



**THE ROLE OF MONITORING AND AUDITING IN THE
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS
IN AUSTRALIA**

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ABSTRACT

Monitoring and auditing are two important components of the Environmental Impact Assessment (EIA) process. There has been an increasing global trend to introduce different regulatory and management approaches to EIA monitoring and auditing. However, monitoring and auditing are two of the weakest areas of the EIA process globally compared to other components. The key issues that relate to EIA monitoring and auditing are mainly institutional/organizational in character rather than technical.

Australia is one of the few countries to have legislative provisions for EIA monitoring and auditing. In the last few years legislative changes have been brought to the EIA process both federally and at State and Territory level, yet monitoring and auditing remain weak or neglected within the EIA process. Procedural and institutional approaches to EIA monitoring and auditing vary among different States and Territories. Previously, no comprehensive study has been conducted to evaluate the procedures and practices of EIA monitoring and auditing in Australia.

This study identifies four major areas for analysis and evaluation of current procedures and practices of EIA monitoring and auditing in three Australian EIA jurisdictions: institutional arrangements; public accountability, transparency and community involvement; approaches and techniques; and resources and capacity. Case studies involving EIA projects and surveys and interviews with EIA practitioners were conducted in three Australian States: South Australia, Western Australia and New South Wales.

This study reveals that Western Australia and New South Wales implement environmental impact monitoring and auditing both within and outside the EIA framework. In South Australia, monitoring and auditing exist completely outside the EIA framework. Out of a total 51 evaluation criteria set in this research, South Australia, Western Australia and New South Wales do not meet 39, 28 and 26 of these criteria respectively. Some of the procedural aspects of EIA monitoring and auditing in NSW are better than those of Western Australia although Western Australia is widely recognized as one of the world's well-reputed EIA jurisdictions.

The case studies show that EIA monitoring and auditing occur in all three Australian States but they are not very effective or efficient. Monitoring and auditing are being implemented as

part of the ongoing environmental management of an operation. They are not integrated into the early stages of the EIA process and they do not provide any real feedback to the EIA process for its future improvement. The Australian approach to EIA monitoring and auditing is that proponents should fulfil their commitments, comply with terms and conditions of a development authorisation, and report to regulators on compliance and environmental performance. There is, however, no real enforcement in practice; instead there exists a situation where regulators rely heavily on proponents for information and everything depends on the proponents being committed to doing their job. Environmental monitoring and auditing implemented outside the EIA framework under different regulatory tools are not linked to the EIA process. They complement EIA monitoring and auditing but they do not replace them.

An absence of mandatory legal provisions for EIA monitoring and auditing is mainly responsible for the absence of an appropriate organizational set-up and lack of resources in the relevant government departments. A lack of formal inter-agency coordination in the post-EIA project operation is an obstacle in maximizing the benefits of environmental monitoring and auditing conducted outside the EIA process. Public accountability and transparency in EIA monitoring and auditing also need to be addressed. This thesis suggests two models in order to implement monitoring and auditing both within and outside the EIA framework in Australia. A number of recommendations have also been made to improve the overall situation.

DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, except where due reference is made in the text.

I consent to this copy of my thesis being available in the department/ university library for loan and photocopying.

A.K.M Rafique Ahammed

February 2007

I dedicate this thesis to my ailing parents who have been counting every moment since 2003 to see the successful end of my studies before they leave the world.

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ABBREVIATIONS

ACR	Annual Compliance Report
ACT	Australian Capital Territory
ADD	Aboriginal Affairs Department
AEMP	Annual Environmental Management Plan
AEMR	Annual Environmental Management Report
AER	Annual Environmental Report
ANZECC	Australia and New Zealand Environment Conservation Council
ASNZS	Australia and New Zealand Standards
BECC	Beverley Environmental Consultative Committee
BS	British Standards
CALM	Department of Conservation and Land Management
CCC	Community Consultative Committee
CEAA	Canadian Environmental Assessment Agency
CEPA	Commonwealth Environment Protection Agency
CESD	The Commissioner of the Environment and Sustainable Development
CHPL	Cadia Holdings Pty Ltd
CNA	Coal and Allied
COAG	Council of Australian Governments
COI	Commission of Inquiry
CSWA	Cable Sands Western Australia Pty Ltd
CVO	Cadia Valley Operations
DAC	Development Assessment Commission
DEC	Department of Environment and Conservation
DEH	Department for the Environment and Heritage
DHUD	Department of Housing and Urban Development
DEP	Department of Environmental Pollution (WA)/ Department of Environment and Planning (SA)
DIAS	Department of Administrative and Information Services
DIPNR	Department of Planning, Infrastructure and Natural Resources
DITR	Department of Industry, Tourism and Resources
DLWC	Department of Land and Water Conservation
DMR	Department of Mineral Resources
DoE	Department of Environment
DOIR	Department of Industries and Resources

DoP	Department of Planning
DPI	Department of Primary Industries
DR	Development Report
DTUP	Department of Transport and Urban Planning
DTUPA	Department of Transport, Urban Planning and Arts
DUAP	Department of Urban Affairs and Planning
DWLBC	Department of Water, Land and Biodiversity Conservation
EA	Environmental Assessment
EAMS	Eco-audit and Management Scheme
EC	European Commission
ECE	(United Nations) Economic Commission for Europe
EEC	European Economic Commission
EES	Environmental Effects Statement
EIA	Environmental Impact Assessment
EIM	Environmental Impact Monitoring
EIP	Environmental Improvement Plan
EIS	Environmental Impact Statement
EMA	<i>Environmental Management Act 1994</i>
EM&A	Environmental Monitoring and Audit
EMM	Environmental Management Manual
EMMP	Environmental Monitoring and Management Plan
EMP	Environmental Management Plan
EMS	Environmental Management System
EMOS	Environmental Management Overview Strategy
ERMP	Environmental Review and Management Programme
EPA	Environment Protection Authority/ Environment Protection Agency
EP&AA	<i>Environmental Planning and Assessment Act 1979</i>
EPBC	<i>Environment Protection and Biodiversity Act 1999</i>
EPD	Environmental Protection Department
EPIP	<i>Environment Protection (Impact of Proposals) Act 1974</i>
ES	Environmental Statements
ET	Environmental Team
FOI	Freedom of Information
GABCC	Great Artesian Basin Coordinating Committee
GPA	Geraldton Port Authority

GRI	Global Reporting Initiative
GWMP	Groundwater Management Plan
HRSTS	Hunter River Salinity Trading Scheme
HSEMS	Health, Safety and Environmental Management System
HVCC	Hunter Valley Coal Corporation
IAIA	International Association for Impact Assessment
ICESD	Australian Intergovernmental Committee for Ecological Sustainable Development
IEC	Independent Environmental Checker
IGAE	Intergovernmental Agreement on the Environment
ISL	<i>In-situ</i> Leaching
ISO	International Standardisation Organisation
MoE	Minister of the Environment
MOP	Mining Operation Plan
NOI	Notice of Intent
NPI	National Pollution Inventory
NPWS	National Parks and Wildlife Service
NSESD	National Strategy for Ecologically Sustainable Development
NSW	New South Wales
ODC	Olympic Dam Corporation
ODECC	Olympic Dam Environment Consultative Committee
OEMP	Operational Environmental Management Plan
OMP	Operational Management Plan
PCWMP	Patawalonga Catchment Water Management Board
PER	Public Environment Report
PFM	Planning Focus Meeting
PIRSA	The Department of Primary Industries and Resources, South Australia
PLNSA	Planning SA
PPA	Post-project Analysis
PSCSS	Patawalonga Seawater Circulation and Stormwater System
RA	Responsible Authority
RMP	Radiation Management Plan
RWMP	Radioactive Waste Management Plan
SA	South Australia
SEA	Strategic Environmental Assessment

