Thermal Power
6. Mining
7. Ports and Harbour
8. Tourism
9. Human settlement
10. Projects in ecologically fragile areas
11. Communication Projects (Banham & Brew, 1996, p. 196)

The criteria that were used to make decisions regarding the requirement of environmental clearance for projects, was based on size or the capital cost of the project. In some cases however, capital cost alone was sufficient (Banham & Brew, 1996, p. 197). Until recently development was viewed only in terms of economic returns (Gopalan et al, 1992, in Biswas & Agarwala, 1992, p207).

Under the 1986 regulations, the MoEF through its Impact Assessment Divisions, (IAD), prepared the Environmental Impact Reports (EIRs) for the environmental clearance (Banham & Brew, 1996, p.197). The IAD would prepare the reports with the help of the project proponents. EIA was a requirement then, only for government undertakings, as a result the proponents were usually government authorities. The system therefore lacked an independent review process. "The lack of legal requirement for an EIA also meant that records were not properly kept and the potential for feedback into the project design process was minimal" (Valappil et al, 1994, Gopalan, 1992 in Banham &Brew, 1996, p.197). Thus, without a legal status for EIA itself, follow-up mechanism during this regulation perhaps was extremely weak.

5.2.2 EIA Notification 1994

The Environment Protection Act empowers the central government of India to protect the environment by enabling it to frame Rules and Regulations and to prescribe national standards. In exercising these powers, central government has laid down certain rules, which amongst other things specifies the following: -

1. "Standards of emission or discharge of pollution in the environment.
2. The factors to be taken into consideration by Central Government for exercising its power for prohibiting or restricting the location of industries.
3. Procedures to be followed by Central Government while prohibiting or restricting the location of industries" (Sinha, 2001, p.77).

However, according to the rules and regulations, Central Government needs to notify its intention to impose any restriction or prohibition on development activities by publishing it in the official gazette. It should then allow a span of sixty days during which any person can file their objections, which then needs to be considered by the Central Government. After giving due consideration to all objections received within the stipulated days, Central Government may proceed with the prohibitions or restrictions within 365 days from the date of publication of the notification.

On 28th January 1994, Central Government published its intention to impose restrictions or prohibit any new development activity to start or expand without getting an environmental clearance from the Central or the State Government. It also published the procedure for obtaining the environmental clearance. After debating and considering several objections that were received, the Notification was amended and issued on 4th May 1994. 'This notification is popularly called the EIA- Environmental Impact Assessment Notification 1994,' (Sinha, 2001, p.78), which streamlines the EIA process

in India. According to the EIA Notification of 1994, restrictions are imposed on the expansion and modernisation of selected activities or new projects to be proposed in any part of India unless, the Government accorded environmental clearance (Mathur and Rajvanshi, 2001, p. 15).

5.3 Procedure for Implementation of EIA in India

In order to obtain an environmental clearance, the first requirement for a proponent is to prepare an Environmental Impact Report. In this context, the proponents can take help of the Impact Assessment Agency (IAA) of the MoEF, who can provide guidance for preparation of the EIA report and can also help in listing the other required documents for it. Other documents, which may need to be included, are hydro-geological reports for projects requiring large quantity of ground water, or deep digging or storage of water like mining; biodiversity or wildlife studying in case of expected impact on flora and fauna of a large area; rehabilitation and resettlement plan for projects requiring large displacements of people, detailed risk analysis report for projects like chemical plants and thermal power stations and approval for mining plan from competent authority, which includes the MOC (Ministry of Coal), for coal and lignite and IBM (Indian Bureau of mines) for other major minerals.

An application needs to be submitted by the proponent to the Secretary, Ministry of Environment and Forests, New Delhi (GoI, 2001, Annexure 1, p.2). The application needs to be sent according to the proforma specified in Schedule-II of the EIA notification. It should include a project report, Environmental Impact Assessment report, Environmental Management Plan and details of the public hearing report. In case of mining projects, it was observed that these documents are combined together and named

as Environmental Management Plan, or Environmental Impact Report and Environmental Management Plan.

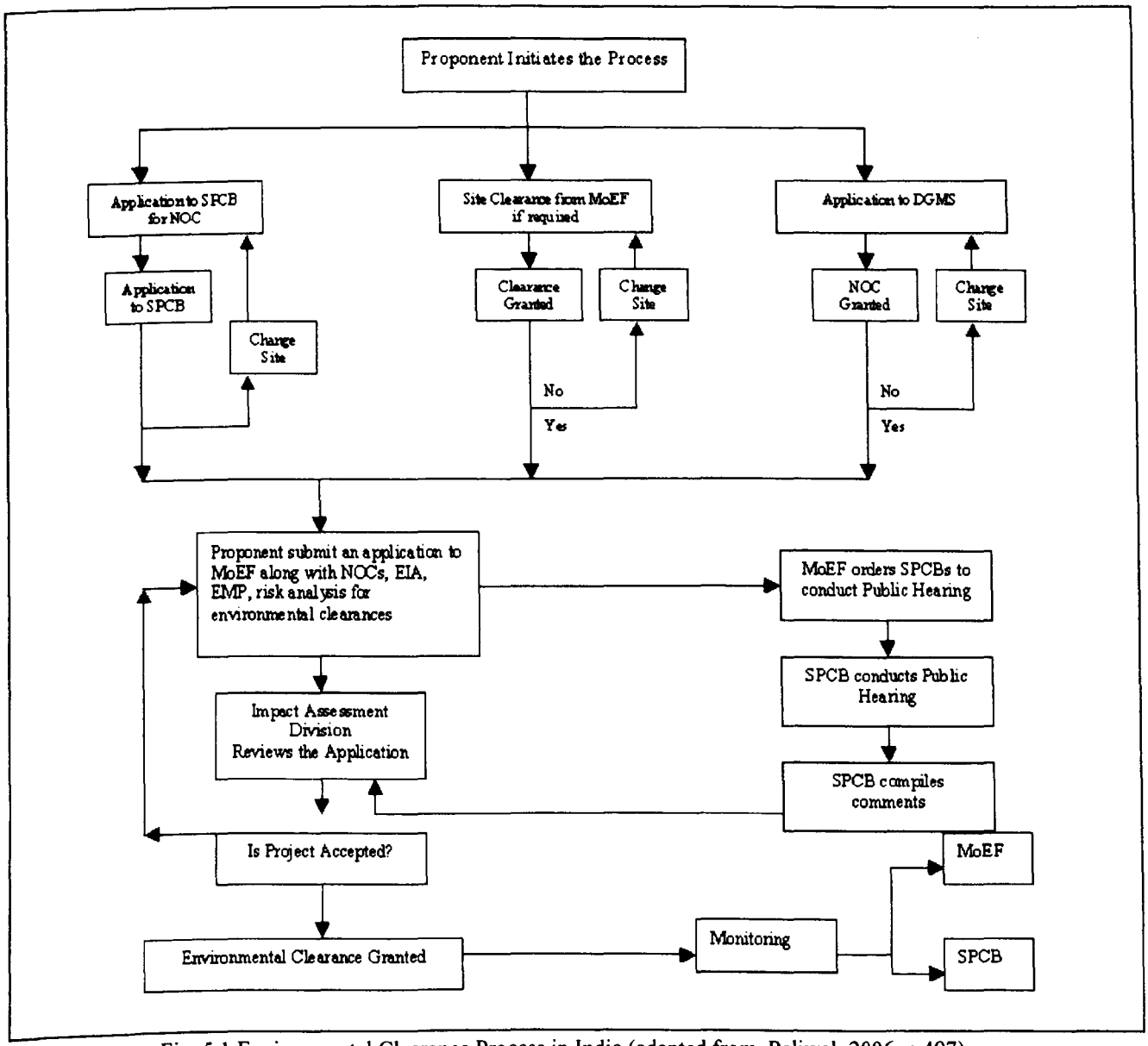


Fig. 5.1 Environmental Clearance Process in India (adapted from, Paliwal, 2006, p.497)

5.3.1 Site Clearance

In order to obtain site clearance the Central Government in the MoEF will have to be notified by the project authorities regarding the project location. The proponents are

contacted in case there are any discrepancies or missing information. If the information is not sent back to the ministry in a reasonable time period in spite of reminders, the file is closed down. Such cases are re-opened as and when the information and justification for delay is submitted (Jain, 2004, p.22). If the application is complete, within thirty days the project authorities will be given the decision regarding the suitability or otherwise of the specific site (GoI, 2003, Annexure 1, p.2).

Thus, the EIA Notification provides for a two-stage clearance for site-specific projects (See Fig 5.1). Site clearance is given at stage one while the environmental clearance is given in stage two. This two-stage procedure has been put into place in order to help project authorities who would not have to spend on detailed impact studies of a project if the site for the project is not cleared. However, if a proponent is willing to take the risk, it can complete the entire study and apply for both the site clearance as well as the environmental clearance in one stage (CII & GoI, 1999, p.1).

5.3.2 Forest Clearance

Projects involving clearance of forested areas also require a forest clearance under the Forest Conservation Act. For forest areas covering more than 20 ha, the MoEF gives the clearance. If the area covered is between 5ha to 20 ha, the state forest department's advisory group makes recommendations while for less than 5 ha the Regional Chief Conservator of Forests (RCCF) makes the decision. Projects, which require both the forest and the environmental clearances, two separate applications are to be submitted for which two separate clearance letters are issued. These kinds of projects can commence only after both clearances have been issued.

The Forest Advisory Committee (FAC), of the MoEF considers the forest clearance process. Forest Clearance itself is given in two stages. At the first stage, 'the proposal is agreed in principle, subject to certain conditions'. Stage two clearance is given only after the receipt of compliance report from the State Government. This compliance report is submitted with respect to compliance of the stipulated conditions regarding transfer and mutation of non-forest area identified for compensatory afforestation, if any. It also reports transfer of funds in favour of the State Forest Department as compensation if required (Jain, 2004, p.29).

5.3.3 Clearance from State Pollution Control Board (SPCB)

Other than the MoEF, the SPCB also plays an important role in the overall clearance process of the project. This is because the projects fall in their jurisdiction under the Water (Prevention and & Control of Pollution) Act and the Air (Prevention & Control of Pollution) Act. The clearance for these is given by the SPCB in two stages: -

1. The 'Consent to Establish', which should be obtained even before environmental clearance application of the projects is sent to the central government.
2. Once the MoEF grants the environmental clearance, the SPCB then needs to give the 'Consent to Operate' which at times is also referred to as the 'no objection certificate' or NOC. This is usually given once the project has already obtained the environmental clearance from the MoEF (See Fig. 5.1). However, it is only after it receives the 'Consent to Operate' certification from its respective SPCB that it can start.

The State Pollution Control Board of the respective project is responsible for organising the public hearing and for publishing a notice for the public hearing in at least two local newspapers including one in local language. The cost for this has to be borne by the project proponent. The hearing is conducted after 30 days since the notice (CII & GoI, 1999, p.2). During these days the general public may submit written suggestions, comments or any objections. Associations or individuals who are eligible to participate in the public hearing process have access to the executive summary of the project furnished by the project proponent to the SPCB (Sinha, 2001, p.83).

The SPCBs and the Central Pollution Control Board (CPCB) were established after the 1986 Environment (Protection) Act. But interestingly they were constituted as autonomous institution under the provisions of the Water (Prevention & Control of Pollution) Act, 1974. Then their primary task was to control and monitor water pollution. At present additional to implementing the Water (Prevention & Control of Pollution) Act, 1974, the SPCB are also responsible for implementing various other environmental legislation, which includes the Air (Prevention and Control of Pollution) Act, 1981, the Water (Cess) Act 1977, some of the provisions of the Environment Protection Act 1986 and the rules framed under it like the Hazardous Waste (M& H) Rules, 1989, the Biomedical Waste (M& H) Rules, 1998 and the Municipal Solid Waste Rules, 2000.

5.3.4 Public Hearing Process

The amendment introduced in April 1997 made public hearing a mandatory requirement to obtain environmental clearance. Prior to the 1994 Notification, the general public was not able to participate in the EIA process. The 1994 notification provided them with

scope for some public involvement. Arrangements for public hearing could be made if the IAA, (Impact Assessment Agency), which is a part of MoEF decided it to be necessary. These considerations were, however, limited to the following three factors: -

- "If the project involved significant displacement of people;
- If there was a public outcry against the project;
- If the project caused significant degradation of the environment" (Sinha, 2001, p.82).

As a result of the 1997 amendment, it became mandatory to submit a public hearing report along with the application for environmental clearance of a project. The public hearing procedures is specified in the EIA Notification as a new schedule (Schedule-IV).

5.3.5 Pre-Decision Scrutiny by MoEF

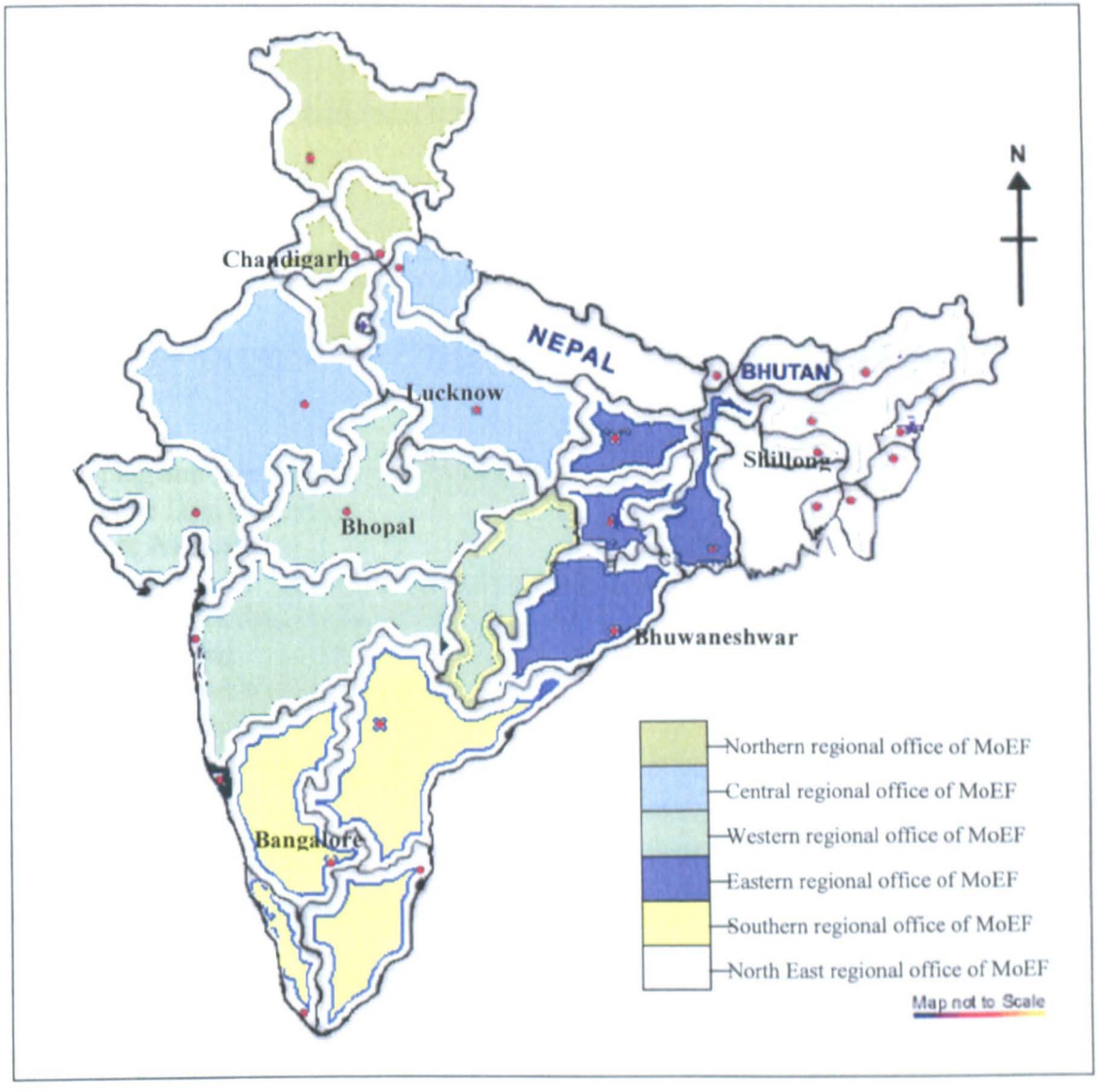
The application along with all relevant documents is scrutinised by the Impact Assessment Agency (IAA), which is a multidisciplinary team of the MoEF. At first, the agency checks as to all enquired documents have been submitted or not. In case it is not, the proponent is informed. Where the sites are close to a National Park or sanctuary, the projects are referred to the Wildlife Wing of the Ministry for their views and suggestions (Jain, 2004, p.22). The team may also go for a site inspection or interact with the proponent or have consultation with relevant experts (Mathur & Rajvanshi, 2001, p.34). In case the application is found complete, it is passed to the Expert Advisory Committee (EAC). EACs have bee constituted for five sectors. These include:

i) Industries
ii) Thermal Power Plants
iii) Mining
iv) River Valley Projects and
v) Infrastructure Projects and Coastal Regulation Zone

The Committee is responsible for reviewing the application of the respective projects and the proponents are required to give a presentation and answer questions if necessary. They may also be asked to give additional information if the Committee asks for it. Usually the Committee decides on the project in not more than two sittings (CII & GoI, 1999, p.4). The Committee can recommend that the project be approved, rejected or approved with conditions. The MoEF then processes these recommendations and all conditions stipulated are binding and should be satisfied by the proponent before the project can 'break ground' (Mathur &Rajvanshi, 2001, p.34). However, the proponent is not required to certify in a written report that these conditions have been met, thus the 'implementation of these conditions is based on the honour system' (Mathur & Rajvanshi, p.20).

5.3.6 Post-Decision Scrutiny

In India, the enforcing agencies for EIA compliance are, State Pollution Control Board (SPCBs), State Government (Department of the state government dealing with the subject of Environment) and Ministry of Environment and Forest (MoEF). The Union Ministry of Environment & Forest is the nodal administrative body responsible for protection and management of environment in the entire country. The MoEF has six regional offices spread across India. Each regional office is responsible for checking compliance of the states falling under its jurisdiction. The regional offices include Shillong (North East), Lucknow (Central), Chandigarh (Northern), Bhopal (Western), Bangalore (Southern) and Bhubaneshwar (Eastern) (Banham &Brew, 1996, p.196). The seventh regional office is yet to start functioning in Ranchi (Jain, 2004, p.38).



Map 5.1 Regional Offices of MoEF in India (Compiled by Author)

Each state in India has its own state pollution control board (SPCB), responsible for implementing most of the environmental legislations. They are also responsible for issue of notifications for permissible emissions. In case of Union Territories (UTs), the Pollution Control Committee (PCC) holds the responsibility. The apex body for the SPCB is the Central Pollution Control Board (CPCB), which is based in Delhi and coordinates the activities of SPCBs and PCCs. It also plays an advisory role for the

Government of India. The CPCB sets the Minimum Standards (MINAS) for Environmental legislation. The CPCB is under the administrative control of MoEF.

5.4 Stages within EIA

The Impact Assessment Division of the MoEF has specified the stages that constitute the Indian EIA. These are very similar to those advocated internationally and include: -

- Screening
- Scoping and Identification of Alternatives
- Baseline Data Collection
- Impact Prediction
- Assessment of Alternatives, delineation of mitigation measures and environmental impact assessment.
- Public Hearing
- Environmental Management Plan
- Decision Making
- Monitoring of Clearance Conditions

Screening: Screening in India is defined as a 'process to see as to whether environmental clearance is needed for a project according to the Indian statutory requirements' (GoI, 2001). There are three criteria based on which screening is decided These are Scales of investment, type of development and location of the project. A list of 29 categories of projects is listed in schedule I of the EIA notification which require an environmental clearance. Through subsequent amendments thus list has been increased to include 32 types of projects.

The list consists of power (hydro, thermal and nuclear), mineral extraction and processing industries, tourism, transportation (rail, road & air), petrochemical, manufacturing and handling of chemicals and synthetic products. The clearance granted will be for a span of 5 years starting from the date of commencement or construction of the project. However, if it is established that the information provided by the proponents

are false or have concealed the factual data, the clearance will be revoked (Mathur and Rajvanshi, 2001 p.15).

Projects listed under schedule I are exempted from obtaining environmental clearance, if land and all other relevant clearances from state government have been obtained before 27th January 1994. Industries like the petrochemical, rubber, cement, paper and some other sectors are exempted from obtaining environmental clearance if an investment of less than fifty crores (1 crore is 10 million) rupees is involved. In other sectors, environmental clearance is exempted as well, if an investment of less than one crore is involved. However, with this regard, an exception is made for industries like tourism, mining and tarred roads in Himalayan and/or forest areas. But tourism projects located in coastal or high altitude areas require environmental clearance if an investment of more than five crore rupees is expected (Sinha 2001, p.78).

Scoping: The IAD defines scoping as 'a process of detailing the term of reference of EIA' (GoI, 2001). In order to aid scoping, the ministry has published guidelines for different sectors such as Thermal Power Plants, Mineral exploitation and River Valley Development Projects. Different sectors have to fill their respective application forms. Specific application forms are applicable for Industrial sector projects, Thermal sector projects, Mining sector projects, river valley and hydroelectric projects, hotels/beach reports and other projects located in CRZ except ports and harbours and road/highway projects (GoI, 1999).

The actual scoping exercise is generally carried out by the consultant in consultation with the project proponent and guidance, if need be, from Impact Assessment Agency. The project authorities and the competent authorities may also add value to it (Dawre,

undated). However, scoping in India is not a statutory requirement and developers usually do not attempt to produce a scoping report (Chandrappa, 2002, p.8).

Baseline Data Collection: Collection of baseline data is important for accurate assessment of impacts on environment. According to the manual issued by the MoEF, it is stated that 'the site-specific primary data should be monitored for the identified parameters and supplemented by secondary data if available' (GoI, 2001).

Impacts specified by Indian Government to be assessed in the projects	
Air	• changes in ambient levels and ground level concentrations due to total emissions from point, line and area sources • effects on soils, materials, vegetation, and human health
Noise	• changes in ambient levels due to noise generated from equipment and movement of vehicles • effect on fauna and human health
Water	• availability to competing users • changes in quality • sediment transport • ingress of saline water
Land	• changes in land use and drainage pattern • changes in land quality including effects of waste disposal • changes in shoreline/riverbank and their stability
Biological	• deforestation/tree-cutting and shrinkage of animal habitat. • impact on fauna and flora (including aquatic species if any) due t contaminants/pollutants • impact on rare and endangered species, endemic species, and migratory path/route of animals. • Impact on breeding and nesting grounds
Socio-Economic	• impact on the local community including demographic changes. • Impact on economic status • impact on human health. • Impact of increased traffic

Table. 5.1 Impacts specified by Indian Government to be assessed in the projects (GoI, 2001)

Impact Prediction: The MoEF has given a set of impacts that need to be predicted. These are broadly categorised as Air, Noise, Water, Land, Biological and Socio-Economic Factors. These have been further sub-divided in categories as stated in the table.

Assessment of Alternatives, delineation of mitigation measures and environmental impact assessment: Consideration of alternatives is perhaps the most crucial stage that determines the very essence of having an EIA. With this respect, the manual indicates explicitly that alternatives for projects location as well as technologies should be considered. It should also consider the 'no option' alternative.

Public Hearing: As already mentioned earlier, public hearing became mandatory only in 1997. People who are likely to be affected due to the development have an access only to the executive summary of the project. This includes bonafide local residents, local associations, environmental groups and other persons located in the project site, which includes sites of displacement. These people can give their written or oral objections to the concerned SPCB. The decision regarding the hearing needs to be done within 30 days after the proposal is forwarded, however, this time limit has been increased to 60 days by amending the notification on 2001 November (MSE, 2003).

Environmental Management Plan (Environmental Statement): Once the likely impacts have been identified, the ways to mitigate them and manage them are included in the Environmental Management Plan (EMP). It should be noted here that as mentioned earlier in Chapter 4, in India EIA itself is often termed EMP. It is the document, which the proponent proposes along with the EIA. 'EMP is a crucial input for monitoring the clearance conditions and therefore details of monitoring should be included in it' (GoI, 2001).

Decision Making: A consultant usually assists the proponent at this stage where a presentation has to be given to the MoEF. The Impact Assessment Division of the MoEF is responsible for the decision-making assisted by the expert committee if required. The

entire process that is from the time all relevant documentation reaches MoEF and the final decision is taken, should take less than 120 days. However, this time limit is seldom met (See chapter 7).

Monitoring the Clearance Conditions

The proponents are responsible for sending periodical reports on compliance of the conditions as stipulated by the MoEF in their clearance letter. These reports are prepared biannually. Additional reports may also be sent if asked by the MoEF. The regional offices of the MoEF carry out site inspection as well and oversee enforcement of the environmental legislation. A special monitoring committee may also be set up for sensitive projects. Midterm corrective measures may also be initiated for environmental protection. In case of non-compliance, discrepancies or violation, written warnings may

Responsible Authorities in India					
	IAA	SPCB	PU	EC	IN
A. Screening	✓				
B. Scoping				✓	✓
C. Analysing/ Predicting					✓
D. Reporting					✓
E. Public Participation		✓	✓		✓
E, Reviewing	✓			✓	
F. Decision Making	✓				
G. Follow-up					
• Monitoring	✓	✓			✓
• Managing					✓
• Auditing					✓

Table 5.2 Responsible Authorities in India (Adapted from Chandrappa, 2002)

IAA: Impact Assessment Agency
SPCB: State Pollution Control Board
PU : Public
EC : Expert Commitee
IN : Initiator

be given. Time is given by the authorities to rectify the situation. If the problem persists then legal action can be taken and the project may be forced to stop (Jain, 2004, p.39). The project authorities also have to submit reports to their respectable SPCB with regards to the water and air prevention and control of pollution acts. These reports are sent monthly or as required by the respective SPCB as long as the project continues. The conditions that need to be monitored are based on the consent to operate letter granted by the SPCB. The Directorate General of Mines and Safety, a subordinate office of the Ministry of Labour, oversees the compliance with the mine and workers safety regulations and standards (Jain, 2004, p.40).

5.5 Deficiencies of EIA in India

As already mentioned earlier in Chapter 4, five major problem areas or 'deficiencies' are identified as contributory factors in undermining the role of EIA in effective decision-making. These include attitudinal, structural, institutional, procedural and technical deficiencies (Sadler, 1998 in Porter and Fittipaldi, p.31). The following discussion of EIA practice in India will be based under these categories, which will help to evaluate strength and weaknesses of the existing EIA system.

5.5.1 Attitudinal Deficiencies

EIA exercises are often treated as a 'pro-formal or narrowly technical exercise' due to the attitude of the proponents and the development agencies that resist it or circumvent it (Sadler, 1998 in Porter and Fittipaldi, p.31). Existence of myths amongst developers and practitioners further influence their attitude. As pointed out by Ahmed and Sammy, such myths include 'EIA is anti-development', 'EIA is very expensive', 'EIA is a paper-tiger'

(Ahmed & Sammy, 1985, p.5-8). Thus due to attitudinal deficiency the potential of EIA can be left under explored.

Lack of Seriousness: In case of India as well, 'lack of seriousness' is exhibited in conducting EIA (Singh & Sinha, 2003, p.13). 'Lack of political will and internal pressure' has been inhibiting the development of an effective EIA system in India (Sinha, 2001, p.84). This may be due to the circumstances under which EIA was adapted in India. EIA was introduced as a condition that had to be met in order to get financial aid. Thus it was external pressure which introduced it and perhaps it was conceived more of an obstacle which had to be overcome in order to proceed with development activities.

Corruption: The legislations introduced in support of EIA in India during the past decade have been said to be impressive, however, with the level of compliance being poor (Priyadarshini & Gupta, 2003, p.13). Many industries that exist today have been in existence long before the 1994 Notification was enacted, which made EIA mandatory in India. These industrial units had different work culture and although there have been attempts to strengthen the legal system, old habits die-hard. The industries may have adapted themselves with the legal changes, but the present lack of will, may reflect the fact that these organisations are yet to develop the internal drive that makes EIA effective. 'Corrupt officials and lenient courts further aid the process of non-compliance' (Priyadarshini & Gupta, 2003, p.17). As a matter of fact the current legal regulations also owe their development more to international commitments rather than internal urge (Sinha, 2001, p.84).

Compliance by an end in itself: There has been enough evidence to suggest that reports have 'serious distortions of facts to provide positive reports that facilitated environmental clearance' (Mathur & Rajvanshi, 2001 p.22). Compliance of legal requirement has become the end in itself rather then the means to an end. The emphasis is getting the clearance, but follow-up of EIA is weak. The 'Mumbai-Pune Expressway Project' is just one out of the many examples where there was gross violation of mitigation measures during its implementation phase (Mathur & Rajvanshi, 2001, p.51). Thus, EIA is conceived and implemented as a study needed to comply with these legislative requirements and in the process, the primary objective, - environmental management to achieve optimal utilisation of natural resources in order to ensure environmental sustainability is lost.

Power of Developers: Power may be yet another factor influencing the attitude of developers. Being a developing country, the poor are the most vulnerable and developers tend to be very powerful. In case of the 'Narmada Sagar Multipurpose Dam Project' for example, the legal framework required compensation of submerged land by grant of land. However, project authorities tried to influence people to take cash as compensation. As a result, local people lost their source of income and were uprooted from their origins without any alternative source of livelihood. In case of the Taj Group of Hotels, the hotel was to be constructed on land, which originally belonged to the Alipore Zoological Garden. However, the zoo directors had withdrawn their objections as they were promised adjacent lands and relocation grant by the state government and the hoteliers agreed to reconstruct displaced facilities at no extra cost to the zoo.

However, in the process, the detrimental effect of the project was ignored, as it would affect the zoo inmates and the flight path of migratory birds (MSE, 2006).

The shortcomings discussed above indicate that in order to make EIA effective in India, a change of attitude is crucial. The above discussion has shown that external pressure can merely help in laying down requirements or procedures, but the country needs to recognise the benefits of having an EIA system in order to make it effective.

5.5.2 Structural Deficiencies

Structural deficiencies within an EIA system is evident when EIAs are poorly integrated with decision-making, especially with project implementation and/or with other supporting policy, planning and regulatory processes (Sadler, 1998 in Porter and Fittipaldi, p.31). In India, EIA is treated as a 'post planning exercise and often regarded as a process to produce evidence as to why the project should be cleared from an environmental angle' (Sinha, 2001, p.84, p.149). The EIA reports in India have been said to be 'advocacy documents used to support projects that are likely to adversely affect the assimilative capacity of the environment' (Singh & Sinha, 2003, p. 15).

Lack of Integration: This is exemplified by the lack of integration of the various regulatory requirements within EIA. Public participation in India works out more or less independent of the EIA process. Mitigation planning may be worked upon much ahead of the schedule for public hearing. The information is not used during the scoping and screening phases of the EIA and thus, information from the public does not contribute in structuring the EIA (Rajvanshi, 2003, p.300). As far as integrating biodiversity perspective with decision-making is concerned, India has a mixed record. Biodiversity

considerations have been able to influence decision-making only in few cases (Mathur & Rajvanshi, 2001, p.23).

Absence of Strategic Planning: Application of environmental procedures to plan and programme, has only been recently attempted in India. This new initiative has been 'necessitated largely because of the operational directives of several donor agencies for environmental review of investments proposed for supporting civic infrastructure expansion, pollution control and environmental improvement programmes' (Mathur & Rajvanshi, 2001, p.21). Finance again is the incentive to introduce these changes. This may help to take environmental planning a step further in India but to what extent environment will indeed be protected is questionable.

5.5.3 Institutional Deficiencies

Institutional deficiencies are due to narrowly defined or applied scope of EIA as a result of which social factors, health factors and cumulative effects are not adequately covered (Sadler, 1998, in Porter and Fittipaldi, p.31).

Social and Health factors neglected: The EIA process in India stresses mainly on environmental impacts and the environment is usually associated with the physical environment (However, see table 5.1). Certain activities have a profound influence on social and health factors. Mining activity is a classic example where the impact on socio-economic environment is severe and may surpass other types of impact. Most large mining companies realise this in India, and accordingly allot funds and even create foundations or trust for this purpose. Community consultation and formation of village working groups are also encouraged (Banerjee, 2004, p.21).

Overlapping Responsibilities: The EIA system in India lacks guidelines on scoping of issues. There is usually provision for health related factors guided by the DGMS (Director General Mines Safety), which falls under Ministry of Labour. The socio economic factors are partly included in the rehabilitation action plans. These again differ from state to state and are targeted for families that need to be relocated and resettled due to mining. Coal India Limited (CIL), which is the largest public sector undertaking for coal production in India, has its own rehabilitation policy. Thus three ministries share the existing institutional arrangements for EIA in coal mining in India, they are: -

a) Ministry of Labour,
b) Ministry of Environment & Forest and
c) Ministry of Coal & Mines.

In order for EIA to be effective, the institutional arrangements need to be more comprehensive and focused in India. Although health and social considerations are included according to some legal requirements, these are vague and ambiguous. The need to develop capabilities for carrying out impact assessment in other offshoots including Cumulative effects assessment and Environmental Health Impact Assessment have been also emphasised in the Indian literature (Singh & Sinha, 2003, p. 16-17).

5.5.4 Procedural Deficiencies

Absence of clear guidance and inconsistent enforcement of the EIA process leads to procedural deficiency. This initiates 'user complaints about fairness, timeliness and efficiency' (Sadler, 1998, in Porter and Fittipaldi, p.31). Delayed decision-making and non-compliance are common in EIA systems with procedural deficiencies.

Weak Compliance: The Draft of the National Environment Policy of India, 2004 acknowledges environmental compliance to be weak in India. It identifies inadequate technical capacities, lack of monitoring infrastructure and trained staff as key factors leading to this (GOI, 2004, p. 1). A study conducted by National Law School of India states that 'the principal legislation is repetitious and poorly drafted'. Tata Energy Research Institute (TERI) conducted a study called DISHA (Directions, Innovations and Strategies for Harnessing Action), according to which '...Environmental performance among Indian corporate is typically ad hoc and restricted to compliance aspects, and even those are not fully addresses...' (Priyadarshini & Gupta, 2003, p.13). The factors that have been identified as responsible for the state of non-compliance in India include lack of flexibility and over ambitious legal standards; weak enforcement; poor monitoring; lack of punitive measures; paucity of funds and inter-state variations who lax enforcement in order to attract investments (Priyadarshini & Gupta, 2003, p.19).

Time Consuming: The process of environmental clearance i.e. from the time all relevant documentation reaches the MoEF, through the EAC Committee evaluation and finally the MoEF decision should take less than 120 days (Mathur & Rajvanshi, 2001 p.20). However, experience indicates that this is seldom met. Forest clearance alone can take more than two years and public participation can take well over a year. Figure 5.3 summarises the average time taken for environmental clearance to be obtained for a mining project, which also involves forestland.

According to Fig. 5.2, the average time taken for EIA to be approved is five years. This suggests that EIA study may become an ineffective exercise as the conditions based on

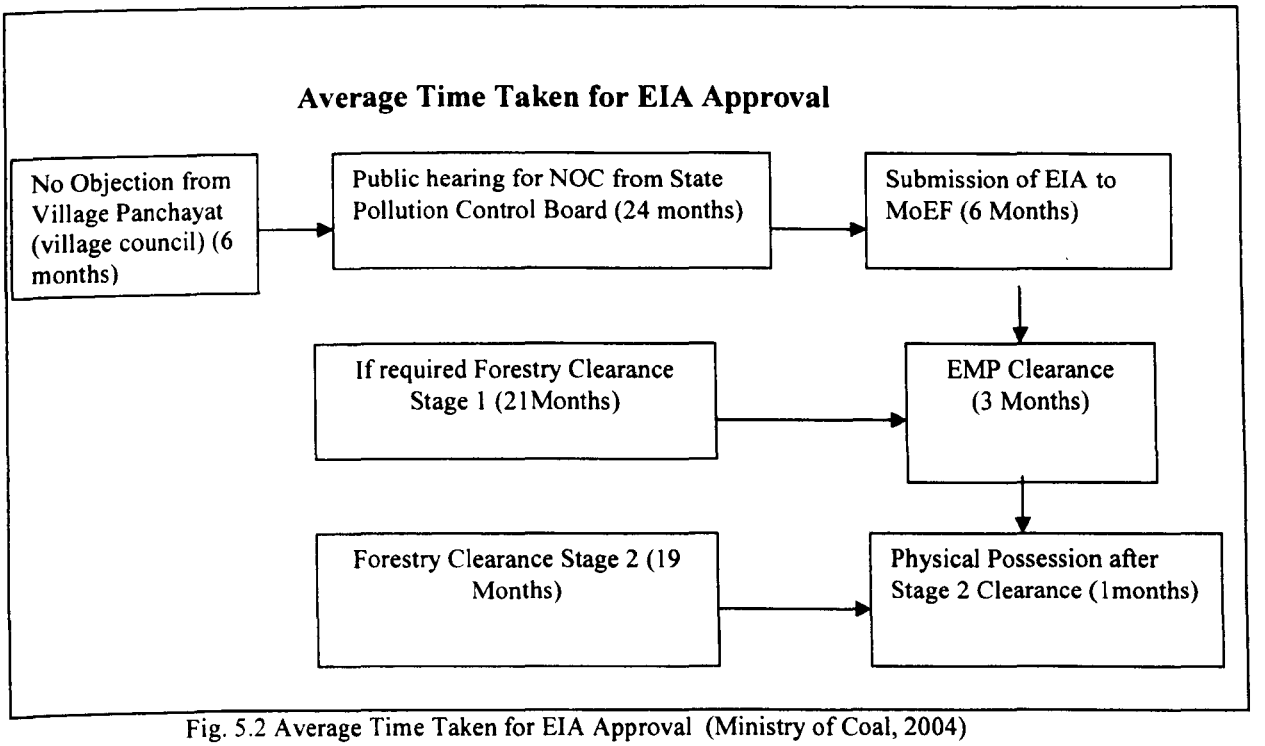


Fig. 5.2 Average Time Taken for EIA Approval (Ministry of Coal, 2004)

which the study is undertaken changes, making the EIA irrelevant for the project at the given time. The procedure thus lacks timeliness and efficiency and by no means can be termed to be fair.

Weak Scoping Stage: The scoping process in India has been identified as one of the stages that have been given the least attention. The sector specific guidelines that should aid in scoping, serve as general guide regarding basic parameters of environmental study including land use, are and water pollution. However, a lack of a single set of guidelines constituting a complete EIA project is still lacking (Mathur & Rajvanshi, 2001, p.22). It has been also argued that the Indian scoping exercise involves collection of inadequate information on numerous parameters irrespective whether they are used for subsequent analysis or not (Singh & Sinha, 2003, p.15).

5.5.5 Technical Deficiencies

Technical accuracy lies in producing good quality EISs, accurate impact predictions and providing for appropriate mitigation measures and compensation. However, these factors are often found to be highly variable even in advanced EA systems (Sadler, 1998, in Porter and Fittipaldi, p.31). Thus, technical deficiency is common in any EIA system.

Lack of Reliable Data: In case of India, prior to the EIA notification, it was stated that the EIRs, which were required to be submitted, were prepared 'using checklists in a mechanistic way that did not reflect or predict the true environmental impacts' (Gopalan, 1992, in Banham & Brew, 1996, p.198). These deficiencies have also been highlighted recently (Singh & Sinha, 2003). The baseline studies undertaken in India are not based on data and information collected for satisfactory prediction and evaluation of environmental impacts. The information that is collected generates considerable volume of data which is based on stereo type testing and measurement work (Singh & Sinha, 2003, p.13). As Wood (2003) quoted Banham & Brew (1996) and Selvam et al (1999), stating that

'some EIA reports in India have been bound like PhD theses, have been similarly indigestible, have been produced with similarly limited numbers of copies and have not even been available through inter-library loan'.

The data used is also old and does not ensure accurate assessment of the environment. However, 'fresh data should be generated to verify the old data' (Jain, 2004, p.26). The data that are furnished especially for topsoil, subsoil chemical properties, surface and ground water are either missing, incomplete or 'sometimes very sketchy' (Jain, 2004, p.26).

Lack of Know-How: The importance of engineering and natural science methods has been highlighted for logical impact prediction in India. However, the consultants, who conduct EIA in the current Indian practice, do not have persons well conversant with these disciplines. In case of EIA in mining projects, botanists and chemists may be conducting the EIA without involvement of any mining engineer or planner. The prediction methods that are used in the EIAs are not systematic and even if they are, they are not reported in the EIA report. Thus, 'in the absence of any systematic predictions of impact at the attribute level the exercise of impact evaluation becomes, at best, unintelligible guesswork' (Singh & Sinha, 2003, p.14).

In case of the EIA of Sankosh Multipurpose project, 'the mitigation approach adopted was based on poor conceptualisation of the impact significance'. The options that were provided were 'too simplistic' and were meant for 'few of the identified impacts' (Mathur & Rajvanshi, 2001 p.48). The mitigation measures that had been suggested for the project were without any prior efforts of evaluating the technical, physical, financial and operational feasibility of the proposed measures.

5.6 SWOT Analysis for EIA Systems in India

The description above highlighted the deficiencies of Indian EIA practice. However, the chapter also reveals that India already has various institutional and structural requirements in place in order to facilitate environmental protection. EIA follow-up is a continuation of what is decided on in the EIA during the pre-decision stage. Thus, the strength and weaknesses of pre-decision EIA will influence in how its follow-up is conducted (Baker, 2002, p.5)

Strength and Weaknesses are present within any system and are internal in nature, i.e. they exist from within the system. However opportunities and threats are exposed from outside the system. Thus, they are external factors in nature having an influence over the internal system (See Chapter 2). In order to understand how EIA follow-up works in India and how it can be improved, understanding the strength weaknesses, opportunities and threats of the EIA at the outset is important. It will help to create the base on which the follow-up study can be conducted and will provide guidance as to the how it can be improved.

5.6.1 Strengths: -

Key Elements Present within EIA: EIA was made mandatory in India in 1994. Since then, there has been a constant attempt to adapt and adjust the institutional and regulatory framework to enhance EIA in India. The literature also reveals that the EIA requirements in the country have most of the key elements found within EIA worldwide. This includes screening, scoping, impact prediction, decision-making, and public hearing and follow-up. There is therefore a basis for developing sound EIA practices.

Institutions Established for EIA: The scope of EIA includes impact on health as well as social factors along with the environmental impacts (Table 5.1). There are additional bodies sharing responsibilities of various aspects of EIA. For example, the Director General Mines Safety is in charge of the occupational related health of the workers, the SPCB is responsible for the Water, Noise, Air pollution standards and thus the MoEF can concentrate more on the specific environment related impacts of the project concerned. Thus division of responsibility seems to be well balanced and adequate.

The EIA system itself has specialised bodies to deal with specific sectors. These include Expert Committees for: -

- Mining Projects
- Industrial Projects
- Thermal Power Projects
- River Valley, Multipurpose, Irrigation and H.E Projects
- Infrastructure Development and Miscellaneous projects
- Nuclear Power Projects

The system therefore accommodates the special needs of the major sectors and ensures multi-disciplinary input into the process.

5.6.2 Weaknesses: -

Dilution of Law: In India, the EIA Notification has been amended twelve times in the last eleven years. Currently, a new Draft EIA Notification (published on the official Gazette on 15.9.2005) is on its way to replace the 1994 Notification (Banerjee, 2006). Some of these amendments have no doubt strengthened the EIA process but the outcome of some amendments can be said to be controversial. For example, in 1997, for the first time public hearing was made mandatory in India. However, a recent amendment notified on 13 June 2002 exempts pipeline projects from preparation of EIA reports. Public hearing is still required to be conducted in all the districts from where the pipeline passes. It implies that mitigation plan needs to be worked out without knowing what the likely impacts of the project are. The second question is without any report, on what basis will be the public hearing process conducted? This amendment thus dilutes the EIA process (India Together, 2006; MSE, 2006).

It was mandatory for IAA to consult the Expert Committee before environmental clearance was granted to a particular project. However, this is no longer mandatory, as

the IAA needs to consult the agency only if 'deemed necessary'. According to the 1994 notification it was mandatory that the half yearly compliance reports submitted by the proponents should be public available. But according to the latest requirements, it is up to the discretion of the IAA to make such reports available 'subject to public interest' (MSE, 2006).

Ambiguity Regarding Responsibilities: The present system to some extent has duplication in efforts being made by various regulatory agencies in monitoring compliance with the environmental management plan and regulations (Jain, 2004 p.40). These may create confusion as to who is responsible for what and in the long run, the effectiveness of the entire process may get diluted.

Dragging Pre-decision Stage: The earlier discussion of the deficiencies within the Indian EIA system also highlights the attitudinal, structural, procedural, institutional and technical weaknesses, which the system suffers from. However, one of the most crucial problems is the delay in decision-making. The pre-decision stage of EIA is unnecessarily dragged. This makes the impact assessment work done outdated by the time the decision is taken. If it has to be done again then it implies a waste of time, money and effort. Being a developing country, such mechanisms are by no means conducive for growth.

Weak Scoping and Ineffective Public Hearing: Within the EIA, scoping and public hearing needs attention, as both the processes are not being able to produce results. Screening is a statutory requirement and thus during EIA care is taken to see that the requirements are met. However, scoping is not a statutory requirement (GoI, 2001). The process is weak and consequently environmental issues, which need to be discussed in detail, are not properly covered by the EIA reports. It has been highlighted in the

literature that public hearing in India is still 'in the rudimentary stage of development and requires substantial improvements' (Rajvanshi, 2003, p.310). It still has to go a long way to be having a positive effect on environment protection.

5.6.3 Opportunities: -

Active Judiciary: Opportunity is an external factor to the system. The judiciary has played a prominent role with regard to creating opportunities for EIA system in India. The court has intervened several times in the past decade to ensure compliance of EIA Notification. The Supreme Court as well as a majority of the High Courts in the country has established 'Green Benches' to deal with the spate of public interest litigations (PILs) on environmental protection matters in these courts (Banerjee, 2006). It has helped in ensuring environmental justice when the MoEF has at times failed. Some of the noted examples of judicial interventions include silent valley project, the Narmada valley project, Taj Group pf Hotels and three hydro development projects in Kullu (MSE, 2006).

Pro-active NGOs: The Indian public has also become environmentally conscious and as a result there has been a rapid growth in the number of non-governmental voluntary organisations in the field of environmental protection during the last Quarter century (Banerjee, 2006).

World Bank Standards: The World Bank has been lending financial aid to many developmental projects in India including open cast coal mining projects. In order to be eligible for these financial grants, the World Bank imposes certain environmental standards, which needs to be met. This includes the Coal Sector Environmental and Social Mitigation Project (CS ESMP), which gave a major boost to environmental

management within the coal sector in India. It included 25 selected open cast coalmines of Coal India Limited (CIL) during the 1996-2002 periods (Banerjee, 2006).

5.6.4 Threats: -

Motivation from Funding Agencies: The standards set up by World Bank are an opportunity for the Indian EIA system as it benefits in achieving overall effectiveness in environmental protection from the Bank. However, it can also be a threat. Projects with World Bank funding may work differently from other projects. The performance of World Bank projects may be used to overshadow the actual Indian EIA system. In the long run, this will encourage viewing environmental clearance and protection as a mechanism to receive funds and in the absence of these funds the system may loose its relevance altogether. This is one of the concerns, which have been expressed at the beginning of this chapter and unfortunately without an attitudinal change, the EIA system of India will continue to suffer from this. The World Bank funding may act as the carrot, but the EIA system itself has many potentials and it is the realisation of these potentials, which in the long run can take EIA to the sustainable road in India.

Political Instability: Perhaps one of the most concerning threat is instability faced by the Government. The Ministers have been changing rapidly both in the Ministry of Coal & Mines and the MoEF and most have not been able to complete the five-year tenure. This highlights the instability of the political system, which can have a profound influence on environmental policy making.

Chapter Six

Coal Mining and Environmental Management in India

Chapter six is sub-divided into four sections. First, an introduction to coal mining in India is provided. Environmental impacts of open cast coal mining are discussed next. The third section identifies the environmental regulations within the coal-mining sector in India. Finally, challenges in environmental management practices within open cast coal mining in India are explored.

6.1 Coal Mining in India

The coal industry has been a pace setter for industrial and economic development in India. Coal and lignite account for almost 70% of the power generated in the country (Prasad, 2001, p.62). Coal is the most abundant fuel resource in the country and it meets around 50-60% of total commercial energy requirements (Jha, 2002). While regulation of the use of coal in the industrial sector in India was first conceived in 1923, the setting up of the National Coal Development Corporation (NCDC) in 1956 was the first major step towards planned development of coal industry in India. NCDC was a Government of India undertaking and the Railways owned the collieries then (MOC, 2006). Singareni Collieries Company Ltd (SCCL), which is a government undertaking, was already in operation since 1945. It was under the control of the Government of Andhra Pradesh, which is a federal state in India (MOC, 2006). The coal-mining scenario in India during the fifties was dominated by government undertakings.

During the 1970s, the private sector played a minor role in the coal industry. However, this resulted in unscientific mining practices and poor working conditions (MOC, 2006).

Based with the experiences of privatisation and in order to plan for growing industrial needs and equitable distribution of the country's coal resources, the coal industry was nationalised under the Coal Mines (Nationalisation) Act, 1973 according to which coal mining was mostly reserved for the public sector.

6.1.1 Nationalisation of Coal Mines

The nationalisation took place in two stages: first, coking-coal mines were nationalised in 1971 and then other coalmines in 1973 (GoI, 1999). The Act was amended in 1976, introducing two exceptions to the nationalisation policy. These include: captive mining by private companies engaged in production of iron and steel and; and sub-lease for coal mining to private parties in isolated small pockets not amenable to economic development and not requiring rail transport. The Act was further amended in 1993, allowing coal mining for captive consumption for generation of power, washing of coal obtained from a mine and other end uses to be notified by Government from time to time, in addition to the existing provision for captive coal mining for production of iron and steel (MOC, 2006).

6.1.2 Administrative Organisation for Coal Industry

Coal industry is held mainly within the public sector. In 2004, two ministries, namely Ministry of Coal and Ministry of Mines were merged into one single unit called Ministry of Coal & Mines. This also explains the dominant position, which coal as a mineral holds in India. The Ministry of Coal & Mines is the public entity that sets policies and strategies for exploration and development for the country's coalmines (CIL, 2006). Coal is found in thirteen states across the country. The main Indian coal belt is concentrated in and around seven states including West Bengal, Jharkhand (ex-Bihar),

Madhya Pradesh, Chhattisgarh, Maharashtra, Orissa and Andhra Pradesh. This does not include lignite (brown coal), which is beyond the scope of this research. Lignite is available in states of Tamilnadu and Rajasthan. Coal India Limited (CIL) is the holding company accounting for around 85% of the coal produced in the country and SCCL is a joint undertaking of Government of Andhra Pradesh and Government of India sharing its equity in 51:49 ratios (MOC, 2006). Coal resources in India as in January, 2005 are estimated to be 248 billion tonnes up to a depth of 1200 meters (Kumar, 2006). India ranks third in coal production after China and the U.S.A and accounts for around seven percent of world's total coal reserve, which is the fourth largest in the world (World Coal Institute, 2006).

6.1.3 Coal India Limited

As mentioned earlier (Chapter 2), the case studies drawn for this research have been selected from CIL alone. It is the largest company in India in terms of coal production and contributes eighty-five percent of coal produced in India. It is also the largest corporate employer in the country, employing nearly 462,000 (CIL, 2006). It also provides casual employment through contractors. The company functions through eight subsidiaries of which, seven are producing subsidiaries and one (CMPDI, Central Mine Planning & Design Institute), is a planning subsidiary acting as consultant for the company. The producing subsidiaries include Eastern Coalfields Limited (ECL), Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Mahanadi Coalfields Limited (MCL), Western Coalfields Ltd. (WCL), South-Eastern Coalfields Limited (SECL), Northern Coalfields Limited (NCL) and Eastern Coalfields Limited. The Head of Office is located in Kolkata in the state of West Bengal (GoI, 1999). The head office

of Coal India through director technical CIL directly controls the collieries located in Assam.

6.1.4 Open Cast Vs Under Ground Coal Mining

There are two basic methods used for mining coal. These are known as open cast (OC) and underground (UG). In case of OC mining, coal is exposed for mining by removing non-coal deposit or over burden (OB) above it (Mathur, 1999, p.94). UG mining of coal on the other hand refers to extraction of coal below the surface of the ground. Generally access to the underground mine workings is through an audit, down a mine shaft or through some other tunnel configuration (Mining Terminology) Since nationalisation of coal mines, the coal industry has shown an extensive growth and this has been possible mainly on account of open cast mining (Jha, 2002). At the time of nationalisation the ratio of underground to open cast production was 75:25 respectively. The situation is reversed now with open cast contributing to more than 75% of coal produced in India (Gupta, 2001, p.443; Roy, 2001, p.325).

Over the last few decades the technological mix of OC and UG mining has been said to be 'imbalanced' (Srinivasan, 2001). Currently, with more emphasis laid on OC mining, the future growth of coal production will have to rely mostly in UG mining. As a consequence the 10^{th} (2002-07) economic plan of India, focused more on under ground mining (Srinivasan, 2001). However, OC mining will still continue to play a dominant role in the country's overall coal development program at least for the coming 25 years (Jha, 2002; Mining India, 1998). The projections made by the Ministry of Coal for the year 2025 show that coal production is likely to go up by 2.8 times to 1061 MTY, with opencast mines contributing to approximately 88% of the total production (Banerjee,

2006). The factors that have led to this technological 'imbalanced' are subsequently discussed in terms of geo-mining conditions; economy & efficiency; planning policy; meeting expected rise in demand and funding agencies.

Geo-mining conditions: The type of mining technique to be used is to a large extent decided, considering the geo-mining conditions. UG mining is most suitable for coal lying at greater depths. Most of the coal in India lies at shallow depths up to 300 meters. Thus open cast mining seems to be the most suitable option for exploiting the 64 billion tonnes of proven reserves of coal at this depth (GoI, 2002).

Economy & Efficiency: OC mining is more economical than underground mining as the percentage of coal extraction for an OC mine is much higher (about 85 to 90%) than that for under ground mining (45 to 60%). OC mining also yields higher production level, which can be achieved faster and the investment per tonne of coal produced is generally lower than underground mining. (Mathur, 1999, p.87). It is safer in operation compared to UG mining and it is more amenable to efficient and higher degree of mechanisation. The operation process is also much simpler and can be well managed (Mathur, 1999, p.87). In 1996-97, CIL's aggregate profit from OC operations was Rs. 2,800 crores (3.73 million pounds approx). It may also be important to mention that 24 OC mines, whose total project report capacity was 96 MTY and produced 105 MTY in 2001. According to Mr. Sengupta (Chairman of CIL, 1998) "the shift in emphasis from the UG mines to OC mines over the years was thus also on economic consideration" (Mining India, 2002).

Planning Policy: Since nationalisation of coal mines, the priority was to increase productivity and quicken the pace of development. Open cast mining provided an easy

option for this. However, due to more emphasis on this type of mining technique, there was inadequate investment in UG mining. Emphasis was not given to UG mining after nationalisation. As a result of this, technology upgradation in UG mines so far has been marginal (Jha, 2002). This neglect further led to the decline of production from the UG mines and the increasing popularity of the OC mines.

Meeting expected rise in demand: India's coal demand is expected to increase manifold within a span of 5 to 10 years due to completion of ongoing coal based power projects, and demand from metallurgical and other industries. Open cast mines annual production increased to 225 MTY in 1997-98 from 20 MTY in 1974-75 and it is projected to double by the year 2010. This projection is based on the requirements of the power sector, which is likely to go up. At present it consumes 70 per cent of the coal produced in India (Mining India, 1998).

Funding Agencies: To meet the growing domestic demand for coal, India requires capital investment to increase mining capacity and to improve the productivity of the existing mines. Part of the capital requirements is met by international funding agencies like the World Bank and JEXIM (Export-Import Bank of Japan. Bank). Such financial aid, help in protecting environment by laying down measures to be followed. However, the investments have also been setting a trend for the more economically lucrative OC mines in India. At present, twenty-five OC mines of CIL have been selected for coal sector environmental and social mitigation project (CS ESMP) (Banerjee, 2006). CS ESMP is linked to the proposed $US530 million loan jointly funded by World Bank (IBRD) International Bank for Reconstruction and Development and JEXIM. The CSRP

is designed to support the government's ongoing market-oriented coal sector reforms and to provide financial and technical support to Coal India Ltd (Bhattacharya, undated).

6.2 Environmental Impacts of OC Coal Mining in India

Mining is an activity that has a profound impact on the social, physical and economical environment. The impacts for open cast mining are more severe as overburden (OB) will have to be removed and handled to reach the mineral deposit (Ghose & Majee, 2002, p.51). This may result in clearing of entire forests, removal of topsoil and in some cases displacement of villages. The impacts of open cast coal mining can be discussed under three broad headings, which are, impacts on physical environment, social environment as well as impacts on health. The impacts vary according to the stage of the life cycle of the project. OC mining can be broadly categorised in three stages, which are initiation stage, implementation stage and termination stage. The negative impacts of OC mining are subsequently discussed. Some of these impacts are obvious, while others maybe more indirect in nature.

6.2.1 Impact of OC Coal Mining in India on Physical Environment

The specific environmental parameters that are given importance in mining activities include air, water, soil, noise and vibration (Shukla & Siddharth, 2003, p.275). In some cases forests are cleared for mining activity. The impacts on these parameters are discussed below.

Air: Air pollution is one of the most important parameters considered in the preparation of EIA report for coal projects and the major impact on air quality is caused due to dust generation, which affects SPM (suspended particulate matter) level in air (Ghose & Majee, 2000, p.260; Biswas & Agarwala, 1992 p.39). The processes causing dust in OC

coal mine can be listed as follows and most of these are a part of the implementation stage of an OC project. These include: -

- Drilling and blasting
- Loading and unloading of coal and OB
- Dust due to movement of heavy vehicles along the haul road
- Dragline operation
- Crushing of coal to a convenient size in the feeder breaker
- Wind erosion
- Presence of fire
- Exhausts from heavy earth moving machinery (Ghose & Majee, 2000,p.256-257).

Some of the remedial measures that can be adopted to prevent such pollution include: -

1. Drills being wet operated or with dust extractors
2. Vehicles used for transportation being covered by Tarpaulins
3. Mobile Water Sprinklers should be used for dust suppression
4. Plantation activities should be carried out on OB dumps, along the mining lease area and roads. Native species should be used for transportation (Gibson, 1981, p.22).

These problems have been further investigated through mine visits during detail case study analysis (See Chapter 8). Other than dust, mine fires are responsible for a variety of harmful emissions within mines. Spontaneous heating in the OC coal mines are caused by situations like quarry refuses containing carbonaceous materials as well as by open stacks of coal. Carbon Monoxide is released as a result of mine fires, which adds up to green house gases. In some cases like in CCL and SECL, the fires have become surface fires In SECL a seam has been engulfed in by fire affecting the working of the OC mine at Chirimiri (Malhotra, undated p.39). Gaseous pollutants like oxides of nitrogen and sulphur and partially burnt hydrocarbons are also released.

Water: Both, surface and underground water may be affected as a result of OC mining and the two major sources for effluent are mine water and domestic and service effluents (Biswas & Agarwala, 1992 p.41). As far as the mine water is concerned, the process of washeries and coke making causes water pollution. In case of sulphurous coals like in Assam and Chhattisgarh (Churcha), the acidic nature of water discharge from mines poses problems (Malhotra,undated, p.51).

OC mining involves large excavations, which normally affects the 'aquifer geometry and characteristics'. This may disrupt the aquifer and groundwater levels. The flow direction may also change if the mine comes in the middle of the aquifer, excavating it from the center. Continuous mine pumping in the OC mines may also affect the wells located in nearby villages. Kusmunda project of SECL is an example where the villagers complained of reduced water levels in their wells. The scarcity was noticed especially during summer. The water supply was not proving to be sufficient to meet their social needs like washing cows and buffaloes and to cater to special occasions like functions, festivals and marriages (SECL, 1996).

Noise & Vibration: Noise and Vibration becomes major problem in cases where there are settlements in close proximity to the mines. As far as mine workers are considered, they are not to be exposed to a level higher than 85 Db and not for more than 8 hours a day. The vibrations caused as a result of blasting causes cracks in the mud houses of the villages.

Workers are required to be provided with earplugs to minimise the impact of noise. Nearby villages are carefully monitored for cracks developing as a result of blasting and the blasting are monitored as to be within the specified levels (Malhotra, undated, p.48).

Soil: OC method of mining results in the dumping of large amounts of over burden. 'This OB originates from the consolidated and unconsolidated materials overlying a coal seam and when disturbed and haphazardly mixed during mining activity, is called mine spoil' (De & Mitra, 2002, p.39). Mine spoils affect the geomorphic system because of the destruction of the landforms and processes, which in turn accelerates soil erosion.

Topsoil quality is crucial as it helps to retain moisture, helps in recharging of ground water and also maintains plants. In case of OC mining, entire topsoil is stripped off to reach the coal seams. If topsoil is not preserved, the land becomes unfit to be used for agricultural purposes. In cases where it had been a forestland, the soil is no more capable of sustaining forests and becomes viable to erosion. Most mines are required to preserve the topsoil and replace it during reclamation stage. However, it is argued that the shelf life of topsoil is affected by leaching out of nutrients and deterioration of the bio-life (Malhotra, undated, p.29). Once the over burden is removed, it is then stored as over burdens. Plantation activities are carried out on these OB to increase soil stability. Toe wall is usually constructed to restrict erosion of soil from the over burdens. This reduces the risk of mudslides in rainy season

In comparison with UG mining, OC mining has a higher land requirement. After the completion of mining, the land has to be brought back to its original level of productivity. In some techniques of OC mining where shovel dumper is used, such activities become uneconomical as the proportion of refuse handling become very high (Malhotra, undated p.53).

Forest: Minerals are at times located in forest areas in case of which forestland are diverted for non-forestry purposes. The direct impact is destruction of forests. However,

this impact has greatly reduced wildlife population in India with some species facing extinction. In order to protect such species the Government has been taking additional steps like the launching of the 'Project Tiger' and 'Project Elephant' in 1973 and 1992 respectively. These projects aim in stabilising the number of tigers and elephants in the wild by monitoring them. The forests are also home to many tribal communities. With the destruction of forest, their livelihood is severely disrupted and their cultural identity is threatened (Banerjee, 2004, p.20).

6.2.2 Impact of OC Coal Mining in India on Social Environment

Displacement: Displacement of settlements is one of the most direct social impacts of open cast mining. The mining companies usually get the land as lease from the government and in the process of acquiring the lease land, many families are often uprooted from their original homestead (Banerjee, 2004, p.21). This can be extremely stressful for the inhabitants whose livelihood dependant on it and often their cultural identity is lost.

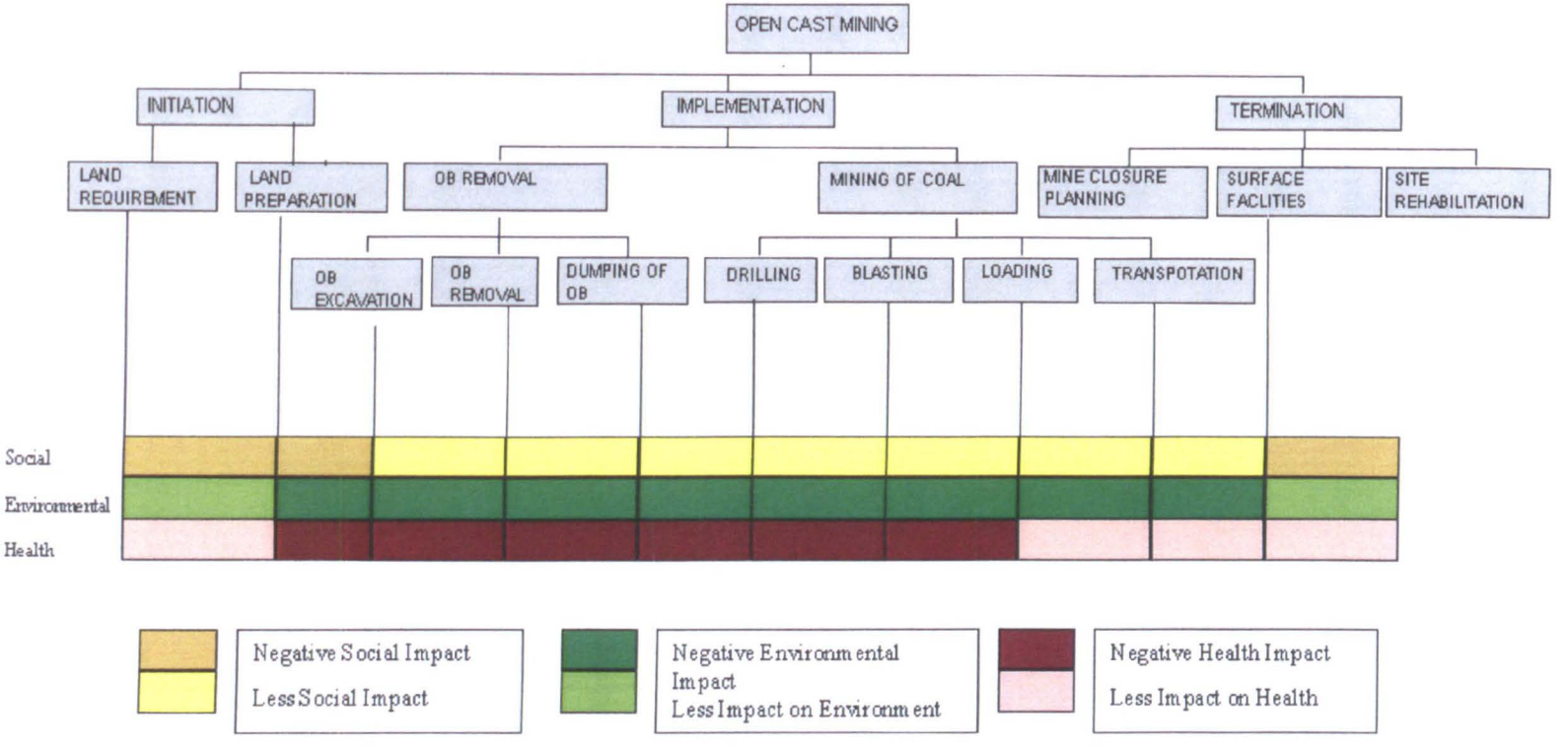
Employment & Boom Town Effect: As a result of mining activities jobs are created and this attracts large number of people. In a developing country like India, people welcome such projects. More people attract more business and before it is realised entire townships are developed. Large proportion of these townships is usually composed of people who have come from outside the region. This is called the 'boom-town effect'. Earlier, mines used to be less mechanised as a result of which more number of jobs for unskilled and a semi skilled people were generated. However, with fierce competition from the international market the mines have to be more mechanised in order to survive

(Banerjee, 2004, p.21). This forces indigenous people to move out and skilled workers to infiltrate in.

Social Disparity: Till the 1980s and early 1990s, the proponents used to offer a job to one member of the family in addition to cash compensation. This proved to be an attractive package for the local people. However, the Indian social fabric is different where join families still work strongly, especially in rural India. Such arrangements would create disparity within the family structure as only one member would benefit and would be responsible for the others. This would mean out of three brothers only one would get the job and the entire family would have to be dependant on them. This is not conducive for joint family system.

It has also been realised that many of the people affected by such projects are not landowners and may include 'tenant farmers, share croppers, squatters, unemployed youth, small traders and agricultural laborers' (Banerjee, 2004, p.21). As they don't have land they are not compensated by land but on the other hand they are equally affected due to the land acquisition. This creates a rift as richer people become richer while people who did not have any assets loose out and thus become poorer. Not only in the family level but also in the regional level such projects cause disparity. Most of the mines are located in remote areas where 'significant part of inhabitants is tribal or marginal farmers living on subsistence agriculture or animal farming' (Banerjee, 2004, p.21). A mine would create jobs and would compensate for the people who are directly affected by the activity. This would introduce a higher standard of living for the project-affected people (PAP). However, other villages that are affected by the project indirectly

Negative Impacts of Open Cast Coal Mining



OB – Over Burden

Fig 6.1 Negative impacts of open cast coal mining (Compiled by Author)

as a result of air, noise and water pollution are left in their primitive system. This is a cause for social tension and may generate crime in the long run.

6.2.3 Impact of OC Coal Mining in India on Health

Loss of hearing as a result of exposure to loud noise is common in OC mining. The exposure of 85Db as specified causes a temporary shift in hearing, which is recovered when the subject shifts to a comparatively low noise level. However, exposure to long hours of noise can permanently shift the hearing capacity of individuals (Malhotra, undated, p.47).

The case study conducted on OC coal mining by Chiplunkar indicated the prevalence of nystagmus, pneumoconiosis and hearing losses to be common for mine workers (Chiplunkar, 1992, p.43).

The negative impacts that are usually associated with OC coal mining have been studied further during the case study analysis. Appropriate measures adopted by formal and informal requirements have bee investigated as well (See Chapter 8 & 9).

The discussion above has stressed on the negative impacts of OC mining. However, with the help of some planning and environmental management, OC mining can also have positive impact on environmental and social parameters. A sustainability study conducted on Rajnagar OC coal mine in SECL in India revealed an overall positive impact on the social and economical parameters. As OC mining is usually profitable, such companies commonly undertake welfare activities.

MINING TYPE	STAGES	ENVIRONMENT	SOCIAL	ECONOMICS	OVER ALL SCORE
Open cast	Initiation	-2	+2	+2	**+2**
	Implementation	-2	+2	+2	**+2**
	Termination	+2	+1	+2	**+5**
	Over all score	**-2**	**+5**	**+6**	**+9**

Table 6.1 Measuring Sustainability of Rajnagar Open Cast Coal Mine in India (Jha, 2001, p.81)

Apart from job creation, the companies take initiative of overall development of the people by providing drinking water, education, and medicinal facility and by building other basic infrastructural facilities like roads (Jha, 2001).

6.3 Environmental Regulations within OC Coal Mines in India

According to the EIA Notification 1994, all mining projects of major minerals with lease area of more than five hectares will require environmental clearance from MoEF (GoI, 2001). Site clearance is required for all mining irrespective of area and prospecting areas above 500 hectares. Other than this, mining is also affected by the environmental laws, which include laws on Water, Air, Forest, Hazardous Wastes and Public Liability Insurance (See Chapter 5). The Environment Protection Act issued further notifications restricting mining activity. These include: -

- Restriction in mining on Dehradun Valley.
- Restriction on mining in Aravalli Hill range in Gurgaon & Alwar districts.
- Restrictions of mining in Coastal Regulation one (CR) i.e. within 500 m from high tide lines (HTL).
- Restrictions of mining in wild life, sanctuaries, national parks, near to national monuments, areas of cultural heritage and in ecologically fragile areas (Mining India, 2003).

Other regulations imposed on environment come from the mining regulation which includes 'The Mines Act of 1952' and the rules and regulations under it. This Act deals with working

hours, occupational disease, periodical medical check-up, drinking water, restriction on employment of females and children, employment of welfare and medical officers. Guidelines for precaution against dust, fire flood, explosions, storage and handling of explosives, lighting and ventilation are provided under the coal and metaliferrous mines regulations. These laws are related to work related environment and thus control on-site environmental conditions within the mine. The Director General Mines Safety (DGMS), which comes under the ministry of labour, is the main body, which stresses on these environmental aspects of mining activity.

In case of mining projects, a mining plan also needs to be approved under the Mines & Minerals (Regulation & Development) Act 1957 (MMRD Act). This act was further mended in 1986 and 1994. For metal mines it is the Indian Bureau of Mines (IBM), which is responsible for approving this plan. However, as far as coal mining is concerned, Ministry of Coal & Mines is the responsible body (Mining India, 2003).

As is shown in the Fig. 6.2, environmental protection within mining industry is interplay of various regulations in addition to the Environmental Protection Act. Apart from regulations, various external influences and conventions influence environmental protection. External influences may include funding bodies while conventions may include the working culture of the particular mines. The EPA acts more of an umbrella legislation connecting the other pieces of legislation to ensure environmental protection.

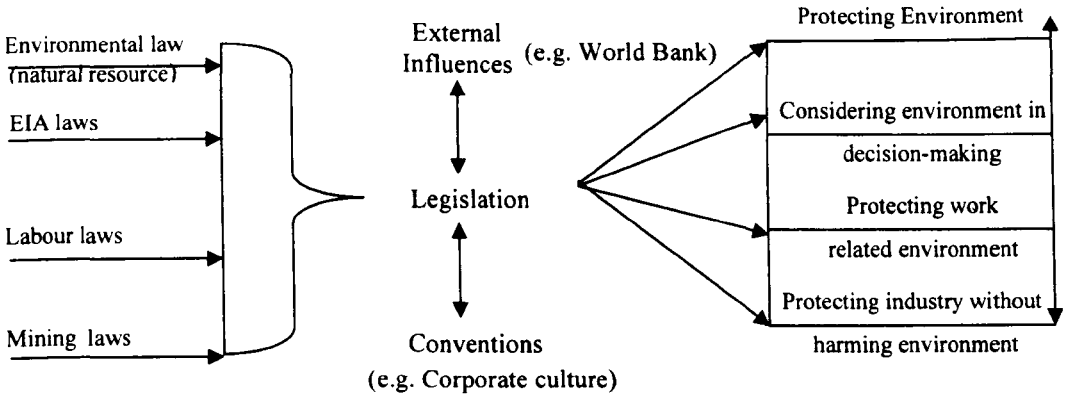


Fig. 6.2 Environmental protection in OC Coal mines as a result of interdependence of EIA, Environmental, Labour & Mining laws (Source: compiled by author)

6.4 Challenges of Environmental Management Practices in Indian Open Cast Coal Mining

Coal is the principal source of energy in India. Public sector units produce almost 98% of the nation's coal (Prasad, 2001, p.63). Due to the efficiency and economy of OC techniques of mining as compared to UG mining (See page 103-106), there is tremendous pressure on OC coal mining in India to bridge the demand and supply gap of the energy market. However, in order to make coal production sustainable, environmental management is crucial. This section presents some of the existing challenges of environmental management in OC coal mining in India. Some of these challenges will be re-visited during the detail case study analysis (See Chapter 8). They have also been used as guidance, while formulating recommendations for improved follow-up practices within the OC coal mining in India (See Chapter 10).

6.4.1 Physical Environment

Topsoil Preservation: As mentioned earlier, maintenance of topsoil is crucial for land reclamation. In case of the existing practices in India, the topsoil is usually not removed

and preserved for future restoration use. Usually it is disposed off along with other waste materials. In a society dominated by agriculture, this means that the land is no longer suitable for cultivation and thus proves to be an unsustainable in the long run. The most common reason cited for not maintaining the topsoil is the cost involved in maintaining it (Sridharan & Banerjee, 2001, p.474).

Compliance Monitoring: Monitoring is carried out solely for fulfilling statutory requirements. Very rarely is it used for developing control strategy or for carrying out scientific investigations (Jha & Kumar, 2003, p.13). This is wastage of the existing data and the money and effort that has been invested in creating it.

No Policy for Abandoned Mines: Most of the land acquired by coalmines is under the Coal Bearing Areas (acquisition and development) Act, 1957. There are three types of land, privately owned land including tenancy land; state owned forestland and state owned non-forest land. In all cases the land has to be transferred back to the government after mining operation is completed. According to the law, restoration plan for mined out area and the strategy to establish is required. It has already been more than three decades of nationalisation of the coalmines and to date no land has been returned back to the government. The reasons are as follows: -

- In some cases, although exploitation has taken place, some coal seam may still exist at greater depths and the company has the right to retain the land to win the coal through under ground mining at a later stage (Kumar, 2001, p.322). This perhaps may also be used as a common excuse not to spend to reclaim such land.
- If the land is not reclaimed properly, it cannot be handed back to the state Government.

- In one case of Northern Coalfields Limited (NCL), reclaimed and afforested land was offered for reversion to state forest department to adjust it against 'compulsory compensatory afforestation against future acquisition of forest land for mining purpose'. The MoEF did not accept this as the afforestation was to be done according to the provisions of environmental clearance (Kumar, 2001, p.322).
- The state forest departments are also not willing to take such afforestated land unless the company provides for the future upkeep and maintenance.

This means that once mining is over, the land becomes a 'no mans land' and there are vast stretches of non-reclaimed OC mine pits. The state does not take it back and the proponent cannot afford to keep maintaining it for years. The mines cannot be used for other commercial purposes. Thus the utilisation of land for OC coalmines is more making the process unsustainable. Like mining policy, policy for abandoned mines is also advocated. Economic use of such land can generate income even for the local people, making it more sustainable in the long run (Dube, 2003, p.194). This is a problem, which is harmful for both the physical and economical aspects of the environment.

6.4.2 Social Environment

Absence of National Guidance on Rehabilitation & Resettlement Policy: OC mining involves land acquisition and this causes displacement of local people. As a result, projects face a lot of resistance. One of the most important causes for such resistance and discontentment is absence of a national resettlement and rehabilitation policy. Coal India Limited (CIL) has adopted its own policy in April 1994. However, some states

have their own laws on resettlement and rehabilitation. This includes the states of Maharashtra, Karnataka and Madhya Pradesh. Gujrat and Orissa have their own state policies. These are primarily meant for irrigation and power projects and have the provision to be extended for mining projects. Orissa and Madhya Pradesh have extended their policies already for mining projects.

Having adopted its own R&R policy, CIL has been able to contain some disturbances related to land acquisition proceedings, but individual state policies cause variation. A national R&R policy for mineral sector overriding all exceeding policies can be a solution to minimize conflicts arising from different manners of problem solving of R&R issues for different projects (Sharma, 2003, p.232-234).

Attitude of PAPs: Coal companies provide schemes for economic emancipation of the eligible project affected persons (EPAPs). This includes provision of jobs with contractors who are currently deployed by CIL; self-employment training; credit access for EPAPs to get self-employed; infrastructure facilities after self employment training has been achieved and forward and backward market linkages of goods produced by the EPAPs. Although some success was achieved by CIL in implementing these schemes, there were several constraints faced as a result of the attitude of the EPAPs.

Tension with other workers: EPAPs are sometimes more interested in a particular kind of job like loading of local sale coal trucks. There are many daily labourers as well, who do this kind of job. In such a situation, any reservation for EPAPs can cause a lot of social unrest amongst workers.

Lack of entrepreneur spirit: While imparting training for converting the EPAPs to contractors, it was realised that EPAPs were keener for job security. Thus they were not

comfortable in taking risks and find it difficult to adapt themselves with entrepreneur spirit, which is required in order to start any business. Therefore the proponents found it very difficult to transform them into businessman.

Job insecurity: The self-employment training provided by the proponents usually do not prove to be very successful as not many EPAPs join the scheme. The reason being that most of them are apprehensive that getting trained in self-employment schemes will mean they will have less chance of securing a job with the company (Bhattacharya & Sen, 2003, p266).

6.4.3 Economical Environment

Disguised Unemployment: As per the provisions of its R&R policy, the eligible PAPs are entitled to assistance from project proponent for economic rehabilitation through non-farm self-employment. In order to secure land for expansion, jobs were offered by coal companies to PAPs who had to give up two acres of irrigated or three acres of un-irrigated land. The threshold was made much less in case of Orissa and Madhya Pradesh. This created 'a burden of unwanted employment' in the company (Bhattacharya & Sen, 2003, p.264). Such a provision perhaps is also not sustainable in the long run for the economy as it is just a case of disguised unemployment.

Gap Between Planners & Executors: Geo-mining conditions help in determining the equipment that should be used for the project. Economy should also play an important role, as the cost should be calculated considering the infrastructure facility of the project and the market demand of the product. In the current practice, there is a wide gap between the planner and the executor while selecting equipment. This results in costly equipments kept idle due to some reason or the other (Gupta, 2001, p.448).

6.5 Summary of Section B (Part one)

6.5.1 EIA in India

EIA in India was formally introduced in 1994 although informally, it existed from the 1970s. The constitution of India highlights environmental protection. However, its adoption in India has been influenced by international conferences and national disasters.

The Environment Protection Act (1986) and the EIA Notification (1994) under it provides for the umbrella legislation under which various other environmental acts are covered. The Ministry of Environment and Forest constitutes apex body of translating environmental protection reality. The State Pollution Control Boards (SPCBs) work hand in hand with the MoEF in implementing follow-up measures in India.

The stages to be adopted in EIA have been advocated by the MoEF and these are very similar to the internationally established stages of EIA and include: -

- Screening
- Scoping and Identification of Alternatives
- Baseline Data Collection
- Impact Prediction
- Assessment of Alternatives, delineation of mitigation measures and environmental impact assessment.
- Public Hearing
- Environmental Management Plan
- Decision Making
- Monitoring of Clearance Conditions

EIA in India has been critically discussed in chapter five based on the five common deficiencies found commonly in EIA system of any country. These deficiencies within the Indian context have been summarised in table 6.2 as follows: -

Deficiencies of EIA in India	
Attitudinal Deficiency	• Lack of Seriousness • Corruption • Treating Compliance by an end in itself • Imbalance of Power amongst Stakeholders
Structural Deficiency	• Lack of Integration amongst Regulators • Absence of Strategic Planning
Institutional Deficiency	• Social and Health • Overlapping Responsibilities
Procedural Deficiency	• Weak Compliance • Time Consuming • Weak Scoping Stage
Technical Deficiency	• Lack of Reliable Data • Lack of Know-how

Table 6.2 EIA Deficiencies in India

A SWOT Analysis was undertaken of the EIA system in India based on the literature review. The Strength, Weaknesses, Opportunities and Threats of EIA system in India are summarised in table 6.3

6.5.2 Environmental Management in OC Coal Mines in India

Coal is the most abundant fuel resource in the country and it meets around 50-60% of total commercial energy requirements (Jha, 2002). Coal India Limited alone accounts for nearly eighty-five percent of India's coal production. The company functions through eight subsidiaries of which, seven are producing subsidiaries and one (CMPDI, Central Mine Planning & Design Institute), is a planning subsidiary acting as consultant for the company. The Ministry of Coal & Mines is the public entity that sets policies and strategies for exploration and development for the country's coalmines (CIL, 2006).

SWOT Analysis of EIA in India	
Strength	• Key Elements Present Within EIA • Various Institutions Established for Implementing EIA
Weakness	• Dilution of Law • Ambiguity Regarding Responsibilities • Dragging Pre-decision Stage • Weak Scoping and Ineffective Public Hearing
Opportunity	• Active Judiciary • Pro-active NGOs • World Bank Standards
Threat	• Motivation from Funding Agencies • Political Instability

Table 6.3 SWOT Analysis of EIA in India

Open Cast Mining is the pre-dominant method of mining accounting for seventy-five percent of coal produced in India (Gupta, 2001, p.443). It is more popular compared to under ground mining in India due to various factors, which are: -

- Geo-mining conditions
- Economy & Efficiency
- Planning Policy
- Meeting expected rise in demand and
- Funding Agencies

Activity	Aspects	Direct Or Indirect	Suggestion
Drilling and blasting	Air	Direct	Drills being wet operated or with dust extractors
Loading and unloading of coal and OB	Air	Direct	Vehicles used for transportation being covered by Tarpaulins
Dust due to movement of heavy vehicles along the haul road	Air	Direct	Mobile Water Sprinklers should be used for dust suppression
Dragline operation	Air, Soil	Direct & Indirect	Plantation activities should be carried out on OB dumps, along the mining lease area and roads. Native species should be used for transportation
Crushing of coal to a convenient size in the feeder breaker	Air	Direct	Use of Water Sprinklers
Mine Fires	Air	Direct	Water Treatment Plant
Mine Water Effluents	Water	Direct	Water Treatment Plant
Domestic Effluents	Water	Direct	Water Treatment Plant
Excavation	Water, land, Air, Social	Direct	Plantation activities, Water Sprinklers, Monitoring of wells, Topsoil Preservation
Blasting	Noise, Vibration, Social	Direct/ Indirect	Use of Ear Plugs by workers, Avoid close proximity to settlements, Monitoring for cracks
Clearing Forest Land	Soil, Fauna, Flora, Air	Direct/ Indirect	Plantation, Top soil Preservation, Biodiversity Plan
Displacement	Social	Direct/ Indirect	Resettlement & Rehabilitation Plan, Compensation

Table 6.4 Overall View of the Mining Industry and it's Associated Aspects & Suggestions

Open Cast Coal Mining has severe implications on environment. The impacts can be broadly categorised on the social environment, physical environment and impact on health. The various aspects on which OC coal mining exerts negative impacts are provided in Table 6.4

Environmental protection in India within the context of mining industry is a result of interplay between laws related to EIA, Environmental protection (e.g. laws related to

water, air, hazardous waste), Labour laws (e.g. laws related to safety in working environment) and Mining laws (e.g. Laws related to social rights of workers).

Currently the numerous challenges faced by the mining industry in India include: -

- Top soil is not preserved due to costs involved
- Monitoring is primarily compliance oriented and even this is not fully achieved
- Lack of Policy for abandoned mines
- Absence of National Guidance on Rehabilitation & Resettlement Policy
- Project affected People find it difficult to adapt to new occupations.
- Social unrest amongst workers
- The industry suffers from disguised unemployment
- Gap Between Planners & Executors

SECTION C

EMPIRICAL

CASE STUDY ANALYSYS

Almost every mistake is a gift if we learn from it...