SHECMS	Safety, Health, Environment and Community Management System
SIGM	St Ives Gold Mine
SIS	Species Impact Assessment
TCWMP	Torrens Catchment Water Management Board
TPL	Thiess Pty Ltd
TSF	Tailings Storage Facilities
TQM	Total Quality Management
UK	The United Kingdom
UNECE	The United Nations Economic Commission for Europe
UNEP	The United Nations Environment Programme
VMMP	Vegetation Management and Monitoring Plan
VROM	The Dutch Ministry of Housing, Physical Planning and Environment
WA	Western Australia
WMC	Western Mining Corporation
WRC	Water and Rivers Commission
XCA	Xstrata Coal Australia

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Environmental Impact Assessment (EIA) is being used globally, either as a planning or management tool, in order to minimise the harmful consequences of economic development. Its emphasis is on prevention and it is hence an example of the precautionary principle (Glasson, 1994a). Ensuring environmental protection and management is the primary goal of EIA (Bailey, 1997; Morrison-Saunders & Bailey, 1999). Since its introduction in the early 1970s, the role and scope of EIA are expanding continuously, although its application, practice and procedures vary from country to country (Glasson et al., 1999; Wood, 1995, 2003). Monitoring and auditing are widely considered as integral parts of the EIA process (Glasson et al., 1999; IAIA, 1999; McCallum, 1987; Morrison-Saunders & Arts, 2004; Sadler, 1987a, 1987b) and are two of the most widely discussed issues in recent EIA literature. Carpenter (1997) notes that the issue of monitoring and auditing in EIA is becoming more prominent. Various themes in monitoring and auditing in EIA were highlighted in a series of workshops at the International Association for Impact Assessment (IAIA) conferences from 1999 to 2005 (Morrison-Saunders & Arts, 2005). The annual conference of the International Association for Impact Assessment (IAIA'00) held in Hong Kong in 2000 specifically focused on monitoring and auditing in EIA and suggested future directions for good practice.

The importance and benefits of monitoring and auditing in the EIA process has been repeatedly emphasised in much literature (Arts, 1998; Arts & Nooteboom, 1999; Arts et al., 2001; Bisset & Tomlinson, 1988; Canter, 1993; Glasson, 1994b, 2005; Glasson et al., 1999; Holling, 1978; Morgan, 1998; Morrison-Saunders & Arts, 2004; Morrison-Saunders et al., 2001; Munro, 1987; Sadler, 1988; Sadler, 1996; Tomlinson & Atkinson, 1987a; Wilson, 1998; Wood, 1995; Wood, 2003; Wood, 1999a, 1999b). In 1986, a special committee of the National Research Council of the USA identified monitoring as the “single action that could most improve impact assessment” (Fairweather, 1989). According to McCallum (1987), EIA cannot be expected to last without the introduction of impact monitoring.

EIA is criticized for being mostly concerned with the prediction and identification of impacts at a pre-decision level focusing only on the steps before and up to the planning decision, but ignoring post-development follow-up activities, such as monitoring and auditing (Arts et al., 2001; Glasson, 1994b; Morrison-Saunders & Arts, 2004; Petts & Eduljee, 1994). As a result, EIA is failing to maximize its potential for continuous improvement (Wood, 1999b).

Moreover, it would seem that the procedural emphasis of EIA upon the pre-decision analysis keeps it distant from its goal, i.e., environmental protection. In a major study on international EIA effectiveness by Sadler (1996), it was found that there was a lack or poor performance of follow-up activities in EIA. This is considered to be a major weakness of EIA globally (Arts et al., 2001; Bisset & Tomlinson, 1988; Buckley, 1989a; Dipper et al., 1998; Glasson et al., 1999, 2005; Morrison-Saunders & Arts, 2004; Ortolano & Shepherd, 1995; Sadler, 1996; Wood, 1995, 2003; IAU, 2003).

In Australia, the governing principles of EIA were formulated and endorsed by the Australian and New Zealand Environment and Conservation Council (ANZECC) through a number of reports (ANZECC, 1991, 1996, 1997). As part of the National and State coordination process an Intergovernmental Agreement on the Environment (IGAE) was adopted in 1992 (Commonwealth of Australia, 1992a). The IGAE set out a schedule for EIA, recognizing and acknowledging the need for national participation in all facets of EIA and accepting the role of EIA in post-development environmental monitoring and management (Commonwealth of Australia, 1992b). This agreement forms the basis for EIA becoming one of the most important and useful tools for environmental management in Australia. However, Glasson et al. (2005) note that in general Australian policies on EIA are not as powerful as those of other major EIA jurisdictions of the world such as Canada or The Netherlands.

A major review of Commonwealth EIA process was conducted in 1994 highlighting a number of issues such as cumulative impacts, strategic assessment, social impact assessment, public inquiry process, public participation and monitoring (CEPA, 1994). This review found very limited implementation of monitoring and auditing in the Australian EIA system. As noted by Harvey (1998) in most of the EIA jurisdictions in Australia, EIA is being used as a planning tool rather than an environmental management tool. Therefore, monitoring and auditing programmes are not strictly considered within most of the EIA processes in Australia; alternatively, they tend to be requirements of the planning approval of the project or other regulatory instruments. Although Australia is one of the world's major EIA jurisdictions, very little research has so far been conducted on EIA monitoring and auditing in Australia. There is no comprehensive study on the role of monitoring and auditing in the EIA process in Australia. Therefore, this study attempts to investigate the role of monitoring and auditing in the EIA process of Australia EIA. This contribution to increased understanding of the Australian situation will be significant for much wider application. Before outlining the

specific aims and objectives it is important to provide a background on monitoring and auditing in EIA.

1.2 Monitoring and Auditing in EIA: Different Terminologies

The EIA process passes through a 'series of iterative steps' including: consideration of alternatives, action design, screening, scoping, preparation of the EIA report, reviewing or evaluating the report, decision-making, and post-decision activities such as monitoring and auditing (Glasson et al., 1994, 1999; Wood, 1995, 2003). According to Bird and Therivel (1996), environmental impact monitoring is an essential part of the EIA process, which forms part of its management component. Glasson et al. (1994) state that EIA should be a cyclical activity, with feedback and interaction between the various steps. It is important to ensure that the consequences of any development action throughout its entire life cycle are understood and acceptable. Therefore, EIA should have some mechanism for checks on the design, implementation, operation and decommissioning stages of the project cycle. EIA itself is a check on the project design. The implementation of monitoring and auditing is the only mechanism available to establish further checks on the later stages of the project cycle. Again, it is equally important to determine the success of EIA in achieving its objectives requiring some sort of feedback or follow-up mechanism in it. Thus, monitoring and auditing can play a significant role in the post-decision stage of the EIA process and, in fact, without their implementation EIA may lose its credibility. As Nixon (1998, p.7) stated: "money, time and effort spent on the baseline studies and predictions are all effectively rendered useless unless there is some way of testing these predictions and determining whether mitigation methods will have to be applied".

Monitoring and auditing in EIA have been defined in many ways and are referred to as 'EIA follow-up', 'ex-post evaluation', 'post-project impact assessment and monitoring', 'post-decision analysis', 'post-decision management', 'post-project analysis', and 'post-development audit' by some prominent authors (see Arts, 1998; Arts et al., 2001; Bailey & Hobbs, 1990; Canter, 1996; Caldwell et al., 1982; McCallum, 1985, 1987; Morrison-Saunders & Arts, 2004; Sadler, 1996, 1998; Shepherd, 1998; Wood, 2003). Definitions of EIA abound in the literature but rarely do they make any mention of post-development activities such as monitoring and auditing. The definition given by Berkes (1988) clearly refers to these activities as follows:

Environmental Impact Assessment is equivalent to impact prediction; prediction of changes from the baseline conditions as demonstrated by the results of monitoring (Berkes, 1988, p.213).

According to Morrison-Saunders and Arts (2004, p.1), “Environmental Impact Assessment (EIA) is a process for taking account of potential environmental consequences of a proposed action during planning, design, decision-making and implementation stages of that action”. This definition takes EIA beyond decision-making recognizing its role at the post-decision stage of a development proposal. Early definitions of ‘monitoring’ and ‘auditing’ are provided by Bisset and Tomlinson (1983). They specifically relate to the identification of actual impacts of the development action on the environment, and the verification of the accurateness of the predictions:

Monitoring is concerned with identification and measurement of impacts from development. It is the process of repetitive observation of one or more elements or indicators of the environment according to pre-arranged schedules in time and space in order to test postulates about man’s impact on the environment. The term ‘audit’ is used to describe the activities involved in comparing predicted impacts of development with those impacts which appear to have occurred. The aim of the comparison is to test the accuracy and coverage of predictions made in EISs (Bisset & Tomlinson 1983, pp. 406-7).