-Anonymous

Chapter Seven

EIA Follow-Up Consideration in Pre-Decision Open Cast Coal Mining in India

Chapter seven deals with pre-decision follow-up for open cast coal mines in India and presents the empirical evidence collected during the second field trip. The first section introduces the set of documents and data, which have been collected and studied in order to determine pre-decision consideration of follow-up in OC coalmines in India. The findings of the analysis of unpublished materials of the Ministry of Environment and Forest (MoEF) are presented in the following section. The fourth section discusses pre-decision follow-up in OC coalmines in India, based on the interpretation of the data collected through document analysis and semi-structured interviews. General observations of the EIA reports are presented in the following section.

7.1 Data Collection Determining Pre-Decision Consideration of Follow-up in OC Coal Mines

Although post-decision stage is usually implied as follow-up of EIA, the design for follow-up starts from the pre-decision stage itself and determines the success of the later part of the follow-up programme (Baker, 2002, p.5) (See Chapter 4). In case of OC coalmines in India, the proponents prepare the EIA report, which is called the EMP (Environmental Management Plan). The proposal for the project is submitted to the Impact Assessment Division of the MoEF (Ministry of Environment and Forest). The importance given to mining industry in India is exemplified by the fact that the MoEF has an Expert Committee dedicated to consider environmental clearance of mining projects only. The Committee thus, plays a crucial role in assessing the design phase of follow-up as they scrutinise as to whether the environmental management and

mitigation measures specified by the proponent in their EIA reports are adequate or not. Based on their recommendations, the decision of granting permission to start or not to start the project is taken.

The minutes of the Expert Committee for Mining and the EIA reports, based on which they take the decision is of significant importance in designing follow-up at the pre-decision stage. These minutes also help in determining the importance given to follow-up by both the regulators and the proponents at the design stage.

7.1.1 Minutes of Expert Committee for Mining

In order to establish the importance of follow-up consideration in the pre-decision stage, the unpublished minutes of the expert committee for mining have been studied. EIA was made mandatory in India in 1994 and the minutes available were only from 1996 Feb. Hence the minutes of the expert committee for mining studied were since 16 February 1996 to 23rd July 2004, i.e. the date when the author visited India for the second field trip. During this span, the expert committee for mining has held 54 meetings in total. The Committee consists of a maximum of fifteen members with a chairman. The chairman is usually a person with experience as an ecologist or environmentalist or technical professional with wide managerial experience. However, in the past it has been observed that the chairman was mostly from CIL. This helped Coal India to get its project cleared easily (Mining India, 2003).

The minutes of these meetings are unpublished materials, which have been collected during a work placement of the author in the Wildlife Institute of India (WII) in Dehradun (July 2004). The period chosen for study is from the year 1996 (February) to 2004 (July). The rationale for choosing this period has been discussed earlier (See Chapter 2). Analysis of these minutes sets the stage for discussing follow-up issues

within the OC coal-mining context. Unlike regulations, which provide for the formal requirements of follow-up, these minutes reflect the actual consideration of follow-up during the pre-decision process. In this respect, they provide for the linkage between formal requirements and actual practice. The analysis establishes the importance of various companies and federal states in terms of coal production capacity and highlights the common problem areas for follow-up.

7.1.2 EIA Reports of OC Coal Mines

The EIA reports on the basis of which the expert committee takes the decision, were also studied. During the 9 years between 1996 February to 2004 July, 37 OC coal projects applied for environmental clearance to the MoEF and were reviewed by the Expert Committee for mining. These were reviewed on basis of the Environmental Impact Report submitted by the proponents. Although it was intended to study all the EIA reports submitted by the OC coal projects during this period, only 28 reports out of the 37 were available.

7.1.3 Interviews with Key Players in the Mining Environment at National Level

In order to establish how follow-up works in practice, a total of 43 interviews were conducted amongst the key players within the mining and environment sector. A cross section of various institutions and organisations related to mining and environment was examined. These include NEERI (National Environment Engineering Research Institute of India), DGMS (Director General Mines Safety), CIL (Coal India Limited), CMPDI (Centre for Mine Planning and Design Institute), ISM (Indian School of Mines), CMRI (Centre for Mining Research Institute of India), WII (Wildlife Institute

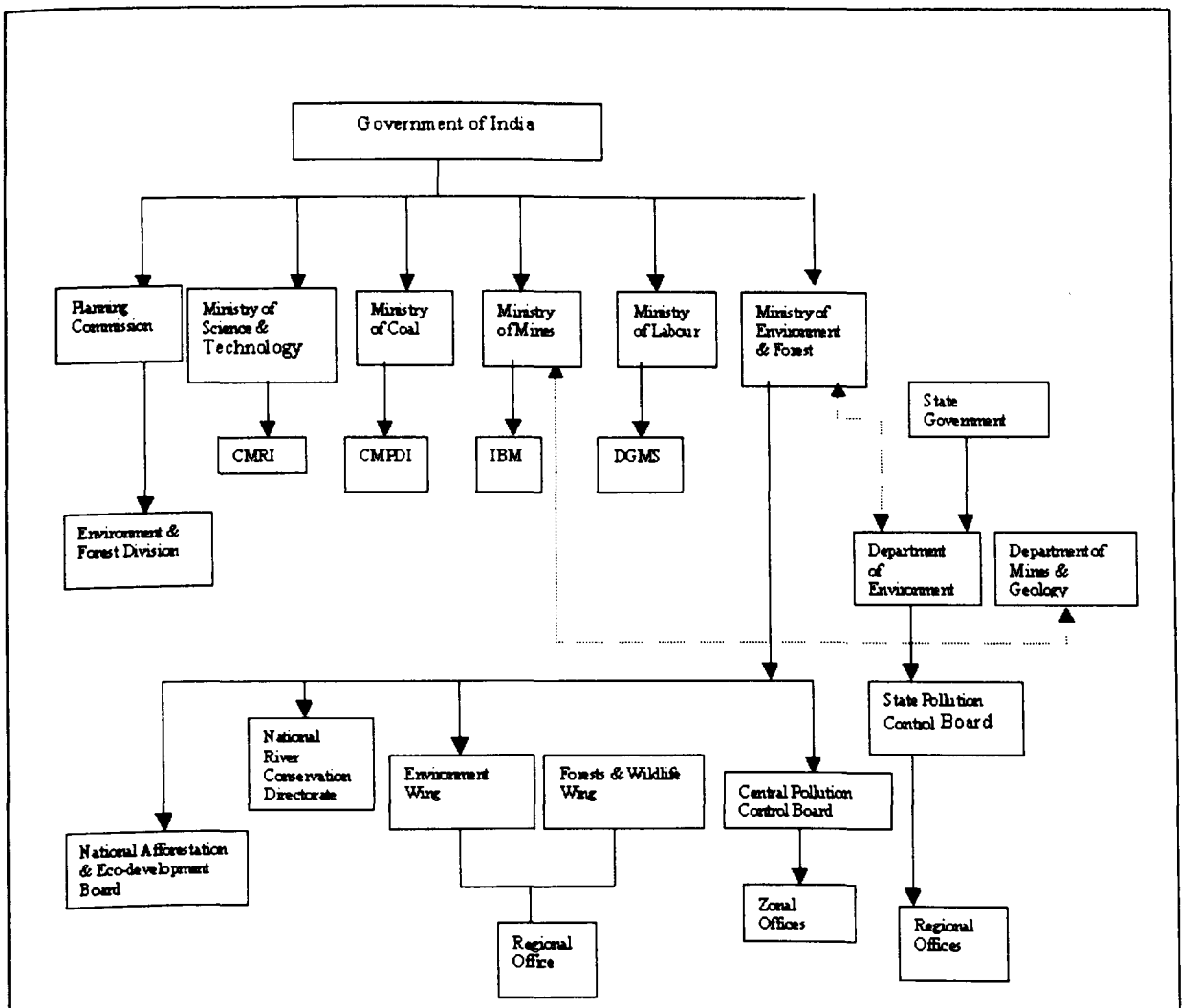


Fig. 7.1Institutional Mechanism -Mining and Environment (adapted, Jain, 2004, p.7)

of India), MOC (Ministry of Coal), MOL (Ministry of Labour), CPCB (Central Pollution Control Board), people from mining related media, academicians and MoEF (Ministry of Environment & Forest). Within the MoEF, interviewees were selected from the Environment as well as the Forest Wing and also from the Expert Committee of Mining constituted in the IAD (Impact Assessment Division) of MoEF. Fig 7.1

illustrates the position of some of these key organisations from which interviewees were selected.

7.1.4 Framework of Analysis

The framework of analysis for these reports are based on the good practice list presented in chapter 2, and developed based on chapter 3,4,5 & 6. They are broadly categorised into five sections, which are as follows: -

1. Regulations and Institutional Arrangements
2. Approaches and Techniques
3. Resources and Capacity
4. Involvement with stakeholders
5. Regional Variation

At this stage, verification of whether or not the Indian follow-up practice has regional variation is done. The good practice criteria will be formulated later only if evidence of regional variation is established (See Chapter 10).

Data collected during the second field trip has been analysed and interpreted in this chapter. The information obtained at this stage is from a combination of document analysis and semi-structured interviews (See Chapter 2). Information on the first three broad categories of the good practice list depends mainly on document analysis while the last two broad categories namely involvement with stakeholders and regional variation rely mainly on the information available through the interviews.

A combination of these methods was used because the EIA reports do not have comprehensive details of all the regulations and institutional arrangements related to follow-up. Neither do they have any information regarding regional variation in follow-up implementation. These two broad categories were emphasised during the interviews conducted. Questions from the first three categories, which could not be answered through document review, have also been included in the interviews. All the

questions are dealt with in detail later, through case studies (See Chapter 9). Further details regarding the use of document analyses and interviews for answering the particular questions of the good practice list have been illustrated in table 7.2, 7.3, 7.4, 7.5 and 7.6. The performance of the Indian follow-up practice against the good practice list criteria have been graded based on the scoring system of Fischer (2005). Details of this system have been provided in chapter 2.

7.2 Analysis of the Minutes of the Expert Committee for Mining

Out of 54 meetings conducted by the Expert Committee during the span of 16th February 1996 to 23rd July 2004, open cast coal mining projects have been considered

Sl. No.	Proponent Name	Total number of projects applied during August 96 to Jul 2004
1.	Coal India Limited (CIL)	22
2.	Singareni Collieries Company Ltd (SCCL)	3
3.	Calcutta Electric Supply Corporation (CESC)	1
4.	Associated Cement Companies Limited (ACC)	1
5.	Bengal EMTA Coal Mines	1
6.	Panem Coal Mines	1
7.	Indian Aluminum Company Ltd (INDAL)	1
8.	Central Collieries Company	1
9.	BLA Industries	1
10.	Castron Technologies	1
11.	Arunachal Pradesh Mineral Development	1
12.	Jindal Power Ltd and Jindal Strips Ltd	2
14.	Monnet Ispat Ltd	1

Table 7.1 Proponent wise distribution of OC projects application from Feb 1996 to July 2004

in 40 meetings. This explains the importance of OC coal mining in the mining sector in India. During these meetings, a total of 37 open cast coal projects have actually applied for clearance. CIL (Coal India Limited) alone applied for 22 projects followed by SCCL, which had a total of 3 projects. Jindal group of companies applied for two projects. The rest constituted of other companies each applying for a single project, adding up the total to 37 projects in all. Some of these companies belong to cement, power, steel and aluminum industries, producing coal mainly in their captive mines. Details are provided in Table 7.1. Contribution of the captive mines is less. This can be explained by comparing the production capacity of coal amongst the applicant companies. Total production capacity applied by all the companies taken together adds up to 128.96 MTY. Projects applied by CIL alone have a production capacity of 95.99MTY. Singareni projects contribute only to about 1.92MTY while Jindal group, which produces coal in its captive mines in the private sector contributes to about 7.2MTY. Arunachal Pradesh Mineral Development Trading Company, which is non-captive coal mining Government Company under the control of Government of Arunachal Pradesh contributes with 1.61MTY.

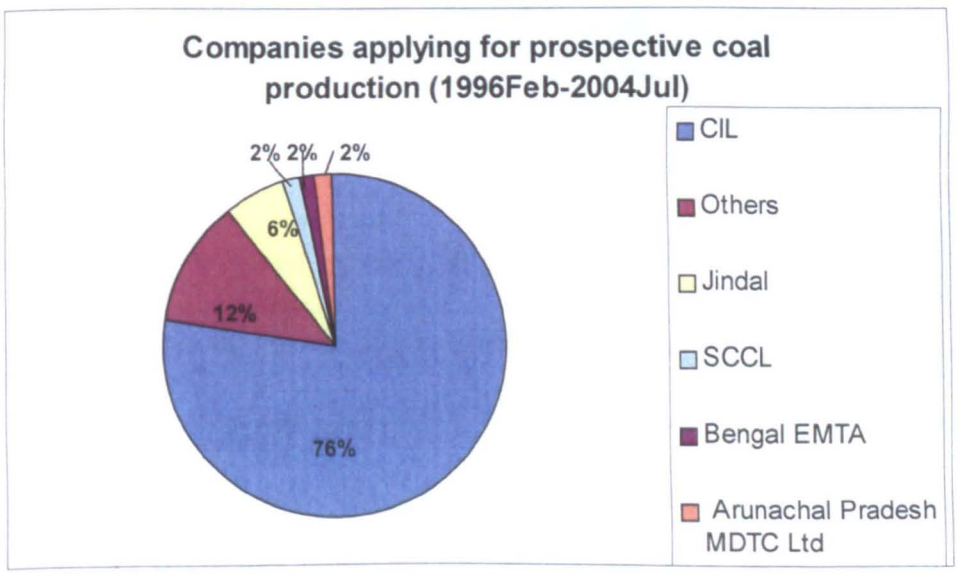


Fig 7.2 Companies applying for prospective coal production (1996Feb-2004 Jul)

Production capacity of other projects together contributes to about 15.29 MTY of the total coal production capacity of projects applying for environmental clearance. This comparison proves that CIL is the major coal producing company of India, with a share of 76% of total coal production applied for.

Within CIL, the subsidiary companies, which have played a dominant role in the given years in expanding coal production, are MCL (Mahanadi Coalfields Limited), WCL (Western Coalfields Limited) and SECL (South-Eastern Coalfields Limited). Out of the total 22 projects of CIL, which have applied for the clearance, the contribution of MCL, WCL, SECL, CCL (Central Coalfields Limited) and NCL (Northern Coalfields Lmited) was 7, 8, 5, 1 and 1 respectively.

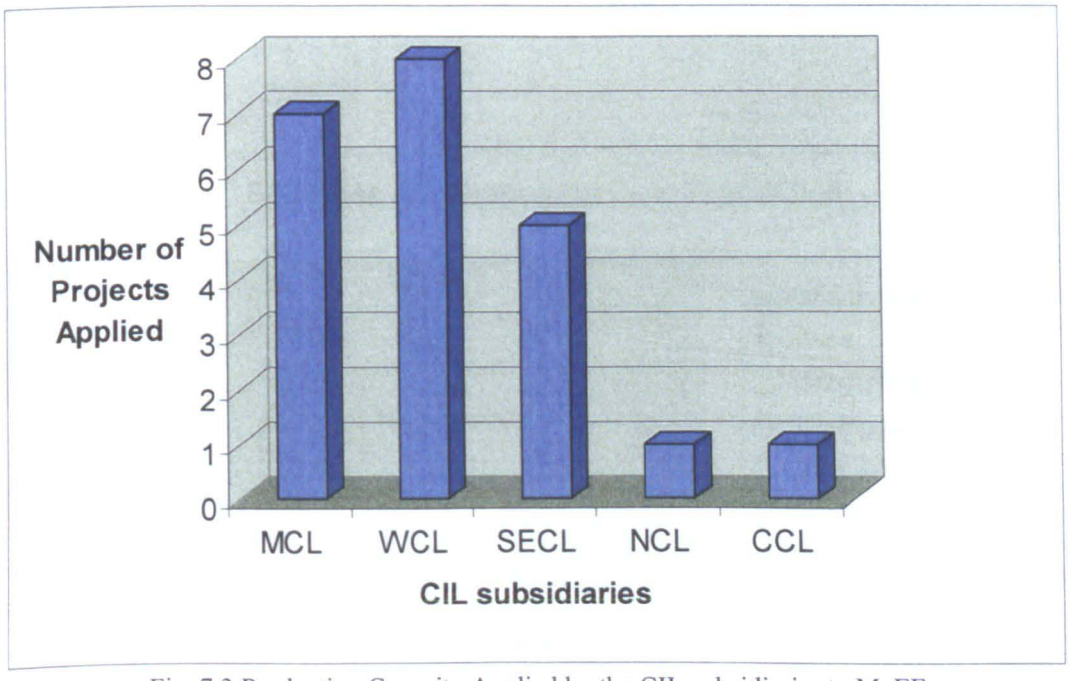


Fig. 7.3 Production Capacity Applied by the CIL subsidiaries to MoEF

Maharashtra emerged as the dominant state from which 10 projects were applied. Orissa and Madhya Pradesh applied for 9 and 6 projects respectively. Jharkhand, which is one of the most important coal-producing regions, has 2 applications while Chhattisgarh and Bihar has 3 and 1 application respectively. However, it should be noted that initially Madhya Pradesh and Chhattisgarh use to be the same state and

Bihar and Jharkhand were also part of the same state. This data indicates the importance of the states as far as OC coal production is concerned, however it may not fully represent the importance of all the states as the data shows only projects applied for during the span of about 9 years.

The average life span of 34 projects (age of three OC mines were not available) is 22.5 years. This explains that OC projects usually have long lives. Out of the 37 projects that were evaluated by the expert committee, five were expansion projects, i.e. existing projects applying for a clearance to increase their production capacity. During the span of 9 years, there was not a single case of rejection. Out of the 37 projects applied to MoEF, only 7 projects were cleared during this time period. However, this does not imply that others were not cleared, but the decision on these was not given during this period.

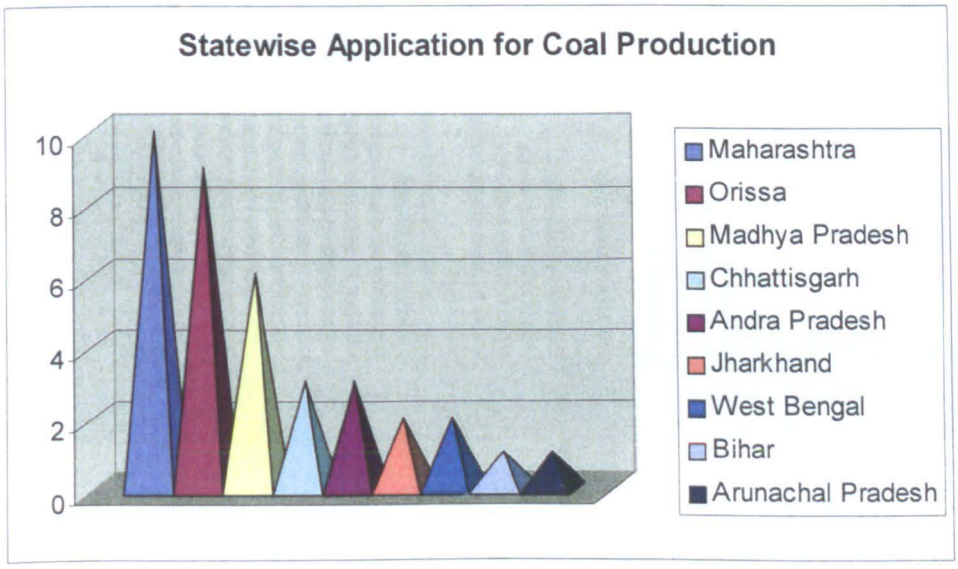


Fig 7.4 State wise application for Coal production

Interestingly, 6 out of 7 decisions were given during 2000 to 2004 and all together 4 projects that were cleared were from WCL, the others were one each from MCL, SECL and Castron Technologies respectively. As the date of clearance for other projects were not available, average time taken for decision cannot be calculated. For

the 7 projects that were cleared the average decision time taken was 17 months. This is not bad when compared to the other projects regarding which no decision has been taken during the 9 years of study period. There is further scope of developing this data by finding out the clearance date of the projects that have applied during 1996 to 2004. 10 projects were applied in 2004 alone. The reason for this sudden increase of applications may need to be further investigated. By the given data it can be said without doubt that that the clearance rate of OC projects are not very good as during a span of 9 years, 37 projects applied and only 7 got a decision.

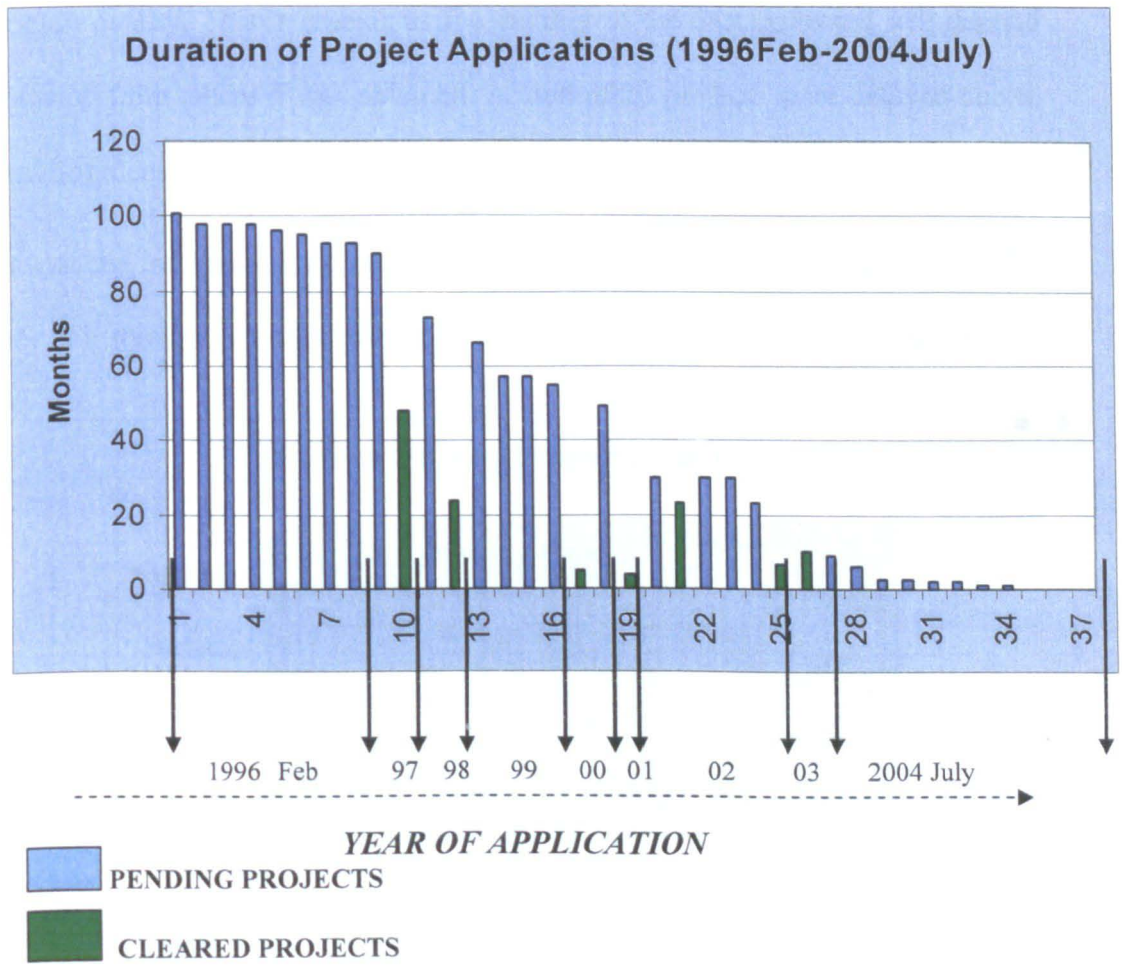


Fig. 7.5 Year-wise projects applied to MoEF

Decision was not taken in most cases due to lack of information submitted by the proponents. This information can be categorised into four types, which are: -

1. Environmental (implies physical environment)
2. Social
3. Technical
4. Procedural

Environmental information was inadequate in many cases. The proponents failed to include all the important parameters that needed to be monitored. In some cases due to proximity to wildlife, more intense study on biodiversity was asked for. For example in one case a detail reptile conservation plan was required. Other examples of lack of environmental information included cases, which did not state follow-up locations for measuring air quality. This is crucial, as the validity of the data collected will depend on the location from where it was obtained. A total of 22 projects were delayed due to lack of environmental information.

Inadequate social information included haphazardly added public meeting reports. The committee at instances asked the proponents to include the reports in a tabular form

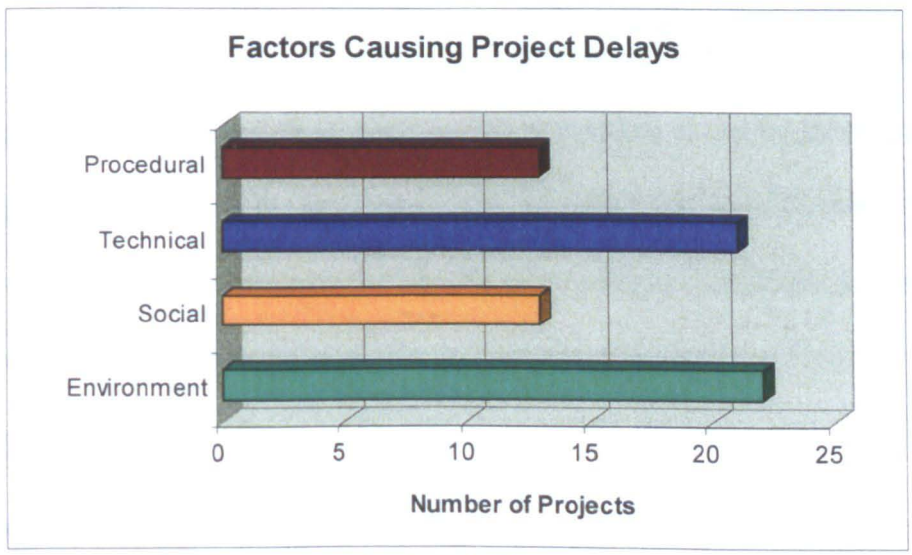


Fig 7.6 Factors causing delay in Environmental Clearance

with the main issues highlighted. Health check-ups to be conducted was also not adequate. Projects delayed due to lack of information on social factors are 13 in number.

Technical factors like environmental factors were common cause for project delays. These were more related to technical aspects of mining. Procedural factors included examples where the project was yet to receive approval of the CIL Board. Certain cases were delayed, as the clearance letter from DGMS regarding mine safety was not yet obtained or the Forest Clearance was yet to be processed. However, in one case the committee wanted the proponent (SECL) to have a mine approval plan from the IBM (Indian Bureau of Mines). This was unusual as mine approval plan for coalmines are usually acquired from the Coal Board and not from IBM. Instances were also there when the proponent was absent and thus the case could not proceed.

The study of the minutes of the Expert Committee for mining clearly indicated the pace with which such projects are considered. The main cause for such delays is lack of know-how. The reports submitted do not have adequate information and at times the proponent is not clear with the procedural arrangements that are required. The minutes maintained reflect the effort given by the committee as during these meetings, many letters were passed in an attempt to simplify the requirements for the proponents. The Expert Committee for Mining gave adequate emphasis to follow-up issues. However, there is no single precise guideline and the entire process can be said to be vague where it is easy for important issues to be missed out.

7.3 Analysis of Pre-Decision Follow-up Based on Good Practice List

The analysis has been broadly classified into five categories based on the good practice list which are- Regulations and Institutional Arrangements; Approaches and

Techniques; Resources and Capacity; Involvement with Stakeholders and Regional Variation. The interpretation depends on the data collected through document analysis and semi-structured interviews.

7.3.1 Regulations and Institutional Arrangements

There are seven questions in this category and all of them have been answered through interviews. Table 7.2 summarises the grades awarded against each criteria. Overall grade given to this category is E which suggests that the regulations in India suffers from serious omissions and inadequacies in integrating effective follow-up. A detailed analysis of the answers provided by the interviewees with regards to regulations and institutional arrangements are discussed as follows: -

Ques No.	Interviews	Source	Score
1.	Is the follow-up system based on clear and specific legal provisions?	Interview	D
2.	Are there any stages specified in legal provisions?	Interview	G
3.	Are any time limits for the various steps in the follow-up process?	Interview	E
4.	Is there any strong commitment by EIA regulators to undertake EIA follow-up?	Interview	F
5.	Are there any independent bodies responsible for reviewing follow-up programmes and results?	Interview	G
6.	Is there any integration of self-regulation tools of the particular industry with the follow-up mechanism?	Interview	E
7.	Is proponent voluntarism encouraged (Example by giving rewards for good practice)?	Interview	F
Overall Grade			**E**

Table 7.2 Analyses of Regulations & Institutional arrangements of pre-decision EIA follow-up

Legal provisions for follow-up: All interviewees acknowledged the presence of legal provision for follow-up in the Indian Coal mining system. Most of them considered

the requirement to submit half yearly and yearly reports to the SPCB and the regional offices of the MoEF, as the legal basis for conducting follow-up. The laws that help in ensuring follow-up included the Air and Water Act, Environmental protection Act, along with the 1994 EIA notification. The EMP itself is also legally binding and it lays down the plan as to how the different mitigation measures will be implemented.

According to the interviewees, although legal provisions for follow-up are present, these are not very clear and are overlapping. There are too many laws originating from various ministries. The meaning is not clear, as members from each institution interpret it from their own angle. The comments shared by the interviewees also reflect general discontentment. 'The process is neither uniform, nor continuous, making it ineffective'. 'There is no real legal binding' and all is on 'pen and paper' only. Due to lack of any real pressure, follow-up is hardly implemented and although offenders can be prosecuted legally, in reality a warning is issued at the maximum. Thus, follow-up requirement to some extent is explicit but on the whole the system suffers from ambiguity. This criteria has been graded D.

Legally Specified Stages of Follow-up: Legally, follow-up does not have distinct stages. The recent requirement of a mine closure plan requires the proponent to submit the plan 5 years before project completion. This is the only stage wise requirement of follow-up, which is not yet mandatory. Although screening is not an explicit requirement, all projects that require EIA clearance, also need to comply against pollution thresholds, specified as the Minimum national Standard (MINAS) by the Central Pollution Control Board. In this respect, all OC Coal projects require follow-up. Therefore, the legal requirements fall short in terms of specifying stages within follow-up and have been accordingly graded as G.

Time Bound Follow-up: Thirty-eight interviewees confirmed that there is no time limit specified for any follow-up activities as such. The rest of the interviewees consisting of ex-ministers and media related personnel could not give any definite answer to this. Follow-up usually starts with project implementation but the decommissioning stage is not implemented in practice. As far as data collection is concerned, in some cases data needs to be collected in all three seasons. The compliance reports need to be sent to the regulating authorities in monthly, yearly or quarterly basis. Partial time limit is specified for certain activities like resettlement and rehabilitation, planting and land restoration. These are proponent initiated and related to the development cycle of mine. Accordingly grade E has been given against this criterion.

Commitment by EIA regulators to undertake EIA follow-up: The response to this question was negative by twenty-one interviewees. Interestingly, one of them was a regulator himself from the Central Pollution Control Board. This particular interviewee criticised the regulating bodies for not conducting their duties seriously, and admitted existence of corruption. Twenty interviewees said that regulators are not very committed in ensuring follow-up. This is also because of lack of infrastructure facilities making it nearly impossible to regulate so many industries. Others blamed it to the attitudinal set-up of the regulators, which is complacent. Regulators ideally should be visiting the project sites for inspection, but such visits are rarely conducted. Data collected from various projects are also not compared. Presence of corruption was highlighted. The feedback for this criterion was strongly negative; hence this has been graded as F.

Independent Review Bodies for Follow-up: Legally, the SPCB and the regional offices of the Ministry are responsible for reviewing the follow-up result. None of the interviewees mentioned about any independent bodies for monitoring. However, NGOs and community pressure was highlighted as a major factor ensuring legal compliance. The

document analysis revealed that other than Panem Coal Mines, no other project mentioned about the presence of any independent monitoring agency.

In case of the Panem Coal Mines, a committee is constituted to examine grievances of project-affected persons (PAPs). The members of the committee were nominated by the state government and consisted representatives of the (PAPs) as well as independent individuals such as respected community leader, retired judge or principal. In one other project, the option to take outside help was considered for monitoring. But the reports exemplify that such a practice in India is an exception rather than a rule. Therefore on an average this criteria is not satisfied, hence has been graded as G.

Integration of self-regulation tools of mining industry with the follow-up mechanism: Officers from different institutions emphasised on different laws ensuring follow-up. For example CIL officers laid stressed on the MMDR act. The requirement for mine closure plan and accordingly restoration of land to original condition after mining was also emphasised. It was admitted that in reality, complete land restoration is rarely done.

DGMS officers mentioned about the conditions stipulated by DGMS to ensure safe working conditions as the legal basis for follow-up. These included, observing safety rules, protection from high-density noise caused during mining process and dust control in air. These were criticised to be old and not uniform making it difficult to implement.

The officers from the Pollution Control Board emphasised on Air and Water Act and the thresholds to be maintained accordingly. Thus, it can be said that although self-regulatory tools are present they are perhaps not well integrated in practice due to lack of coordination amongst the different regulating bodies. Accordingly, this criterion has been graded as E.

Proponent Voluntarism: Only two out of a total of 45 interviewees acknowledged voluntary encouragement. In both instances it was the regulators who acknowledged them. Proponents denied such rewards being conferred. Based on this, the performance for this criterion was concluded to be very unsatisfactory and graded as F

7.3.2 Approaches and Techniques

According to the good practice list constructed, the broad category of approaches and techniques has seventeen questions. Interviews and document analysis have been combined to answer these questions. A detail analysis was possible through the case studies (See Chapter 9).

EIA reports in India are usually voluminous documents. They are 'bound like PhD theses' and prove to be 'similarly indigestible' (Banham and Brew, 1996; Selvam et al., 1999, in Wood, 2003, p.11). For some questions, like 'follow-up of indirect impacts and integration of local EIA culture' a more thorough study of the EIA reports was essential which would be time consuming. Semi-structured interviews were used instead. Overall impression of the approaches and techniques for follow-up reveal that there are some parts that are well attempted within the Indian context, but overall the performance is not satisfactory. Table 7.3 shows the grade awarded against the criterion and the method used for collecting data for the question concerned.

Early Start of Follow-up: The answer to this criterion was obtained through document analysis. Baseline monitoring is mentioned in all the 28 reports studied. Considering this all projects have started their monitoring from pre-decision stage. The reports in general are silent about the starting stage of any specific follow-up

Ques No.	Approaches & Techniques Questions	Source	Score
1.	Does follow-up start at an early stage of the EIA process?	Documents	C
2.	Is follow-up designed according to the life cycle stage of the project?	Documents	D
3.	Is there any screening mechanism for it?	Document	C
4.	Is there any scoping done for it? If yes, is it objective-led and continuous throughout the project cycle?	Document	E
5.	Is follow-up design documented?	Document	C
6.	Is existing data used?	Document & Interview	?/E
7.	Is monitoring practiced in a comprehensive manner (Use of various monitoring types)?	Document	E
8.	Is there any provision of rigorous monitoring data? In case rigorous methods are not possible, is there any provision for simple techniques for conducting follow-up?	Document	D
9.	Does the proponent have any formal EMS in place? If yes, is it well integrated with follow-up?	Document	E
10.	In case of too many environmental issues, is there any quick scan approach adopted to determine issues, which require in-depth study?	Document	D
11.	Does follow-up serve all its purposes (conformance, performance, dissemination, tackling uncertainty)?	Document	E
12.	Does follow-up have all the components?	Document & Interview	D
13.	Is any dominant approach adopted for follow-up in the Indian context?	Document & Interview	Legal based approach
14.	Does follow-up cover environmental, social and health issues?	Document	E
15.	Does follow-up deal with indirect effects (boom-town effect)?	Interview	D
16.	Is consistency maintained in the procedure by the regulators For reviewing the reports?	Interview	?
17.	Are the efforts of the regulators (if there are more than one) well integrated?	Interview	F
Overall Grade			**D**

Table 7.3 Analysis of Approaches and Techniques of Pre-decision Follow-up Practice

programme although it is implied that once the project starts the follow-up will resume simultaneously. Accordingly, grade C has been accorded to this criterion.

Follow-up Based on Life Cycle Stage of Project: The EIA reports indicated some aspects of follow-up, which would be conducted according to a specific mining stage. Plantation, mine closure planning and resettlement and rehabilitation were some of these stages. It can be said that partially follow-up is designed according to life cycle of mining and this is usually proponent initiated. Hence, it has been graded D.

Screening for Follow-up: The reports did not have any evidence suggesting screening mechanism for follow-up. All the reports were for OC coal projects and hence had similar environmental issues to be handled. Thus, like EIA the requirement for follow-up is also implied through legislation and not decided or discussed in the EIA reports. Legislation ensures EIA requirement based on size of project, investment and location (See Chapter 5), similarly follow-up requirement is also a required by legislation. This itself acts as the screening mechanism for follow-up and accordingly this criteria has been graded C.

Scoping for Follow-up: Out of the 28 reports studied only three of them showed some evidence of scoping. However, the exercise was more for EIA rather than for follow-up. In one report a matrix was presented comparing the impacts on environment, with and without mitigation measures thus showing how the mitigation measures would benefit in environmental protection. The parameters that are dominantly monitored for OC Coal mines include air, water, noise, vibrations, plantations and in case of displacement of people resettlement and rehabilitation is conducted. During the reviews conducted by the expert committee for mining, issues were raised that may have been ignored in the reports and deserved more attention. Thus the committee ensures some sort of scoping exercise for follow-up. But there is no evidence to suggest scoping being

continuous in project-life cycle. This can be verified later through case studies. Based on the information obtained trough document analysis and interviews, this category has been graded as E.

Documentation of Follow-up Design: The EIA report prepared by the proponents has a separate chapter on mitigation of impacts or environmental management plan. Usually the report also dedicates a chapter to the environmental costs that are involved for mitigation and monitoring. The EIA report, which is also known as the EMP (Environmental Management Plan), is the document, which designs follow-up. Hence grade C has been given against this criterion

Use of Existing Data: It is difficult to identify the source of data used in the reports, as referencing is not done properly. Thus, it was difficult to distinguish between existing data and new data and hence it is not possible to confirm the use of any existing data in the EIA reports studied. This also dilutes the technical quality of these reports. According to the interviews, some existing data maybe used especially from the data bank of CMPDI. But data sharing amongst different bodies is not usually practiced. Accordingly a clear conclusion could not be drawn and the performance against this criteria has been graded as '?/E'.

Types of Monitoring: According to the EIA reports, monitoring practiced would be usually compliance monitoring. Baseline monitoring was mentioned in most of the reports. Only one project mentioned that the data collected during baseline monitoring would be later used to detect the impact of the project, suggesting effect or impact monitoring, (For further details in monitoring types see Chapter 3). Thus monitoring is not practices in a comprehensive manner in the Indian follow-up and has been graded as E.

Rigorous and Simple Monitoring Techniques: Nearly all reports showed rigorous techniques for measuring air and water pollution. Being OC coal projects requiring EIA clearances, all the projects were reasonably big and thus more attention was given to technical and rigorous type of monitoring. There was no evidence for simple techniques used for follow-up programme. As there was evidence showing rigorous techniques were used, grade D has been given to this criteria. There is scope to improve performance by integrating simple techniques in the follow-up design.

Integration of EMS with Follow-up: The Jhingurda project of NCL mentions about ISO 14001 being implemented in its EIA report. However, the NCL Company as a whole has ISO14001 in place and thus no further discussion was carried out as to how it will be integrated with the follow-up mechanism. The EMS was mentioned in the EIA report perhaps to gain approval of the MoEF and display commitment on behalf of the proponent. None of the projects mentioned about their EMS. The EIA reports are at times called the EMP (Environmental Management Plan). EMPs are accompanied in all EIA applications as an essential component. The EMP is the management plan of the proponent and it discuses in detail how environmental impacts will be managed by the company. Hence, this crietia has been graded as E.

Quick scan approach: All OC coal projects usually have to deal with a wide range of complex environmental issues. The legislation requirement itself has developed an approach through which the crucial aspects are covered like air, water, noise, vibration, forest lost and rehabilitation and compensation. Thus satisfying the legal requirements itself, acts as a quick scan approach for the OC coal projects. Grade D is given against this criterion.

Purpose of Follow-up: All reports are predominantly compliance oriented. Only 5 reports out of the total 28 showed some evidence of dissemination. These included examples of having regular reviews and meetings with project affected people (PAP). One of the projects suggested an environmental awareness programme during its public hearing meeting, which was incorporated in the report. Some projects mentioned frequent meetings to be held involving the Environment Management Cell of the proponent, IBM (Indian Bureau of Mines), SPCB and the affected villages. It was noted that IBM was usually involved in mines, which were not under CIL.

Most of the projects were accompanied with a Disaster Management Plan (DMP). It was the DMP, which aimed at tackling uncertainty and risk. However, the reports lacked any method to tackle uncertainty in environmental performance. Only 4 reports tackled this topic but not in depth. It was mentioned in one that environmental parameters will be closely monitored and in case any discrepancies are seen, help of CMPDI will be taken. Regular meetings amongst the various stakeholders were also planned in few projects to tackle problems that may surface during the project implementation. Temporary air stations were built in one of the project to check air pollution that may be caused in various locations.

Effort to improve performance was evident in 8 reports and it was targeted only in the social sector. These included creating educational and medicinal facilities, improving general quality of life in the project affected villages. Overall, the potential of follow-up is left unexploited in the Indian practice, as the design stage itself does not incorporate it comprehensively. Therefore grade E has been accorded to this criterion.

Components of Follow-up: Interviews as well as document analysis were used to answer this question. Monitoring is the main component of follow-up in India. The regulators carry out auditing. Evaluation of data and management of issues is mainly taken care of by the proponents. The regulators also conduct evaluation as compliance reports are sent to them periodically. Dissemination is the weakest components of follow-up in the Indian practice and accordingly as some parts have been well attempted, this criterion is graded as D (To see components of follow-up, See chapter 3).

Approach Adopted for Follow-up: The approach adopted in the Indian context is dominantly legal-based approach. During the interviews it was indicated that some projects have formal EMS in place suggesting that these projects have adopted a self-regulatory approach. This also suggests that perhaps green image is gaining importance in India, (for further details regarding approach to follow-up, See Chapter 3). However, before EIA was made mandatory, there was very less provision of incorporating environmental protection within the mines. But with more NGOs participating and increase of public awareness, there is further scope to encourage follow-up through incentive and disincentive approach.

Scope of Follow-up: It is clear after studying the reports that follow-up is carried out dominantly for environmental parameters. As it is compliance oriented, specific parameters such as the air, noise, water, land reclamation and afforestation plans are usually well covered. However, it will be interesting to investigate through case studies as to how the projects take care of other environmental parameters that may not be directly covered by the laws. Social parameters are also included. But it lacks specific follow-up programmes and does not have specific indicators or monitoring programmes for follow-up. Social aspects are covered in a

generic way by overall development of the project-affected villages. The rehabilitation and compensation programmes that are required by law are covered. But without a proper follow-up programme it is possible that certain valuable social assets may be ignored or camouflaged with general social work. There are few examples of some projects developing special committee for solving disputes amongst stakeholders. In others, rehabilitated villages are developed in such a way the people enjoy the civic amenities and yet get to retain their village set-up. Only 2 projects belonging to the Jindal group and the Panem Coal Mines Ltd had a more specific follow-up program for social parameters. One of them have a system of conducting social survey once in 3 or 4 years while the other has developed indicators for quality of life and uses this to monitor social welfare.

Although OC coal projects can have huge impacts on health, this is one area where the reports are very sketchy. The only consistent requirements are from the DGMS but it is from the safety perspective. The DGMS requires a check up of workers once in every five years. Only 50 % of the reports mentioned about follow-up on health issues but for most of them it was the five yearly health check-up required by the DGMS. In some cases, there was no separate budget allocated for this. As the laws may be less stringent on this issue, companies have performance-oriented activities in which special eye camps and family planning camps are held benefiting local people and project-affected people. It should be noted here that this is not follow-up but more of general welfare activities which the companies initiate. One of the Jindal group projects mentioned about specific health parameters that will be monitored. This was a good exception. Based on the overall performance, the scope of follow-up consideration in the pre-decision stage has been graded as E.

Follow-up of Indirect Effects: Information gained in the interviews suggested that proponents do take in to account some indirect impacts of the project. This is usually a result of social pressure. Examples cited included developing infrastructure, like building roads and hospitals, taking into account the additional pressure of migrants who may be getting attracted to the project vicinity. Thus, follow-up of indirect effects is usually proponent and community driven. The performance for this has been graded as D.

Consistency amongst Regulators: According to the interviews, the regulators are themselves unaware of the procedures implemented by another state. This was unclear for most of the interviewees and thus a definite conclusion cannot be drawn here. Perhaps, the case studies will provide a better insight to this.

Integration amongst Regulators: Based on the information gained in the interviews, the regulators do not work in an integrated manner. The proponents are the only point of contact amongst the various regulators. The SPCB and the regional offices have overlapping responsibilities and although they can collaborate and work together, this is rarely done in reality. Grade F has been given against this criteria.

7.3.3 Resources and Capacity: -

This category in the good practice list has eleven questions grouped under it. A combined approach has been adopted for this category using both document analysis and interviews. The reports were silent on issues like knowledge imparting and brokering, as well as taking local knowledge into account. For these questions, interviews have been used. Interviews were also used to reconfirm roles and responsibilities of follow-up amongst the stakeholders. For particular questions

both the methods have been used to confirm the answers. Based on the consideration of follow-up at the pre-decision stage, allocation of resources and

Ques No.	Resources and Capacity	Source	Score
1.	Is responsibility clearly allocated for someone to pay for follow-up?	Document & Interview	C
2.	Is responsibility clearly allocated for someone to conduct follow-up?	Document & Interview	C
3.	Is responsibility clearly allocated for someone to evaluate for follow-up?	Document & Interview	C
4.	Is responsibility clearly allocated for someone to manage the changes if required?	Document & Interview	C
5.	Is responsibility clearly allocated for someone to prepare the report?	Document & Interview	C
6.	Is responsibility clearly allocated for someone to to whom the results are reported to, or, who checks compliance?	Document & Interview	C
7.	Is finance allocated for conducting follow-up? If yes to what proportions?	Document	D
8.	Is local knowledge taken into account for designing follow-up?	Interviews	?
9.	Is there any provision of 'institutional memory' and knowledge brokering (contract with universities or research institutes for knowledge sharing)?	Interviews	C
10.	Is there any kind of training or education and capacity building imparted for follow-up?	Interviews	D/?
11.	Is the strength for follow-up team clearly stated?	Document	D
Overall Grade			**C**

Table 7.4 Analysis of Resources & Capacity of pre-decision follow-up practice

capacity seem to be satisfactory. Hence, overall this category has been graded as C. Table 7.4 shows the grades given against each criterion in this category.

Resource Allocation for Follow-up: -

The first six questions under the broad category of resources and capacity ensures that proper allocation of resources and tasks have been allocated for implementing follow-up. These include, responsibility for paying for follow-up; conducting

follow-up; responsibility for evaluating the data collected; responsibility for managing any change that may be required; responsibility for preparing the report for follow-up and finally responsibility for someone to check compliance. Overall performance against this criterion is graded as C. The allocation of responsibilities for follow-up is quite straightforward within the Indian context and has been discussed below.

Bearing Cost of Follow-up: The costs for follow-up are borne by the proponent and the EIA/EMP report allocates this cost. However, the cost for regulating follow-up and inspecting it is borne by the government.

Responsibility for Conducting Follow-up: The proponent conducts follow-up. Usually the proponent has a separate department also known as the environment cell, which shoulders the responsibility of environmental protection. In case of CIL subsidiaries, follow-up is conducted at the area level and project level. The CGM (Chief General Manager), of the subsidiary is usually the manager for environmental issues. There are project officers dealing with follow-up implementation at the project level. The only exception to this picture has been observed in case of a MCL project where the SPCB, which in this case is the Orissa Pollution Control Board conducted follow-up along with the proponent.

Evaluating Follow-up: It is the proponent who evaluates follow-up. In case of CIL subsidiaries, the CGM plays a crucial role in follow-up evaluation. In one of the WCL projects, the regional office of the CMPDI also helped in evaluating the results. Panem Coal Mines was the only exception where an independent social committee was constituted to look into follow-up issues especially in social aspects.

Managing Changes: The proponent plays a dominant role in this matter. In some CIL subsidiaries like WCL and MCL the CMPDI helped in managing emerging environmental issues. Once again Panem Coal Mines was an exception as its EIA/EMP report mentioned about periodical meetings with members from the Pollution Control Board, affected villagers and IBM to discuss project impacts and possible management approach to be adopted.

Preparing Reports: Out of the total 28 reports studied, 19 belonged to CIL subsidiaries and thus all the 19 reports prepared for the CIL subsidiary were prepared by CMPDI, which acts as the consultant to CIL. CMRI (Centre of Mining Research of India) prepared 2 EIA reports. SCCL prepared the EIA reports themselves so did Jindal strips. The rest took help of other consultancies to prepare the report. Overall, 24 out of 28 reports are prepared by the proponent's in-house system.

Checking Compliance: The follow-up reports at first stage are usually passed on to the subsidiary manager in case of CIL. Eventually the reports are sent to the respective pollution control boards. The standards prescribed by the Boards have been mentioned in few of the EIA reports but their role has not been explicitly mentioned. The regional offices of the Ministry of MoEF also play an important role in checking compliance. The SPCB as well as the regional offices of the MoEF can come for periodical visit to the mines for checking compliance.

Finance Allocation for Follow-up: All projects have allocated finance for carrying out environmental protection other than one. However, the budget for environmental protection is complex as it may include a variety of costs taken together ranging from implementation of monitoring activities, resettlement and rehabilitation, afforestation, anti-pollution measures, greenbelt, preparation of EIA/EMP reports

and monitoring equipments. In this regard the budget allocation in the EIA reports is not always clear. A general pattern is observed amongst the CIL subsidiaries where apart from environmental cost, monitoring cost is separately allocated. Budget on health monitoring is often absent. In case of a project of Arunachal Pradesh Mineral Development, the allocation has been done explicitly for air, water, greenbelt, noise and machinery. Thus, the reports satisfy the need of allocation of funds for environmental purpose and monitoring but they are often ambiguous. Accordingly this criterion has been graded D.

Integration with Local Knowledge: Nothing can be inferred from the reports on this. According to the interviewees, the public participation ensures local knowledge has been taken into account. However, there was no clear answer obtained regarding the use of local knowledge in follow-up design or implementation and accordingly has been graded as '?'.

Knowledge Brokering for Follow-up: Most of the interviews confirmed that research institutes are a part and parcel of follow-up process CMRI (Centre for Mining Research Institute of India) and ISM (Indian School of Mines) form the core institutes in the field of mining technology and environmental processes. Other than this the IIT (Indian Institute of Technology) also contributes in this field. Grade C has been given to this criterion.

Follow-up Training: CMRI and ISM do conduct courses and training on environmental practices and mining. However, it could not be inferred as to whether there are any courses targeted especially for follow-up. CIL also organises training on environmental practices and mining. But how much importance is given for imparting knowledge and training specific to follow-up issues cannot be inferred and has accordingly been graded as 'D/?'.

Strength of Follow-up Team: The CIL subsidiaries have a separate Environment Cell to carry out environmental protection and implementation of monitoring measures. This cell is usually headed by the CGM (Chief General Manger) of the area and the project officer deals directly with the respective project consideration. Thus, the subsidiary company acts as the apex body for the environment cell of the project. Most of the EIA reports of CIL subsidiary have a detailed organisation chart of the environment cell. However, it was not possible to conclude the exact number of personnel sharing the responsibility of follow-up in a project. In other companies as well, separate departments are constituted for environment. This criterion has been accordingly graded as D.

7.3.4 Involvement with Stakeholders

Out of a total of six questions listed in the good practice list, three were used for studying the EIA reports whereas questions on usefulness of follow-up, stakeholder involvement in follow-up and compliance checking of regulators were answered with the help of semi-structured interviews. Overall performance of the Indian follow-up

Ques No.	**Involvement with Stakeholders**	**Source**	**Score**
1.	Does community participation take place at an early stage?	Document	D
2.	Are the results of the follow-up available to the public?	Document & Interview	E
3.	Are public concern represented in follow-up?	Document	D
4.	Do regulators insure that follow-up is carried out in accordance with the regulations?	Interview	E
5.	Is follow-up viewed as a useful exercise?	Interview	D
6.	Is follow-up regulator, proponent or community driven?	Interview	Regulator
Overall Grade			E

Table 7.5 Analysis of Involvement of Stakeholders in follow-up in India

system against this criteria is unsatisfactory revealing significant omissions and accordingly has been graded E.

Community Participation in Follow-up: Ideally public participation should take place before the report is prepared in order to incorporate the feedback received. However, in case of four projects the report was prepared before public participation took place and the public concerns were later incorporated. In case of five projects there was no mention of public hearing. This could be because these reports were given as revised reports with additional information requested by the expert committee and thus, may not have included public hearing process again. It cannot be said for certain as to whether this was really the case. In other reports the public hearing was conducted before the EIA/EMP report was prepared. This criterion has been graded D.

Access of Follow-up Result: Most of the reports were silent on this issue and thus, based on the reports, it was not possible to say as to whether the reports would be publicly available or not. The number of reports, which explicitly mentioned about displaying the monitoring reports to the public, was only four in number. During the interviews it was confirmed that results are available upon request. However, it should be noted that the EIA report itself is a restricted document and cannot be viewed by the public. Accordingly, this criterion has been graded as E.

Representation of Public Concern: Out of the total 28 reports studied, public concern was clearly stated in 18 reports. There were instances where the meetings were not very informative. Economical concerns were quite dominating in the public meetings. During one meeting, the local people requested the project to be converted to an under ground project as this would generate more employment. In another case the public were not ready to part away from their land in return of land compensation. Other concerns related to follow-up were fairly attended. Concern on air quality, dust, ground water

level, vibrations causing cracks in village houses were frequently raised and handled well in the EIA.

Social and Health issues are handled in the reports in a generic way. With this regard interaction with local communities are strong. These kinds of activities are however, proponent initiated. Although they lack clear indicators and may not be directly related to follow-up of impacts, they deal with the general well being of the community and create an interactive link between the proponent and the project-affected people. According to interviews, follow-up can be reactive in nature. If the villagers do complain or raise issues, the proponent usually takes it into account. Grade D was accorded against this criterion.

Responsibility of Regulators in Ensuring Compliance: There are different bodies responsible for regulating different aspects of mining related environment. Usually it is the responsibility of the respective body to ensure compliance in their related area. According to the interviewees, regulators are not very consistent in checking compliance. Some interviewees, who were mainly from the field of media and consultants, criticised the existing regulatory system as they think it does not have the capacity to carry out its responsibilities diligently. The performance against this criterion has been graded as E.

Perception of Follow-up: Based on literature, five choices were given to the interviewers to choose from to describe how they thought EIA follow-up is perceived by various stakeholders especially the proponent in the Indian context. These were as follows: -

1. Anti-developmental
2. Bureaucratic hurdle
3. Wastage of resources
4. Progressive
5. Useful (Ahmed & Sammy, 1985, p.6-8; Singh & Sinha, 2003, p.17; Arts et al, 2001).

Twenty-seven interviewees considered follow-up to be a bureaucratic hurdle but a considerable number of people also said it is a useful exercise. Some interesting examples were given to illustrate the situation where one interviewer said that 'a project is to the proponent like a child to the guardian and all the parent wants is that the child should some how pass in the exams'. In this case getting the clearance and showing compliance is all that matters to the proponents.

It was also pointed out that sometimes it is just wastage of resources involving only paper work. This is especially true for the smaller projects where resources are scarce but there are too many conditions to be complied with and to many paper works involved. Management attitude was cited as a major factor in determining the attitude towards EIA and its follow-up. A pro-active management made use of the follow-up mechanism thus adding value to it but in other cases the management treated it to be nothing more than a bureaucratic hurdle, which somehow has to be managed. The media personnel as well regulators said that without follow-up whatever little is happening will also stop and thus, undoubtedly it is a useful exercise. Thus, it will be fair to say based on the above feedback that overall perception of follow-up is useful within the Indian context. This criterion has been accordingly graded as D.

Stakeholder Involvement in Follow-up: Follow-up in the Indian practice is a combination of all three stakeholders initiative, i.e. proponent, regulator as well as community. However, pre-dominantly it is regulator driven. The example provided by an interviewee from CIL to prove this fact was that 'few years earlier environment was

only forest for the coal industry but now CIL has a separate department dedicated for environment and it means much more 'than simply planting trees'. Some interviewees also said (eight in number), regulators themselves are not bothered about follow-up. Interestingly one of them said that 'follow-up in India has been World Bank driven'. A CIL officer who was in charge of World Bank project coordination in CIL said this. In other words, the influence of the funding agency has paved the way to better environmental practices within the coal-mining sector.

7.3.5 Regional Variation

There are eight questions in this category. During the pilot interviews five factors were suggested for causing regional variation. Accordingly, regional variation was integrated with the framework of best practice list (Morrison-Saunders et al, 2003, p.14) (See Fig. 2.3, 4.3). These include, economical, political, management, cultural values and occupational pattern. However, regional variation in detail is verified through case studies. At this stage an additional question was posed asking the interviewees whether they thought that regional variation in follow-up implementation was at all present in the Indian practice. At this level, the grading system has not been used. It is attempted here to verify the presence of any regional variation. If such a variation exists then accordingly good practice criteria for it will be formulated (See Chapter 10). The nine questions have been grouped in three categories as shown in table 7.6. In the first question, the interviewees were asked to state whether they thought there was any evidence of regional variation at all in follow-up implementation. In case they answered yes, they were asked to specify as to what they think caused such variation, choosing from the five factors mentioned above. They could also specify other factors, which they think causes such variation. The third question was regarding variation with which the regulators review compliance. The answers obtained are discussed below:

Perception of Regional Variation: Out of a total of 43 interviewees, 41 agreed that regional variation is present in case of follow-up implementation. One said that the variation was based on companies rather than regions while the other, neither confirmed nor rejected the notion of regional variation.

Ques No.	Regional Variation in follow-up implementation	Method	Conclusion
1.	Do you think there is any regional variation in implementation of follow-up?	Interview	Yes
2.	Does the economic situation of the region affect the follow-up implementation?	Interview	Economic
3.	Does local politics influence follow-up implementation?		Social
4.	Does management influence in the effectiveness of follc implementation?		Political
5.	Does cultural values have an influence on follow- up implementation?		Environmental
7.	Does occupational pattern have an influence on the follow-up?		Management
8.	Is there any variation in the frequency and procedure in which the respective SPCB (State Pollution Control Boards) provide feedback o the proponents?	Interview	Partial
9.	Is there any variation in the frequency and procedure in which MoEF provides feedback to the proponents?		

Table 7.6 Analysis of Regional Variations in Implementation of Follow-up in India

Thus, the interviews helped to conclude that although requirements for compliance are uniform throughout India, the level of effectiveness with which they are implemented differs according to regions. In this case, regions are considered to be the federal states in the Indian union.

Factors causing variation in Follow-up: The factors causing such variation identified by the interviewees vary. In order to identify these causes they used a variety of terms. These have been again sub-divided into five categories, which have been illustrated in Fig 7.7 and are presented as follows: -

Economical: Terms used in this category included, infrastructure, resources, economic condition. Thirteen interviewees identified this as the factor causing regional variation.

Geo-Technical: Terms used by the interviewees, which have been grouped under this category include, geographical characteristics of the area, landscape and geo-mining conditions. Thirteen people cited this as the factor causing regional variation.

Population characteristics: This category included terms like cultural values of people, occupational characteristics, social awareness, attitude of people, education level of population, population density. This was cited by a maximum number of eighteen people as the variation-causing factor.

Politics: Terms categorised under this heading included local politics and state governance and was thought to be the factor causing regional variation by eleven interviewees.

Thus out of the total five factors identified as causing regional variation, one is actually not regional in nature but interestingly it may prove to be the all powerful factor, which if strong can overpower the other factors causing regional variation. According to this finding, the contextual factors and follow-up implementation get influenced by regional variation as well. Although management is not a regional factor, these contextual factors can influence it. However, at the same time management can also play an effective role to override the influence of the regional factors. This has been further explored in detail though case studies in chapter nine.

Consistency amongst Regulators in Checking Compliance: The interviewers have generally said that some specific regional offices of MoEF, like the Bhopal office in Madhya Pradesh, are more active than others. Although general variation in performance was indicated, nothing specific was pointed out at this stage. The other questions in this category included exact number of people responsible for checking compliance and

number of visits undertaken by the respective regulating bodies. These questions have been asked in detail during the case studies.

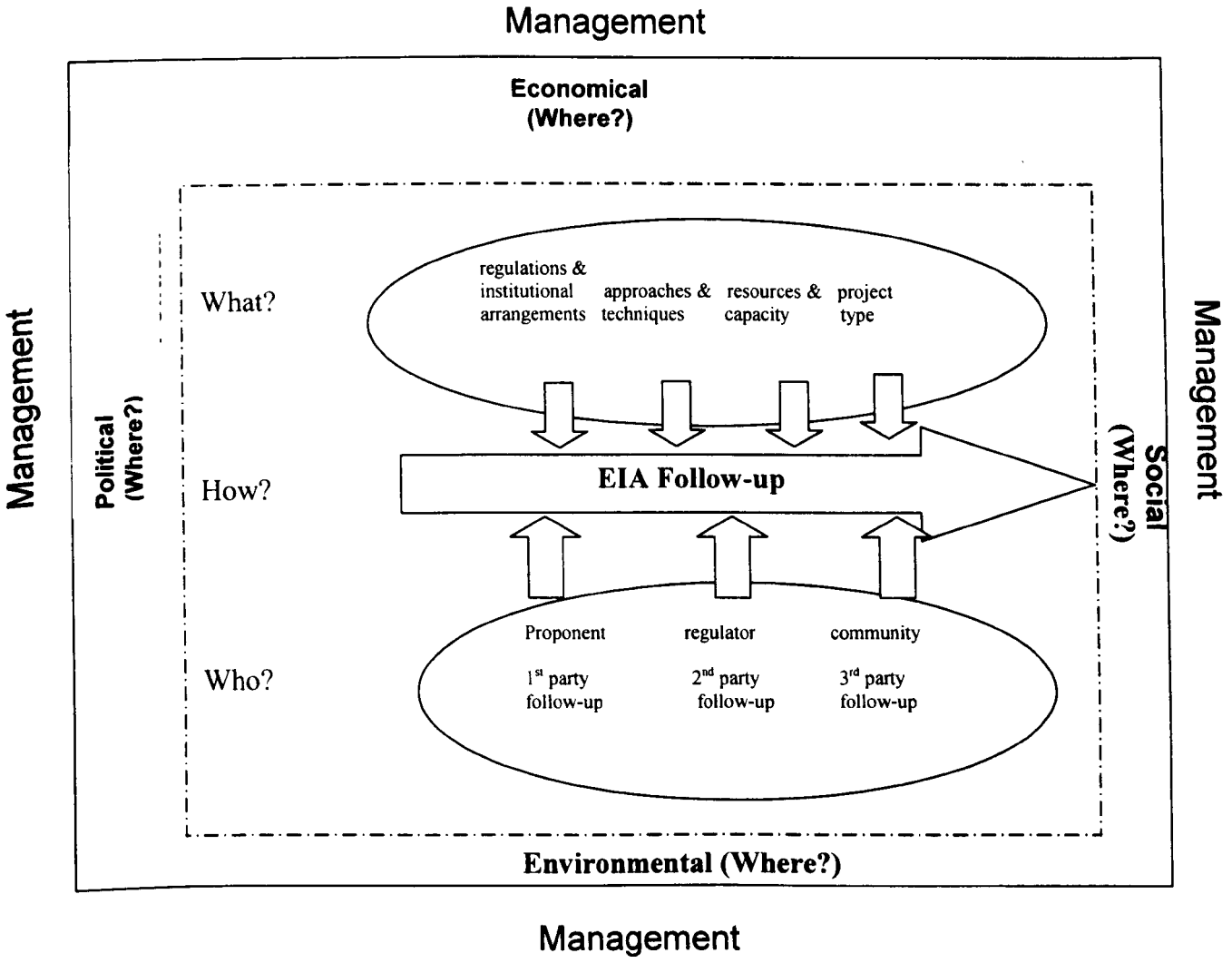


Fig. 7.7 Regional Variation in Implementation of follow-up, (Adapted from Morison-Saunders et al, 2003, also see Fig. 2.3, 4.3)

Based on the findings from the interview conducted, it can be said that the contextual factors and follow-up implementation are influenced by regional variation as well. Management although not necessarily regional in nature as far as responsibility is concerned, can be influenced by these contextual factors. It can also override their influences. Fig 7.7 shows how the additional question 'where?' added to the existing contextual framework of follow-up can be further grouped into four categories namely:-

- Political
- Social
- Economical
- Environmental

It also shows that lying above these regional factors in responsibility is management, which envelopes the four regional factors. The original framework based on which this has been developed, is provided in chapter 4 and chapter 2 has addressed the question 'where?' as an additional question to the existing framework (for details see Fig 2.3 & 4.2). These factors causing regional variation have been further explored in detail through case studies in chapter nine.

7.4 General Observations on EIA/EMP Report

The name, which is most commonly used for the document is Environmental Management Plan. Other names that were used are EIA & Management Plan, EIA/EMP and Environmental Appraisal. However, these names are used within the OC coal mining projects, but while going through reports from other sectors, it was observed that different names are used amongst different sectors. The term EIA and EMP are used synonymously. Interestingly this also indicates that there is an absence of a common name for the report and it may perhaps suggest that the document is also perceived differently. In OC coal mining projects, the name EMP suggests that the management plan of the proponent is dominant. In certain cases the EIA itself was done in a sketchy manner with the use of matrix. The documents usually consisted of an executive summary and several chapters as listed below: -

1. Introduction
2. Description of The Project
3. Existing Environmental Scenario
4. Environmental Impact Assessment
5. Environmental Pollution Control Measures
6. Disaster Management Plan
7. Environmental Cost Projection

8. Monitoring & Management Organisation

The documents were quite repetitive in nature. It was observed during the study that certain sections were even worded in an exact manner, using the same language. The MoEF recently introduced a requirement for the submission of the mine closure plan, five year in advance of the closure. However, there is no statutory or regulatory provision requiring the mine operator to plan and execute a formal mine closure scheme. Hence some reports, which did have a mine closure plan, did not follow any standard format. The regulatory standards applicable during the operation phase of mine are also applicable to the mine closure plan.

Most of the reports submitted for CIL subsidiary companies followed a certain trend. Some exceptions were seen in reports of other companies like Panem and SCCL, which were also better in some aspects. The CIL reports were repetitive in nature and almost followed the same format without many alterations. CMPDI acted as the consultant for producing all the EIA reports that were submitted during 1996 Feb to 2004 July. This indicates that perhaps, there is lack of competition amongst consultants for preparing EIA reports for CIL. CMPDI thus, has the monopoly and this may be hindering it from introducing innovative techniques and approaches to follow-up design in the open cast coal sector in India.

Chapter Eight

Introduction to Case Studies

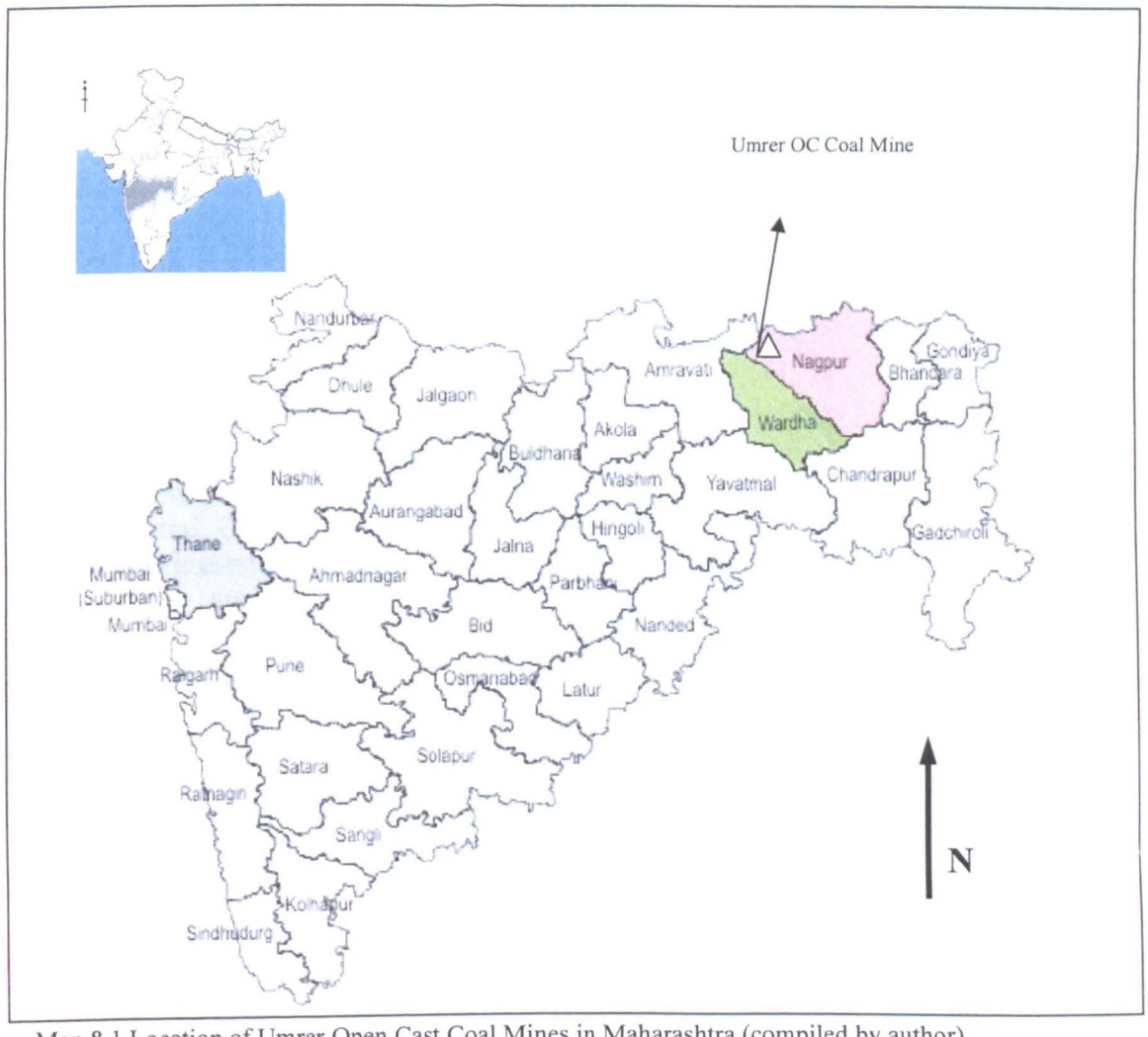
In this chapter, the three case studies are introduced. For each case, first a general introduction is given, followed by a brief description of the background. The pre-decision stage is explored and the follow-up conditions to be complied with are identified. The ongoing follow-up mechanism is presented next. Findings from observations carried out during mine visits are presented in the following section. Finally, key emerging issues from the case studies are drawn out.

8.1 Case Study A: Umrer Expansion Open Cast Coal Mine

The Umrer opencast project of Western Coalfields Limited (WCL) is situated in the Umrer Coalfield and lies between Latitudes 20^0 50' 45" North and Longitudes 79^0 16' 00" East. The area falls in to the Nagpur district of Maharashtra State. It has a production capacity of 3.5 Mty (million tones per year). Although it is an old mine dating from the 1960s, it has been producing at the current capacity since 1998-99 (CMPDI, 2005a). The project taken into consideration is thus called 'Umrer Expansion OC Coal Project' and the age of the project as on 2005 is 6 to 7 years. At present, the project is not a World Bank funded project, however, World Bank funding was provided to the project during 1997-98 to 2002-02.

8.1.1 Background of Project Umrer

Umrer OC mine was first opened on 14-04-1963. In its initial phase, the mine was under National Coal Development Corporation (NCDC) (See Chapter 6). A preliminary report for Umrer Colliery project was prepared in November 1961 and was sanctioned by the



Map 8.1 Location of Umrer Open Cast Coal Mines in Maharashtra (compiled by author)

government of India wide letter No. C2-5(19)/61, dated 27-8-62. The OC project was planned for producing 1.016 Million Tonnes (Mty) of non-coking coal. NCDC came under the jurisdiction of CIL in 1975 i.e. after the nationalisation of coalmines in India. The Coal Board on 13-12-1979 approved the project report (PR) and the Revised Cost Estimate (RCE) was approved on 5.03.1985 (CMPDI, 2005a). Thus, the mine started before the Environment Protection Act came into force in 1986 and its subsequent EIA Notification in 1994. Project approval therefore, did not take into account environmental aspects to any large extent.

The project was planned to have capacity of 1.84 Mty. But it was interesting to note that Umrer had expanded its production capacity since 1998 and no environmental clearance from the MoEF was sought prior to increase in production. At present, the mine is a working mine with a production capacity of 3.0404 Mty. The project applied for an environmental clearance only in 2004. However, this clearance process was initiated by the MoEF's Circular dated 12.02.2002, according to which: -

> "the proponent should, however, seek prior environmental clearance from Central Government for expanding production and/or mining lease area irrespective of the quantum of increase in size of mining lease (ML) area/production or investment involved. The above provisions will apply to existing/operating mines even when no renewal of mining lease is involved" (CMPDI, 2005a).

In case of Umrer OCP, no prior environmental clearance has been acquired from MoEF prior to increase in production (without increase in size of mining lease area) during 2001-02. Hence in terms of MoEF Circular dated 12.02.2002, the case of Umrer OC Project comes under item 3 of Para (d); i.e. there is an increase in production without change in the lease area (GoI, 2002). As a result, the EIA report, which in this case is known as the Environmental Management Plan (EMP), was prepared for Umrer in November 2004 for seeking ex-post facto environmental clearance from Central Government in terms of MoEF's Circular dated 14.05.2002 for enhanced production of 3.50 Mty without any change in ML area for balance mine life.

8.1.2 Pre-decision Stage of Umrer OCP

The term 'pre-decision' implies that decisions are yet to be made and thus the project has not started. However, this is an existing mine and decision sought in this case is for a production capacity of 3.5 Mty as against a planned capacity of 1.84 Mty. The

Environmental Management Plan (EMP) that has been prepared for the project has considered 1998-99 to 2001-02 as the assessment period (WCL, 2005).

The first requirement in the clearance process is to obtain 'consent to establish'. However, in this case a 'no objection certificate' (NOC) was first obtained from the Gram Panchayat (Village Council). This was obtained for the project in 2004, followed by the public hearing meeting, which was held on 23rd September 2004 (CMPDI, 2005a; WCL, 2005). It should be made clear at this point that although the same terminology has been used, 'no objection certificate' obtained from the Gram Panchayat, is not the 'consent to operate' or 'no objection certificate' offered by the SPCB (See Chapter 5). The public hearing meeting is usually the responsibility of the SPCB, which in this case is the MPCB (Maharashtra State Pollution Control Board). Fifty people attended the meeting. An EMP was prepared for the project during November 2004 to January 2005. Consent to establish the mine was given by the MPCB to the project on 28th February 2005. Fig 8.1 shows the order and timescale in which the various procedural requirements were met for the Umrer Expansion OCP.

The EMP was submitted to the MoEF on 3rd of May 2005 and the clearance was received on 20th May 2005. As mentioned earlier, 'the process of environmental clearance i.e. from the time all relevant documentation reaches the MoEF, through the EAC Committee evaluation and finally the MoEF decision should take less than 120 days (Mathur & Rajvanshi, 2001 p.20). However, in this case, it took only 13 days for the EIA report to be assessed and accepted. Interestingly, the time taken is much less compared to the average time usually required (See Chapter 5).

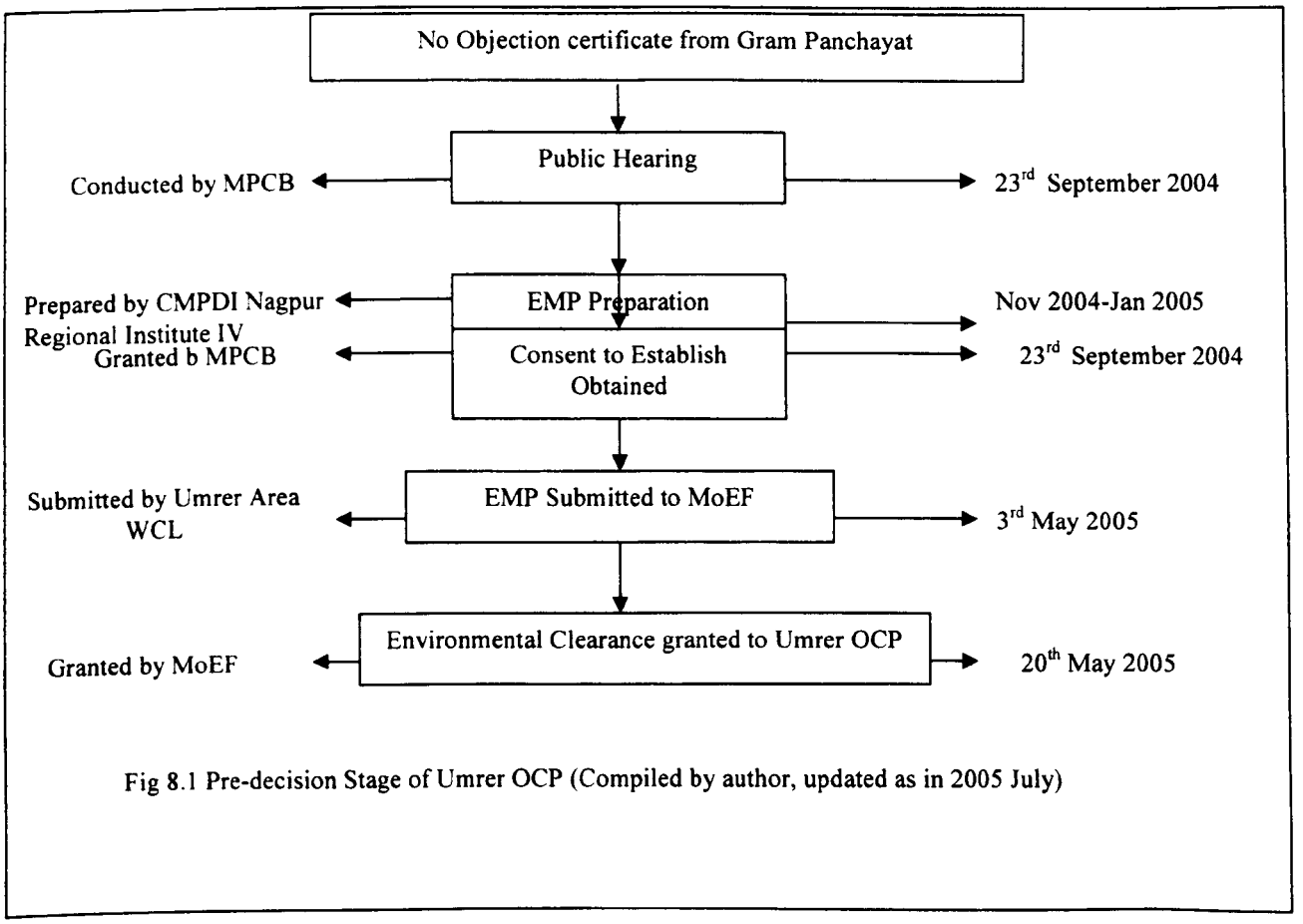


Fig 8.1 Pre-decision Stage of Umrer OCP (Compiled by author, updated as in 2005 July)

But the consent to operate, which is to be obtained from the MPCB (Maharashtra Pollution Control Board) and without which, a project should not commence was not yet issued to the proponent at the time of the study. The expansion did not require clearance of forestland and hence forest clearance was not a requirement in this case.

8.1.3 Follow-up issues to be considered for the Umrer Expansion OCP

The MoEF on the basis of the EIA/EMP prepared by the proponent and the presentation delivered by the same grants the environmental clearance. Therefore, the EIA/EMP lays down the foundation for follow-up in its pre-decision stage. In case of Umrer Open Cast project, the document was named EMP and consisted of ten parts. It provided an executive summary and

constituted of nine chapters. This was submitted to the MoEF in May 2005. This implies that during the time of the study, follow-up of the conditions specified by the EMP might have just begun. The EMP consisted of 10 chapters and included the environmental protection and monitoring measures to be adopted by the proponent. These are shown as shown in Table 8.1.

Chapters of EMP for Umrer OCP	Conditions to be monitored according to EMP of Umrer OCP
1. Introduction 2. Project Description 3. Existing Environmental Scenario 4. Environmental Impact Assessment 5. Environmental Pollution Control Measures 6. Disaster Management Plan 7. Progressive & Final Mine Closure Planning 8. Environmental Cost Projection 9. Monitoring and Management Organisation	1. Air Pollution Control Measures 2. Water Pollution Control Measures 3. Noise Pollution Control Measures 4. Land Reclamation and Land Management 5. Rehabilitation Scheme

Table 8.1 EMP Chapters and Monitoring Conditions for Umrer Expansion OC Mine (CMPDI, 2005a)

However, the MoEF laid down certain conditions and the environmental clearance is granted subject to the compliance of these terms and conditions. These are broadly categorised in two groups, which are 'specific conditions' and 'general conditions'. The former relates to the specific mine in consideration. The general conditions, on the other hand are common to all OC coalmines. In case of Umrer Expansion Coal Project, the MoEF clearance letter stipulated a total of thirty-two conditions out of which sixteen are general and the rest are specific in nature (GoI, 2005a).

The 'consent to establish' along with the 'consent to operate' given by the SPCB further provides conditions to be complied with. But as mentioned earlier, the consent to operate for the Umrer Expansion OCP is not yet given to the proponent. The consent to establish is granted for a period up to commissioning of the unit and the conditions to be complied with are stipulated under the Water Act 1974, Air Act 1981 and the Renewal of Authorisation under Rule 5 of the Hazardous Wastes (Management & Handing) (HW(M&H), Rules 1989

and Amendment Rules, 2003 (MPCB, 2005). These conditions are about 22 in number and the standards and thresholds of emissions are also provided.

The Director General Mines Safety (DGMS) also gives permission to start mining on the basis of numerous factors. These are more technical in nature and deal with mine safety and techniques employed. The Chief Inspector of Mines (also designated as Director-General of Mines Safety) exercises his power under regulation 98(1), 98(3), 100(1), 126(2) and 127 of the Coal Mines Regulations, 1957 (GoI, 1997). Permission of DGMS is usually not a part of the process of environmental clearance.

In case of Umrer, permission from DGMS was granted in 1997. DGMS permission is sought before any mine can start. For the Umrer expansion project, as there is no change in mining techniques, DGMS has not issued any new conditions for the expansion project. The conditions provided in 1997 have been categorised as general opencast workings; which includes: - manner of extraction; height and width of the benches in coal and intervening strata, general; Additional precautions while extracting developed pillars; fencing around opencast workings; roads for trucks and dumpers etc; shotfiring; *precautions against fire*; precautions against danger and *dust explosion*; machinery; operation of machinery; duties of machinery operators; duties of truck/dumper operators; *protection of workers against noise and vibration* in the working environment; *precautions against dust*; general lighting; protective equipments, supervision and duties of manager (GoI, 1997). The conditions in italics are those, which have overlapping boundaries with environmental protection. Although the conditions are not directly related to environmental protection, the two overlap with regards to safety issues in the work related mining environment and thus permission from

DGMS plays an indirect role in environmental protection. As a matter of fact, it is only this permission, which gives consideration to health issues in the entire process.

8.1.4 Ongoing Follow-up Mechanism in the Umrer OCP

The stakeholders for Umrer project include the regulatory bodies of Maharashtra Pollution Control Board (MPCB), regional office of the MoEF in Bhopal, the proponent, which in this case includes the Umrer Area Office as well as the Head office of WCL in Nagpur, and local community of Umrer area. The proponent is required to submit compliance reports to the regional office of the Maharashtra Pollution Control Board (MPCB), located in Nagpur and the regional office of Ministry of Environment and Forest (MoEF) in Bhopal. Environment Statement is sent to MPCB annually and a copy of it is also forwarded to the MoEF. Compliance of the clearance conditions as required by the MoEF is also sent six monthly to the MoEF office in Bhopal.

The Bhopal regional office of MoEF confirmed that till date, the MoEF did not visit the Umrer Expansion project. Therefore, compliance checking by MoEF did not commence with the Ministry. Since the project had never acquired any clearance from MoEF earlier, this meant that the MoEF had never checked compliance of Umrer OCP, neither stipulated conditions to be complied with. The clearance for the Expansion project of Umrer OC mine was given only in May 2005 and the MoEF office in Bhopal was still awaiting responses to start on with compliance checking. Although consent to establish had been provided by the MPCB, consent to operate with a production capacity of 3.5 Mty was not yet released for the project. Thus the project was operating still with the production capacity of 3.0404 Mty since 1998-99 without any conditions imposed by the MoEF.