In more recent times however, opinions are changing. The coverage of monitoring and auditing has become much broader and they are now linked with ongoing environmental management of project operations. Definitions of monitoring and auditing given by Glasson et al. (2005) clearly reflect it:

Monitoring involves the measuring and recording of physical, social and economic variables associated with development impacts (e.g. traffic flows, air quality, noise, employment levels). The activity seeks to provide information on the characteristics and functioning of variables in time and space, and in particular on the occurrence and magnitude of impacts. Monitoring can improve project management (Glasson et al., 2005, p.185).

Environmental impact auditing involves comparing the impacts predicted in an EIS with those that actually occur after implementation, in order to assess whether the impact prediction performs satisfactorily. The audit can be of both impact predictions (how good were the predictions?) and of mitigation measures and conditions attached to the development (is the mitigation effective? Are the conditions being honoured?) (Glasson et al., 2005, p.186).

Different authors have proposed different types of monitoring and auditing (Table 1.1) in the EIA process (see Bailey & Hobbs, 1990; Bisset, 1987; Lohani et al., 1999; Thomas, 2001; Tomlinson & Atkinson, 1987b; Wood et al., 2000). However, in recent times the term ‘EIA

follow-up' is used as a generic term to mean monitoring and auditing in both EIA and Strategic Environmental Assessment (SEA) (see Morrison-Saunders & Arts, 2004, 2005; Marshall et al., 2005; Marshall, 2005). 'EIA follow-up' is a Canadian term that includes all activities carried out after the EIA process is complete. The concept of 'EIA follow-up' seeks to establish a link between the operational environmental management and pre-decision environmental assessment of a development proposal via some sort of feedback. According to Arts et al. (2001) and Morrison-Saunders & Arts (2004), EIA follow-up consists of four basic elements: monitoring, evaluation, management and communication. Accordingly, Morrison-Saunders and Arts (2004, p.4) define EIA follow-up 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". The most recent explanation of the term 'EIA follow-up' is given by Marshall (2005) as outlined in the following Table (Table 1.2). Accordingly, the term 'EIA follow-up' will be used in this thesis to mean 'EIA monitoring and auditing'.

Table 1.1: Different Types of Monitoring and Auditing Activities in EIA.

Activities	Proposed types
Monitoring	<p>Baseline monitoring: Establishes a database during a representative pre-project period.</p> <p>Effects or impact monitoring: Measures changes during the project.</p> <p>Compliance monitoring: Verifies compliance with regulatory standards and terms and conditions of approvals.</p> <p>Scientific monitoring: Checks accuracy in the EIA and explains errors.</p> <p>Management monitoring: Determines the effectiveness of management initiatives.</p> <p>Enforcement monitoring: Ensures that mitigation is being performed as specified.</p> <p>Effectiveness monitoring: Measures the extent of success of mitigation approaches.</p> <p>Implementation monitoring: Determines the degree of implementation of a project as designed.</p>
Auditing	<p>Draft EIS audit: Determines the adequacy of EIS.</p> <p>Decision point audit: Determines the value of EIS to the decision-maker.</p> <p>Implementation audit: Verifies the installation and operation of plants and machineries.</p> <p>Performance audit: Verifies the response to potential environmental problems in the project operation stage.</p> <p>Project impact audit: Identifies environmental changes as consequences of the project activities.</p> <p>Prediction audit/Post-auditing: Assesses the accuracy and utility of predictions.</p> <p>Compliance audit: Verifies compliance with terms and conditions and regulatory requirements.</p> <p>Effectiveness or policy audit: Checks the feasibility of mitigation measures and the consistency of EIA practice.</p> <p>EIA procedure audit: Examines the performance of EIA procedures and identifies possible improvements.</p>

(Based on Bisset, 1987; Tomlinson & Atkinson, 1987b; Bailey & Hobbs, 1990; Thomas, 2001; Lohani et al., 1999; UNEP, 2002; Wood et al., 2000).

Table 1.2: Features and Activities of EIA Follow-up

Key activities in EIA-follow-up	Proponent oriented forms of EIA follow-up	Description
Monitoring	Monitoring for conformance	The collection of data and comparison with standards, predictions or expectations that provide proof of technological, management or operational control against a specific consent requirement or voluntary mitigation measure.
	Monitoring for compliance post-decision	Monitoring and audit activities that are developed through environmental management frameworks to demonstrate how the collective body of consent conditions or voluntary mitigation measures will be enacted and complied with.
Evaluation	Evaluation for future knowledge	The appraisal of the actual impact or implemented mitigation with standards, predictions or expectations in environmental performance for one development that can address areas of impact encountered in future developmental EIA.
Management	Management for future consents and licenses	Monitoring and evaluation activities during EIA that facilitate operational or environmental permitting in subsequent stages of the development's life cycle.
	Management for liability avoidance	Monitoring and evaluation activities arising from EIA that offsets future risk of liability or compensation issues.
Communication	Communication for consent closure pre-decision	Anticipatory proposals that detail management, monitoring or evaluation proposals submitted pre-decision, their objective being to foreclose concerns and to positively increase the likelihood of the development being granted statutory consent.
	Stakeholder communication	Activities integrated within the EIA process that inform stakeholders or communities, enhancing the relationship between the developer and such interested parties to pre-empt concerns or foreclose objections.

(Source: Marshall, 2005, p. 192)

It is widely accepted that monitoring and auditing in the EIA process are essential to verify the performance of the mitigation activities, compliance with regulatory standards, and the accuracy of impact predictions and to take corrective actions when needed. Despite its undisputed usefulness, according to Wood (1995), EIA practice often leaves much to be desired. Apart from the fact that many important steps are often left out of EIA procedures in many jurisdictions around the world, it is also often thought that the process itself is too 'linear', with no real provisions for feed-back (Morgan, 1998). It is therefore necessary to redefine EIA in order to consider monitoring and auditing as its integral part and to make it a cyclic process pushing it beyond decision-making. EIA should be recognized as a two-phase

process that in its first phase analyses the possible environmental, social and economic consequences throughout the life of a proposed development from project design to decommissioning, establishes baseline conditions, makes certain verifiable predictions and suggests appropriate safeguards and management measures in order to facilitate decision-making. Then, in the second phase, it provides feedback to decision-makers on: the status of conformance with commitments, standards and terms and conditions; effectiveness of the proposed safeguards and management measures; accuracy of predictions, actual project impacts; requirements of adjustments, control or management measures through monitoring, auditing, reporting and evaluation.

Many terminologies can make monitoring and auditing seem a somewhat complex phenomenon. Moreover, most of the terms overlap considerably (Arts et al., 2001; Glasson et al., 2005). Shepherd (1998) termed the monitoring and auditing activities in EIA as 'post-project impact assessment and monitoring' (PPIAM) and suggested seven components for this. Tomlinson and Atkinson (1987b) define seven types of auditing for various stages in a typical EIA process. Three of these relate to the post-development stage whilst others are applicable during the EIA study. Actually, monitoring and post-auditing are interlinked, the former being essential for the latter (Dipper et al., 1998). It is not practical to integrate all types of monitoring and auditing in the EIA process of a particular project at one time. The type of project and its potential for producing significant social, economic and environmental impacts will determine what type of monitoring and auditing programmes are needed in the EIA process of that particular project. There is a need to prioritise actions under EIA monitoring and auditing in order to fulfil the basic need of EIA. Hence, Wilson (1998) argues that auditing the performance of mitigation commitments could be the first priority. It is necessary, however, to make EIA more effective and meaningful without promoting any unnecessary complexity. Therefore, it is important to look into the existing mechanisms of EIA monitoring and auditing in order to establish an effective and uncomplicated procedural framework, which can ensure integration between impact predictions, mitigation measures and impact management.