This implies that follow-up for Umrer Expansion OC Project has not yet commenced. The project should not have started without the 'consent to operate'. Although the production capacity has been increased, the existing follow-up mechanism is still based on the conditions as stipulated by the MPCB for the former production capacity and the DGMS requirements layed down for safety procedures. The proponents did have records of the compliance reports sent to the MPCB. The MPCB however, denied access to these records to the author.

8.2 Case Study B: Ananta Open Cast Project

Ananta OC expansion project is located in the Talcher coalfield in Jagannath area, Angul district in the state of Orissa. It lies between latitude 20° 57' 25"-20° 58' 01"N and longitude 85° 07' 01"-85° 10' 00"E. The production capacity of the expansion project is 8.0 Mty and environmental clearance from MoEF was obtained for the existing production capacity on 2/05/2005 (CMPDI, 2005b). The expected life of the expansion project with 8.0 Mty production capacity is 12 years. The EIA report submitted is named as the Environmental Impact Assessment & Environmental Management Plan (EIA & EMP). The project had World Bank Funding during 1996 to 2002.

8.2.1 Background of Ananta OC Expansion Project

This was an existing mining site, which started in 1988, when it had a production capacity of 4.0Mty. In the year 1991, clearance for the project was obtained from the MoEF. By the year

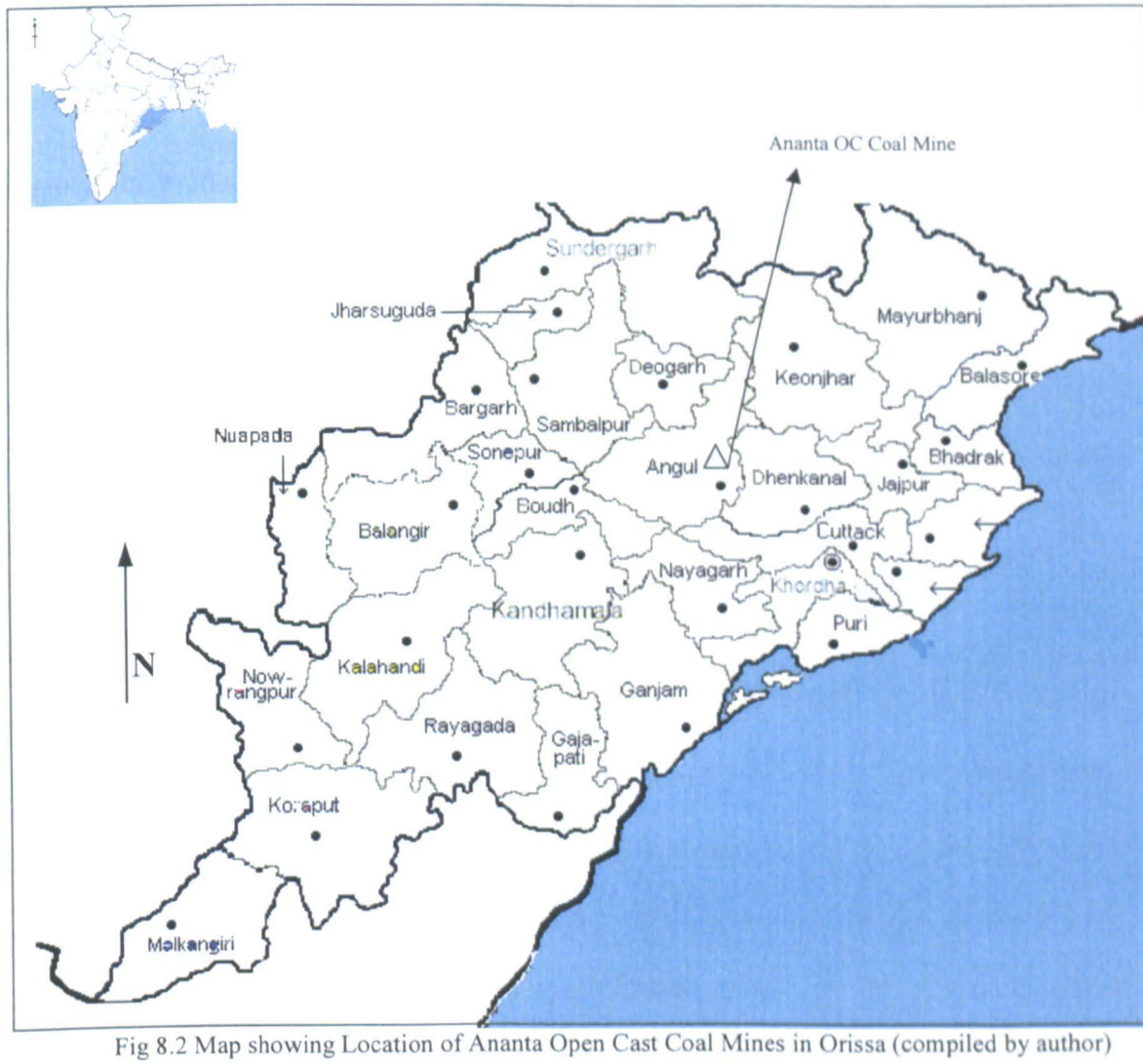


Fig 8.2 Map showing Location of Ananta Open Cast Coal Mines in Orissa (compiled by author)

1992, a new project report was formulated for an incremental production capacity of 1.5 Mty i.e. for a production level of 5.5 Mty (CMPDI, 2005b). The EMP for Ananta OC expansion project (5.5Mty) was prepared in August 1993. But during that time, the EIA notification was not yet passed and although public hearing was mentioned, it was not yet mandatory. The SPCB, which is responsible for organising the public hearing, was also not prepared to implement this. Consent to establish was not granted by the SPCB as the project was violating the SPM (Suspended Particulate Matter) thresholds. This became a controversial subject as the threshold specified for SPM by SPCB and DGMS differed from each other. The debate as

to which was the correct one continued till 2000 when coalmine specific standards were introduced.

Subsequently, the production was raised at a level of 8.0 Mty to meet the rising demand and the EIA/EMP for Ananta OC expansion Project (8.0 Mty) was submitted under 'Ex-post-facto circular of MoEF, Government of India in October 2002. During 2005, the production level was already increased to 10.0 Mty and a new EIA/EMP report was on its way for an increased capacity of 12.0Mty. Interestingly, the production level has been increasing at a faster pace than at which clearances have been granted.

8.2.2 Pre-decision of Ananta expansion OCP (8.0Mty)

The proponent applied for the Consent to establish to the SPCB in 2002, which was granted by the OPCB in 2004. Normally, the proponent should acquire the consent to establish from the SPCB while applying for the environmental clearance from the MoEF. The application for environmental clearance to the MoEF for a production capacity of 8.0 Mty was submitted on 19th December 2002 and the MoEF finally granted clearance on 2/05/2005. The total time required for the clearance was over 29 months. After the application was submitted, the MoEF desired certain clarifications dated 6th June 2003 and 5th January 2004. The consent to operate was granted on 31st March 2005. The public hearing meeting was held in January 2004 i.e. after the application was already submitted to the MoEF. Thus, the EIA/EMP report was prepared and submitted by the proponent even before the public was consulted. Fig. 8.2 illustrates the procedural steps of the Ananta Expansion OC project for (8Mty).

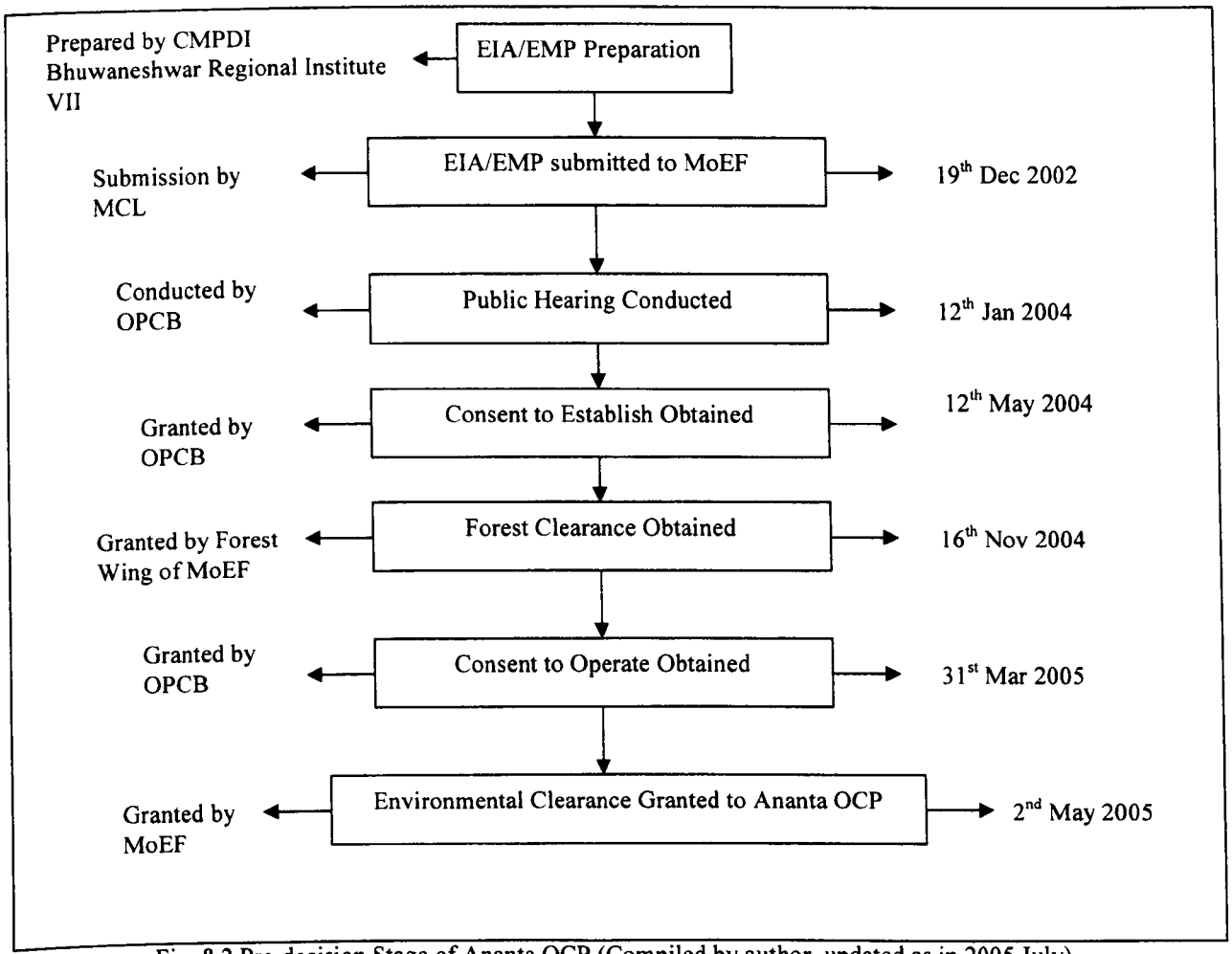


Fig. 8.2 Pre-decision Stage of Ananta OCP (Compiled by author, updated as in 2005 July)

Clearance for the Ananta project, took longer, as the application to the MoEF was incomplete. The project proponent applied for the environmental clearance to the MoEF even before it held the public hearing meeting and applied for the consent to establish from the SPCB. But one of the most crucial factors that caused delay in the pre-decision stage was the public hearing meeting. The entire EIA clearance process i.e. the time from application to all relevant documentation reaching the MoEF, through the EAC Committee evaluation and finally the MoEF decision should take less than 120 days (Mathur & Rajvanshi, 2001 p.20). However, the SPCB required 2 years to organise the public hearing process alone. The procedure for organising public hearing has been discussed earlier (See chapter 5). In case of the Ananta

expansion project, the delay caused was due to an emergent assembly meeting being called on the date the public meeting was scheduled for, which was 6/05/003. Two MLAs (Member of legislative assembly) who were members of the public hearing had to attend this assembly. As a result, the public hearing meeting had to be re-scheduled. Ironically, in order to re-schedule a public hearing meeting, the entire procedure had to be repeated, resulting in a delay of one year.

Ananta expansion project requires diversion of forestland, as well. Stage II forestry clearance has been granted by MoEF, Government of India on 19th November 2004. But the condition for grant of land was depended on the grant of environmental clearance for the expansion project of 8.0 Mty.

8.2.3 Follow-up issues to be considered for the Ananta OCP

The EIA report submitted by the proponent of the Ananta project is called the EIA/EMP report. The report consists of 10 chapters, which have been shown in Table 8.2 along with the monitoring conditions.

The EIA/EMP reports also consist of conservation plans that are prepared for maintaining biodiversity in the region. Furthermore, impacts on the environment with and without mitigation measures are being compared. The impact index with adoption of appropriate mitigation measures has been estimated to be (-) 100 and the report has concluded that the project falls under the category of "no appreciable impact on the environment" (CMPDI, 2005b). This is questionable as first, it is an open cast mining project, which involves conversion of forestland and secondly, it involves rehabilitation of 'project affected persons' (PAPs). Both these conditions have severe impact on physical and social environment, which perhaps is difficult to completely mitigate.

Chapters of EMP for Ananta OCP	Conditions to be monitored according to EMP of Ananta OCP
1. Introduction 2. Study area profile 3. Project profile 4. Present environmental scenario 5. Environmental impact assessment 6. Environmental control measures 7. Risk assessment and management 8. Environmental monitoring organization 9. Cost estimate 10. Progressive mine closure plan	1. Air, 2. Water, 3. Noise, 4. Blasting, 5. Land resource management, 6. Socio-economic measures, 7. Control measures to reduce impact on biodiversity, 8. Traffic movement effect control measures, 9. Visual/aesthetic effect control measures

Table 8.2 EIA/EMP Chapters and Monitoring Conditions for Ananta OC Coal Mine (CMPDI, 2005b)

No definition has been provided as to what exactly is the criteria for the category of "no appreciable impact on the environment", neither does the report mention about classification of any other categories.

According to the clearance letter granted by the MoEF, the conditions have been categorised as general and specific conditions. In case of Ananta Expansion OCP, The MoEF stipulated sixteen conditions as specific and a total of seventeen conditions were laid to be followed as general, adding up to a total of thirty-two conditions to be complied with (GoI, 2005b).

The SPCB has granted the 'Consent to Establish', which in this case is the Orissa Pollution Control Board (OPCB) with thirty-two conditions. Eight out of these are general conditions while the other 24 conditions are specific conditions. The consent to establish is granted under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for manufacture/production of coal quantity. It was also subject to Environmental Clearance from the MoEF (OPCB, 2004). Consent to Operate was given by the OPCB on 31st March 2005.

The Director General Mines Safety or DGMS granted its approval on 28/06/89. DGMS permissions are required before any mine commences. Thus, this permission is acquired by

the project before the environmental clearances are applied for. It should be noted here that 'except where otherwise provided for in this conditional permission, all provisions of the Coal Mines Regulations, (1957) should be complied with'. Twenty-five conditions were provided by the DGMS and each of these was classified in additional ones. The twenty broad category of conditions are general; height and width of the benches; drainage arrangements; fencing around opencast workings; soil banks; supervision; precautions while drilling; precautions while charging; precautions while firing; roads for trucks and dumpers in opencast workings; maintenance of trucks/dumpers; operation of trucks/dumpers; daily examination of truck/dumpers; weekly examination of trucks and dumpers; fortnightly examination of trucks and dumpers; check examination; design of machines; maintenance of machines; repair of machines; operation of machines; inspection of machines; duties of shovel or dragline operator; duties of drill operators; duties of trucks/dumper drivers; *precautions against dust*; general lighting; *protection against noise and vibration* (GoI, 1989). The conditions, shown in italics are ones, which overlap with environmental protection measures. Although the conditions are given from the perspective of safety, environmental parameters do overlap them at times. DGMS modifies or adds on to existing requirements time to time by sending circulars. This facilitates exchanging of views between the project managers and DGMS. However, the DGMS circulars are not legally binding.

There is an additional follow-up requirement for Ananta OCP. Three hundred and eighty six people were affected by the project and thus the state government, which is the Government of Orissa, approved guidelines for rehabilitation of the displaced persons and families due to MCL project. These guidelines consist of the eligibility criteria of PAPs for the rehabilitation scheme, which includes, land compensation, assistance for construction of temporary shed and

benefiting the PAPs with improved civic facilities in their rehabilitated villages (Government of Orissa, 1989).

8.2.4 On-going follow-up Mechanism in Ananta

Ananta OCP belongs to Mahanadi Coalfield Limited (MCL), subsidiary of CIL. The regulatory bodies for the project are the SPCB, which in this case are the Orissa Pollution Control Board (OPCB) and the regional office of the MoEF in Bhuwaneshwar. The project has to report to the sub-regional office located in the Angul district of Orissa. The proponent as well as the respective regulatory bodies has confirmed that the proponent submits six monthly compliance reports to the MoEF regional office and sends a copy of the same to the OPCB. Yearly environmental statements are sent to both regulators. This report is also known as the audit report. Monthly compliance checking is done by the OPCB. The MoEF office in Bhuwaneshwar confirmed that the project has been visited eleven times since 1991, while the OPCB confirmed that the project is visited four times a year.

In case of Ananta OCP, a Peripheral Development Committee has also been set-up to look at social welfare issues. It consists of the Chief Managing Director (CMD) of the subsidiary, collector, Member of Parliament from the local area, Revenue Divisional Commissioner (RDC), Director Personnel (DP) and the MLA.

Follow-up for Ananta OCP is thus based on the conditions laid down in the EIA/EMP report, the conditions laid by the OPCB as well as the MoEF. However the EIA/EMP report for 8 Mty production capacity has been cleared only in 2005 May. This implies that the project was already producing more than what it was sanctioned, for based on the conditions stipulated on lower production capacity. During the time of the study, it was also revealed that that due to pressure of rising demand, the project had increased its capacity to 10.0 Mty. Although, both

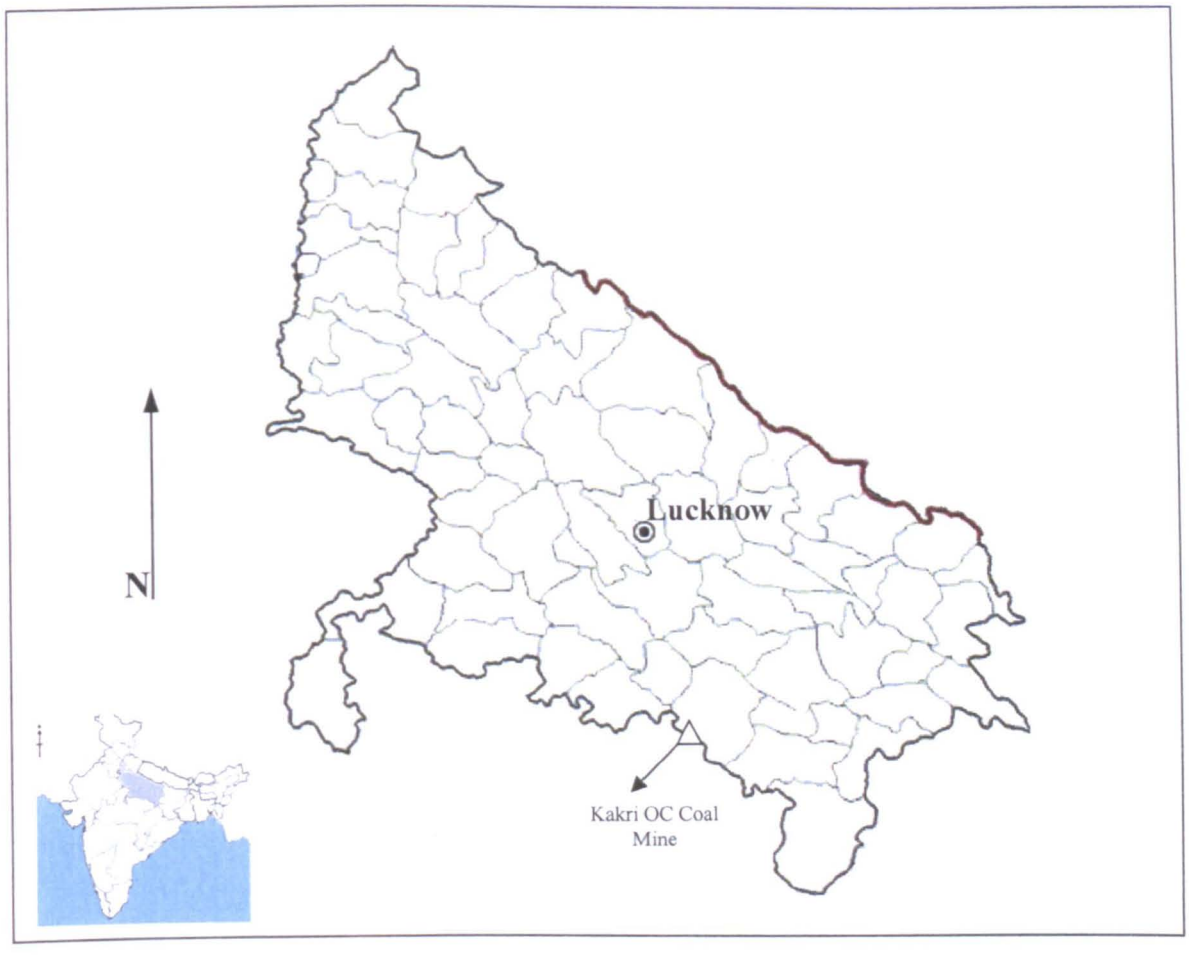
regulatory bodies checked compliance of the project, it was still allowed to produce a higher capacity. This dilutes the importance of the follow-up procedures, as the parameters to be complied with are not in par with the production capacity, which is produced.

8.3 Case Study C: Kakri Open Cast Project

Kakri Open Cast Project of Northern Coalfields Limited is located in the Singrauli coalfields and lies between Latitudes 24^0 11' 00"- 24^0 09' 50" North and Longitudes 82^0 44' 50"- 82^0 45' 45" East. The area falls in Sonbhadra district in the state of Uttar Pradesh. The production capacity of this mine is 3 MTY (CMPDI, 2004). The objective of the mine is to supply coal to Anpara 'A' power station of Uttar Pradesh State Electricity Board (UPSEB). The mine dates back from the 1980's but it has been producing in the current capacity of 3.0 MTY between 1998-2005.

8.3.1 Background of Project Kakri

The mine was first opened on 4.12.1980. The project was initially designed to produce 2.5 MTY. The feasibility Report of Kakri OCP was prepared by CMPDI in February 1979 and was sanctioned by the government for a total investment of Rs 50.54 Crores on 30.10.1980. Subsequently the Government sanctioned the Revised Cost Estimate of the project for Rs. 137.80 crores on 7.9.1989. The mine has produced 2.63 MTY of coal during 2001-02. Projected production for the next 5 years from year 2004-05 to year 2008-09 is 3.0 MTY (CMPDI, 2004). The EMP prepared by the proponent is for the increased production capacity of 3.0 MTY as per the statutory requirement of the EIA Notification of 1994. However, it should be noted here that the mine was already producing more than it was sanctioned for. Thus, clearance from MoEF is sought for the existing mine with increased production capacity, but without increasing the mining lease area.



Map 8.3 Location of Kakri Open Cast Coal Mine in Uttar Pradesh (compiled by author)

8.3.2 Pre-decision stage of Kakri OCP

The first environmental clearance was given to the project from MoEF in 1989 for a production capacity of 2.5 MTY. The mine increased its production to 3.0 MTY and thus an EMP was formulated for an increased capacity and submitted to MoEF in March 2003. The process started in November 2002 with application to the SPCB for Consent to Establish (NOC). SPCB in this case is the Uttar Pradesh Pollution Control Board (UPPCB). The public hearing meeting was held in April 2003. NOC was given by UPPCB in June 2004. The EMP was again updated in December 2004. Consent to Operate was given by the UPPCB in 2nd May 2005 and finally the MoEF granted environmental clearance on 11th

May 2005. Time taken for the total process was more than 24 months. Thus, it took much longer than the estimated 120 days for the entire process. Another striking point in the process was that the consent to operate was given before the MoEF granted the environmental clearance. However, theoretically consent to operate is given only after the clearance from MoEF is granted.

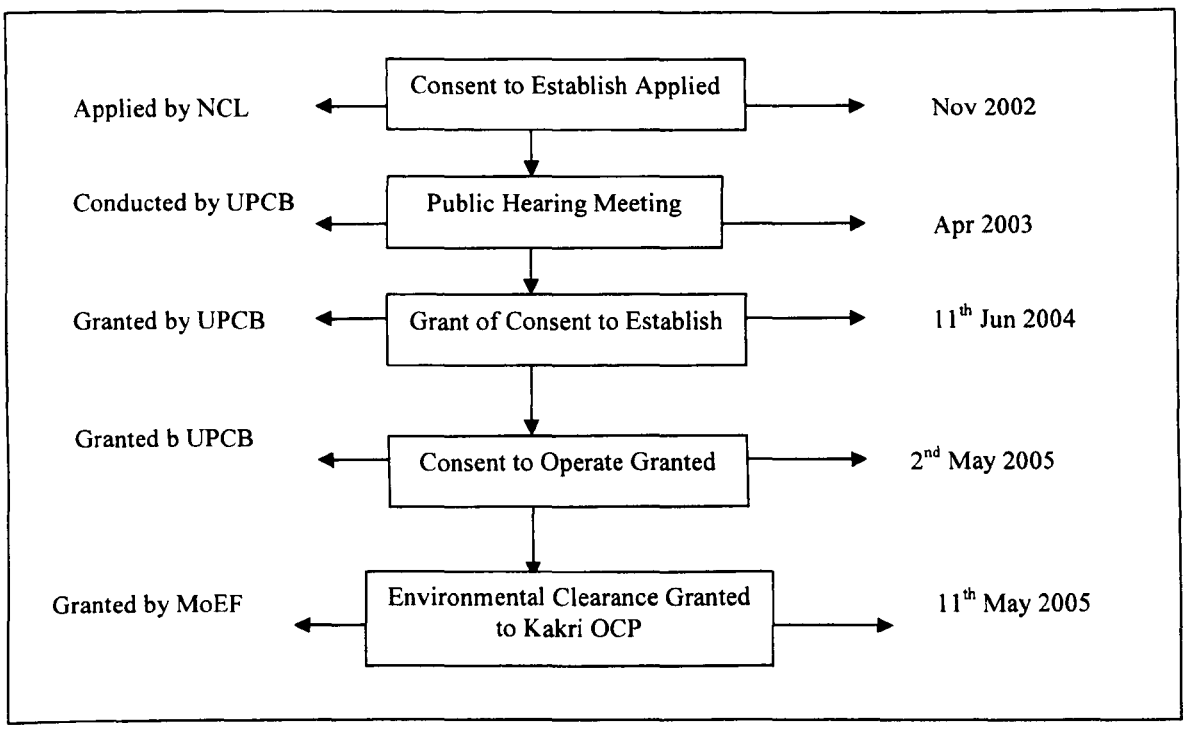


Fig. 8.3 Pre-decision stage of Kakri OCP (Compiled by author, updated on Aug, 2005)

8.3.3 Follow-up issues to be considered for the Kakri OCP

The EMP prepared for Kakri OCP has nine chapters as shown in Table 8.3. The last two chapters have been dedicated for follow-up and its cost. The environmental conditions for follow-up are of ten types and have been shown in Table 8.3.

Chapters of EMP for Kakri OCP	Conditions to be monitored according to EMP of Kakri OCP
1. Introduction	1) Socio-economic measures
2. Project Profile	2) Solid waste disposal and its management
3. Study Area Profile	3) Land Use
4. Existing environmental scenario	4) Land reclamation
5. Environmental Impact assessment	5) Afforestation
6. Environmental Control Measures	6) Air pollution control measures
7. Disaster Management Plan	7) Water pollution control measures
8. Environmental pollution control	8) Noise pollution control measures
9. monitoring organisation and cost of environmental control measures	9) Blasting Vibration control plan
	10) Prevention against fire

Table 8.3 EIA/EMP Chapters and Monitoring Conditions for Kakri OC Coal Mine (CMPDI, 2003)

According to the clearance letter issued by the MoEF, there are 13 specific conditions laid down for the proponent to implement. There are 17 general conditions laid down making a total of 30 conditions issued by the MoEF for the proponent to comply with (GoI, 2005c).

The DGMS clearance for Kakri OCP was given in 1989. Like Umrer project, this too is an expansion project without any change in mining technique. Thus the conditions given by DGMS have not changed and are overall 20 in number. These conditions have been categorised (Government of India, 1989) as follows: -

1) Open cast workings
2) Drilling and blasting of deep holes
3) Design operation and maintenance of excavations
4) Design operation and maintenance of trucks or dumpers or dozers or scrapers
5) General Precautions.

Most of them are related to mining techniques ensuring safety of workers but some are overlapping with environmental concerns as they are related to work related environment.

The Uttar Pradesh Pollution Control Board has issued its consent to establish as well as consent to operate. Consent to establish is general in nature and is based on preliminary proposal while consent to operate is much more specific. However, the PCB satisfies itself on the compliance status of the conditions of the consent to establish, before consent to operate is granted. The 'consent to establish' granted by the SPCB, stipulated 23 conditions, which were based on air, water and waste. The consent to operate is given for expansion of production capacity of the project and is valid from 1/01/2005 to 31/12/05. It is based on Air Act 1981, according to which 13 general and 21 specific conditions have been stipulated by the UPCB. Based on Water Act 1974, 13 general and 29 specific conditions have been stipulated (UPCB, 2004).

8.3.4 On-going follow-up Mechanism in Kakri OCP

The head office of Kakri project is Northern Coalfields Limited, which is located in Singrauli. The two regulators in case of Kakri OCP are the UPPCB and the regional office of the MoEF. Both the regulators' head offices are located in Lucknow. These offices have further sub-regional offices, which are responsible for checking compliance of particular industries in their zone. NCL sends compliance reports once in 6 months to the regional office of MoEF in Lucknow. The Lucknow office confirmed that the project was visited once in every year since environmental clearance was first granted to it. Although environmental clearance for increased production capacity of 3.0 MTY was granted only in 2005, the project was working on the basis of the conditions stipulated by the MoEF for production capacity of 2.5 MTY.

The proponent also sends compliance reports to the UPPCB. The UPPCB has given consent to operate for one year. Thus for renewing it again for the next year, the mine would have to

be inspected by them. This practice of one year consents are granted by the UPPCB purposely as it helps in ensuring that the PCB visits the projects yearly. Thus as far as on-going follow-up for Kakri OCP is concerned, it had commenced involving both the MoEF as well as the UPPCB. DGMS also inspects the mines but DGMS offices have not been visited to confirm this.

8.4 Case Visits

In order to check the extent to which environmental monitoring conditions were actually implemented on the ground observations were carried out (See Chapter 2). All three mines were visited and evaluated as follows: -

8.4.1 Maintenance of Topsoil: As mentioned earlier, topsoil restoration and maintenance is paramount as it helps to retain moisture, helps in recharging of ground water and also maintains plants in restoring the land as the nutrients essential for plan growth are locked in this layer (See Chapter 6). In case of open cast mining the topsoil is removed in order to excavate coal from beneath the surface. This constitutes an important impact of OC mining. According to the conditions of MoEF this topsoil should be preserved and should be used for land restoration.

For all three case studies, the first specific condition mentioned by the MoEF and worded identically is that 'top soil should be stacked properly with proper slope at earmarked site(s) and should not be kept active and shall be used for reclamation and development of greenbelt'. In case of Kakri OCP in NCL, through observation and discussions with the proponents it was revealed that this condition was not being met. The reason stated was that the stripping ratio was low i.e. the layer of topsoil is thin which makes it impossible for it to be stored and maintained. In case of Ananta project of MCL, the same story was repeated

and it was also suggested that this condition is usually not met by any of the companies due to the costs and technicalities involved. However, according to the proponents of the Umrer project of WCL, this condition was partially met. Unfortunately, this statement could not be verified, as it would involve scientific tests and analysis, which was beyond the scope of this research.

The regulators responsible for all projects were also interviewed. In this context, it was clear that they too were aware of the non-compliance status of this condition. It was therefore surprising that although such a condition was repeated in all clearance letters by the Ministry and at times stated in the EMP as well, no efforts were being taken to implement it or at least to modify the condition by the regulators in such a way so that it would become more suitable for implementation by the proponents. The reason for repeating conditions in the clearance letter and EMP was stated to emphasise the condition.

8.4.2 Maintenance of Over Burden (OB): The loose unconsolidated material which is excavated to reach the coal seam is the over burden (See Chapter 6). The second specific condition common to the clearance letter of all the three projects was related to maintenance of Over Burden dumps. Once again, this condition is also worded identically and includes specifications on height and slope of dump, which are maximum 60 m height and 28^0 slopes in all cases (GoI, 2005a; GoI, 2005b; GoI, 2005c;). The height ad angle is specifically mentioned to avoid erosion or instability of the OB dumps as this can lead to mud slides. The condition also mentions that monitoring and management of rehabilitated dump sides should be continued until vegetation becomes self-sustaining. The vegetation helps to bind the soil together avoiding soil erosion.

In Kakri OCP of NCL, the EMP states that the slope of the OB would range from 28^0 to 37^0. This was proposed, as the terrain of the project site is hilly due to which the space for maintaining the OB at 28^0 is not always possible. However this suggestion was refused and the condition in the clearance letter was stated, that an angle of 28^0 for the slope is to be maintained. In practice, this condition has still been violated but no action has been taken.

Usually toe-walls are also built to check soil erosion (See Chapter 6). With this regard the maintenance of the OB dumps in the Kakri OCP site was impressive as compared to the other two mines. In Ananta OCP, remnants of toe-wall existed in old OB dumps (See Picture 1 & 2). It was confirmed through discussions that these were built to comply with World Bank standards.

However, toe-walls are usually not built any more as the proponents view it to be expensive. Ananta OCP is also not as hilly as Kakri OCP and thus the proponents' think that instability in the OB dumps is less and can be effectively controlled by planting trees. Some plantation activities in OB dumpsites were done in all the three mines.

8.4.3 Wet Operated Drills: Drills should be wet operated or with dust extractors. This condition is not only common for all the clearance letters issued by the MoEF but is also common in the DGMS conditions. All projects claimed to be have wet operated drillers.

Due to safety reasons, the author was not allowed to view such a drilling mechanism closely. But based on discussions, it is concluded here that all the three mines complied with this condition.

8.4.4 Plantation: Plantation activities usually help to control dust pollution as well as help in avoiding soil erosion (See Chapter 6). The compliance of this condition was generally

satisfactory for all three mines. The proponents were also keen to show the plantation activities that were carried out. OB dumps were externally covered with plantation. Plantation was also done along workshop roads and in and around the townships. In addition to normal plantation activities, plants of medicinal value were also planted.

8.4.5 Tarpaulins on Transporting Materials: This condition is imposed to protect roads and nearby areas from coal dust. Coal dust is a major source of air pollution in OC mining areas. Use of tarpaulin on coal-loaded trucks is encouraged to reduce such impacts (See Chapter 6, p.160). This is however not strictly adhered to as was evident from the condition of the roads. Although tarpaulins were provided, workers do not follow this condition diligently. Some trucks had tarpaulins while some did not. NCL was particularly good with the implementation of this compared to the WCL and MCL projects.

8.4.6 Protective respiratory devices: This condition is included in the clearance letter issued by the DGMS as well as the clearance letter granted by the MoEF. During the mine visits, evidence of protective devices by workers was not present. Through discussions with the proponents it was evident that workers usually are not very strict with wearing the devices. Thus, this condition is not strictly observed in the mines endangering the safety of workers.

Picture 8. 1. Toe-wall in Kakri OCP (taken by author, 2005)

Picture 8.2. Toe-wall in Ananta OCP (taken by author, 2005)

8.4.7 Mobile Water Sprinklers: This is another method of suppressing dust in OC mines. During the time of the field visits, it was monsoon season in India. Due to this, mobile sprinklers were used less. However, proponents in all three projects confirmed that this condition was always met. Mobile sprinklers were present in all projects and active mobile sprinkler was noticed in MCL. According to the regulators compliance of this condition was usually satisfactory.

8.5 Emerging Issues from Case Studies

A more detailed case study analysis is presented in the next chapter. However, with the introduction of the case studies, certain broad themes and issues emerge. Although all of these are not directly related to follow-up, they do act as influential factors in shaping how follow-up is done.

Mine Age: According to the criteria set for choosing the case studies (See Chapter 2, p.45), the age of the mine had to be taken in to consideration. The mine should be at the implementation stage, i.e. neither too new nor too old. The mine age of all the OC projects were collected from the CIL office during the second field trip. The age depicted in these records were based on the production capacity of the mine at that particular point of time. However, while undertaking the selected case studies in detail, it was realised that all the three mines began much before the 1994 EIA Notification was enacted. The mines have been evolving with time. Due to intense demand of coal, the mines have increased their production capacities. Each mine had a long life, which can be further divided into distinct phases based on the production capacity. The mines and their environmental management also have been evolving along with the Indian legislation. These transformations may not have been very straightforward due to the roles played by the various stakeholders in it.

Post facto Environmental Clearance: Although the mines have been producing for many years, a pattern has emerged showing most of them had applied for environmental clearance from the MoEF over the past 2 years and all of them had been granted clearance in 2005. This is because all the projects have been granted post-facto environmental clearance.

In 1998, it was observed by the government that large numbers of existing units were operating without having obtained an environmental clearance, which was mandatory by then. This review was initiated by the Goa Foundation Versus Union of India case. In order to bring such units under the regulation, the Ministry instructed the SPCBs on 5th November 1998, to issue notices to all such units to apply for environmental clearance by 31st March 1999. This deadline has been extended twice. First to 30th June 2001, then 31st March 2003. This final chance for letting defaulting units to regularise themselves was instructed through the circulation dated 14th May 2002 (GoI, 2002). This also explains the findings from the second field trip (See Chapter 7), where a sudden increase in applications for environmental clearance for OC coalmines was observed. In 2004 alone, ten open cast coal projects applied for environmental clearance.

All defaulting units which used this opportunity were required to earmark a separate fund for eco-development measures, including measures for benefiting the community. However, units that were established before 5th November 1998 (i.e. before Ministry's first circular or post-facto clearance was issued) are exempted from this. The projects, which have already been granted the ex-post facto clearance, have to deposit the amount required to be earmarked for eco-development measures to the concerned SPCB. Any fund already spent should be deducted from this and in cases where projects are covering more than one state; the Central Pollution Control Board will keep the deposit (GoI, 2002). Thus all the

OCP studied applied for the clearance only at the very last opportunity. As a result it has taken a decade to even start implementing the regulations that were enacted. Considering this, follow-up has hardly taken off the ground.

Weak Regulatory Bodies: Usually the regulators need to have control over the developers regarding the conditions and capacities that can be produced. However, in the Indian case the developers seem to be having all control and regulators have to keep pace with the developers. The whole point of regulating the coal mining industry is getting defied as whatever maybe the regulatory conditions, the demand will have to be met with increased production. This is exemplified by the fact that the condition letters issued by the SPCB as well as the MoEF specify that mining conditions or capacity should not be changed without prior consent from them (GoI, 2005a, b and c). The letters also mention that failure to comply with any of the conditions may result in withdrawal of the clearance, but this has never happened. During the mine visits, it was clear that there are some conditions, which are never complied with and although the regulators are aware of this, no steps are taken either to take action against the developers or to modify the conditions in such a way so that the developers can abide to the thresholds. In case of the Ananta OCP the production capacity has been increasing faster than clearances have been provided and although the current production capacity of the project for which clearance was granted was 8.0 Mty, the proponent was producing 10.Mty and a new EMP report was being formulated for 12.0 Mty (MCL, 2005). Such a practice was also justified in the EMP with the reason that the mine had to supply in order to meet the rising demands.

But a major setback for regulators has been the decision given by the Supreme Court. In 2005, it was observed that many projects were still not meeting legal requirements and were

in operation without having obtained the mandatory environmental clearance from the MoEF. The Government of India passed an order, dated 2nd March 2005, directing closure of defaulting units within a period of ten days, which were operating in violation (Supreme court of India, 2004). However, past performance of the Ministry also indicated that too much time was required for granting environmental clearance. Thus, the operation of the order dated 2nd March 2005 stayed, while directing the MoEF to process the applications. This fact may explain the reason as to why the clearances were suddenly granted at a faster pace compared with the time usually taken. It is also worth noting here that EMP for all the three mines was submitted during different years. Umrer, Ananta and Kakri submitted their EMP for environmental clearance in the year 2005, 2002 and 2003 respectively. As shown in Table 8.4, all of them were granted environmental clearance within 2nd to 20th May 2005. But eventually all the three mines received their environmental clearance from the MoEF more or less around the same time of summer 2005.

The violation resulted in closure of various projects. Many of these projects which were either ordered to close down or were apprehending closure appealed to the Supreme Court. Coal Mines were also included in this. These applications were examined by the Supreme

Project Name	Date Consent to Establish Obtained	Date Consent to Operate Obtained	Date of application for environmental clearance	Date clearance was granted by MoEF
Umrer	23rd September 2004	Not obtained	3rd May 2005	20th May 2005
Ananta	12th May 2004	31st Mar 2005	19th Dec 2002	2nd May 2005
Kakri	11th Jun 2004	2nd May 2005	March 2003	11th May 2005

Table 8.4 Comparison of Time Frame within which Consents and Clearances were obtained by the Case Studies

Court, which asked the MoEF to examine them and assist the court. According to the status report, which was prepared, 292 units were violating. These can be divided into two categories, mining and industry. Mining category consisted of 171 units out of which 35 are coalmines. Out of these the ministry has granted clearance to 18 units, including the case studies. All 35 coalmines have been allowed to carry on production. These produce approximately 35 million tones of coal, which is essential to fuel the economy of the country (Supreme Court of India, 2005). Action has been taken against the non-coal mining units.

Thus, coal-mining industry was blanketed from the action taken against the violating units. The Government had taken strong measures to regularize the violating industries. However, the momentum built from 2002-03 was abruptly stopped with the decision to protect the coalmines. Closing down coal mines, meant threat to the economic development process, which the government did not want.

SPCB Vs MoEF: The SPCBs play a crucial role in environmental protection. Even before the EIA Notification was made mandatory in 1994, the SPCBs controlled the environmental pollution of mines mainly though the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act 1981. The EIA Notification made it mandatory to obtain the environmental clearance from the MoEF. However, this acts as an umbrella legislation combining the various environmental protection legislations already in place. It is possible that the MoEF is yet to strengthen its position in combining the various environmental laws. As it has been seen in the case studies introduction, one of the projects was operative even without an environmental clearance. In others the clearances obtained were already outdated as the production capacity was in excess of the permitted capacity.