The implementation of EIA follow-up in practice is not a simple matter (Arts et al., 2001), with the major issues relating to the initiation mechanism and responsibility (Morrison-Saunders et al., 2001). Another issue to consider is that environmental monitoring and auditing activities are also undertaken outside the EIA process. Pollution control, waste management, land use planning, natural resource management and other aspects of

development planning and policy-making all involve various forms of monitoring of activities. There is often considerable overlap between the monitoring of EIA and all other aspects of environmental management (Lee & George, 2000) and it is therefore necessary to establish some sort of mechanism that can avoid or reduce the overlap between the monitoring and auditing requirements in EIA and other aspects of environmental management. Monitoring and auditing generally involve three main stakeholders of the EIA process including proponent, EIA regulator and the community, each with different interests and responsibilities (Morrison-Saunders et al., 2003). In addition to an appropriate institutional and legal arrangement proper coordination between these parties is important for effective implementation of monitoring and auditing in EIA (Canter, 1996; Wood, 2003).

1.3 The Importance and Benefits of Monitoring and Auditing in EIA

The importance and benefits of monitoring and auditing in EIA have been repeatedly stressed in a wide range of literature in many ways (Holling, 1978; Beanlands & Duinker, 1984; Tomlinson & Atkinson, 1987a; Bisset & Tomlinson, 1988; Canter, 1993, 1996; Sadler, 1988, 1996; Glasson et al., 1999, 2005; Arts, 1998; Arts & Nooteboom, 1999; Arts et al., 2001; Morgan, 1998; Morrison-Saunders and Arts, 2004; Ross, 2004; Wood, 1995, 2003). There is no literature where the importance of monitoring and auditing in EIA has been ignored. However, a wide range of opinion exists. Some have expressed concerns for errors and uncertainty with predictive techniques of the EIA process and its credibility, while others put emphasis on impact management, improvement of future EIAs, efficiency and cost-effectiveness of EIA, and verification of EIA outcomes.

Wood (1999b) argues that monitoring and auditing the actual impacts of development projects in various environmental settings has been acknowledged as a means of informing decision-makers about the possible degree or error associated with techniques of prediction, in addition to providing a basis for improving predictive methods for future use. According to Sadler (1988), monitoring can help learn from experience and can help minimise errors in future assessments and impact predictions. Bisset and Tomlinson (1988) note that monitoring provides an early warning device, which alerts those managing the project or the environment. Martyn et al. (1991) argue that monitoring is more important for controversial proposals where there are uncertainties of data or impacts. Thompson et al. (1997) argue that monitoring in EIA is required to determine or evaluate the success of mitigation measures. Shepherd (1998) notes that monitoring can make EIA a continual assessment of impacts rather than merely a pre-project document. According to Marshall et al. (2005), monitoring

and auditing are essential in determining the outcomes of EIA. Wood (2003, p. 240) argues that “impact monitoring reduces the implementation gap of mitigation measures if there is a short fall of incorporation of mitigation measures proposed in the EIA report.” Glasson et al. (2005) believe that monitoring and auditing in EIA can contribute to all aspects of the EIA process. Based on some early and recent literature, the benefits of monitoring and auditing are summarized in Box 1.1 below.

Box 1.1: The Importance and Benefits of Monitoring and Auditing in EIA.

Monitoring and auditing can

- ❑ be used as an early warning device to identify harmful trends in advance in order to mitigate or prevent them in time.
- ❑ improve knowledge about the impacts of various projects on specific environments.
- ❑ improve project management by providing ongoing management information about the project and its environmental effects.
- ❑ provide opportunities for project managers and regulators to respond to changes in any activity.
- ❑ improve future EIA studies on the basis of the improved technical and scientific knowledge and can help learn from experience.
- ❑ make future assessments more efficient, cost-effective and timely by reducing the time and effort and minimising errors.
- ❑ provide an accepted and useful database reducing the need for future monitoring activities.
- ❑ reduce uncertainty in impact predictions in future assessments.
- ❑ prevent environmental problems, which result from inaccurate predictions, inadequate mitigation or factors unforeseen at the time of the assessment.
- ❑ be used as an effective means of ensuring regulatory control over the project through compliance and enforcement.
- ❑ identify the required adjustment of mitigation plan.
- ❑ help resolve disputes over different environmental issues related to an operation by providing regular evidences as a basis for discussion with authorities or the public.
- ❑ provide evidence to support or to refute claims for compensation over impacts on people or property.
- ❑ improve public awareness about the actual effects of development projects on the environment.
- ❑ reassure all participants in the EIA process, in the face of uncertainty over the impact predictions and associated management decision.
- ❑ help implement the EIA process as acyclic process by providing feedback into it.
- ❑ evaluate the overall performance of the EIA process.
- ❑ provide documentation of the actual impacts of an activity for use in similar situations elsewhere.
- ❑ help change or revise the current consent conditions of a project.
- ❑ provide a database of impact history that can be used to speed the process of renewing licences, permits, or **planning** consents for the activity in future.

(Based on Bisset & Tomlinson, 1988; Canter, 1996; Martyn et al., 1991; Glasson et al., 1999, 2005; Morris and Therivel, 1995; Morgan, 1998; Wood, 2003).

In recent years, there has been an increasing trend in examining the effectiveness of EIA. Sadler (1998) identified at least six areas for the overall evaluation of the effectiveness of EIA, 'effect monitoring and impact auditing' being one of them. Monitoring and auditing play a vital role in making EIA an effective environmental management tool. According to Bird and Therivel (1996) environmental impact monitoring and impact auditing are two vital activities, which must be performed in order to assess an EIA's effectiveness in achieving environmental protection. Morrison-Saunders (1996) argues that the effectiveness of EIA is the extent to which it achieves its goals for environmental protection and management. Gibson (1993) considers monitoring of effects as one of the basic principles for evaluating the EIA process. Sadler (1996) focused on 'follow-up' as one of the major themes in his international EIA effectiveness study and identified follow-up activities as one of the major priorities for improving EIA effectiveness. In fact, without monitoring and auditing there is no opportunity for feedback in the EIA process and without feedback EIA is a static and linear process that does not have any mechanism for the improvement in the future. Actually, the benefits of monitoring and auditing in EIA are huge. It can be argued that in order to make EIA an effective, broader and long-term environmental management tool and to ensure its credibility, the proper implementation of monitoring and auditing in the EIA process must be taken into consideration.

1.4 Purposes and Objectives of Monitoring and Auditing in EIA

The objectives and purposes of monitoring and auditing in EIA have been discussed clearly in the literature (see Bisset and Tomlinson, 1988; Bailey and Hobbs, 1990; ECE, 1990; Sadler, 1996; Canter 1996; Arts and Nooteboom, 1999; Arts et al., 2001; IAIA, 1999; Morrison-Saunders & Arts, 2004). Arts and Nooteboom (1999) suggest that the main objective of monitoring and auditing in EIA is to control implemented projects. Bisset and Tomlinson (1988) note that the aim of impact monitoring is to detect whether an impact has occurred and to estimate its magnitude. As noted by Bailey and Hobbs (1990) the purpose of monitoring and auditing is to provide feedback into the EIA process and to determine whether EIA is an effective tool in environmental management. According to Sadler (1996) this feedback system helps disseminate information that can improve the future EIA process through learning from previous experience. The Economic Commission for Europe (UNECE, 1990) identifies the following general purposes for conducting monitoring and auditing in EIA:

- To monitor compliance with the agreed conditions set out in construction permits and operating licenses.

- ❑ To review predicted environmental impacts for proper management of risks and uncertainties.
- ❑ To modify the activity or develop mitigation measures in case of unpredicted harmful effects on the environment.
- ❑ To determine the accuracy of past impact predictions and the effectiveness of mitigation measures in order to apply this experience to future activity of the same type.
- ❑ To review the effectiveness of environmental management for the activity.
- ❑ To use the monitoring results in order to determine the compensation required to be paid to local citizens affected by a project (UNECE, 1990 cited in Canter, 1996, p. 640).

Sadler (1996) identifies almost the same type of purposes of monitoring and auditing in EIA: to ensure terms and conditions of project approval are met; to verify environmental compliance and performance; to cope with unanticipated changes and circumstances; to adopt or adjust mitigation/management measures when required; and to improve future EIA process. The purposes of monitoring and auditing in EIA are wide ranging (Canter, 1996). According to Wilson (1998), monitoring and auditing in EIA have both scientific and management related purposes. Morrison-Saunders and Arts (2004) identify at least five main purposes ranging from technical and scientific to socio-political and management aspects which are: “the control of projects and their environmental impacts; maintaining decision-making flexibility and promoting an adaptive management approach; improvement of scientific and technical knowledge; improvement of public awareness and acceptance; and integration with other information” (Morrison-Saunders & Arts, 2004, p.8).

The objectives and purposes of monitoring and auditing in EIA, as mentioned above are very specific and clear although they are wide-ranging. Some of them may not be valid for a particular project. In recent times there has been much emphasis on environmental management outcomes of EIA. However, in order to make EIA an effective, credible and meaningful environmental management tool and to prevent EIA from being just a pro forma exercise the role of monitoring and auditing in EIA must be taken into consideration. The implementation of monitoring and auditing in EIA depends on the objectives of implementing EIA in a particular EIA jurisdiction. It is very likely that the performance of monitoring and auditing is better in EIA jurisdictions where EIA is more concerned with environmental protection rather than with planning approval (Morrison-Saunders, 1996).

1.5 Global Status of Monitoring and Auditing in EIA

Although monitoring and auditing are two important components of the EIA process, their implementation in the EIA process is being neglected globally. It is widely believed that monitoring and auditing are the weakest areas in the EIA process globally. Sadler (1996) reviewed the implementation of monitoring and auditing in various EIA jurisdictions in his 'international study of the effectiveness of environmental assessment' and found that there was a lack or poor performance of follow-up activities in EIA. This weakness has been established in some of the recent literature (Wood, 2003; Morrison-Saunders and Arts, 2004; Marshall et al., 2005; Glasson et al., 2005). Wood (2003) evaluated the status of monitoring and auditing in seven EIA jurisdictions of the developed world including the United States, United Kingdom, The Netherlands, Canada, Australia, New Zealand and South Africa, and he found none of them to fully meet his evaluation criteria.

A review by Dipper et al. (1998) reveals that post-auditing activities are not widespread in practice and concludes that there is much scope for raising the profile of post-auditing activities in EIA worldwide. The extent to which follow-up actions are explicitly required by the EIA process varies greatly between countries, although mandatory requirements appear to be the exception rather than the rule (Dipper et al., 1998, Wood 2003). Again, a procedure-practice gap is also evident (Wood 2003). Barker and Wood (1999) report that of eight European countries studied, only Greece was found to take measures to strengthen EIA follow-up. Briffett's study of Asia (1999) found that within 15 EIA jurisdictions only four countries (Hong Kong, Indonesia, South Korea & the Philippines) had compulsory provisions for monitoring and auditing in EIA (Briffett, 1999). Lee and George (2000) note that in many developing and transitional countries an Environmental Management Plan (EMP) or monitoring plan is included in the EIS as required by the procedural guidelines or donor agencies. However, due to complex institutional arrangements and the lack of supervision by the competent authority, the enforcement and compliance usually do not take place (Lee & George, 2000). Box 1.1 summarises the major findings of the literature on monitoring and auditing in EIA and Table 1.2 shows the global status monitoring and auditing in EIA.

Canter (1996) notes that in the United States only minimal attention has been given to post-EIA monitoring and auditing. He mentions the following reasons relating to less emphasis on monitoring and auditing in the EIA process of the United States:

- Environmental monitoring is not required in the current EIA process; the emphasis has been on getting the EIS completed so the project, plan or program can be started.
- Monitoring requirements may be included, or assumed to be included, as part of environmental-media (air, surface, or groundwater, and/or noise) or other permit conditions.
- There is the presumption that numerous federal, state and even local monitoring networks could be used if necessary, and that they would meet project-monitoring needs, if any.
- There is resistance to planning and implementing a monitoring program, since collected data could be used for notifying of violations, or even the levying of fines.
- Even if monitoring is considered a necessity, agency staffing and funding may be limited (Canter 1996, pp. 638-39).

Monitoring is not a mandatory requirement under UK EIA Regulations (Frost, 1997; Glasson, 1999, 2005). Frost (1997) notes that the UK administrative guidance on EIA procedures does not even refer to monitoring and audit. However, there is monitoring activity under the *Environment Protection Act 1990*, Waste Management Licensing and planning approvals (Frost, 1997; Wood, 2003). Wood (2003) notes that impact monitoring is not generally required for projects approved under the Planning Regulations and it is confined to only major developments such as power stations or waste disposal operations. Frost (1997) notes that the European Economic Commission (EEC) eco-audit and management scheme (EAMS) and British Standard 7750 are relevant to EIA follow-up in UK. A study on 28 UK projects by Wood et al. (2000) showed that very little monitoring of environmental impacts actually occurred. This study also revealed that out of 865 predictions 488 (56%) were auditable and of them 105 (21%) predictions were inaccurate. Dipper et al. (1998) and Chadwick and Glasson (1999) report more or less similar findings. An analysis of 700 UK environmental statements (ESs) conducted by Frost (1997) shows that only 30% of ES include some form of monitoring proposal and they are not comprehensive. The studies of Wood (1999, 2000) indicated a tendency to overestimate the magnitude of impacts in UK. The study by Wood et al. (2000) identified a number problems associated with the auditing of predictions in UK projects. They include a lack of data, vague or ambiguous prediction and time dependency.

The Canadian environmental assessment legislation strongly emphasizes monitoring and auditing in EIA but it contains no means of ensuring that monitoring is implemented (Wood, 2003). David Redmond and Associates (1999) report that of 191 Canadian screening reports they examined about 50% included follow-up requirements. The Commissioner of the Environment and Sustainable Development (CESD, 1998) reports that the responsible

authorities (RAs) in Canada did not plan for follow-up in one third of 48 screening projects that required follow-up. The European Directive on EIA (Directive 85/337/EEC or its amendments) does not specifically require impact monitoring, and there is a lack of statutory provision in of most Member States (Dipper et al., 1998). The Netherlands require monitoring and remedial action if actual impacts exceed predictions (Wood 2003). However, in the Dutch EIA system monitoring and auditing do not essentially take place and they depend on other regulatory instruments outside the EIA process (Arts, 1998; Arts & Noteboom, 1999; Arts & Meijer, 2004).

In Australia, an almost similar approach to that of the UK is followed in implementing monitoring and auditing in EIA. Although there is some provision for monitoring in some Australian EIA jurisdictions, it is largely discretionary and has not been an important part of the EIA process (Harvey 1998). Buckley (1989a) reported that many EIAs in Australia were descriptive as opposed to predictive and there was considerable problem with predictions in EIA (28% of the auditable predictions were found to be completely inaccurate). Bailey et al. (1992) found 22% of the auditable predictions inaccurate in seven artificial waterway developments in Western Australia and noted that the lack of monitoring data constrained auditing of impacts. Another study in Western Australia by Morrison-Saunders (1996) found 29% of inaccurate predictions with 14% of actual impacts not predicted at all. The only research in South Australia relating to post auditing is the work of Read (1994) which shows a different scenario. This research found the faunal predictions in the EIS of a mineral mine accurate and useful overall.

Box 1.2: Summary of the Evaluation of Monitoring and Auditing in EIA.

- There appears to be no standardised audit methodologies.
- Monitoring needs to be considered and designed very early in the EIA process.
- Monitoring requires coordination, information, management and resources.
- Many EIA reports contain very few forecasts.
- Many EIA reports' forecasts are vague and qualitative.
- Little impact monitoring (especially at construction and decommissioning phases) takes place.
- Impact monitoring data (especially for socio-economic impacts) are often inadequate for auditing purposes.
- Routine impact auditing is rarely carried out.
- Only a minority of EIA forecasts have proved accurate or almost accurate.
- Few EIA report forecasts have been proved totally inaccurate.
- Post-EIA report design changes invalidate some forecasts but do not appear to affect accuracy significantly.
- Few unanticipated impacts have been detected.
- There is little evidence of systematic bias in forecasts.