World Bank Funding: Care was taken to study only those mines, which did not have any World Bank support or funding from any other agencies. The rational for this criterion was based on the fact that funding agencies impose their own environmental standards, which the proponents have to abide to in order to be eligible for the fund. During the case studies, it was found that all the three projects have been World Bank funded at some stage or the other. Due to this past experience, the practice of follow-up may to certain extent have been influenced by the agencies. This influence is perhaps good in many cases like the remnant of Toe-wall in the Ananta OCP (See p.223) is due to World Bank requirements. This is not necessarily the reflection of true Indian practice. This has been kept in mind while interpreting the data collected in the field.

Chapter Nine

Analysis of Case Studies

In this chapter, the three case studies are analysed. The analysis is based on the information obtained through interviews, document analysis and mine visits. It is presented according to the five categories of the good practice list identified in chapter two, including (i) regulations and institutional arrangements,(ii) approaches and techniques, (iii) resources and capacity,(iv) involvement with stakeholders and (v) regional variation.

9.1 Case Study Analysis

According to the framework developed by Morrison- Saunders et al (2003), follow-up implementation is influenced by four contextual factors, including: a) regulations and institutional arrangements, b) approaches and techniques, c) resources and capacity and d) the project type. The first three factors are used in the good practice list. The fourth factor, (project type), is not used here, as this has been kept constant in the study. Additionally, based on the discussions provided in chapters 2 and 5, the framework also includes the involvement of the stakeholders and regional variation. The case studies are compared with these criteria set in the good practice list. The performance of the case studies against each criterion of the good practice list is graded, based on information gathered through document analysis, interviews and mine visits. Depending on their performance against each criterion, an overall grade is given to the respective case studies. The scoring system adopted for this purpose is based on the review procedure developed by Fischer (2005) (See chapter 2).

9.2 Regulations & Institutional Arrangements

There are seven questions within the broad category of regulations and institutional arrangements. The answers to these questions have been obtained with the help of discussions and interviews, carried out with the various stakeholders. Furthermore, they are based on document analyses and observations. Unlike chapter 6, where the design stage of follow-up was reviewed against the good practice list, here the actual legal requirements for follow-up practice in the case studies are analysed.

No.	Questions for Regulation & Institutional Arrangements	Grade Obtained		
		Umrer	Ananta	Kakri
1	Is the follow-up system implemented based on clear and specific legal provisions?	F	E	D
2	Are there any stages specified in legal provisions?	E	D	C
3	Are any time limits for the various steps in the follow-up process?	E	D	D
4.	Is there any strong commitment by EIA regulators to undertake EIA follow-up?	F	D	D
5.	Are there any independent bodies responsible for reviewing follow-up programmes and results?	G	C	G
6.	Is there any integration of self-regulation tools of the particular industry with the follow-up mechanism?	E	D	E
7.	Is proponent voluntarism encouraged?	G	D	D
Overall Score for Regulations & Institutional Arrangements		E	D	D

Table 9.1 Performance of the Case Studies against Regulations & Institutional Arrangements Category of Good Practice List

Tale 9.1 shows the grades awarded to the respective case studies against the questions in the category of regulations and institutional arrangements in the good practice list. An overall grade of E was awarded to Umrer and a D was awarded to Ananta and Kakri OC project, respectively. The grade reflects that in practice the regulations and institutional arrangements suffer from omissions or inadequacies. In case of Ananta and Kakri OCP, parts were well attempted. However, the performance of Umrer is unsatisfactory as it

reflects that follow-up had ignored important legal standards and specifications. The detailed analysis of the performance of the case studies in implementing regulations and institutional arrangements is discussed in the following paragraphs.

Legal Provisions for Follow-up: There was absence of clear and specific legal requirements in the case of Umrer OCP. The project is working without having obtained any clearance from MoEF, which implies that follow-up is not taking into consideration conditions stipulated by the Ministry. The follow-up criteria are based on the specifications of the SPCB, which are mainly the Water (Prevention and Control of Pollution) Act 1974 and the Air (prevention & Control of Pollution) Act 1981. The EMP itself considered the other parameters to be monitored. But compliance checking had not yet commenced by the MoEF. As a result, the only legal provisions applicable for the mine are the general conditions of Water and Air pollution stipulated by the MPCB. It can therefore be concluded that follow-up in Umrer OCP is not based on specific legal provisions. Grade F has been given to this criterion in Umrer OCP.

Ananta OCP complies with the SPCB conditions, which are guided by the Water (Prevention and Control of Pollution) Act 1974 and the Air (prevention & Control of Pollution) Act 1981. The project started its application for the MoEF clearance since 1992 for a production capacity of 5.5 Mty against its sanctioned capacity of 1.5 Mty granted in 1991. Thus, the project has been complying according to the conditions laid down in 1991. It was also revealed that the proponent was not clear with the legal status of the EMP. Thus in practice, legal and institutional provisions are not clear as a result, this criterion have obtained grade E.

Compliance in Kakri is also based on the Water and Air Act and environmental clearance obtained from MoEF in 1989 for a production capacity of 2.5 MTY. The proponents comply with the conditions stated in their EMP as well. Although inadequacies are present, overall performance is better than with the former two. Accordingly, Grade D was awarded.

Legally Specified Stages of Follow-up: As far as maintaining threshold for air and water pollution is concerned, the entire mine life is treated in the same manner with similar thresholds to be maintained for the parameters of water, air, noise and vibration. In the case of Umrer OCP, special provision is made only for the mine closure plan. However, the EMP comments that the mine has adequate quarriable reserves, which will be further extended and thus no closure plan had been finalised yet (CMPDI, 2005, p.42). Some distinct stages have been practiced in implementing follow-up, but these are due to production purposes and include land reclamation, stabilising Over Burden Dumps and Plantation activities. Grade E has been given to this criterion in Umrer

For Ananta OCP follow-up is general in nature and as such it does not have distinct stages. However, mine closure plans are going to become mandatory which will have distinct follow-up parameters for the termination stage. At present this criterion is not satisfied and accordingly, has been given Grade D

In Kakri OCP, the EMP specifies stages like land reclamation to be done with five years and then again after ten years. The MoEF or the SPCB, which in this case is the Uttar Pradesh Pollution Control Board (UPCB), does not specify any stages as such. Although the regulators do not specify distinct stages, the proponent does implement follow-up

stage-wise to some extent. Presence of a formalised EMS system has further enhanced this practice. Grade C was given to these criteria in Kakri.

Time Bound Follow-up: According to the EMP of Umrer, a time bound action plan is desirable for follow-up. The EMP does mention that a calendar plan for backfilling has already been drawn up, but there is no provision for this to be inspected. The clearance letter from the MoEF also states that a progressive mine closure plan needs to be drawn up. The fact that the project has only recently been granted the clearance and monitoring has not yet begun reflects that time limits are not followed through in reality. Thus Grade E has been given to this criterion.

In case of Ananta OCP, this criterion is partially met, as according to the EMP land reclamation has to be done within a time limit. Community health survey needs to be done in specific timings so is regional cumulative impact assessment. Thus there is evidence of time bound features for this project. Grade D has been given to this criterion.

In Kakri, OCP follow-up compliance reports have to be submitted within time limits, but follow-up implementation is not legally time bound. The EMP does have evidence of some time bound plans but these are not checked by any regulatory authorities, thus it is proponent initiated and Grade D has been given to the performance of this project in his criteria.

Commitment by EIA regulators to undertake follow-up: It was confirmed by the MoEF office in Bhopal that till date Umrer OCP was never visited for inspection. Therefore, there has been gross violation of the EIA Notification. The ex-post facto clearance, which Umrer recently obtained, was a result of the Supreme Court circular intervention (See Chapter 8), instigated by the Goa Foundation Versus Union of India case (Supreme Court, 2002). This in

itself exemplifies that the regulators had shown no commitment in implementing the legislation. Although the project has now started, the MoEF has not yet visited the mine. However, the MPCB has confirmed that monitoring has been conducted on their behalf for Umrer OCP. Thus the performance of the regulatory authorities was very unsatisfactory with important tasks being omitted. Hence Grade F has been given the performance of Umrer against this criterion.

Ananta OCP has been Graded D for this criterion. According to the SPCB, which in this case is the Orissa Pollution Control Board (OPCB), the project submits compliance reports once in every four months. OPCB has also issued warnings to the project regarding insufficient water sprinkler and high RPM/SPM levels. Since 1991, the project has been visited ten times by the regional office of the MoEF in Angul. Considering these, both regulators show commitment. However, the fact that the project has been producing more than its sanctioned capacity dilutes the commitment portrayed.

MoEF office located in Kakri confirmed that the project has been visited every year since mining is a hazardous industry and is given priority. The project has been given the consent to operate from UPCB for one year, which makes it necessary for the regulating authorities to inspect the project every year for renewing it again. This practice of one year consents are granted by the UPPCB purposely as it helps in ensuring that the PCB visits the projects yearly. However according to the proponents, the regulators show lack of commitment as they are not mining experts and many a times they do not have the know-how of sampling data. Grade D has been accorded for this criteria.

Independent Review Bodies for Follow-up: No independent monitoring bodies exist for Umrer OCP. The MPCB office however did mention that the Government of Maharashtra

has set up environmental bodies consisting of senior citizens, academicians, freedom fighters and the collector as the head of such a group. But no involvement of any such groups was associated in case of Umrer OCP. Grade G has been accorded to the performance against this criterion.

A Peripheral Development Committee (PDC) is set up for the Ananta OCP consisting of the Chairman cum Managing Director (CMD) and Director Personnel (DP) of MCL, local Member of Parliament (MP) and revenue divisional commissioner. They decide on issues related to funding and scope of follow-up activities especially in relation to the social sector. Thus, independent committee was established looking after environmental issues especially social issues that need to be taken care of. As a result, the project has performed just satisfactorily although there is scope to make the responsibility of this committee more comprehensive. Grade C has been given to the performance against this criterion.

In Kakri OCP, there is no independent monitoring agency for the project. A new independent body called CREP (Corporate Responsibility on Environment Protection) has been recently introduced for exchange of views amongst different stakeholders in particular sector. But this is not applicable to the coal industry. As this criteria has not been satisfied at all in the project Grade G has been given.

Integration of self-regulation tools of mining industry with follow-up mechanism: As already mentioned earlier, environmental protection and follow-up mechanism within the coal mining industry is a combination of environmental acts (Water and Air Prevention and Pollution Act), acts related to EIA (Environmental Protection Act) along with labour (DGMS regulations) and mining laws (MMDR Act) (See Chapter 5). In the case of Umrer, the EMP is the only document, which combines the various requirements to some extent.

In this respect, they are integrated. But the key players for follow-up implementation do not show integration. The project was working in violation of the EPA Act and was producing more than it was sanctioned for. MPCB was checking compliance, but did not notify the MoEF regarding the violation. Thus, if the authorities had worked closely, such violation could have been curtailed to some extent. At present there are significant omissions, especially by the regulating authorities in integrating follow-up. Accordingly, Grade E was given to Umrer project for this.

Like Umrer OCP, the EMP is the only document, which takes into account the requirements of the DGMS, SPCB and social factors. The Environmental Management Cell of the company is responsible for implementing environmental protective measures. The proponent to some extent integrates the various regulating acts but there is potential for the regulators to improve upon this. Grade D was given to Ananta for these criteria.

In order to obtain the consent to establish from the UPCB, the Kakri project needed to obtain an 'Emergency Response Center Membership'. However, according to DGMS requirement the project has to be a member of the Mine Emergency Response Plant (MERP). Both memberships are similar. The project already has a MERP in place, but the UPCB insists the project to obtain the membership specified by them. The proponent is not happy, as this will mean paying extra to the UPCB and yet not obtaining any additional benefits or services. Thus, it seems each regulating body tries to increase their own profit at the expense of the proponent. Grade E was accorded to the performance of the OCP against these criteria.

Proponent Voluntarism: The project creates employment and generates revenue. In the Indian situation, as mentioned in chapter eight, the developer is in a powerful position

compared with the regulators. As far as Umrer OCP is concerned, there was no evidence of the proponent being encouraged for voluntarism. However, it is the community pressure and local politics, which plays a crucial role in obliging the proponent to maintain its follow-up performance. Thus follow-up is more reactive in nature than pro-active. As there was no provision of such voluntarism Grade G was given for Umrer OCP against this criterion.

According to the regulators for Ananta OCP, the Pollution Control Board of Orissa grants an Excellency Award to an industry for their environmental performance. Thus proponent voluntarism does exist. However, the proponents do not think such encouragement really happens in practice. As provision does exist Grade D was given for this criterion.

The only evidence of proponent voluntarism is found in the Water (Prevention and Pollution Control) Cess Act, 1977 according to which 'Where any person or local authority, liable to pay the cess under this Act, installs any plant for the treatment of sewage or trade effluent, such person or local authority shall from such date as may be prescribed, be entitled to a rebate of [5][twenty five per cent], of the cess payable by such person'. The proponents view that this depends entirely on the state government's attitude and government sectors usually never benefit from this. This kind of voluntarism exists only on paper. The regulators, on the other hand argued that such rebates are given. It was recently given to NTPC (National Thermal Power Corporation). As there was evidence that such practices do take place Grade D was accorded to this criterion.

9.3 Approaches & Techniques

There are seventeen questions under the category of Approaches and Techniques.

No.	Questions for Approaches & Techniques	Grade		
		Umrer	Ananta	Kakri
1	Does FU start early in the EIA stage of the project?	E	D	D
2	Is follow-up designed according to the life cycle stage of the project?	E	E	D
3.	Is there any screening mechanism for it?	C	C	C
4.	Is there any scooping done for it? If yes, is it objective -led and continuous throughout the project cycle?	E	E	D
5	Is follow-up design documented?	E	E	D
6.	Is existing data used?	F	B	D
7.	Is monitoring practiced in a comprehensive manner (Use of various monitoring types)?	E	D	D
8.	Is there any provision of rigorous monitoring data? In case rigorous methods are not possible, is there any provision for simple techniques for conducting follow-up?	D	D	D
9.	Does the proponent have any formal EMS in place? If Yes, is it well integrated with follow-up?	?	G	D
10.	In case of too many environmental issues, is there any quick scan approach adopted to determine issues, which require in-depth study	D	D	C
11.	Does follow-up serve all its purposes (conformance, performance, dissemination or tackling uncertainty)?	E	E	D
12.	Does follow-up have all the components?	F	D	D
13	Is any dominant approach practiced for follow-up in the Indian context?	**Legal Based Approach**		
14.	Does FU include environmental, social and health issues?	E	E	D
15.	Does follow-up deal with indirect effects?	D	D	D
16.	Is consistency maintained in the procedure by the regulators For reviewing the reports?	E	E	E
17.	Are the efforts of the regulators (if there are more than one) well Integrated?	F	E	E
Overall Grade for Approaches & Techniques		E	E	D

Table 9.2 Performance of the Case Studies against Approaches and Techniques Category of Good Practice List

Interviews, informal discussions and document analyses have been used in order to obtain the answers for these. The overall Grade given to the three case studies of Umrer, Ananta and Kakri OCP are E, E and D respectively. Table 9.2 provides details of grade awarded against individual questions under this category. However, the questions have been divided into three broad categories in the following paragraphs as follows: -

1. **Analysis of Follow-up Design:** This includes questions 1 to 6 in table 9.2
2. **Analysis of Monitoring Techniques:** Including questions 7 to 12 in table 9.2
3. **Analysis of Follow-up Approach:** Including question 13 to 17 from table 9.2

9.3.1 Analysis of Follow-up Design: -

Early Start of Follow-up: Follow-up in the Indian OC Coal projects do not start early with the EIA process. As is already evident from the discussions above that even after a decade since EIA has been made mandatory in India, follow-up is yet to start off in the true sense.

The baseline conditions used for preparing the recent EMP for the Umrer OCP, for a 3.5 MTY production capacity, took 1998-2002 as the base years, during which the project was already producing around 3.0 MTY. Baseline conditions prior to the implementation of mining operations have never been considered. In case of Ananta OCP, rehabilitation and restellement was conducted before the project commenced. This was to avoid public unrest and in true sense it is more of displacement and compensation rather than resettlement and rehabilitation. In case of the Kakri OCP, the compliance reports are sent after six months from the project commence date. With this respect follow-up activities start early. However rehabilitation of people was initiated before the project commenced. Umrer, Ananta and Kakri OCP have been graded against this criterion as E, D and D respectively.

Follow-up Based on Life Cycle Stage of Project: Follow-up in the Indian coal mines are not specifically designed to accommodate the different life cycle of the mining operation. The conditions stipulated by the Pollution control Board as well as MoEF have not specified follow-up according to the life cycle of the mining project. The EMPs of all three projects have categorised some aspects of follow-up based on the stage of the production process. This is essential from production point of view and involves steps like: -

- Constructing topsoil dump
- Forestation
- Reclamation
- Plantation

However, having a formalized EMS in place, Kakri OCP has evidence have better stage wise implications of environmental management measures. Grade E, E and D have been given to project Umrer, Ananta and Kakri respectively.

Screening for Follow-up: Mining is an activity included in list I of the Environmental Protection Act 1986, and thus requires EIA clearance. According to the EIA Notification 1994, all mining projects of major minerals with lease area of more than five hectares will require environmental clearance from MoEF (GoI). This in itself implies that the project will need to implement follow-up based on the conditions imposed by the MoEF along with the respective SPCB. Thus coal-mining project requiring environmental clearance will always require follow-up. This is an example of the extreme model for screening for follow-up as suggested by Arts, i.e. projects that always require follow-up (Arts, 2001a) (Se chapter 3). Accordingly all the three case studies have pre-requisite follow-up requirements and have been given a grade C for this criterion.

Scoping for Follow-up: Scoping for follow-up for the coal mining industry is to a great extent established by the regulations. This includes the mining, environment and labour laws, which establishes the conditions that need to be complied with. The expert committee while granting clearance also reviews the conditions to be monitored. They can add further conditions in the clearance letter. This to some extent facilitates scoping exercise. Once again Kakri has a better scooping process as it has identified top ten impacts, which needs more attention. ISO14001 certification has enabled it to do so. Grades given to Umrer, Ananta and Kakri OCP are E, E and D respectively.

***Documentation of Follow-up Design*:** In case of all three cases it can be seen that perhaps there are too many follow-up issues to be complied with and many of these are not being implemented. The question then arises is, are these conditions generated specifically for the particular project or are they a mindless repetitions for all projects? The scoping exercise is not objective led. As a matter of fact the EMP itself is not referred to once the clearance is granted. Thus it is a static document. It does not adapt or grow with the project. Once the project is cleared, the proponent is required to comply with conditions stipulated by the respective regulating bodies and at times, even this is difficult to achieve. However Kakri OCP is ISO14001 certified according to which a scoping exercise is conducted and top ten significant impacts are determined. In this respect it is better than Umrer and Ananta. Accordingly Kakri has been graded D while Umrer and Ananta has been graded E.

Use of existing Data: Both regulators as well as the proponent of Umrer OCP commented that data is not exchanged amongst organisations and thus, existing data are not used. It was also mentioned, that organisations are reluctant to share their data as it is usually termed as internal and confidential data. This criterion is not satisfied in case of Umrer OCP and has been graded as F. In Ananta OCP data sharing is practiced. This was confirmed in the EMP where a chart was provided stating the type and source of data used. Existing data was used from Census of India 2001, Sambalpur University, The Central Ground Water Board, Bhuwaneshwar and the Directorate of Mining & Geology, Dept. of Steel and Mines, Government of Orissa (CMPDI, 2005b). The EMP reflected the use of existing data comprehensively and thus this criterion for Ananta has been graded as B. In case of Kakri OCP, CMPDI acts as a nodal organisation, which also acts as an existing data bank. Data from CMPDI is used. This restricts the type of data used. In this respect the system still

suffers from inadequacies and omissions but CMPDIs data bank is a good attempt. Accordingly the criterion has been given a grade D.

9.3.2 Analysis of Monitoring Techniques: -

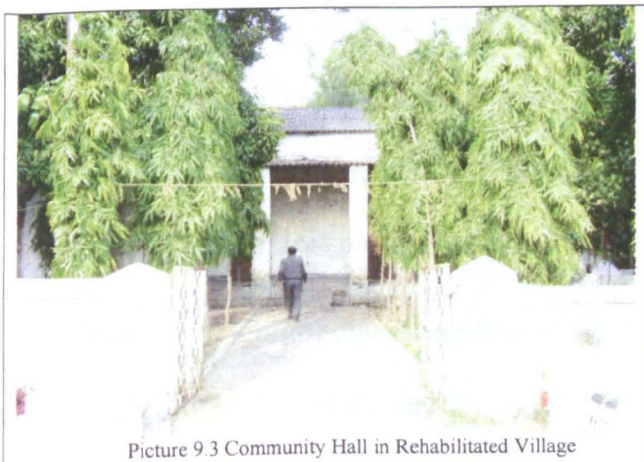
Types of Monitoring: All three projects showed strong evidence of using compliance monitoring. The respective Pollution Control Boards specify environmental parameters, which are continuously measured to ensure that regulatory requirements are met. Baseline monitoring has also been conducted for all three projects (See chapter 3, p.65-67). The baseline period chosen for Umrer OCP was 1998-99 to 2001-02. Interestingly this was also the time span during which the World Bank funded the project and thus the mitigation measures adopted were based on the World Bank requirements. In true sense baseline monitoring for all three projects have never taken into consideration the pre-mining environmental scenario. In addition to these, Ananta OCP mentions about area-wise monitoring while Kakri and Ananta also show evidence of having effects or impact monitoring. Accordingly grades given to Umrer, Ananta and Kakri OCP are E, D and D respectively.

Rigorous and Simple Monitoring Techniques: For all three projects, the techniques used for follow-up are highly technical and rigorous. Since all of the projects are large scale, simple techniques have not been encouraged at all. All the projects have been graded a D, as there is further scope to develop more simple techniques in follow-up implementation.

Integration of EMS with Follow-up: The answer to this question for Umrer OCP is not clear, as according to the discussions held in WCL office, the project does not have an EMS in place. It does have its own environmental management plan based on which the project was considered for clearance. The project proponents did confirm that other projects were already implementing ISO 9000 and ISO 14001 within WCL. There are plans to get Umrer OCP ISO

certified as well, but it was in very early stages. However, when the author visited the particular mine, there were signs claiming the project was one of the first to be ISO 9001-2000 certified. Picture 9.1 and 9.2 is taken by the author in Umrer OCP during mine visit.

Picture 9.1 and 9.2 Evidence of Formal EMS in Umrer OCP (photographs taken by author during case visits)



Picture 9.3 Community Hall in Rehabilitated Village in Ananta OCP (photo taken by author)

Picture 9.4 Temple and Playground built in Rehabilitated Village of NCL (photo taken by author)

MCL does not have a formal EMS in place thus the question of its integration with the follow-up design does not arise. As the criteria have not been attempted at all, it has been graded as G. As mentioned earlier, Kakri project is ISO14001 certified and thus has a formal EMS in place. According to the proponent, the regulators do not give value to such accreditation and follow-up still continues to be stereotype. Integration of EMS with follow-up would only be possible if regulators accepted EMS as a valued contribution in the follow-up mechanism. Based on this information, Kakri was given grade D for this criterion.

Quick Scan Approach: The regulations themselves serve the purpose of a quick scan approach for all open cast coal mine in India. The parameters that are given importance includes, air, water, waste, land, noise, vibration, socio-economic factors as well as safety factors. This provides for a general quick scan, for all open cast coal projects. No specific quick scan approach is adopted for Umrer and Ananta OCP. Ananta involves displacement of people and thereby follows the guidelines formulated by the Orissa government. Grade D has been given to this criteria for both these projects In case of Kakri, ISO 14001 is implemented, as a result of which top ten impacts are identified. This serves the purpose of quick scan approach. The project then complies with the conditions stipulated by the legal requirements as well. The performance of this project as been graded C against these criteria.

Purpose of Follow-up: According to the stakeholders of Umrer OCP, follow-up serves a bit of all functions it is supposed to, but it is chiefly compliance oriented. Through observations, it was revealed that even compliance was not properly done (See Chapter 8). Follow-up undertaken is not what is legally specified, but it is implemented for overall general well being of the community and the area. In this respect, follow-up is to some extent performance oriented especially for the social sector. However, without compliance, performance cannot be improved

in real sense. Social work initiated helps to make the proponent popular. This criterion has been graded E for Umrer.

For Ananta OCP, follow-up is compliance oriented but even this is not fully achieved. Dissemination is weak. However the EMP includes a disaster Management plan, which to some extent tackles uncertainty. Once again for Ananta too, Grade E has been given for his criteria owing to omissions of significant issues.

Follow-up is predominantly compliance oriented n Kakri. Dissemination is also practiced by NCL as awareness programs are conducted by it. The proponent views that ISO14001 mechanism allows for more effective follow-up than the present regulatory requirement does. Grade D has been given to the performance of Kakri OCP for this criterion.

Components of Follow-up: Monitoring is the most prominent component of follow-up in the Indian practice but this too is not comprehensively implemented. Ananta has a peripheral Development Committee, which enables dissemination activities. Successful evaluation also depends on the respective regulatory bodies. At the moment, this is not well achieved in the Indian scenario. Huge volumes of data are generated but not much is being done in making sense of it. Management is a crucial factor, which takes into consideration uncertainities that are coming up in the project. Umrer has been graded as F while Ananta and Kakri have been graded as D respectively against this criterion.

9.3.3 Approach Adopted for Follow-up: -

Legal Based Approach for Follow-up: All three projects are based on command and control approach but unfortunately even this is not fully achieved. The recent interference of the Supreme Court created a good momentum in regularising the defaulting units (See Chapter

8). But this momentum was abruptly broken when defaulting coal units were allowed to go ahead with production, in order to supply the increasing demand of coal. Perhaps, in this respect, the command is with the proponent while the market demand for coal is the controlling factor.

Scope of Follow-up: In case of Umrer expansion project, it was mainly environmental issues that were considered in the follow-up program. There was no rehabilitation involved in the expansion project. The EMP included a paragraph on peripheral development. This included various development works like construction of Primary school, Post office, Shopping center, diversion of cat track for villagers, establishment of bank and diversion of irrigation canal. There was no consideration of health issues in the EMP. The only consideration was in the DGMS clearance according to which periodical health checks-ups should be conducted for mine workers once in five years. Thus follow-up is predominantly environment oriented, and that too is not fully complied with. Social and health factors, especially health factors are seriously falling back in follow-up program. However, the proponent takes initiative to organise health camps for general people. This is not a part of any formal follow-up program but these are some of the community welfare activities conducted by WCL. Overall scope of follow-up is limited and much more needs to be done to make it comprehensive. The criteria has been graded E for this project.

For Ananta OC project, social aspects are stronger compared to environmental and health standards. According to legal obligations, the requirements are similar to any other OC coal projects. However, after studying the project closely, social aspects were considered to be of paramount importance. It still suffers from inadequacies and omissions in environment and health aspects and has been given grade E.

Follow-up in Kakri does include social, environmental and health issues. The EMP has set out a comprehensive plan for social issues, which includes social welfare measures. Health care activities are also included in this. At this stage it is important to point out that such activities are proponent initiated and some of which are general in nature. For example, the proponent organises eye camps, family planning camps, cancer detection camps and special camps by social workers for auditory problems and other disabilities. These are not regulated and are not included in compliance conditions to be followed as laid down by the regulatory agencies. Compliance checking by regulators re mainly focused on environmental issues. Some of the services provided are not necessarily follow-up. The project has been accordingly been given grade D as some parts are very well attempted.

Follow-up of Indirect Effects: The clearance letter from MoEF and MPCB are quite straightforward and indirect effects are not taken into account. The EMP for all three projects does not mention any such impacts. However the social work undertaken by the proponent takes into account many grievances of the local people. Some of these are not even indirect impacts of the project. These steps taken are not formally structured follow-up. But as the proponent is resourceful and has to maintain a general well being of the area for seeing the project through, they become the authority where local people can express their grievances. Indirect effects are taken care of by the proponent as and when they arise or are noticed. These are not included with the legal requirements and no records are kept. However the proponents did confirm that many such indirect effects do come up, especially in relation to social aspects. This was also re-confirmed with the affected community. All the three cases have been given grade D for this criterion.

Consistency amongst Regulators: The Indian experience indicates a lack of consistency with which regulating bodies practice follow-up. There is no particular format in which feedback is provided to the proponents. As a matter of fact, the present practice involves the proponent sending compliance reports, which is usually a one-way process. Very little or no feedback is sent back to the proponent from the regulators. In this respect the regulators are more of policing agents rather than facilitating follow-up measures. All projects have been graded as E against this criterion.

Integration amongst Regulators: The efforts of the regulators are also not integrated. This is more so especially in case of Umrer OCP, where the State Pollution Control Board is in Maharashtra while the regional office of the MoEF is in the state of Madhya Pradesh. The semi-structured interviews revealed that there is no exchange of data or ideas between the bodies. Umrer has been graded as F against this criterion while Ananta and Kakri have been graded E.

9. 4 Resources and Capacity

There are six questions under this category. The answers to these questions have been obtained from document analysis and through interviews. Overall Grade given to Umrer, Ananta and

No.	Questions for Resources & Capacity	Grade		
		Umred	Ananta	Kakri
1.	Is FU responsibility properly allocated amongst stakeholders?	C	C	C
2.	Is finance allocated for conducting follow-up?	D	D	D
3.	Is local knowledge taken into account for designing Follow-up?	D	D	D
4.	Is there any provision of 'institutional memory' and knowledge brokering (contract with universities or research institutes for knowledge sharing)?	C	C	D
5.	Is there any kind of training or education and capacity Building imparted for follow-up?	?/D	?/D	?/D
6.	Is the strength for follow-up team clearly stated?	F	E	E
Overall Grade for Resources and Capacity for		D	D	D

Table 9.3 Performance of the Case Studies against Resources & Capacity Criteria of Good Practice List

Kakri is D. Table 9.3 provides further details of grades obtained by the case studies against individual questions under this category.

Resource Allocation for Follow-up: -

In order to discuss the first question under this category, which is resource and task allocation for follow-up, the question is further subdivided into seven questions, which are shown in table 9.4. For all three case studies the allocation of tasks was quite straightforward and the performance against this criterion has been graded as C. The proponent pays for follow-up implementation, but the regulators pay for inspecting follow-up compliance. However when the regulators come for inspection, the proponent usually provides the cars and other amenities.

Questions for Allocation of Task for Follow-up	Umrer	Ananta	Kakri
Who pays for follow-up?	WCL	MCL	NCL
Who prepares the report?	CMPDI (regional institute IV)	CMPDI (regional institute VII)	CMPDI (regional Institute VI)
Who conducts follow-up?	WCL	MCL	NCL
Who evaluated follow-up?	Head Office WCL	Head Office MCL	Head Office NCL
Who manages the changes if required?	Environment Cell WCL	Environment Cell MCL	Environment Cell NCL
To whom are the results reported to, or, who checks compliance?	MPCB, Nagpur regional office of MoEF	OPCB, Bhuwaneshwar regional office of MoEF	UPCB, Lucknow regional office of MoEF

Table 9.4 Allocation of Responsibility for Follow-up in Case Studies

The cost of preparing the EIA/EMP report is borne by the proponent. In case of Umrer, it is prepared by the regional institute IV of CMPDI (Central mine planning & design institute Ltd), which is a planning subsidiary of CIL (Coal India Ltd) and is itself an ISO 9001 company.

For the Ananta OCP, the regional institute VII of CMPDI, located in Bhuwaneshwar, prepared the EMP. The environmental monitoring cell of MCL conducts follow-up. The samples are sent to the CMPDI laboratory in Ranchi where it is evaluated. The laboratory is approved by the CPCB. The results are then reported back to the environmental cell of MCL. If there is any

evidence of the thresholds being violated, the environmental cell manages these. The results are reported on a monthly basis to the project officer (Ananta OCP Expansion), CGM (Jagannath Area & GM (Environment.), MCL (HQs). The results are reported to the OPCB and the regional office of MoEF in Bhuwaneshwar. The regional office at Bhuwaneshwar of OPCB and MoEF sends these to their respective head office i.e. the CPCB and MoEF in Delhi.

For Kakri OCP, the regional institute VI of CMPDI prepares Environmental Management Plan (EMP). The proponent conducts follow-up, while the UPCB and regional office of MoEF located in Lucknow conducts compliance checking. The head office at NCL evaluates the results and the proponent manages the changes. The results are reported first to the head office at NCL and then compliance reports are sent to the UPCB and MoEF.

Finance allocation for Follow-up: Chapter VIII of the EMP for Umrer OCP is related to environmental cost projection. Rs 3 per tonne of coal produced are kept under revenue to cater for Plantation, Environmental management/ Auditing, Socio-economic welfare measures, Miscellaneous pollution control measures and for Compliance of statutory obligations like Consent fees, Water Cess payment and Authorisation (CMPDI, 2005a).

The finance allocated for environmental cost for Ananta OCP expansion project includes rehabilitation and resettlement package including land; compensation tenancy land; land reclamation, compensatory forestation, anti-pollution measures, miscellaneous like community development, EMP preparation and data generation. Total amount allocated for the above-mentioned purposes is 2,475.1 lacs, which is about 12.16% of the sanctioned capital of the project. However, a major chunk of this total cost is for general environmental measures including community welfare and rehabilitation and resettlement cost.

The capital cost estimates of EMP for Kakri OCP covers various head which include rehabilitation cost; pollution abatement cost; effluent treatment; compensatory forestation, green belt development; technical reclamation; community development and scientific research and EMP preparation. According to EMP finance has been allocated for each cost separately. It comes to an average of Rupees 6 per tonne of coal produced.

The finance allocated for all the three projects includes various activities, and a breakdown for cost involved in follow-up was not clear. The interviews also revealed that this finance is usually not available in reality and most of the time money has to be taken from miscellaneous expenses. Thus although there is indication that the allocation has been well attempted for all the three projects, the interviews reveal that inadequacies do exist as what is allocated is not always utilised for monitoring purposes. Thus Umrer, Ananta and Kakri were given a Grade of D for this criterion.

Integration with Local Knowledge & Culture: The follow-up design adopted by the proponent for Umrer OCP, as well as the conditions imposed by the regulators reflected a standard format. There was very little evidence of using local knowledge for designing follow-up. However, during discussions with the proponents of Umrer OCP it was revealed that for plantation activity, help of local vaidya (ayurvedic doctors) are taken. They usually have a good understanding of the local species of plants beneficial for health. Exhibitions have also been held on this. Thus, by planning medicinal plants and by including these people with specialised local knowledge, the project helps in encouraging local culture to flourish and has been accorded grade D for this criterion.

In Ananta social aspects are important as the project involves rehabilitation and resettlement. Local culture is important in the follow-up design. The rehabilitated villages are built in a way

to retain the original village culture. 'Pipal' trees are planted, which are regarded as 'Devata' (God) by the villagers. The villages also have a platform and a temple in a central location where 'bhajans' (devotional songs) are performed and local meetings and interactions are held. The village was visited and these were confirmed. Picture 9.3 shows community hall built in rehabilitated village following the traditional social norm of the original village. However, the villagers themselves desire modernisation and many times they themselves are not keen in retaining their original culture. This is a result of more money and exposure, which is a result of development. Some of the houses in the villages were lavishly built and the structures were not in conformance with the village houses. Grade D has been given to the project for criteria.

The follow-up design is more or less repetitive in nature in all OC coalmines relying heavily on the regulations to be complied with. However for Ananta project, although the follow-up design follows the common trend, the rehabilitation and resettlement unit takes into account the needs and knowledge of the local people. This is done to avoid social unrest. Based on this, the project was graded D for the performance against this criteria.

There is very little evidence to suggest integration of local knowledge with follow-up design for Kakri OCP. According to the proponents of Kakri OCP, 95% of the population of the company consists of outsiders. This region originally was not a very populated region. However, when rehabilitated villages are built, it is so planned that the village constitutes part of the existing village environment, along with civic facilities provided by NCL. This ensures that the families continue to be in a rural matrix enjoying modern civic amenities. Picture 9.4 was taken by author during mine visit. It shows the temple and playground built in the rehabilitated village. This project too was given graded D for this criterion.

Knowledge Brokering for Follow-up: WCL takes help from a number of Institutes for knowledge brokering. These include Nagpur University, Kavi Kulguru Institute of Technology, National Environmental Engineering Research Institute. Grade C has been given to Kakri project against this criterion.

MCL has been given Grade C as there is evidence of institutional brokering in the EIA/EMP report itself, which uses data provided by the educational institutions as well as other government bodies. During discussions with the MCL officers this was confirmed. MCL also takes help of educational institutions from Asansol and Ranchi.

In case of Kakri OCP the proponents did suggest that knowledge brokering is done, there was lack of evidence to back this up and Grade D has been accorded for this criteria.

Follow-up Training: Courses on environmental protection are held time to time in the mining industry. WCL officers especially avail the courses offered by the Indian Institute of Coal Mining (IICM). Although such provisions may be present, courses on follow-up as such are not mentioned. General environment training is conducted from time to time. Officers are sent for training in IICM (Indian Institute for Coal Management) and IIT (Indian Institute of Technology). However, no separate data could be collected on follow-up specific training. At NCL level itself training is imparted but once again it is not based on follow-up as such. Thus, all the three projects have been given Grade D as there is evidence to suggest that training is imparted to officers on environmental matters, but to what extent importance is given to follow-up issues is unclear.

Strength of Follow-up Team: -

Umrer Proponent: The proponent constitutes a separate organisation for monitoring and management. WCL head office acts as the apex body, which is responsible for supervising the

activities relating to environment at project level through General Manager. The General Manager of the area coordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the project level. Area Nodal officer also known as the environmental officer helps in generating, analysing and interpreting monitored data. An outside agency is employed for plantation jobs supervised by a horticulturist and a supervisor. The project officer is also responsible for mechanical reclamation of the area. WCL head quarter acts as an apex body for environmental management in the project. The General Manager supervises the activities relating to environment at project level. This entire team helps in implementing follow-up and seems to have adequate staff for the purpose.

Umrer Regulator: However, resources and capacity of the regulators was far more inadequate. MPCB is responsible for checking compliance of 11lakh, 25000 industries plus 20,000 hospitals and 250 municipal corporations. But it has only 250 technical staff to accomplish this. Achieving satisfactory compliance checking is next to impossible with the current capacity. The situation of the regional office of MoEF in Bhopal is verse as the office has only 2 officers responsible for checking compliance of over 800 industries. Thus, the office has set up a task of checking compliance for 120 industries per year. This means, assuming they are successful in achieving the set task, each industry gets checked once in every six and a half years. Thus, the regional office is extremely understaffed and not resourceful enough to carry out the task for which it has been set up. Based on this information, the project has been graded as F.

Ananta Proponent: The EMP for Ananta provides a detail organisational structure for mine as well as environmental management. In first glance the follow-up team strength looks adequate. However in reality, most of the officers are pressed for production duties. During time of the study the officer responsible for follow-up implementation was himself an engineer in

profession and had very limited staff for his assistance. First priority was production and thus environment is not prioritised in terms of resources and staff. Officers from non-environment backgrounds are given the responsibility to see follow-up implementation. Based on this information, grade E was given to this criterion in Ananta.

Ananta Regulator: The regional office of MoEF was also highly understaffed for checking compliance. Usually due to lack of staff, all industries are not monitored every year. The Bhuwaneshwar office of MoEF has four posts for scientist. During the time of the study the office has only two scientists responsible for checking compliance of around 390 projects. Thus, many projects were being dropped for checking compliance. The office has set up an official target for checking compliance of 80 industries per year.

The OPCB has 200 officers including the sub-regional officers. It has about 50 scientists and engineers and the number of industries to be monitored is 200 in number out of which 25 are coalmines alone. Overall the regulators are weak in their numbers and are understaffed. The proponent has a sound looking follow-up team, but in reality most of the staff and resources are dedicated for production and environment is usually the shunned department. Grade E was given to Ananta for this criteria.

Kakri Proponent & Regulator: In case of Kakri, it was reported that like other environmental cells in CIL subsidiaries, NCL too has one, but in reality there are only two men in Head Quarters responsible for environment and monitoring and just one in project. The regional office at Lucknow had three scientists to cover more than 150 industries. The official target is to check compliance of 112 industries per year. However, the more hazardous industries are usually checked every year including open cast coal mining projects. The UPCB has 18 regional offices and has an overall strength of not more than 1000 staff including clerical

staff. Once again the resource and capacity provided is unsatisfactory as there were significant omissions and inadequacies in the system based on which Grade E was given.

9.5 Involvement with Stakeholders

There are six questions under this category of the good practice list. Project Umrer, Ananta and Kaki have been graded as E, D and D respectively. Table 9.5 shows the grade accorded to the individual questions under this category in details. The analysis of the projects against the criterion set under this category is discussed as follows.

No.	Questions for Involvement with stakeholders	Grade		
		Umred	**Ananta**	**Kakri**
1.	Does community participation take place from an early stage?	**E**	**F**	**D**
2	Are the results of the follow-up available to the public?	**E**	**E**	**E**
3	Are public concern represented in follow-up?	**E**	**C**	**D**
4	Do regulators insure that follow-up is carried out in accordance with the regulations?	**F**	**D**	**D**
5	Is follow-up viewed as useful exercise?	**D**	**D**	**D**
6	Is follow-up regulator, proponent or community driven?	**?**	**Reg/Com**	**Reg/Pro**
Overall Grade for Involvement of Stakeholders		**E**	**D**	**D**

Table 9.5 Performance of the Case Studies against the Criteria of Involvement with Stakeholders category in the Good Practice List

Community Participation in Follow-up: In the open cast coalmines in India, public hearing is made mandatory for EIA clearance. Public hearing facilitates community participation in the project. In Umrer OC project, public hearing was conducted before the EMP was prepared and thus community participation started for the Umrer expansion project from the initial stage. However, the EMP preparation commenced when the project had already expanded. Thus in true sense, public hearing was conducted as a formal requirement after the project had commenced. This criterion has been given grade E for this project.

In Ananta OC project the EIA/EMP report of the project was submitted to the MoEF for clearance on December 2002 but the public hearing for the project was conducted on January 2004, which is two years after the report was submitted. This proves that public participation has not been given enough importance from the early stage of the preparation of the EMP. The project was already producing more than it was sanctioned for during the public hearing meeting. Like Umrer, the hearing is conducted to meet formal requirements after the project has commenced and in this case even after the EMP has been prepared. Accordingly Grade F has been given to the project for the performance against this criterion. The public hearing meeting for the Kakri expansion project took place in 2003 while the project was given clearance on 2005. Thus public participation for Kakri OCP also began at the initial stage of the project and has been graded D.