(Source: Wood, 2003, pp.243-44).

Table 1.3: Global Status of Monitoring and Auditing in EIA.

Country	Comments
USA	No monitoring provision in the National Environmental Policy Act 1969 (NEPA). Monitoring provisions in the Council on Environmental Quality (CEQ) regulations are essentially discretionary. The CEQ regulations primarily focus on the use of monitoring in conjunction with the implementation of mitigation measures; often weak in practice.
UK	No provision for monitoring. Uncoordinated implementation monitoring takes place under planning and other legislation un related to earlier stages in EIA process.
Canada	Mandatory and extensive legal provisions; monitoring programme is linked to the early stages of EIA but no mechanism for ensuring full compliance.
Commonwealth of Australia	Discretionary legal provisions. The Environment Minister has the power to direct an environmental audit but inoperative in practice. Monitoring activities outside the EIA process exist.
The Netherlands	Mandatory legal provision for post-decision evaluation but it does not often happen in practice. No effective enforcement mechanism; monitoring and auditing take place out side the EIA process under other regulatory tools .
New Zealand	Mandatory legal provisions but not often complied with. Public has the right to ask for enforcement by the court. There is an improving trend.
Developing and transitional countries	Mandatory legal requirements in a few countries. Procedural requirements for EMP or monitoring plan in several countries. Guidelines of funding agencies require monitoring. Complex institutional arrangements in some countries. Compliance and enforcement are very week or lacking. Lack of supervision by the competent authorities.
European Union	The European Directive on EIA (Directive 85/337/EEC or its amendments) does not specifically require impact monitoring, and there is a lack of statutory provision in most of the member States

(Based on Wood, 2003; Glasson et al., 1999, 2005; Lee and George, 2000; Canter, 1996).

1.6 Monitoring and Auditing in EIA in Different Australian States

Australia is one of the three EIA jurisdictions that partially meets Wood's evaluation criteria of monitoring (Wood, 2003). However, monitoring and auditing are considered to be one of the weakest areas in the EIA systems in Australia (Conacher & Conacher, 2000; Harvey, 1998; Malone, 1997; Wood, 2003). In Australia, there are several reports and studies that refer to the lack of EIA monitoring and auditing in this country (see the Review of Commonwealth Environmental Impact Assessment 1994 and Buckley's environmental impact auditing studies, 1989a, 1989b, 1991a, 1991b, 1992, 1995; ANZECC, 1991). Various recommendations have been made in a number of government reports to overcome this shortcoming. The report of the Australian and New Zealand Conservation Council (ANZECC, 1991) recommended the use of enforceable and auditable conditions and an effective monitoring programme. The Intergovernmental Agreement on the Environment (Commonwealth of Australia, 1992a) states that:

The environmental impact assessment process will provide a basis for setting environmental conditions, and establishing environmental monitoring and management programmes (including arrangements for review) and developing industry guidelines for application in specific cases (Intergovernmental Agreement on the Environment, p.22, Schedule 3 (3xii)).

The Commonwealth Environmental Protection Agency (1994, p.45) in its review proposed the 'introduction of post-assessment monitoring as a standard element of the Commonwealth environmental impact assessment process'. Unlike the EIA system of Canada or the Netherlands, the requirement of monitoring in the Australian EIA systems is discretionary. It must be noted that even if monitoring is not provided for in legislation, it does still occur on an *ad hoc* basis in some areas (Harvey, 1998; CEPA, 1994). Except for Western Australia, in most Australian EIA jurisdictions developers are required to carry out impact monitoring under planning consent conditions or the environmental permit system (Harvey, 1998; CEPA, 1994). The Australian approach has a similarity with that of the United Kingdom in this regard. Although monitoring is still a weak link in Australia, some Australian EIA jurisdictions do have provisions for it in their legislation (Harvey, 1998). The Commonwealth Review of Environmental Impact Assessment in 1994 found that generally, monitoring is limited to that required by licences.

To be truly effective EIA has to achieve goals for better environmental management of any particular project; however, EIA can be effective on a nation-wide level by contributing information to future projects. The review of Commonwealth (of Australia) Environmental Impact Assessment in 1994 found that very little was done to utilize the information contained in the multitude of Environmental Impact Statements (EIS) around Australia. Buckley (1989a) also remarked on the lack of effort in Australia to collate information in a systematic way to be used as a base for future reference. This is indeed unfortunate as a great deal of time, money and effort would be saved on future EIA preparation if the information contained in past EISs provided some feedback. Future projects and activities could then be compared against similar developments carried out in the past which were subject to similar variables (Malone, 1997).

According to Wood (2003), the Commonwealth *Environment Protection and Biodiversity Act 1999* (EPBC) has made considerable improvement on the previous situation. The EPBC Regulations 2000 require an EIS or public environmental report to include "an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of action, including any

provisions for independent environmental auditing” (EPBC Regulations, Schedule 4, Paragraph 5(d)). The EPBC Act empowers the Environment Minister to impose conditions relating to monitoring and auditing in granting approval for an action. The Environment Minister is also empowered to direct an environmental audit to be carried out by proponents. Wood (2003) notes that although the Commonwealth of Australia makes a requirement for EIA reports to contain a section on monitoring arrangements to ensure that mitigation is effective, there are no provisions to compare monitoring results with predictions. Wood then states that in practice the monitoring of impacts is seldom carried out.

EIA in Western Australia is often cited as being a good example for the other Australian states to follow and it places emphasis on environmental monitoring and management (Bailey et al., 1992; Wood, 1995, 2003; Wood & Bailey, 1996; Glasson et al., 1999, 2005). The Western Australian *Environment Protection Act 1986* does not include any mandatory provisions for monitoring and auditing. However, under Part IV of the Act the ‘Ministerial Statement’ (Ministerial approval), which is legally binding on proponents, usually provides for monitoring and auditing. In Western Australia, the Environment Protection Authority (EPA), an agency independent of the government, is responsible for assessing development proposals and making recommendations to the Minister of the Environment. On the basis of the EPA recommendations the Minister attaches conditions to an environmental approval of a proposal/activity. The Department of Environment (DoE) is responsible for ensuring compliance with the Ministerial approval. The DoE is also the licensing authority under Part V of the Act. The licensing conditions essentially require monitoring and reporting by licensees. According to Harvey (1998), Western Australia has an extensive audit programme in place making the reports public. Wood and Bailey (1994) note that during the assessment of a project the EPA sets an environmental objective to be met by the proponent, which is accompanied by a requirement for monitoring. As noted by Morrison-Saunders and Bailey (1999), EIA influences effective environmental management outcomes in Western Australia.

The environmental assessment process in the Northern Territory is administered under the *Environmental Assessment Act 1982 (amended in 1994)* and *Administrative Procedures 1984 (amended in 2003)*. The Act does not contain any provision for monitoring and auditing in EIA. However, Paragraph 15 of the *Administrative Procedures* contains provisions for the monitoring of environmental effects. These provisions empower the Minister of the Environment to require an audit in order to determine the effectiveness of the EIA process and to make monitoring recommendations to the responsible Minister. The case study of

McKillop and Brown (1999) on a large mining project in the Northern Territory reveals that there is a lack of connection between the EIA process and project management outcomes; EIA has failed to ensure effective environmental management outcomes. However, in the Northern Territory, mining proposals usually require monitoring under lease conditions, and the Environmental Management Plan (EMP) required for mining proposals includes monitoring requirements (Commonwealth Environment Protection Agency, 1994).

The Victorian *Environment Effects Act 1978* (last amended in 2005) makes discretionary provisions for monitoring and auditing in EIA. The Act empowers the relevant Minister to inquire into the environmental impact of any works. The “Ministerial guidelines for assessment of environmental effects under the *Environment Effects Act 1978*” (DSE, 2006) require an Environmental Effect Statement (EES) to outline a framework for environmental monitoring and management for implementation of a project. Monitoring provisions under the Victorian Act are considered to be weak (Harvey, 1998), although Wood (1993) notes that monitoring does occur in practice. Monitoring is mostly restricted to the licensing system with non-licensed parameters generally not monitored (Commonwealth Environment Protection Agency, 1994). Monitoring requirements are outlined in the assessment report and planning permits may include monitoring conditions but commitments in Environmental Effects Statements (EES) are not usually monitored (Commonwealth Environment Protection Agency, 1994). According to Thomas (1998), the public register of decisions established in 1988 can ensure monitoring to happen in Victoria. The Australian Intergovernmental Committee for Ecological Sustainable Development (ICESD, 1996) reports that sometimes there are community monitoring committees in place to facilitate environmental management and public accountability in Victoria.