Access to Follow-up Result: The EMP itself is strictly restricted document. It is not available to any person who is not holding an official position in the CIL or the Government. The compliance reports are displayed for the public in the village council body (panchayat). According to the proponents people usually do not view the reports as even from their point of view, the interest and thrust is on employment issues more than environment issues. When asked about these reports to the public, six out of eight of them were unaware of their existence. The reason for their unpopularity may be because the reports themselves are technical in nature without any comments on evaluation making it difficult for the common man to make sense of it. Thus all the three projects had similar problems. Grade E has been given against this criterion to all three projects.

Representation of Public Concern: The minutes of the public meeting in Umrer and Kakri OCP are put forward and discussed and the issues have been integrated with the EMP. The

minutes were also provided to the MoEF during the project application. Grade E has been given to Umrer OCP and D to Kakri OCP.

During the public hearing for Ananta, various issues were raised by the public, related to environmental pollution, employment opportunities, transport conditions and medicinal facilities. Most of these issues are addressed in the EIA/EMP report. As the report was prepared much before the public hearing meeting, the minutes of the hearing have been attached with the existing report. The public has also raise the issue of peripheral development activities and the project has set up a peripheral development committee. Although the meeting was held after the EMP was prepared and the project was then already producing more than it was sanctioned for, there are good evidences to suggest that issues raised were integrated with the follow-up mechanism of the project. Thus Grade C was accorded to the performance of Ananta OCP against this criterion.

Responsibility of Regulators in Ensuring Compliance: In this respect, Regulators in Ananta have been the most active. They have issued warnings to the project and have regularly checked compliance. Regulator's performance in Umrer is perhaps the worst. Maharashtra is a economically developed state and perhaps the regulators have more pressure here to check compliance of more industries. Grade given to Umrer, Ananta and Kakri is F, D and D respectively.

Perception of Follow-up: For Umrer, the proponent, regulator as well as community all confirmed that follow-up is a useful exercise and this crietria has been graded as D. At present the project does have much more scope left to improvise its follow-up design but as admitted by the proponents, environmental protection a few years back was just related to planting trees and thus although there was a cell in WCL looking after forest, the office did

not have an environmental department. Thus follow-up has improved in recent years. It has broadened its scope it helps in protecting environment along with creating rapport with community.

Community, regulators as well as the proponents of Ananta OCP do think that follow-up has helped in maintaining a certain standard of environment, which in its absence would be totally lost and thus it is a useful exercise for them. Grade D has been given to this criteria for Ananta project. However the proponents do think that sometimes, the conditions laid by the regulators are repetitive in nature and are not applicable in certain cases. It was pointed out that once the regulators had imposed certain specification on the OC mine which were true for under ground mine. Such unnecessary conditions make the follow-up practice ineffective rather than creating a more serious approach to it.

All personnel interviewed in NCL office viewed that follow-up is a useful exercise. But the existing follow-up system lacks co-ordination amongst the various stakeholders and makes the entire process ineffective. According to the regulators there are a few points that are not complied in the present system. Nevertheless they consider the system to be useful as it ensures in compliance of some of the key issues of environmental management in mines. Once again Kakri has also been given grade D or this criteria.

Stakeholder Involvement in Follow-up: Follow-up in the Indian Coal Mines is predominantly regulatory driven. In case of Ananta OCP, community involvement was stronger. This may be perhaps due to location of the project in a sensitive state, which has dense population and the problem of unemployment. Contrary to this, proponent initiative is more prominent in Kakri OCP. Kakri is located in an area where population is sparse. As a result the proponent faces fewer complications in dealing with social issues and can divert

more attention to improving environmental performance of the mine. Thus, more population does not necessarily mean more emphasis to environmental concern. On the contrary population pressure usually compels the proponent to create more jobs and causes hindrances in the smooth working of the project.

9.6 Regional Variation

Based on the analysis of the first four category of good practice list, it was observed that Kakri performed slightly better then the other two case studies. However all the three case studies performed similarly on many criteria namely 'resources and capacity' where it was observed that the regulating bodies were under staffed for all the three projects. The structure of the subsidiary companies was also similar in the respect that each had its own environmental cell with environmental officers. The screening and scoping criteria was also similar as a standard format is maintained based on the legal requirements in the country. The clearance letters issued by the respective pollution control board and the MoEF revealed that the conditions stipulated are also similar in format and often worded identically for the three case studies. Apparently it may seem that perhaps there is very little difference in the follow-up implementation of the case studies. However, the fact is that the conditions stipulated by the respective regulating authorities have hardly considered individual specifications and characteristics of the case studies. All over the country a standard format is maintained and this is irrespective of the requirements of the particular project concern.

In order to investigate the occurrence of regional variation in implementation of follow-up, the case studies were inspected closely based on the factors identified to be causing regional variation. Regional variation was suggested during the pilot interviews (See Chapter 2) and confirmed during the semi-structured interviews conducted amongst key players at national

level. Based on the findings of the interviews undertaken, the factors responsible for contributing to regional variation can be broadly categorised in to five categories which are:

1. Economical
2. Social
3. Political (Government)
4. Geographical (Physical Environment)
5. Managerial (See chapter 7)

During the case studies, these factors have been further explored. The detail analysis has been provided as follows.

9.6.1 Economical Factors Causing Regional Variation: -

Challenges in Job Creation: Out of three case studies, Maharashtra as a state is economically more advanced than Orissa. In Orissa, the pressure on the proponent for providing employment is overpowering. The interviews revealed that the proponent was compelled to provide employment to people who were not necessarily affected by the project. Social unrest is very common in these areas. The Peripheral Development Committee was perhaps initiated in this project to take in to consideration the issues that arise from the community. Such mechanisms are absent in the other two case studies. Although public hearing meeting was held in Ananta after the EMP was prepared, there was strong evidence to suggest that the recommendations of the public hearing meeting were incorporated in the EMP. This is perhaps done to control social unrest in this sensitive area.

Power of Proponents: As the proponent is a revenue generating company, the state government also depends on the proponent for the overall improvement of the area. Thus proponent runs more or less a parallel government. This puts undue pressure on the proponent but at the same time makes the proponent very powerful and dilutes the role of

the regulators. As it can be seen in case of MCL, the project has been increasing its production continuously to meet the rising demand of coal irrespective of the clearance obtained.

Occupational Pattern: The economic situation of the region has a direct relationship with the occupational pattern of the population. Maharashtra has less people depending on agriculture. As a result the project-affected people are progressive and blend themselves with the new industry. However in Orissa, the value of land is more for local people, as most of them are agriculturist. Thus demand for land compensation is higher. As it is impossible to satisfy everyone, social unrest in these mines are common.

Under Staff Regulating Bodies: The resource and capacity of all the regulating bodies is weak. But their position becomes weaker in an economically active state as it means industries are more densely located demanding more resources to monitor. This may lead to corruption as well. In case of Umrer, no records were obtained from the respective pollution control board on the number of occasion the mine was visited. The regional office of MoEF in Bhopal had never visited the mine. As the staff of the regulating authorities is already struggling to keep up with their monitoring targets, they do not have the time or resources to pursue the violating units to oblige by the law.

9.6.2 Political Factors Causing Regional Variation:

Pro-active proponent: In Maharashtra the local MLAs (Member of legislative assembly) are active. This puts frequent pressure on the proponent. This also compels the proponent to engage in research involving institutional brokering. This helps them to use follow-up for defending their role in protecting the environment. Thus in case of Umrer OCP it was observed that although the project had just received environmental clearance and did not

fare well in the first category of the good practice list (regulations & institutional arrangements), it performed satisfactorily under the criteria of knowledge brokering with universities (Grade C)

Corruption: Unfortunately politics can also breed corruption into the system. State Government interference was suggested in MCL where social unrest is very common. Political meetings have also delayed public hearing process. An emergent meeting was called due to which the MLAs (member of legislative assembly) were not able to attend the public hearing meeting, delaying the meeting by a whole year. Political conflicts also result in more public outcry.

Variation in R& R Policy: The Orissa Government has its own rehabilitation and resettlement policy. This further complicates the situation as Coal India Limited also has its own policy on this.

Lack of co-ordination amongst PCBs: Inconsistency amongst the SPCB is quite evident. The Maharashtra Pollution Control Board (MPCB) was yet to issue Consent to Operate to the proponent while the Uttar Pradesh Pollution Control Board (UPCB) gave the consent to operate even before the MoEF granted its clearance. The UPCB does not send compliance report to the Central Pollution Control Board while the other SPCBs do. The cost of the application form required by the proponents also differs. There is not set format for analyses of data and the SPCBs are not coordinated with each other. However the similarity lies in the fact that all SPCBs are understaffed and lack resources.

Lack of co-ordination amongst regional offices of MoEF: In case of Umrer the project had received its clearance from the MoEF in 2005 prior to which it was operating without obtaining any clearance from the MoEF. The MoEF had never visited the mine. However Ananta Project

was visited 10 times since it had started while Kakri was visited every year. Thus there is no format or frequency set amongst the regional offices of the MoEF with which they check compliance. None of the offices provide feedback to the proponents neither do they have a similar reporting style. The reports send by them to the MoEF could not be reviewed as access to these documents was not provided.

9.6.3 Social Factors Causing Regional Variation: -

Priority of project-affected people: In Kakri project of NCL, the proponents wanted to re-create the village culture retaining the original characteristics of the villages, which were displaced. However the people wanted to have a more advanced life and they preferred to deviate from their original cultural settings in pursue of a modern way of life. The people usually get compensation from the proponents, which improves the financial status and this in turn changes their taste and preferences. Thus, it is not always up to the proponent to maintain the cultural identity of the community concerned. It changes along with the changing socio-economic conditions.

Ananta project of MCL however had to take into account the local culture of the people. The villagers usually treat trees as god and they have a particular structure in their original villages, which are maintained by the proponent in the rehabilitated villages. These includes a well with each house, a worship place n the village and other landmarks like a platform at the center of the village where meetings can be held. Here the affected community wanted to maintain their cultural vales. Thus its not always up to the proponent in maintaining original social and cultural values for the project affected people.

Boom Town Effect: In case of NCL, where 95% of the people were from beyond the region, this gives rise to new patterns and cultural set-ups. This is usually termed as the 'Boom Town

Effect' where the new settlement is a spontaneous combination and blend of the several groups that migrates to the area.

9.6.4 Geographical Factors Causing Regional Variation: -

In Kakri mine of the NCL project, the terrain is hilly and there is less flat land available. Due to this, the overburden dumps have not been able to maintain the stipulated angle at which they should be built. However due to the geographical conditions of the region, the mine has very good features of environmental management. Toe walls are built protecting the site from erosion. Although such a requirement is stated for all mines, Kakri is one of the finest examples of actual implementation of these measures. Thus what legal requirements has not been ale to achieve, actual geographical and environmental conditions have.

However, Ananta OCP, which is has a more flat terrain, has low stripping ratio (ration between the over burden thickness and coal seam). According to the proponent, this makes it very difficult for the proponents to maintain the topsoil. Although the issue is debatable, the regulating authorities do not encourage any feedback from the proponents with this regard.

9.6.5 Management's role in Regional Variation: -

The officers did indicate that management was a crucial factor in enhancing or reducing the effectiveness with which follow-up measures are implemented. It was implied by many that the same company is able to achieve more when a strong and environmental conscious management is present. Power lies mainly with the proponent as in this developing economy, it's the coal producing company, which is creating the resource to fuel the economy of the country. Thus the proponent has resources and power. The ability of a mine to perform well in environmental management depends on how much importance has been given to it by the higher management.

The officers were however reluctant to say much due to the sensitive nature of the subject and for ethical purposes details of such discussions have not been presented here.

However, through observation it was clear that having a formal EMS in place made a difference in NCL's performance. In MCL, it was evident that the environment cell was not getting resources to accomplish its task. Production of coal is the most important factor for any of the subsidiaries of CIL and undoubtedly the emphasis is justified. It seemed that with a bit more support and encouragement from management a lot more can be achieved b the mines. Regulators may not appreciate the ISO 14001 implemented in NCL, but it does help in strengthening the environmental management and spirit of the team. Thus, unlike the other factors which are regional in nature, management is perhaps the only factors which is not necessarily regional but which has the potential to overcome the regional variances.

9.7 Summary of Section C

Section C consists of chapter seven, eight and nine. These chapters helped in establishing the importance of follow-up consideration in the pre-decision stage as well as identifying follow-up practice in India through the case studies. The findings of the respective chapters in this section are summarised as follows: -

9.7.1 Consideration of Follow-up in Pre-Decision stage

The study of pre-decision follow-up helped to identify the importance of the contextual factors in follow-up. The documents, which in this case included the unpublished minutes of the expert committee for mining; EIA/EMP reports along with the various interviews conducted at national level, reflected how the formal requirements are considered at the pr-decision stage. This provides a linkage between formal requirements and actual practice.

Regulations & Institutional Arrangements: The regulations and institutional arrangements in India were studied and proved to be fairly established and with good potential. However, an overall Grade of E was given to this category as the overall performance was not satisfactory due to significant omissions of important aspects. The responsibilities are usually overlapping amongst various bodies. The EIA Notification can embrace all of this together, which can eventually contribute in delivering effective follow-up outcomes.

Approaches and techniques: This as graded as D, which implies that some areas are well covered but the overall performance is not satisfactory due to significant omissions and inadequacies. The scope of follow-up is usually restricted within environmental factors. Social factors are included but generic steps are taken for overall improvement. There is a lack of structured follow-up program for social aspects. Health is a neglected factor, which is of vital importance in OC coalmines (See Chapter 6). Rigorous techniques have been used for follow-up but the potential of simple techniques have not been explored. Follow-up is predominantly compliance oriented. Overall there is ample scope of improvement.

Resources & Capacity: Distribution and allocation of resources and capacity was adequately provided for in the EIA/EMP reports. The interviews reflected a clear understanding of the roles and responsibilities allocated to the various parties. Usually, there was a financial provision for ensuring follow-up along with separate environment cells allocated with the task of follow-up implementation. An overall Grade of C was given to this category, as it seemed to be satisfactory despite some minor omissions and inadequacies.

Involvement with Stakeholder: Stakeholder involvement is not satisfying. Although results should be available to public, their views are at times integrated after the reports have been prepared. Thus in true sense, their participation is sought as more of a formal requirement rather

than a meaningful exercise. The EIA/EMP reports are not available to be viewed by public. The overall performance in this category reflected Grade E.

Regional Variation: This has been an established factor and the causes of such variation have been identified as social, political, environmental, economical and management factors. Out of these, four are regional in nature but management is not. It is the most important factor, which if strong can override the regional factors causing variation in follow-up implementation.

9.7.2 Summary of Case Study Introduction

Follow-up yet to start for Increased Production Capacity: Follow-up in open cast coalmines is based on the conditions stipulated by the respective Pollution Control Boards (PCBs), the Ministry of Environment and Forest and the Director General Mines Safety. In case of Umrer, follow-up with MoEF was yet to commence. Ananta and Kakri were also producing more than the projects were sanctioned for. Thus, follow-up for increased capacity for the respective projects had not yet commenced.

Supreme Court Intervention: The recent environmental clearances granted in the year 2005 by the MoEF were initiated by the MoEF's Circular dated 12.02.2002. The Supreme Court created further pressure on the MoEF to clear pending projects and close down violating ones. As a result of this all the three case studies received their clearance from the MoEF in May 2005 although they had applied for the same in three different years. Thus the Ex-post-facto clearance has played a major role in compelling open cast coal mining projects to obtain fresh environmental clearance as well as on MoEF to grant environmental clearance.

Poor Compliance in Mines: The monitoring conditions stipulated by the various regulating bodies are repetitive in nature and are usually identically worded for the three case studies.

Although different regulating bodies share several overlapping responsibilities, it was observed through mine visits that there are some particular monitoring conditions, which are never complied with. These conditions are merely repeated in case of all mines without proper compliance. Maintenance of top sol is a typical example, which is almost never complied with. In most cases the regulating bodies were aware of this but no action was taken against the mines.

Regional Variation: Some of these conditions were also not complied with because of the regional and geographical variation within the mines themselves. In case of Kakri OC project, due to hilly terrain and lack of space the over burden dumps were built steeply and did not comply with the specific angle of 280 as mentioned in the clearance conditions. Such factors were not taken into account while stipulating the conditions, neither were the proponents consulted before laying down such conditions.

The regulating bodies repeat conditions to be monitored but there is a lack of integration amongst them. The coalmines are compelled to increase production due to the increasing demand. Production does not wait for environmental clearance rather Government relaxes various requirements in an attempt to make these violating units work according to legal requirements.

World Bank Influences: The practices in the coalmines are influenced by the World Bank conditions, which were imposed when the projects received funding from the agency. Although requirements were met during the time of funding, these were not continued later. However this was kept in mind when the mines were visited.

9.7.3 Summary of Follow-up Implementation in the Case Studies

The case studies namely Umrer, Ananta and Kakri OCP revealed significant similarities and dissimilarities with which they perform their follow-up implementation. Umrer OCP was graded E wile the other two OCPs were graded D for regulations and institutional arrangements. It was revealed that the projects were not actually based on specific legal obligations and were in violation of significant legal requirements.

Under the category of approaches and techniques, Umrer, Ananta and Kakri were graded as F, E and D respectively. However, the projects performed similarly for a number of criteria under this category, which included screening, scooping, type of monitoring and considering indirect impacts for follow-up.

Umrer, Ananta and Kakri were all graded as D for resources and capacity. However, the projects fared similarly in respect to allocation of responsibilities, finance allocation and training imparted on follow-up.

Involvement of stakeholders was graded as E, D and D for Umrer, Ananta and Kakri. The general observation in this category revealed that public hearing process was held in order to meet formal requirements. Usually the projects had already started producing more than they were sanctioned for without the approval of the public concerned.

Regional variation does exist in economical, social, political, geographical set-up of the projects. Management is an important factor, which may help in overcoming the differences of the regional factors. However, significant influences under particular management were not revealed. Perhaps the interviewees were reluctant to say much on this issue due to the sensitive nature of the subject. The proponents emerge as more powerful compared to regulators.

Feedback from the regulators are minimum and although regional variation is evident due to economical, social, geographical and political factors, these differences are not incorporated while designing the follow-up of the respective project.

SECTION D

SUMMARY & RECOMMENDATIONS

Circumstances are the rulers of the weak; they are but the instruments of the wise
-Anonymous

Chapter Ten

EIA Follow-up Practice in India: Summary & Recommendations

Chapter ten summarises follow-up practice in India. Furthermore, recommendations are provided for improving EIA follow-up in open cast coal mines within the Indian context. The first section summarises follow-up practice in India, based on formal requirements, presented in Chapter 5 & 6; pre-decision follow-up design discussed in Chapter 7; actual follow-up practice in the open cast coalmines as discussed in Chapter 8 & 9. Based on this the problems of follow-up in India are identified. Recommendations are provided, which may help in improving the practice of EIA follow-up in India. Criteria for regional variation in the good practice list are presented in the following section. Finally, conclusions are drawn.

10.1 Follow-up Practice in OC Coal Mines in India

In order to evaluate follow-up practice in OC coalmines in India, the formal requirements for follow-up in the OC coal-mining sector were explored through literature review (See Chapter 5 & 6). The consideration given to follow-up in pre-decision stage was established (Chapter 7) and finally, through case studies, the actual implementation of follow-up in the OC coalmines was analysed (Chapter 8 & 9). Follow-up practice in India has been summarised in table 10.1, 10.2, 10.3, 10.4 and 10.5 based on its performance against the good practice list under the broad categories of regulations & institutional arrangements; approaches & techniques; resources & capacity; involvement with stakeholder and regional variation respectively.

10.2 Regulations & Institutional Arrangements

Based on formal requirements, pre-decision follow-up design and actual consideration and implementation of regulations and institutional arrangement of follow-up in the OC coalmines, the Indian performance has been graded as E. This reflects that the Indian system suffers from significant omissions and inadequacies in regulations and institutional arrangements for follow-up implementation. Table 10.1 shows the detail grading of each criterion under this category.

No	Questions for Regulation & Institutional Arrangements	Grade Obtained				
		Umrer	Ananta	Kakri	Design	Overall
1.	Is the follow-up system implemented based on clear and specific legal provisions?	F	E	D	D	D
2.	Are there any distinct stages according to the life cycle of mining within FU implementation?	E	D	C	G	E
3.	Are any time limits for the various steps in the follow-up process?	E	D	D	E	E
4.	Is there any strong commitment by EIA regulators to undertake EIA follow-up?	F	D	D	F	F
5.	Are there any independent bodies responsible for reviewing follow-up programmes and results?	G	C	G	G	F
6.	Is there any integration of self-regulation tools of the particular industry with the follow-up mechanism?	E	D	E	E	E
7.	Is proponent voluntarism encouraged?	G	D	D	F	E
Overall Score for Regulations & Institutional Arrangements for case studies and design stage		E	D	D	E	E
Overall Score for Regulations & Institutional Arrangements for Indian Practice of Follow-Up		**E** (Not satisfactory. Revealing significant omissions or inadequacies)				

Table 10.1 Performance of follow-up in Indian OC coal mines against the criteria of regulations and institutional arrangements

Based on the grades awarded against each criterion, it can be inferred that the performance of the individual case studies against the criteria of regulations and institutional arrangements do not differ significantly. The performance is consistent in between the design and implementation stage. Some of the key problems identified in this category are as follows: -

Weak Regulation: During the data analysis in the pre-decision stage, clearance was not rejected for any mine. The case studies revealed that although theoretically a mine can be issued notice to close down, this does not happen in reality. As a result, the proponents are aware, that regulations are not strict enough and therefore, can be taken lightly. The proponent on the other hand is usually more powerful. Coal production is crucial for the economy of the country and thus, the law seems to be working to accommodate the proponent's requirement rather than compel the proponent to follow environmental regulations. Supreme Court Intervention in the 'Goa Foundation Vs Union of India' case exemplifies the situation (See Chapter 8).

Over Ambitious Regulations: Based on the stipulated conditions by the various regulating bodies, it is perhaps fair to say that the regulations are over ambitious. Too many conditions are stipulated irrespective of whether they get implemented or not. Legal requirement is necessary, as without it nothing will be achieved. But impractical standards or over ambitious requirements without the proper resources to implement it may simply dilute the whole purpose of follow-up. As rightly pointed out by Bailey & Hobbs (1990), 'What point is there correctly predicting 99 percent of impacts, if none of them gets managed properly?'

Lack of Guidance for Follow-up: At present lot of ambiguity is present amongst the various conditions that need to be complied with. However, there is no specific guidance that comprehensively sets out the procedures or requirements of follow-up in specific sectors.

Never Ending Follow-up: Follow-up should be comprehensive and should also have a definite end. The present legislative requirement makes follow-up in India a never

ending process of creating unintelligible lists of data, which are never evaluated neither do they contribute in actually improving environmental protection in the mines.

Lack of Independent Review: CIL is the monopoly body as far as coal production in India is concerned. The public sector company does not require approving their mine plan from Indian Bureau of Mines. Rather it has its own Coal Board, which is responsibly for doing this. Similarly Ministry of Coal, which has recently merged with Ministry of Mine acts as the apex body for coal production. CMPDI acts as the consultant company for CIL. As a result, the monopoly of the company continues even in the field of EIA Clearance where the chairman of the expert committee has mostly been from CIL (Mining India, 2003).

10.3 Approaches & Techniques: The overall grade given against this criterion is D. This reflects that part of it has been well attempted. This was partially a result of the follow-up activities that are conducted informally. The legal compliance itself is not fully achieved, however, proponent initiatives go a long way in establishing good rapport with project-affected people through welfare activities. The common problems identified in this category are as follows: -

Stereotyped Conditions: The conditions stipulated by the MoEF as well as the respective State Pollution Control Board are stereotyped questions which are perhaps issued even without considering the specific conditions of the mine. In one instance as stated by an officer in CIL, conditions of under ground mine was stipulated for an open cast mine. Such careless attitude by the regulators discourages proponents to take these conditions seriously.

No.	Questions for Approaches & Techniques	Grade				
		Umrer	Ananta	Kakri	Design	Overall
1	Does FU start early in the EIA stage of the project?	E	D	D	C	E
2	Is follow-up designed according to life cycle of the project?	E	E	D	D	
3	Is there any screening mechanism for it?	C	C	C	C	C
4	Is there any scoping done for it? If yes, is it Objective-led and continuous throughout The project cycle?	E	E	D	E	E
5	Is follow-up design documented?	E	E	D	C	
6	Is existing data used?	F	B	D	?/E	D
7	Is monitoring practiced in comprehensive manner?	E	D	D	E	
8	Is there any provision of rigorous monitoring data? In case rigorous methods are not possible, is there any provision for simple techniques for conducting follow-up?	D	D	D	D	D
9	Does the proponent have any formal EMS in place? If yes, is it well integrated with follow-up?	?	G	D	E	E
10	In case of too many environmental issues, is there any quick scan approach adopted to determine issues, which require in-depth study	D	D	C	D	D
11	What purpose does follow-up serve in the Indian Context (conformance, performance, dissemination or tackling uncertainty)?	E	E	D	E	E
12	Does follow-up have all the components?	F	D	D	D	
13	Is any dominant approach adopted for follow-up in the Indian context?	**Legal Based Approach**				
14	Does FU include environmental, social and health issues?	E	E	D	E	E
15	Does FU deal with indirect effects?	D	D	D	D	D
16	Is consistency maintained in the procedure by the Regulators for reviewing the reports?	E	E	E	?	D
17	Are the efforts of the regulators well integrated?	F	E	E	F	
Overall Score for Regulations & Institutional Arrangements for case studies and design stage		E	E	D	D	D
Overall Score for Approaches Techniques for Indian Practice of Follow-Up		**D** (Indication of parts being well attempted but, on the whole, performance is unsatisfactory because of inadequacies)				

Table 10.2 Performance of follow-up in Indian OC coal mines against the criteria of approaches & techniques

Static EMP: The EMP document is a static document, which has the sole purpose of getting the clearance only. The conditions, which are stated in the document, are not checked for compliance. Neither is the document adapted with ongoing project management. Thus the document looses its relevance when the project gets cleared.

Increasing Production Capacity: In case of Ananta OCP it was noticed that the mine increased production at a faster rate than which clearance was granted. The project had recently obtained environmental clearance for a capacity of 8.0 Mty but it was already producing 10 Mty. The new EMP was being prepared when the author visited the mine and there were already plans to increase the production capacity to 12 Mty by the coming two years. This implies that by the time the clearance was granted for 10. Mty the mine would have surpassed that production capacity.

Lack of Dissemination: Some mines innovate techniques in environmental protection. However, due to lack of dissemination, these initiatives and innovations are lost. There is lack of coordination not only amongst the regulating bodies but also amongst the proponents. However, officers in CIL keep getting transferred as a result, they carry their knowledge in different subsidiaries ensuring dissemination of know-how amongst the CIL subsidiaries.

Prolonged Pre-Decision Stage: The pre-decision stage of EIA in India is too long. Follow-up considerations are incorporated at this stage. However, the proponents have to go a long way in obtaining clearance and in the process lot of time and resources are invested. Thus, once the clearance is obtained, the proponents no longer take interest in follow-up activities as they start on with the production process.

10.4 Resources & Capacity: This category has also been graded as D against the good practice list suggesting that some parts have been well attempted, but overall performance is still unsatisfactory. The drawbacks in this category are provided as follows: -

Understaffed Regulating Bodies: The regional offices of the MoEF are seriously understaffed. Lack of infrastructure further hinders their effectiveness in checking compliance. The state pollution control board also suffers from similar lack of resources. Some offices lack the basic equipments to check pollution standards. This imbalance of power amongst regulators and proponents also breeds corruption.

No.	Questions for Resources & Capacity	Grade				
		Umrer	Ananta	Kakri	Design	Overall
1.	Is FU responsibility properly allocated amongst stakeholders?	C	C	C	C	C
2	Is finance allocated for conducting follow-up?	D	D	D	D	D
3	What is the team strength of the stakeholders for conducting & compliance checking of FU? Is it satisfactory?	F	E	E	D	E
4	Is local knowledge taken into account for designing Follow-up?	D	D	D	?	E
5	Is there any provision of 'institutional memory' and knowledge brokering (contract with universities or research institutes for knowledge sharing)?	C	C	D	C	C
6	Is there any kind of training or education and capacity Building imparted for follow-up?	?/D	?/D	?/D	D/?	D/?
Overall Grade for Resources and Capacity		D	D	D	C	D
Overall Score for Resources & Capacity for Indian Practice of Follow-Up		**D** (Indication of parts being well attempted but, on the whole, performance is unsatisfactory because of inadequacies)				

Table 10.3 Performance of follow-up in Indian OC coal mines against the criteria of resources & capacity

Environment as the Shunned Department: During the interviews, it was revealed that environment within CIL is usually considered to be a shunned department. Mining engineers are at times posted in CMPDI and this is usually a de-motivating experience. Thus, officers who have unwillingly been transferred to this department, lack the enthusiasm to diligently perform their duty in the field of environmental protection.

As a result of this, resource allocation within the mining companies is also biased. As stated by an environmental officer in CIL, the environment department does not get a car when it needs, neither are the funds available. Although finance allocation is shown in

the EMP document, it is not practiced in reality. The environmental cost at times is accommodated from the miscellaneous fund available.

Overlapping Responsibility: There are various bodies responsible for monitoring OC Coal mines. Some of them have overlapping responsibilities but their efforts are not integrated. As a result, resources and effort are wasted and still compliance is not achieved.

10.5 Involvement with Stakeholders: An overall grade D suggested that overall performance in this category is not satisfactory. Ananta and Kakri performed relatively better in this category than Umrer OCP. The problems identified in this category in the Indian practice of follow-up are provided in the following paragraphs.

No.	Questions for Involvement with stakeholders	Grade				
		Umrer	Ananta	Kakri	Design	Overall
1.	Does community participation take place from an early stage?	E	F	D	D	E
2.	Are the results of the follow-up available to the public?	E	E	E	E	E
3.	Are public concern represented in Follow-up?	E	C	D	D	D
4.	Do regulators insure that follow-up is Carried out in accordance with the regulations?	F	D	D	E	F
5.	Do stakeholders view follow-up as a useful exercise?	D	D	D	D	D
6.	Is follow-up regulator, proponent or community driven?	?	Regulator /Commu-nity	Regulator /proponen	Regulator Driven	Regulator
Overall Grade for Involvement of Stakeholders		E	D	D	E	D
Overall Score for Involvement with Stakeholders in Indian Practice of Follow-Up		**D** (Indication of parts being well attempted but, on the whole, performance is unsatis-factory because of inadequacies)				

Table 10.4 Performance of follow-up in Indian OC coal mines against the criteria of involvement with stakeholders

Lack of Coordination: The efforts of the various stakeholders are not integrated and coordinated. The regulating agencies do not interact with the proponents and are more of policing agencies. This lack of coordination also implies that good practices of environmental management by the proponent is not appreciated or rewarded by regulating agencies.

Public Participation Process: The public participation process is usually conducted after the production process has already started. Thus, their views are not taken in to consideration in the design stage. On the contrary an ad-hoc approach is taken in providing short-term solution to their wants. As the public themselves are usually from the weaker community, they get exploited by this approach. It was also pointed out that at times local political parties bribe people to create unrest and stop a project. In a society where resource is scarce and basic amenities are also not provided, corruption easily breeds in to the system.

Lack of Environmental Awareness: Public participation was made mandatory in India to incorporate public views in to follow-up. However, mining activities usually take place in remote areas, which need development activities. People in these areas are not aware of the environmental impacts of mining. They are keen to get employment and other basic amenities in life. Lack of public awareness has left this valuable asset of public opinion unexploited in the Indian context.

10.6 Regional Variation: Presence of regional variation was identified during the pilot interviews and confirmed during the interviews undertaken at the national level. The interviews helped in identifying five broad areas in which regional variation in follow-up implementation occurs. These are economical, social, political, geographical and

managerial (See Chapter 9 for details). During the case studies, these factors were studied in detail and the summary of the factors causing variation within these five broad headings has been provided in table 10.5.

Causes of Regional Variation in Implementation of Follow-up	
Economical Factors	• Less developed areas put more pressure on proponents for job creation. • Proponents are more powerful in less economically developed area. • Agriculture as an occupation predominates in less developed areas and it is more challenging to persuade local people to adapt to jobs created by mining. • More staff is required to monitor economically developed areas as the industries are more densely located here.
Political Factors	• In areas where local politicians are more active, proponents are also compelled to become pro-active. • Corruption in the political system is a major problem, which can cause social unrest and cause hindrances in effective follow-up implementation. • There is no uniform national policy on Resettlement and Rehabilitation. Only three states have their own R & R policy and in other cases CIL exerts its own company policy. Thus there is variation in implementation of R & R policy across the states. • There is lack of coordination amongst the respective pollution control boards as well the regional offices of the MoEF causing variation in enforcement and evaluation techniques.
Social Factors	• Different people from different states and cultural backgrounds have varied preferences, which the proponent has to take into consideration in the resettlement and rehabilitation policy. Some communities want to retain their traditional ways of life in their rehabilitated villages while others want to develop modern style of living. • The migrating population also influences follow-up activities in social sector. It becomes more challenging in retaining traditional practices in rehabilitated villages when the region experiences an influx of population with varied cultural background.
Geographical Factors	• Ananta OCP is located in plains while Kakri OCP is located in hilly terrain. This has implications on the land available to built over burden dumps. • The geological structure of the soil also differs from mine to mine based on its geographical location. The treatment of topsoil accordingly varies. In Ananta OCP, the topsoil layer is not thick as coal lies in shallow depth. This makes it more difficult to preserve the topsoil for future use. • Local species of flora and fauna also differs from mine to mine. This has to be taken into consideration for plantation activities carried out in mining areas for reclamation purpose.
Managerial Factors	• Some management is more pro-active and has environmental management systems in place. This enhances the performance of

	the mine in environmental protection. Kakri OCP was a fine example where the mine exhibited good environmental management practices and also had ISO14001 in place. • Good management can encourage better implementation of environmental measures. Although the condition of preservation of topsoil is not usually complied with (See Chapter 8), it was successfully attempted in a mine in NCL. As quoted by a CIL officer on the importance of management in environmental protection, 'if the management has the will then there is a way'. • EMPs of all the three open cast projects allocated a separate cell for environment protection. In case of one of the project, only one officer was actually discharging the duty of environmental protection and he too was a mining engineer by qualification. It was also pointed out that environment it self was treated as a shunned department. The priority is always production process and thus resources are not easily spared for activities related to environmental protection.

Table 10.5 Factors Causing Regional Variation in Implementation of Follow-up in India

10.7 Recommendations

EIA follow-up in India has been studied in detail and compared against the good practice list created in chapter two. The study has revealed that at present the system suffers from inadequacies and omissions and as a result the overall performance in follow-up implementation is not satisfactory. The study also shows that there are factors, which cause regional variation in the implementation of follow-up. However the monitoring conditions issued by the regulating bodies do not take these variations in to consideration. The following paragraphs set out recommendations to improve follow-up practice in India. The recommendations provided have also taken into consideration the strength, weakness, opportunities and threats of the existing EIA system of the country (See Chapter 5). Although they have been presented under the five broad categories of the good practice list, the recommendations have overlapping benefits and as such are not strictly compartmentalised within a category of the Good Practice List.

10.7.1 Recommendations for regulations & Institutional Arrangements

Follow-up based on life cycle of mine: At present a separate Committee exists in the MoEF to consider mining projects. The conditions issued are based on impacts caused due to mining. But compliance checking is still monotonous. Monitoring conditions should be prioritised according to the life cycle of the mine. Based on Arts and Meijer (2004, p.84), follow-up in the Indian coal mining can be organized in 'several phases and related evaluative moments' in the life cycle of an EIA project (See chapter 4).

For example, health impacts should be more stressed upon during the implementation stage of the mine while social impacts should be emphasized during initiation and de-commissioning stage (See Chapter 6, Fig. 6.1). Level of dust pollution may be more during the implementation period while land reclamation should be emphasised during termination.

Time Limits: To avoid making follow-up indefinite and never-ending exercise (See Chapter 4), specific time limits should be stated in the clearance letters for accomplishing tasks. Compliance checking should be carried out accordingly. The feedback of the proponents should be taken into consideration while issuing such time limits. This will ensure that the target set is achievable and practical.

Compliance of EMP conditions: At present the regulating authorities check compliance based on the conditions stipulated in the clearance letter issued by them. The EMP thus loses its significance after the decision has been taken. The regulators should check compliance based on the EMP conditions as well. The compliance officers of the Ministry of Environment and Forest should do this.

Independent Review Committee: Following the example of the Ekati Mine Project in Canada (Ross, 2000), each project may set-up an independent review committee consisting of members from the public, representative of the proponent, NGOs and social workers. If possible representative of the regulating bodies should also be encouraged to attend these meetings. The minutes of this committee should be maintained. If any steps suggested by the committee are integrated in the project design for follow-up, then the EMP should be accordingly updated. Such a practice will encourage community participation and may eventually help in enhancing community driven follow-up.

Incentive and Disincentive Approach: During the implementation stage, the regulators should encourage an incentive and disincentive approach (See Chapter 3), this approach may perhaps be useful in cases where legal requirements are absent. In the Indian case, although legal requirements are present, there is evidence suggesting that this may not always prove to be successful. As a result adopting an incentive and disincentive approach may prove to be complementary with the legal requirements and perhaps will help to motivate the developers. Definite criteria should be set based on which the incentives or disincentives should be awarded and record of the recipients should be maintained and distributed amongst the eligible industries. This will also help in encouraging the proponents to take more serious notice of environmental regulations and may help o overcome the complacent attitude with which follow-up tasks are performed.

Involving Proponents: Where Clearance is granted, the attached conditions do not involve proponent participation. This should be encouraged, so as to ensure better compliance with conditions. The case studies revealed that the proponents are not

complying with many of the conditional requirements and the regulating authorities are aware of it but no action is taken. Top-soil preservation, for example was not done in any of the three mines studied. This defies the whole purpose of follow-up. In this respect, it is better to make the compliance conditions relatively more flexible at the deciding stage rather than offer the opportunities to comply or not to comply in the post-decision stage.

Adjustments in Stipulated Conditions: For the reasons cited above, there is also a need to make adjustments to the conditions stipulated by the regulating agencies. The EIA clearance process itself is time consuming (See Chapter 5). Even though at times the conditions are not appropriate for the mine or the proponent faces specific difficulties in complying with certain conditions, there has been no instance of modification of the stipulated condition after the clearance has been granted. The proponents fear therefore that the process will be time consuming. The regulators although aware of the non-compliance are complacent about the situation.

In order to make follow-up more effective it is important that the conditions are rendered compliable by the proponents. Thus, it is recommended that the proponents should report such problems in annual report, which is required by the MoEF. The regional offices of the MoEF should also notify such instances of non-compliance to the Ministry. The MoEF should consult the proponent and the expert committee of mining and make necessary modifications to suit the situation. This can be: -

1. Arrange to relax the stipulated condition so that the proponent can comply.
2. Give time concession to the proponent during which the proponent has to make the necessary changes in order to comply with the stipulated condition.

3. Issue a warning, if the proponent is violating the condition without any strong reasons.
4. Change the condition to make it more appropriate to the mine concerned.

Such practice will also help in reducing regional variation by taking into account regional problems and shortcomings in implementation of particular conditions.

10.7.2 Recommendation for approaches & Techniques

EMP as an adaptive document: EMP at the moment is treated as a static document. Its purpose is to obtain the environmental clearance at the pre-decision stage. Regulators do not usually refer to the conditions set out in the EMP for checking compliance. In the present practice, it is a restricted document available only to CIL and government officials and unfortunately they too are not using the document to its fullest potential. The resources and effort in producing such a document is being wasted. Based on Marshall's (2001a) example from the construction industry, it can be recommended that EMP should evolve and adapt along with the progress of the project. Any modifications should be recorded in the document and it should be publicly available.

Use of Simple Techniques: The mines should encourage use of simple techniques in monitoring. Such examples include:

- Sticking paper against the wall of an over burden dump. If the slope changes as a result of erosion or subsidence, the paper folds and indicates the change.
- When plantation activities are conducted, local people can be involved in counting the trees that are planted and the trees that survive, indicating the success rate of plantation.

The practical examples cited have been obtained as a result of discussions with mining technicians and managers. The point is to show that effective results can be achieved through simple monitoring techniques.

Requirement for Environmental Managers: At present the environmental jobs are usually assigned to mining engineers in the projects. The mining engineers are better trained for production purposes and thus lack the perspective with which environmental managers do the task. Environment is usually treated as a shunned department. The government as well as the companies should encourage environmental management or planning as a profession and accordingly employ suitable qualified people for the job. This will go a long way in effective treatment for environmental problems.

Data Bank: In Hon Kong, the Internet is used as a medium where monitoring data is shared (Au, 2001). Internet to some extent can be used in the Indian context as well. In this case however, it may not be suitable for public participation as many affected may not be computer literate. But a internet data bank may be maintained at the national level, which can be accessed for all mining companies in the country. At present CMPDI acts as the data bank for CIL projects. This should be exchanges and broadened with other companies. Thus maintaining records is crucial as this avoids in re-inventing the wheel all the time.

Integration of EMS with follow-up: Regulators may encourage proponents to integrate their EMS with follow-up. Not recognising such pro-active initiative by the company does not help in enhancing environmental performance. EMS improves in the maintenance of record keeping (Marshall, 2001a), which the regulators can use

during compliance checking as well. Regulators can also encourage such actions by awarding special incentives.

Integration of Regulating Bodies: At present the Pollution Control Boards are responsible for checking compliance under the Air and Water (Prevention & Pollution), the MoEF is responsible for checking compliance for the conditions stipulated under the EIA notification, the DGMS for checking compliance for the work related environment Act. Some of these are overlapping. In case of India where resources are limited, such repetition may simply waste money and effort. It was found during the case studies, that the regulators fail to check compliance because of lack of resources and manpower. Thus it is recommended that the regaling bodies at least the PCBs and the regional offices of the MoEF take turns to check compliance.

Emphasis on Decommissioning Stage: The present Indian practice does not have an adequate de-commissioning phase. Proponents usually acquire land from the government as lease and they need to restore the land after mine use and hand it over back to the government. Till date, not a single mine has actually handed the land back to the government. The proponents usually show that some coal is still not exploited and avoid reclaiming the lands.

The proponents usually need to invest considerable amount of money in planting tress on this land. They have to further invest to take care of the samplings till they are stabilised for around four years. Following this however, the state government does not take the land back due to the costs involved in maintaining it. It is not financially feasible then for the proponents to keep investing on the land. The land

cannot be used for producing fruits or any other products of commercial value. As legally the proponent is a coal producing company and cannot produce and earn profit from any other commodity other than coal. This creates an unusual dilemma. The land in true sense becomes a non-mans land. The trees planted are exploited and eventually the plantations are destroyed, as there are costs involved in providing security.

It is thus, recommended that the state government should take the land back and in case it cannot do so, the proponents should be allowed to grow trees of commercial value and should be allowed to sell the products after consultation with the appropriate forest department. Such a practice will encourage afforestation activities and controlled felling of trees and exploitation of the forest products can yield profit to the company. Such areas can also be used as recreation parks and yield revenue.

10.7.3 Recommendation for Resources & Capacity

Strengthening Regulating Bodies: The regional offices of the MoEF are severely understaffed so are the respective pollution control Boards (See Chapter 9). The government is encouraged to create more job opportunities in these offices. This will help in creating more environmental professionals, create more job opportunities at the same time help in environmental protection.

Training for Follow-up: The proponents as well as the regulating bodies should encourage their staff to acquire training in follow-up implementation. This can help in effectively mitigating negative environmental impacts but can also help in reducing environmental costs.

10.7.4 Recommendations for Involvement with Stakeholders

Non-technical Summary of Monitoring Reports: At present the compliance reports are available for the public to view. However, the reports are technical in nature and are difficult for local people to understand. It is thus recommended that the monitoring reports should be evaluated and translated in non-technical language for the common people to make sense. This will encourage local people to use the facility more and eventually will enhance public know-how and participation in environmental protection.

EMP should be available for viewing by Stakeholders: At present the EMP document is a restricted document. In order to make this an useful document in practice, it is perhaps better to make it available for viewing by all parties affected.

10.7.5 Recommendations to avoid Regional Variation

One yearly Clearance from PCBs: The Uttar Pradesh Pollution Control Board (UPCB) issued clearance for only one year. This ensured yearly checking as each year the PCB had to visit the mine in order to renew the clearance. Similar practice should be adopted by other states as well. It was also observed that in some states such as Maharashtra, the proponent could obtain clearance for multiple years by paying an additional fee fee. Such a practice does not encourage effective follow-up implementation and also breed corruption.

Evaluation Technique: Each state has its own evaluation technique. The style of reporting also depends on the individual scientist who is assigned the task. However it is recommended that the different PCBs of the state formulate a standard format

for collecting and reporting data. This will make them more comparable and will ensure uniformity in evaluation of follow-up results.

Resource Allocation: In a relatively economically developed state, industries tend to be more densely located. At present all regional offices of the MoEF have only two scientists for checking compliance. More staff is required in these states which have more industries so that the offices are better equipped to handle monitoring duties.

Uniform Guideline for Resettlement & Rehabilitation Policy: An Uniform Guideline for Resettlement and Rehabilitation of project-affected people should be drawn at the national level. This will imply similar compensation rules for project-affected people all over India.

Co-operation from State Government: In areas with agriculture as the dominant occupation, the villagers are not willing to adapt to industrial jobs. The proponents do try to provide training to these people in handicraft and cottage industries. However the State Government should also be shouldering responsibilities in marketing such products.

10.8 Regional Variation in Good Practice List

The Good Practice List has been presented in chapter two. While analysing the data of the follow-up consideration at the design stage and during the case study analysis, the good practice list has been used as the framework. However the criteria for regional variation have not been set-up earlier, as during the study at the different levels of analysis, it was attempted to verify as to whether regional variation really

exists. The analysis has helped to confirm that variation does exist but is not taken into consideration in designing and implementing follow-up. The following criteria have been set-up, which adds on to the good practice list and accommodates regional variation consideration for follow-up. As mentioned earlier, the good practice list is based on the 'Best Practice List' advocated by Morrison-Saunders et al (2003). The original framework had three questions, which were 'What', 'How' and 'Who'? (See Chapter 4). The study added another fourth question to this framework, which is 'Where'? (See Chapter 2). During the analysis of the data obtained on follow-up consideration at the design stage, five factors were identified for causing variation. Out of these, four were regional factors including, social, economical, political and Geographical, the fifth factor is Management. It is the only factor, which is not regional (See Chapter 7). However management can overcome regional variations and implement effective follow-up but again weak management can dilute effective follow-up implementation. Based on some of the findings, which causes regional variation, the criteria that should be set under this category have been presented below. However, these are within the Indian context and not absolute, as more study and research is needed to determine variation by studying follow-up practices around the world. Although Management is a crucial factor, this area needs further research in the area of corporate responsibility, organisational learning process and behaviour. Some of the criteria set under the category of regional variation are as follows: -

1. Are there different regulating bodies within the country checking compliance? If yes do they use similar evaluation and reporting techniques?
2. If different geographical characteristics exist within the country, are these taken into considerations in stipulating follow-up conditions?

3. Is there any mechanism to integrate the efforts of the regulating bodies?
4. Are the resources allocated in accordance with the needs of the administrative units of the country?
5. In projects, which require resettlement and rehabilitation, is the follow-based on uniform guideline at the national level?

10.9 Conclusion

The chapter summarises the practice of EIA follow-up in the Open Cast Coal Mines in India. The follow-up practice in India is graded against the four categories of good practice list including regulations and institutional arrangement, approaches and techniques, resources and capacity and involvement with stakeholders. The Grades given are E for regulations & Institutional Arrangements and D for the other three categories respectively. The overall performance has been judged based on the formal requirements for follow-up (Chapter 5 & 6), follow-up consideration in the design stage (Chapter 7) and finally actual follow-up implementation in the case studies (Chapter 8 & 9). The grades reflect that as far as regulations & Institutional arrangements are concerned, the performance is not satisfactory as the system suffers from significant inadequacies and omissions. However some aspects have been well covered in the other three categories but due to inadequacies the performance is still not satisfactory.

No.	Broad Category of Good Practice List	Recommendations
1.	**Regulations & Institutional Arrangements**	1. Follow-up should be based on the life cycle stage of the mine 2. Time Limits should be set up for specific follow-up activities. 3. Compliance should be checked based on the conditions stipulated in the EMP document as well 4. Independent Review Committee should be set-up for individual projects. 5. Incentive and Disincentive approach should be used frequently and consistently. 6. Proponents should be involved while stipulating conditions to be monitored in the pre-decision stage 7. There should be provision for adjusting stipulated conditions at the post-decision stage.
2.	**Approaches & Techniques**	1. EMP should be treated as an adaptive document and should be continuously used during the progress of the project. 2. Use of simple techniques should be encouraged in the follow-up process. 3. Environmental Managers should be recruited based on suitable qualifications and experience for the project. 4. Data Bank should be maintained where follow-up experiences and results are stored and should be available for dissemination amongst stakeholders. 5. EMS should be integrated with the follow-up mechanism and the regulating bodies should support the proponents in doing so. 6. The effort of the various regulating bodies should be well integrated. 7. The respective state government should work in coordination with the proponent in the implementation of the decommissioning stage of the mine.
3.	**Resources & Capacity**	1. Providing more staff and resources to the offices should strengthen the regulating bodies. 2. Both the regulating officers as well as the proponents should provide training related to follow-up.
4.	**Involvement with Stakeholders**	1. Non-technical summary of the monitoring reports should be available for the stakeholders to view. 2. EMP should be available for viewing by Stakeholders
5.	**Regional Variation**	1. SPCBs should issue clearance on yearly basis and should check the performance of the proponent before renewing it. 2. The evaluation techniques and reporting format amongst the regulating authorities across the states should be uniform. 3. Resource allocation of the regulating bodies in each state should be in accordance with the number of industries situated in he state concern. 4. Uniform guideline for R&R policy should be passed by the Central Government. 5. Respective State Government should work in co-operation with the proponents in imparting alternative employment training to PAPs

Table 10.6 Recommendations provided to improve follow-up implementation in OC coal mines in India

The case study analysis also reflects regional variation in the implementation of follow-up. The four broad categories causing such variations are economical, social, political

and geographical. The factors have been studied in detail in the case studies to reveal the other sub-factors within the four broad factors, which causes regional variation.

Recommendations have been provided in the second section to improve follow-up implementation in the open cast coal-mining sector in India. These have been provided based on the five broad categories of the good practice list including regional variation and have been shown in Table 10.5.

The final section has provided the criteria for regional variation to be integrated with the good practice list. These are five in number and deal with maintenance of similar evaluating and reporting techniques amongst various regulating bodies; considering geographical variation while stipulating conditions for monitoring; integration mechanism for the various regulating bodies, resource allocation amongst the regulating bodies in accordance with variation in industries to be monitored and finally providing uniform guidelines for rehabilitation and resettlement policy in projects which cause displacement of communities.

Chapter Eleven

Conclusions

Chapter eleven draws the conclusions from the PhD research. Within this context, the aim & objectives are presented in the first section and the following five sections presents the findings of the five objectives of the research. The seventh section identifies the limitations of this study and presents the prospects for further research in this area.

11.1 Aim & Objectives of the Research

The underlying aim of the PhD was to 'evaluate the practice of EIA Follow-up in Indian open cast coalmines and to develop recommendations for its effective implementation'. In order to establish the aim, five objectives were formulated as follows: -

1. To construct a list of good practice list for conducting EIA follow-up
2. To review the status of EIA in India and its deficiencies.
3. To review EIA follow-up considerations in the pre-decision stage of the Indian open cast coal sector.
4. To examine in detail the implementation of EIA follow-up in open cast coal mining in India through case studies.
5. To develop recommendations suitable for implementation of EIA follow-up within OC coal mining in India.

The following paragraphs summaries the findings in terms of each of the objectives.

11.2 Objective one: Constructing a list of Good Practice Criteria

A list of good practice criteria is presented in chapter two. It is based on the 'Best Practice List' by Morison-Saunders et al (2003) and also takes into consideration EIA follow-up theory (Chapter three) and practice (Chapter four), EIA system in India (Chapter five) and environmental practice in open cast coalmines in India (Chapter six). Chapters three, four, five and six deal with these aspects that have been integrated within the good practice list presented in chapter two. The broad categories of the good practice

list consist of regulations and institutional arrangements; approaches and techniques, resources and capacity and involvement with stakeholders. Table 2.4 shows the detailed good practice list. The category of regional variation has been presented at this stage, however, the criteria for the good practice list has been developed as the research has progressed.

11.3 Objective 2: Status of EIA and its Deficiencies in India

The EIA system in India was studied based on five deficiencies identified by Sadler as common in any EIA system of a country. This includes, structural, procedural, attitudinal, institutional and technical (Sadler, 1998 in Porter and Fittipaldi, p.31).

Attitudinal Deficiency: The main attitudinal deficiencies from which the EIA system in India suffers are lack of seriousness; presence of corruption; treating compliance reports as an end in itself rather than means to an end and misuse of power by developers.

Structural Deficiency: The structural deficiencies in the Indian EIA system was reflected by two main factors which are lack of integration amongst the different responsible bodies and regulating agencies; & an absence of strategic level planning.

Institutional Deficiencies: The scope of EIA is limited in India because social and health factors are neglected; responsibilities are usually overlapping amongst various regulating agencies resulting in less effective implementation.

Procedural Deficiencies: The dominating procedural deficiencies from which the India EIA system suffers constitutes of weak compliance; time consuming and weak scooping stage of EIA.

Technical Deficiencies: Technically EIA is deficient in India because there is lack of reliable data; lack of technical know-how.

Based on the literature review of EIA formal requirements and practice, a SWOT analysis (defined in chapter two) was carried out. The following paragraphs summarise the strengths, weaknesses, threats and opportunities of the EIA system in India.

Strengths: The main strengths of EIA system in India consists o the following two aspects: -

1) It has been more than a decade since EIA was mandatory in India and since then the system is undergoing adaptation to adjust according to the Indian needs.
2) There are various bodies to take care of EIA related to different sectors. Thus the system is already well equipped for discharging responsibilities in various fields.

Weaknesses: The Indian EIA regulations are still very volatile. Three aspects reflect this: -

1) In the last eleven years the EIA notification has been modified twelve times. It can be argued that some of these amendments have actually diluted the EIA Notification of 1994. This also exposes the vulnerability of the legal system based on which EIA is implemented. At present time, effort and money are wasted in the EIA system as the present system to some extent has duplication in efforts being made by various regulatory agencies in monitoring compliance with the environmental management plan and regulations.
2) The pre-decision stage takes too much of time, which makes the impact assessment work done, outdated by the time the decision is taken or if it has to be done.
3) Scoping and public participation stage within EIA are not effective Scoping is not yet a statutory requirement and public hearing in India is still 'in the

rudimentary stage of development and requires substantial improvements' (Rajvanshi, 2003, p.310).

Opportunities: Opportunity is an external factor to the system and in this case they are: 1) The Supreme Court interventions have helped in ensuring environmental justice when the MoEF has at times failed. 2) The World Bank World Bank imposes certain environmental standards, which needs to be met in order to be eligible to get financial aid. These environmental standards impose help in raising the standards of follow-up practices.

Threats: Threat is also exposed from outside the system and in the Indian EIA system the threats have been identified from 1) World Bank funding may encourage proponents to introduce additional environmental protection measures. However the performance of World Bank projects may be used to overshadow the actual Indian EIA system. In the long run, this will encourage viewing environmental clearance and protection as a mechanism to receive funds and in the absence of these funds the system may loose its relevance altogether 2) The instability of the political system The Ministers have been changing rapidly both in the MOC and the MoEF and most have not been able to complete the five-year tenure.

11.4 Objective 3: Follow-up Consideration in Pre-decision Stage

In order to establish the importance of follow-up in the pre-decision stage, the unpublished minutes of the expert committee for mining have been studied along with the EIA reports submitted during this period of study. Interviews were also conducted at the natinal level amongst 45 interviewees who played a direct or indirect rle in follow-up implementation.

11.4.1 Minutes of the Expert Committee of Mining: Between 16 February 1996 & 23rd July 2004, the expert committee for mining has held 54 meetings in total. During the 9 years

between 1996 February to 2004 July, 37 OC coal projects applied for environmental clearance to the MoEF and were reviewed by the Expert Committee for mining. 28 reports out of the 37 were available and analysed. Out of these, CIL alone had applied for 22 projects followed by SCCL, which had a total of 3 projects. Jindal group of companies applied for two projects. The rest constituted of other companies, each applying for a single project, adding up the total to 37 projects in all. CIL Proved to be the major coal producing company as it alone had a share of 76% of total coal production applied for during the period studied.

As far as the states are concerned Maharashtra emerged as the dominant state from which 10 projects were applied. Orissa and Madhya Pradesh applied for 9 and 6 projects, respectively. Jharkhand, which is one of the most important coal-producing regions, has 2 applications while Chhattisgarh and Bihar has 3 and 1 application respectively. Interestingly, 6 out of 7 decisions were given during 2000 to 2004 and all together 4 projects that were cleared were from WCL, the others were one each from MCL, SECL and Castron Technologies respectively. By the given data it can be said without doubt that that the clearance rate of OC projects are not very good as during a span of 9 years, 37 projects applied and only 7 got a decision. Four causes were identified for causing delay in project clearances, which are procedural, technical, social and environment related to physical actors.

11.4.2 Performance of follow-up consideration in pre-decision stage of EIA: Based on the EIA reports and interviews undertaken, the performance of follow-up consideration at the pre-decision stage was graded. The grades have been awarded based on the scoring system developed by Fischer (2005)

Regulations & Institutional Arrangement: The regulations and institutional arrangements in India were studied and proved to be fairly established and with good potential. However, an overall Grade of E was given to this category as the overall performance was not satisfactory due to significant omissions of important aspects. The responsibilities are usually overlapping amongst various bodies. The EIA Notification can embrace all of this together, which can eventually contribute in delivering effective follow-up outcomes.

Approaches & Techniques: Approaches and techniques were awarded Grade D, which implies that some areas are well covered but the overall performance is not satisfactory due to significant omissions and inadequacies. The scope of follow-up is usually restricted within environmental factors. Social factors are included but generic steps are taken for overall improvement. There is a lack of structured follow-up program for social aspects. Health is a neglected factor, which is of vital importance in OC coalmines (See Chapter 6). Rigorous techniques have been used for follow-up but the potential of simple techniques have not been explored. Follow-up is predominantly compliance oriented. Overall there is ample scope of improvement.

Resources & Capacity: Distribution and allocation of resources and capacity was adequately provided for in the EIA/EMP reports. The interviews reflected a clear understanding of the roles and responsibilities allocated to the various parties. Usually, there was a financial provision for ensuring follow-up along with separate environment cells allocated with the task of follow-up implementation. An overall Grade of C was given to this category, as it seemed to be satisfactory despite some minor omissions and inadequacies.

Involvement of Stakeholders: Stakeholder involvement is not satisfying. Although results should be available to public, their views are at times integrated after the reports have been prepared. Thus in true sense, their participation is sought as more of a formal requirement rather than a meaningful exercise. The EIA/EMP reports are not available to be viewed by public. Grade E was allocated to the overall performance of this category.

Regional Variation: Regional variation is an established factor and the causes of such variation have been identified as social, political, environmental, economical and management factors. Out of these, the first four are regional in nature but management is not. It is the most important factor, which if strong can override the regional factors causing variation in follow-up implementation.

11.5 Objective 4: Detailed Case Study Analysis

Chapter eight introduced the three case studies of Umrer, Ananta and Kakri open cast mine located n the states of Maharashtra, Orissa and Uttar Pradesh respectively. Chapter Nine critically analysed the case studies against the good practice list.

11.5.1 Key Emerging Issues

During the case study introduction, some of the key issues surfaced out in relation to follow-up in pen cast coalmines in India. These are presented below.

Post facto Environmental Clearance: All the mines have been in operation for decades but had recently obtained their environmental clearance for their increased production capacity. All the mines were producing more than they were sanctioned for. The recent clearance granted (May 2005) to all the three case studies was a result of a circular by the Supreme Court dated 12.02.2002, according to which "the proponent should, however, seek prior environmental clearance from Central Government for expanding production and/or mining

lease area irrespective of the quantum of increase in size of mining lease (ML) area/production or investment involved. The above provisions will apply to existing/operating mines even when no renewal of mining lease is involved" (CMPDI, 2005a).

Weak Regulatory Bodies: The fact that all the mines were producing more than they were sanctioned for and Umrer OCP had never obtained any clearance from the Ministry of Environment and forest reflects the weakness of the regulatory system of the country. The Supreme Court had to intervene as the regulating bodies had failed in discharging their duties. The mines were visited by the author, which revealed that some conditions are never complied in the mines and both the regulators as well as the proponents are aware of the non-compliance and are complacent about it.

SPCB Vs MoEF: The State Pollution Control Boards perhaps played a more crucial role compared to the MoEF. Even before the EIA Notification was made mandatory in 1994, the SPCBs controlled the environmental pollution of mines mainly though the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act 1981. The EIA Notification made it mandatory to obtain the environmental clearance from the MoEF. Although EIA notification should act as the umbrella act, the EIA system is still in its transitional phase and SPCBs are continuing to play the most important role in compliance checking.

World Bank Funding: During the case studies, it was found that all the three projects have been World Bank funded at some stage or the other. Due to this past experience, the practice of follow-up may to certain extent have been influenced by the agencies. This influence is perhaps good in many cases (See p.221) however; it is not necessarily an Indian practice.

11.5.2 Performance of Case Studies against Good Practice List

The case studies namely Umrer, Ananta and Kakri OCP were compared against the criteria set in the good practice list. Their performance was graded based on the scoring system developed by Fischer (2005) and have been summarised in the following paragraphs.

Regulations & Institutional Arrangements: Umrer OCP was graded E while the other two OCPs were graded D for regulations and institutional arrangements. It was revealed that the projects were not actually based on specific legal obligations and were in violation of significant legal requirements.

Approaches & Techniques: Under the category of approaches and techniques, Umrer, Ananta and Kakri were graded as F, E and D respectively. However, the projects performed similarly for a number of criteria under this category, which included screening, scooping, type of monitoring and considering indirect impacts for follow-up.

Resources & Capacity: Umrer, Ananta and Kakri were graded as D, D and E for resources and capacity respectively. However the projects fared similarly in respect to allocation of responsibilities, finance allocation and training imparted on follow-up.

Involvement with Stakeholders: Involvement of stakeholders was graded as E, D and D for Umrer, Ananta and Kakri OCP respectively. The general observation in this category revealed that public hearing process was merely held to fulfill formal requirements. Usually the projects had already started producing more than they were sanctioned for without the approval of the public concerned.

Regional variation: Regional variation does exist in economical, social, political, geographical set-up of the projects. Management is an important factor, which may help in overcoming the differences of the regional factors. The proponents emerge as more

powerful compared to regulators. Feedback from the regulators are minimum and although regional variation is evident due to economical, social, geographical and political factors, these differences are not incorporated while designing the follow-up of the respective project.

Summary: The results show that even after having EIA as a mandatory requirement for more than a decade, compliance is lagging behind. Regulations and institutional arrangements are present and there are various bodies, which have been constituted in ensuring compliance. Regulations have also been established to ensure stakeholder involvement in the process. But Supreme Court had to intervene and it was only in 2005 that many mines have been compelled to obtain their clearance from the MoEF. Before this there have been mines like Umrer OCP, which have been working without obtaining the Environmental clearance under the EIA notification of 1994. The Supreme Court intervention has been a positive step but coal being the backbone of Indian economy is almost treated above law. Most of the legal requirements are in-house mechanisms in the coal company. It has its own Ministry and does not require Indian Bureau of Mines to grant approval of the mine plan. The coal board itself grants the approval. This implies that to a great extent CIL acts as a monopoly in producing coal in India.

11.6 Objective 5: To develop recommendations for improving follow-up in India

The performance of EIA follow-up practice in India was summarised in chapter ten. The summary was based on the formal requirements for follow-up, consideration of follow-up in the design stage and the actual implementation of follow-up practices in the OC coalmines in India.

11.6.1 Summary of Performance of Follow-up in Indian OC Coal Mines

The follow-up practice in India is graded against the four categories of good practice list including regulations and institutional arrangement, approaches and techniques, resources and capacity and involvement with stakeholders. The Grades given are E for regulations & Institutional Arrangements and D for the other three categories respectively.

The grades reflect that as far as regulations & Institutional arrangements are concerned, the performance is not satisfactory as the system suffers from significant inadequacies and omissions. However some aspects have been well covered in the other three categories but due to inadequacies the performance is still not satisfactory.

Regional variation was established and the different factors causing such variation was categorised under five broad headings of social political, economical, geographical and managerial.

Criteria for regional variation to be incorporated in the good practice list were recommended in chapter ten. These are five in number and deal with: -

1) Maintenance of similar evaluating and reporting techniques amongst various regulating bodies;
2) Considering geographical variation while stipulating conditions for monitoring;
3) Integration mechanism for the various regulating bodies,
4) Resource allocation amongst the regulating bodies in accordance with variation in industries to be monitored;
5) Providing uniform guidelines for rehabilitation and resettlement policy in projects, which cause displacement of communities.

11.6.2 Recommendations for Improving Follow-up Implementation in India

Recommendations were provided to improve follow-up practice in India. These were presented under five broad categories of the good practice list which include regulations & institutional arrangements; approaches & techniques; resources & capacity; involvement with stakeholders and regional variation. These are summarised as follows:

Regulations & Institutional Arrangements:

1. Follow-up should be based on the life cycle stage of the mine
2. Time Limits should be set up for specific follow-up activities.
3. Compliance should be checked based on the conditions stipulated in the EMP document as well
4. Independent Review Committee should be set-up for individual projects.
5. Incentive and Disincentive approach should be used frequently and consistently.
6. Proponents should be involved while stipulating conditions to be monitored in the pre-decision stage
7. There should be provision for adjusting stipulated conditions at the post-decision stage

Approaches & Techniques:

1. EMP should be treated as an adaptive document and should be continuously used during the progress of the project.
2. Use of simple techniques should be encouraged in the follow-up process.
3. Environmental Managers should be recruited based on suitable qualifications and experience for the project.
4. Data Bank should be maintained where follow-up experiences and results are stored and should be available for dissemination amongst stakeholders.
5. EMS should be integrated with the follow-up mechanism and the regulating bodies should support the proponents in doing so.
6. The effort of the various regulating bodies should be well integrated.

7. The respective state government should work in coordination with the proponent in the implementation of the decommissioning stage of the mine.

Resources & Capacity:

1. Providing more staff and resources to the offices should strengthen the regulating bodies.
2. Both parties, the regulating officers as ell as the proponents should provide training related to follow-up.

Involvement with Stakeholders:

1. Non-technical summary of the monitoring reports should be available for the stakeholders to view.
2. EMP should be available for viewing by all Stakeholders involved

Regional Variation:

1. SPCBs should issue clearance on yearly basis and should check the performance of the proponent before renewing it.
2. The evaluation techniques and reporting format amongst the regulating authorities across the states should be uniform.
3. Resource allocation of the regulating bodies in each state should be in accordance with the number of industries situated in he state concern.
4. Uniform guideline for R&R policy should be passed by the Central Government.
5. Respective State Government should work in co-operation with the proponents in imparting alternative employment training to PAPs.

11.7 Limitations and Scope of the Research

The research has focused in evaluating follow-up practices within a specific sector of coal mining within the Indian context. In doing so it has established the current EIA follow-up practice in India and exposed the hindrances in effective follow-up

implementation. However the research has some shortcomings, which are presented as follows.

Sector Specific: Follow-up practice in this research has emphasised only for open cast coalmines. Although the results can be generalised and represent follow-up practice in India to some extent, it is not comprehensive. Each sector may have its own unique requirement and situation may perform better or worse. Thus more research needs to be done on generic follow-up practice or follow-up practices in other specific sectors to appreciate the full picture of follow-up practices in India.

Generalisation from Case Studies: The case studies have been chosen only from within Coal India Limited, which is a government undertaking. The research has not examined the experience of private companies. The relations between the proponents and the regulators may change in private undertakings. This in turn can result in different problems and opportunities for follow-up. This would suggest there is further scope for research involving different types of companies and the evaluation of follow-up practice across government and private companies. To avoid generalization from the three case studies, the recommendations have been specifically provided for similar open cast coal mines in India which excludes the private undertakings.

Project Type: According to the framework of Best Practice List (Morission-Saunders et al, 2003), there are four contextual influences, which are regulations and institutional arrangements, approaches and techniques, resources and capacity and project type. It also includes stakeholder involvement. In this study however, project type has been kept constant. Thus follow-up practices in smaller projects are beyond

the scope of this research. There is further scope in evaluating follow-up practices in small-scale industries in India.

Limited coverage: The coal belt in India is restricted to eastern and central India. Although some coal is available in the northeast and south, they are not under CIL. Due to restricted availability of coal, states from extreme western, southern and northern India have not been considered. Regional variation can be more prominent when these states are studied. However unless and until such research is carried out the occurrence and factors causing regional variation cannot be fully established.

Qualitative Analysis: The method of data analysis is qualitative in nature for this research. However in order to appreciate the techniques and effectiveness of monitoring a scientific and quantitative approach is essential. During the case visits, the conclusions on compliance have been drawn with the help of documents, advice from proponents and other stakeholders and through observation. However the author has not conducted any laboratory or scientific tests in determining pollution levels. There is further scope of research in developing quantitative and scientific techniques in determining follow-up effectiveness and compliance across states.

Interdisciplinary Research: The research has revealed that regulations and institutional arrangements, approaches & techniques, resources and capacity and mechanisms to ensure stakeholder involvement is present. However legal compliance is poor and existing mechanisms are also not fully utilized. It can be concluded to some extent that follow-up implementation is to a great extent determined by organisational behaviour and learning culture. There is further scope in combining impact assessment study with organisational studies and establishing

significant and theoretical links as to what are the bottlenecks in the Indian organisational system, which prevents effective implementation in follow-up.

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Appendix 1

List of Interviewees

The First Fieldwork in Autumn 2003

06/10/2003	**11:15-12:30 pm**	**Mr. B.C. Bhattacharya** Chief General Manager World Bank Project Foreign Project & Environment Management Division (Coal India Limited) Kolkata
9/10/03	**12:00-1:00pm**	**Dr. Tapan Chakrabarti** Scientist G. & Head Environmental Biotechnology Division NEERI, Nagpur
9/10/03	**11:00-12:00am**	**Dr. Sarin** Chief Scientist NEERI Nagpur
10/10/03	**3:40-5:00pm**	**Pawan Kumar** Scientist Environmental Impact & Risk Assessment Division, NEERI, Nagpur
10/10/03	**11:00am-12:30pm**	**Mr. Kaushik Chakraborty** CMPDI, Nagpur Branch
14/10/03	**11:00-1:00am**	**Prof. S.P Banerjee** Environmental Consultant and Member of Expert Committee of Mining, Kolkata
15/10/03	**5:00-6:30pm**	**Mr. K.M. Lal** Retired Manager of Environmental Cell SECL, Bilaspur
15/10/03	**3:00-5:00pm**	**Mr. A. Biswas** CMPDI, Orissa Branch Kolkata
17/10/03	**4:00-5:30pm**	**Mr A. Mehta** Chairman-cum Managing Director Western Coalfields Limited Nagpur
18:10/03	**3:00-5:30**	**Mr. G.K Jha** Ex Chairman-Cum Managing Director of SECL, Kolkata

Appendix 2a

Conditions issued by Ministry of Environment and Forest to Kakri opencast coal project of Northern Coalfields Ltd. Located in village Kakri, Tehsil Dudhi, District Sonebhadra in Uttar Pradesh in the environmental clearance letter dated11th May 2005.

Specific Conditions

1. Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mine out areas.
2. OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope will come down to 28 degree. The excavated area should be backfilled simultaneously with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.
3. Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development etc. The drains should be regularly desilted and maintained properly.
   Garland drains of appropriate size should be constructed, to collect surface run-off from the OB and waste dump site(s) and taken to settling pond before discharge.
4. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.
5. Green belt should be raised in an area of 176.0 ha by planting the native species around the ML area, OB dump sites, colony etc. in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.
6. The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.
7. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MoEF, Central Ground Water Authority and Regional Director Central Ground Water Board.
8. The project authorities should meet the water requirement of nearby village(s) in case the village wells go dry due to de-watering of the mine.
9. Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should have efficient dust control arrangements. These should be properly maintained and operated.

10. Consent to operate should be obtained from SPCB for the enhanced production.
11. Vehicular emissions should be kept under control and regularly monitored.
12. Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to MoEF and its regional office.
13. A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment and Forest 5 years in advance of final mine closure for approval.

General Conditions

1. No change in mining technology and scope of working should be made without prior approval of the MoEF.
2. No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.
3. At least four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO2, NOX and CO monitoring. Location at the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Boards. Data on ambient air quality (RPM, SPM, SO2, NOX and CO) should be regularly submitted to the Ministry including its Regional Office at Lucknow and to the State Pollution Control Board/Central Pollution Control Board once in six months.
4. Drills should be either wet operated or with dust extractors.
5. Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements in haul roads, wagon loading, dumps, loading and unloading points should be provided and properly maintained.
6. Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and drilling operations, operations of HEMM, etc., should be provided with ear plugs/muffs.
7. Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease tap should be installed before discharge of effluents from workshop.
8. Acid mine water, if any has to be treated and disposed of after conforming to the standard prescribed by the competent authority.
9. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to coal dust and take corrective measures if needed.
10. Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

11. A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior Executive, who will report directly to the Head of the organisation.
12. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-Wise expenditure should be reported to the Regional Office, Lucknow of the MoEF and to the Ministry.
13. The Regional Office of this Ministry located at Lucknow shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional Office by furnishing requisite data/information/monitoring reports.
14. A copy of the clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom any suggestions/representations has been received while processing the proposal.
15. The project authorities should inform to the Regional Office located at Lucknow regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
16. State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's/Tehsildar's Office for 30 days.
17. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at web site of the Ministry of Environment and Forests at http://envfor.nic.in

The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environmental protection.

Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

Appendix 2b

Conditions issued by Ministry of Environment and Forest to Expansion of Ananta Open Cast Coal Mining Project of Mahanadi Coalfields Limited located in Village(s) Hensamul, Dera, Purunia, Chandpur and Nakhetrapur, Tehsil Talcher in Angul District of Orissa in the environmental clearance letter dated 2nd May 2005.

Specific Conditions

1. The environmental clearance is subject to approval of the State Land-use Department, Government of Orissa for diversion of agricultural land for non-agricultural use.
2. Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mine out areas.
3. OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope will come down to 28 degree. The excavated area should be backfilled simultaneously with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.
4. Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development etc. The drains should be regularly desilted and maintained properly.

   Garland drains of appropriate size should be constructed, to collect surface run-off from the OB and waste dump site(s) and taken to settling pond before discharge.
5. Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.
6. Green belt should be raised in an area of 431.600 ha by planting the native species around the ML area, OB dump sites, backfilled area, safety zone infrastructure, colony etc. In consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.
7. The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director Central Ground Water Board, South Eastern region, Bhhubaneshwar.
8. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year i.e. January, April-May, August and November and the data thuds collected may be sent regularly to MoEF,

Central Ground Water Authority and South Eastern Region, Central Ground Water Board, Bhubaneshwar.

9. The project authorities should obtain prior approval of the competent authority for drawal of 455 meter cube per day from the Brahamani river under integrated water supply for the project.
10. The project authorities should meet the water requirements for nearby villages in case the village wells go dry due to dewatering of the mine.
11. Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.
12. Consent to operate should be obtained from SPCB before starting activities.
13. Vehicular emissions should be kept under control and regularly monitored.
14. Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to MoEF and its regional office.
15. A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment and Forest 5 years in advance of final mine closure for approval.
16. Land-oustees and land losers shall be compensated as per the R & R plan approved by the CIL and the State Government.

General Conditions

1. No change in Mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forest.
2. No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.
3. At least four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO2, NOX and CO monitoring. Location at the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Boards. Data on ambient air quality (RPM, SPM, SO2, NOX and CO) should be regularly submitted to the Ministry including its Regional Office at Lucknow and to the State Pollution Control Board/Central Pollution Control Board once in six months.
4. Drills should be either wet operated or with dust extractors.
5. Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements in haul roads, wagon loading, dumps, loading and unloading points should be provided and properly maintained.
6. Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and drilling operations, operations of HEMM, etc., should be provided with ear plugs/muffs.
7. Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended

from time to time. Oil and grease tap should be installed before discharge of effluents from workshop.

8. Acid mine water, if any has to be treated and disposed of after conforming to the standard prescribed by the competent authority.
9. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to coal dust and take corrective measures if needed.
10. Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.
11. A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior Executive, who will report directly to the Head of the organisation.
12. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-Wise expenditure should be reported to the Regional Office, Lucknow of the MoEF and to the Ministry.
13. The Regional Office of this Ministry located at Lucknow shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional Office by furnishing requisite data/information/monitoring reports.
14. A copy of the clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom any suggestions/representations has been received while processing the proposal.
15. The project authorities should inform to the Regional Office located at Lucknow regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
16. State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's/Tehsildar's Office for 30 days.
17. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at web site of the Ministry of Environment and Forests at http://envfor.nic.in

The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environmental protection.

Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention &

Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

Appendix 2c

Conditions issued by Ministry of Environment and Forest to Umrer opencast Expansion project of Western Coalfields Limited in village Kanhwa, Tehsil Umrer, District Nagpur, Maharashtra in environmental clearance letter dated 20th May 2005.

Specific Conditions

1. Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mine out areas.
2. OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope will come down to 28 degree. The excavated area should be backfilled simultaneously with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.
3. Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development etc. The drains should be regularly desilted and maintained properly.
   Garland drains (size, gradient, length) and some capacity should be designed keeping 50 percent safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Some capacity should also provide adequate retention period to allow proper settling of silt material.
4. Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.
5. The embankment constructed for the part of the mine lease boundary, which is located along Ambi river should be of sufficient height over the HFL and width to protect the mine from inundation from peak flow from river.
6. Pumps of adequate number and capacity should be provided which drain the mine water even during maximum rainfall.
7. Drills should be wet operated or with dust extractors.
8. Controlled blasting should be practiced with the use of delay detonators and only during day time. The mitigated measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.
9. Plantation shall cover external OB dumps, along ML boundary, on embankment, workshop, roads, CHP, township outside the lease area by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

10. A Progressive mine closure plan should be implemented. Backfilling of the mined out area covering a total of 395 ha leaving a void of 15ha shall commence in the quarried decoaled area (void) and reclaimed.
11. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year in pre-monsoon (May), monsoon (August), coast-monsoon (November) and winter (January) seasons and for ground water quality in May. Data thus collected should be submitted to the MoEF and the Central Ground Water Board, regional office quarterly within one month of monitoring.
12. The company shall put up artificial ground water recharge measures for augmentation of ground water resource. The project authorities should meet water requirement of nearby villages in case the village wells go dry due to dewatering of the mine.
13. Sewage treatment plant should be installed in the existing colony. ETP should also be provided for workshop and CHP waste water.
14. The requisite clearance from the State Land use Board shall be obtained for diversion of agricultural land for more agricultural purpose.
15. Digital processing of the entire lease area using remote sensing techniques should be done regularly once in three years for monitoring land-use pattern and report submitted to MOEF and its regional office at Bhopal.
16. A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment and Forest 5 years in advance of final mine closure for approval.

General Conditions

1. No change in mining technology and scope of working should be made without prior approval of the MoEF.
2. No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.
3. Four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO2, NOX and CO monitoring. Location at the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Boards.
4. Data on ambient air quality (RPM, SPM, SO2, NOX and CO) should be regularly submitted to the Ministry including its Regional Office at Lucknow and to the State Pollution Control Board/Central Pollution Control Board once in six months.
5. Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements in haul roads, wagon loading, dumps, loading and unloading points should be provided and properly maintained.
6. Adequate measures should be taken for control of noise levels below 85 Dba in the work environment. Workers engaged in blasting and

drilling operations, operations of HEMM, etc., should be provided with ear plugs/muffs.

7. Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease tap should be installed before discharge of effluents from workshop.
8. Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.
9. Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.
10. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to coal dust and take corrective measures if needed.
11. A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior Executive, who will report directly to the Head of the company.
12. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-Wise expenditure should be reported to the Regional Office, located at Bhopal.
13. The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional Office by furnishing requisite data/information/monitoring reports.
14. A copy of clearance letter will be marked to concerned Panchayat/ local NGO, if any, from whom and suggestion/representation has been received with processing the proposal.
15. SPCB should display a copy of the clearance letter at the regional office, district industry centre and collector's office/ Tehsildars office for 30 days.
16. The project authorities should advertise at least in 2 local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within 7 days of issue of the clearance letter in forming that the project has been accorded environmental clearance and a copy of the clearance letter is available with the SPCB and may also be seen at the website of the MoEF at http://envfor.nic.in

The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environmental protection.

Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

Appendix 3

List of Interviews

Interviews Undertaken during Second Field Work in Summer 2004

17/07/04	**10:00-11:30**	**Mr. Pawan Kumar Labhsetswar** NEERI, Nagpur
19/07/04	**10:00-12:00**	**Mr. P.R. Chaudhari** NEERI, Nagpur
19/0/04	**3:00-4:00pm**	**Dr. V.P. Deshpande** NEERI, Nagpur
19/07/04	**4:00-5:00pm**	**Dr. D.S Ramteke** NEERI, Nagpur
20/07/04	**3:00-5:00pm**	**Dr. D.G. Garway** Consultant, Anacon
20/07/04	**10:00-11:00am**	**Parikshit Verma** Neeri, Nagpur
20/07/04	**12:00-1:00am**	**Harshavardhan Singh** Neeri, Nagpur
21/07/04	**10:00-11:00am**	**Dr. Chalapati Rao** Scientist, NEERI
21/07/04	**3:00-4:00pm**	**Dr. Asha Juwalkar** Scientist, NEERI
21/07/04	**4:30-5:00pm**	**Mr. Bhaskar Bhattacharya** Director, DGMS
29/07/04	**10:30-12:00am**	**Mr H.B.W Hussain** CIL, Kolkata
29/07/04	**2:00-3:00pm**	**Mr Kaishik Chakraborty** CIL, Kolkata
29/07/04	**4:00-5:30pm**	**Mr. V.K. Verma** CIL, Kolkata
29/07/04	**9:30:10:15am**	**Mr. Sashi Kumar** Chairman, CIL, Kolkata

30/07/04	**10:00-11:00am**	**Mr. M.N Jha** CMPDI, Ranchi
30/07/04	**12:00-1:30pm**	**Miss Vineeta Arora** CMPDI, Ranchi
30/07/04	**2:30-4:00pm**	**Mr. Sishir Kumar** CMPDI, Ranchi
30/07/04	**4:30-5:30pm**	**Mr. Vinod Kumar Pandey** CMPDI, Ranchi
31/07/04	**10:00-11:00am**	**Mr. Alok Kumar** CCL, Ranchi
31/07/04	**12:00-1:00am**	**Mr. N.K Rukhaiyar** CCL, Ranchi
31/07/04	**3:00-4:30am**	**Mr. S.K. Jha** CMPDI, Ranchi
1/08/04	**11:00-12:30pm**	**Prof. S.P. Banerjee** Member of Expert Committee of Mining, Kolkata
4/08/04	**10:00-11:00am**	**Mr P.K. Sarkar** DGMS, Kolkata
4/08/04	**12:00-1:30am**	**Dr. Asim Kumar Pal** ISM
4/08/04	**2:00-3:00am**	**Assistant Prof. I.N. Sinha** ISM, Dhanbad
4/08/04	**4:00-5:00pm**	**Dr. M.K. Chakraborty** CMRI, Dhanbad
5/08/04	**10:00-11:00am**	**DrB.K. Tiwari** CMRI, Dhuanbad
5/08/04	**12:00-1:00am**	**Dr. A.K Ghosh** CMRI, Dhanbad
13/08/04	**10:00-11:3-am**	**Dr. Asha Rajvanshi** WII, Dehradun

16/08/04	**2:00-3:30pm**	**Dr. V.B Mathur** WII, Dehradun
19/08/04	**10:00-12:00am**	**Mr. A. Vajpayee** MoEF, Forest Division New Delhi
19/08/04	**1:00-2:30**	**Mr. K.K Jain** MoEF, New Delhi
19/08/04	**3:00-4:00**	**Mr. Nair, MoEF** New Delhi
19/08/04	**4:30-5:30**	**Dr. T. Chandni** MoEF, New Delhi
20/08/04	**10:00-11:00am**	**Mr. S.K. Choudhury** Ex-Chairman, CIL New Delhi
20/08/04	**12:00-1:30am**	**Mr. K.P. Verma** MOC, New Delhi
20/08/04	**3:00-4:00pm**	**Mr. Paritosh Chakroborty** Media Personnel related to Coal Mining in India, New Delhi
21/08/04	**11:00:12:00am**	**Mr P.A Sangma** Ex-Speaker of Lok Sabha Ex Minister of Coal Ex- Minster of Labour
21/08/04	**3:00-4:00am**	**Mr. Dilip Ray** Ex-Minster of Coal
21/08/04	**4:30-5:30am**	**Mr. Mahendra Pandey** Central Pollution Control Board New Delhi
25/08/04	**3:00-4:00pm**	**Mrs Rinita Banerjee** Absoloute Cmpany Media Personnel related to Mining
26/08/04	**4:00-5:00pm**	**Mr. Ajit Panja** Ex-Coal Minster