In New South Wales, the *Environmental Planning and Assessment Act 1979* (EP&A Act) did not contain any explicit requirements for monitoring and auditing in EIA (Harvey, 1998). However, in practice monitoring and auditing in EIA usually happen under the planning approval conditions (Harvey, 1998). Proponents are usually responsible for monitoring and reporting. The Department of Planning (formerly Department of Planning, Infrastructure and Natural Resources) conducts audits to verify compliance and environmental performance (DIPNR, 2003a, 2003b). The Commonwealth Environment Protection Agency (1994) reports that in NSW Environmental Impact Statements (EIS) commitments in general are not monitored and monitoring is restricted to licence conditions. According to DIPNR (2005), the recent amendment to the EP&A Act brought in 2005 has improved monitoring, compliance

and enforcement provisions in New South Wales. The Act now empowers the Minister to require proponents to monitor and audit environmental impacts and to provide evidence to demonstrate compliance.

In Queensland, the *Integrated Planning Act 1997* does not have any provisions for monitoring and auditing in EIA and they are usually required under the approval conditions (Harvey, 1998). The Commonwealth Environment Protection Agency (1994) reports that in Queensland, proponents must prepare an Environmental Management Overview Strategy (EMOS) for mining proposals including measurable parameters. There is no mechanism for enforcement except where licences are required (Commonwealth Environment Protection Agency, 1994). However, in practice, some monitoring does occur in Queensland (Harvey, 1998). The study by Nitz and Holland (2001) reveals significant increases in follow-up commitments in EISs over time in Queensland.

The EIA legislation (the *Land (Planning and Environment) Act 1991*) in the Australian Capital Territory (ACT) does not have any explicit provisions for monitoring and auditing (Harvey, 1998). In the ACT, there is an informal mechanism in place where any person/body can apply for an order requiring monitoring (Commonwealth Environment Protection Agency, 1994). There are no legislative requirements for monitoring in Tasmania and monitoring is restricted to licence conditions (Harvey, 1998; Commonwealth Environment Protection Agency, 1994). The Board of Environmental Management and Pollution Control under section 25 (6) (c) of the *Tasmanian Environmental Management and Pollution Control Act 1994* may require monitoring as part of the permit conditions.

Under the South Australian *Development Act 1993*, initially there were no provisions for monitoring. In 1997, an amendment to the *Development Act 1993* made discretionary provisions for monitoring and auditing (Harvey, 1998). Section 48C of the Act states that the Minister may require a person who is undertaking a development or project, to carry out specified tests and monitoring relevant to the development or project, and to comply with the requirements of an audit programme. The Minister may also conduct tests and monitoring if necessary. However, monitoring and auditing practices under the South Australian EIA process are still very poor; they often take place under the legal permit system (Ahammed & Nixon, 2006).

1.7 Problems and Issues in Monitoring and Auditing in EIA

The problems and issues associated with monitoring and auditing in EIA, which have been widely discussed in the literature, are more or less similar (see Arts, 1998; Arts & Nooteboom, 1999; Bailey et al., 1992; Bird & Therival, 1996; Bisset, 1981; Bisset, 1984; Bisset & Tomlinson, 1988; Buckley, 1989b; 1991a, 1991b; Chadwick & Glasson, 1999; Culhane et al., 1987; Dipper et al., 1998; Glasson et al., 1999, 2005; Morrison-Saunders, 1996; Morrison-Saunders & Arts, 2004; Tomlinson & Atkinson, 1987b; Wood, 1995, 2003; Wood et al., 2000). There is some research on environmental impact auditing that determines the overall performance of impact predictions within the EIA procedure. Dipper et al. (1998) provide a list of 30 published post-auditing studies in the US, Canada, Australia and UK. Some of the prominent earlier research including the work of Buckley (1989a) in Australia, Culhane et al. (1987) in the United States, Bisset (1984) and Berkes (1988) in the United Kingdom and Beanlands and Duinker (1984) and Dickman (1991) in Canada identified weaknesses in EIA in predicting impacts. This inherent weakness of EIA has been highlighted in some of the recent literature (see Morrison-Saunders, 1996; Chadwick & Glasson, 1999; Wood, 1999, 2000). Chadwick and Glasson (1999) identify the following problems in auditing in EIA (Box 1.3).

Box 1.3: Problems Associated with Auditing in EIA

Nature of impact predictions. Many EIAs contain few testable predictions; instead, they simply identify issues of potential concern. Many EIS predictions are vague, imprecise and qualitative. Testable predictions often relate to relatively minor impacts, with major impacts being referred to only in qualitative terms.

Project modification. Post-EIS project modifications invalidate many predictions.

Monitoring data. Monitoring data and techniques often prove inadequate for auditing purposes. Pre-development baseline monitoring is often insufficient, if undertaken at all. Most monitoring data are collected and provided by the project proponent, which may give rise to fears of possible bias in the provision of information.

Comprehensiveness. Many auditing studies are concerned only with certain types of impacts (e.g. biophysical but not socio-economic; operational but not construction-stage impacts) and are therefore not full-project EIA audits.

Clarity. Few published auditing studies are explicit about the criteria used to establish prediction accuracy; this lack of clarity hampers comparison between different studies.

Interpretation. Most auditing studies pay little attention to examining the underlying causes of predictive errors: this needs to be addressed if monitoring and auditing work is to provide effective feedback in the EIA process.

(Source: Chadwick and Glasson, 1999, p.814)

There are also a number of institutional problems associated with monitoring and auditing in EIA. They include: the lack of mandatory requirements for monitoring and auditing in most EIA systems; the lack of guidance on how to conduct monitoring and auditing in EIA; financial cost involved in monitoring and auditing; inadequate resources in the government agencies; confidentiality and data access problems; unwillingness of decision-makers due to concerns that post-decision monitoring and auditing may draw attention to the inadequacies of EISs, or may imply criticism of the decision-making process; and unwillingness of developers due to concerns that monitoring and auditing may indicate adverse impacts of their operations on the environment for which they may face huge financial liabilities (Dipper et al., 1998; Chadwick & Glasson, 1999; Wood, 2003; Morrison-Saunders & Arts, 2004; Arts & Nootboom, 1999). According to Morrison-Saunders and Arts (2004) monitoring and auditing in EIA still face a number of challenges including uncertainty and unlimited information, deficiencies in EISs, lack of guidance, legislative deficiencies, and demands on financial and staff resources. They further explain these challenges as mentioned below (Box 1.4).

Box 1.4: Challenges for Monitoring and Auditing in EIA

- Like the pre-decision-stage of EIA uncertainties may continue to pose difficulties during post-decision follow-up investigations.
- There is a need for guidance, training and capacity building for EIA monitoring and auditing, especially in countries with little experience.
- Part of the reason why there is minimal guidance available on EIA monitoring and auditing is because there are relatively few jurisdictions with a formal legislative requirement for follow-up in place.
- Until the benefits of EIA monitoring and auditing are more widely recognized in terms of long-term cost saving and improved environmental management, the demands on financial and staff resources are likely to impede progress in this area.
- When multiple projects with similar impacts occur together, it can be problematic determining which proponent(s) should be held financially responsible for area-wide and cumulative effects monitoring.
- Staffing continuity is another important issue. Personnel changes in both proponent and regulatory agencies may disrupt EIA monitoring and auditing and impede learning from experience.

(Based on Morrison-Saunders & Arts, 2004, pp. 16-17).

The review by Dipper et al. (1998) shows that all of the previous studies relating to EIA follow-up are concerned with the performance of EIA in relation to its technological aspects. None of them looked at the institutional and procedural aspects of the EIA monitoring and auditing. However, the implementation of monitoring and auditing in EIA depends not only on technical aspects but also on the political, economic, social and institutional factors.

1.8 Rationale for Research

Monitoring and auditing in Australian EIA systems are widely recognized as weak areas (CEPA, 1994; Sadler, 1996; Harvey, 1998; Wood, 2003). The requirement for monitoring and auditing in the Australian EIA system is discretionary (Harvey, 1998). The discretionary provision of law and a lack of proper institutional arrangements may have an influence on the poor implementation of monitoring and auditing in EIA in Australia (Wood 2003). Within Australia different States have their different legal and institutional arrangements for EIAs (Harvey, 1998; Thomas, 1998, 2001; Wood, 2003). For example, in South Australia, New South Wales and Victoria EIA is implemented by the planning agency, while in Western Australia, Queensland, Australian Capital Territory, the Northern Territory and Tasmania this responsibility lies with the environmental agency. Accordingly, in some Australian states EIA is integrated into the planning system while in other states EIA is related to pollution control and environmental protection. In some Australian EIA jurisdictions multiple agencies are involved in the EIA process (Wood, 1995, 2003). The Commonwealth EIA procedure is applicable to all of the Australian states/territories for some specific categories of project known as 'controlled actions'. The relationship and coordination between the Commonwealth and different state agencies responsible for EIA are important in the implementation of EIA as well as monitoring and auditing in different EIA jurisdictions (Commonwealth of Australia, 1997). Very little research has so far been conducted that discusses: firstly, how monitoring and auditing in different Australian jurisdictions are being implemented; and secondly, what their role is in the EIA systems in Australia.

Several years ago, the Commonwealth government introduced a new piece of legislation called, the *Environment Protection and Biodiversity Conservation Act 1999* that supersedes the previous law known as *the Environment Protection (Impact of Proposals) Act 1974*. Some recent changes have also been brought into the EIA legislation of most Australian states. It is necessary to examine how these new laws bring changes in procedures and practices in the implementation of EIA in Australia. Key research on EIA follow-up in Australia at the national level is contained in Buckley (1991a). This study focused mainly on the correctness of impact predictions; but did not discuss the institutional and procedural aspects of monitoring and auditing in EIA. None of the previous studies including the national study by Buckley (1991a), the international study of Sadler (1996) and the comparative review by Wood (2003) at international level answer the following questions clearly:

- How are monitoring and auditing activities being implemented in the EIA systems of Australian states?
- What are the legal and institutional approaches for their implementation?
- Do they fit with in the EIA process?
- How effective are they in practice?
- What is the gap between the procedural requirement and the actual practice?
- How do they contribute to the EIA process?

There is still a need for a comprehensive study to look into the procedures and practices of monitoring and auditing in different EIA systems in Australia. Again, Western Australia is reported to have a good EIA system (Morrison-Saunders, 1996; Wood, 1995; Wood & Bailey, 1996; Glasson et al., 1999, 2005). No study has so far been conducted to investigate how effectively monitoring and auditing are being implemented in the Western Australian EIA system. Therefore, it is necessary to investigate the EIA system of Western Australia in terms of implementation of monitoring and auditing and compare it to other Australian states.

1.9 Scope of the Research

Wood (2003) notes that although all Australian States/Territories have their own EIA process, they are more similar than dissimilar. According to Harvey (1998), the basic difference is that in some Australian states EIA is being used as a planning tool while in other states it is considered as an environmental management tool. It is difficult to investigate all the Australian states within a three-year study period, based on the objectives of the research. Therefore, three established and major EIA jurisdictions have been selected from the two broad categories of EIA process in Australia, considering the achievability of research objectives in terms of limited time frame and available resources. Hence, South Australia, Western Australia and New South Wales appear to provide the best option in determining the scope of this study due to the following reasons. New South Wales represents one of the most established and major EIA jurisdictions in Australia where EIA is integrated into the planning system. Western Australia is another major EIA jurisdiction where EIA is linked with pollution control legislation. The need for an investigation into the effectiveness of EIA monitoring and auditing in Western Australia has already been mentioned in the previous section of this chapter. South Australia is also an established EIA jurisdiction where the initial EIA legislation was repealed by completely a new piece of legislation. This new law was further amended to include monitoring provisions. Therefore, it is necessary to investigate the EIA process of South Australia in order to find changes in procedures and practices of EIA monitoring and auditing under the amended legislative provisions. The

following section (Section 1.10) further discusses the scope of this research more specifically through aims and objectives.

1.10 Aims and Objectives of the Research

The principal aim of this research is to investigate how monitoring and auditing are being implemented in different EIA jurisdictions in order to determine their role in the EIA process. More specifically, it will investigate the procedures and practices of monitoring and auditing within the EIA framework in South Australia, Western Australia and New South Wales. This research also aims to evaluate different procedural aspects of monitoring and auditing in the EIA process of the selected jurisdictions, comparing them and offering recommendations with suitable models for the effective implementation of monitoring and auditing within or outside the EIA framework. The overall aims of this research have the following objectives:

- i. To explore various concepts, ideas and principles in relation to procedures and practices of monitoring and auditing in the EIA process of the major EIA jurisdictions from the developed and developing world. A literature review will be conducted to understand the Australian procedures in both national and international perspectives.
- ii. To synthesise the current procedures and practices of monitoring and auditing in the EIA process of South Australia, Western Australia and New South Wales, focusing on: the legislative provisions and procedural guidelines in place, institutional arrangements, coordination mechanism, transparency, accountability, public involvement, resources and capacity, compliance and enforcement status, and environmental management outcomes. This objective will be achieved through the literature review, questionnaire surveys, interviews and analysis of relevant legislation, policy documents, procedural guidelines, reports and relevant government and private documents.
- iii. To examine the effectiveness of monitoring and auditing practices in the EIA process of selected jurisdictions. A literature review, analysis of relevant documents, interviews and case studies will be conducted in order to achieve this objective.
- iv. To analyse the gap between procedural requirements and actual practices in implementing monitoring and auditing in the EIA process of selected EIA

jurisdictions. Case studies from the selected EIA jurisdictions will help achieve this objective.

- v. To develop criteria in order to evaluate the procedures and practices of monitoring and auditing in the EIA process of selected EIA jurisdictions. A literature review on international experience of EIA monitoring and auditing will be conducted in order to achieve this objective.

1.11 Thesis Structure

This thesis includes 9 chapters. Chapter 1 outlines the context, necessity, aims and objectives and scope of this research focusing on the importance and benefits of monitoring and auditing components of EIA, their global status, and their status in Australia. Some sections of this introductory chapter draw heavily on the author's recently published article (see Appendix-11). Chapter 2 discusses the procedural aspects of monitoring and auditing within and outside the EIA and framework focusing on the historical development and current international trend. Chapter 3 discusses the methods and techniques employed in this research and their theoretical base. Chapter 4 analyses the international procedures and practices focusing on three major EIA jurisdictions of the world and the current procedures of monitoring and auditing in the EIA process of selected Australian States in detail, and sets out the evaluation criteria. Chapter 5 discusses the monitoring and auditing practices in the EIA process of South Australia with reference to six case studies. Chapter 6 discusses the monitoring and auditing practices in the EIA process of Western Australia with reference to seven case studies. Chapter 7 discusses the monitoring and auditing practices in the EIA process of New South Wales with reference to nine case studies. Chapter 8 presents the results of surveys and interviews conducted in relation to this research. Chapter 9 discusses the results and findings of this research, presents an evaluation summary and offers recommendations and models.

CHAPTER 2: THE ROLE OF MONITORING AND AUDITING IN EIA

This chapter attempts to explore various concepts and ideas from the literature in order to develop a framework for EIA monitoring and auditing. As discussed in Chapter 1 monitoring and auditing are neglected areas in the EIA process globally and there are some issues that need to be addressed properly in order to implement them effectively. Environmental monitoring and auditing occurs both within and outside the EIA framework in many countries. Therefore, based on the literature review this chapter highlights some of the key aspects of EIA monitoring and auditing both within and outside the EIA framework.

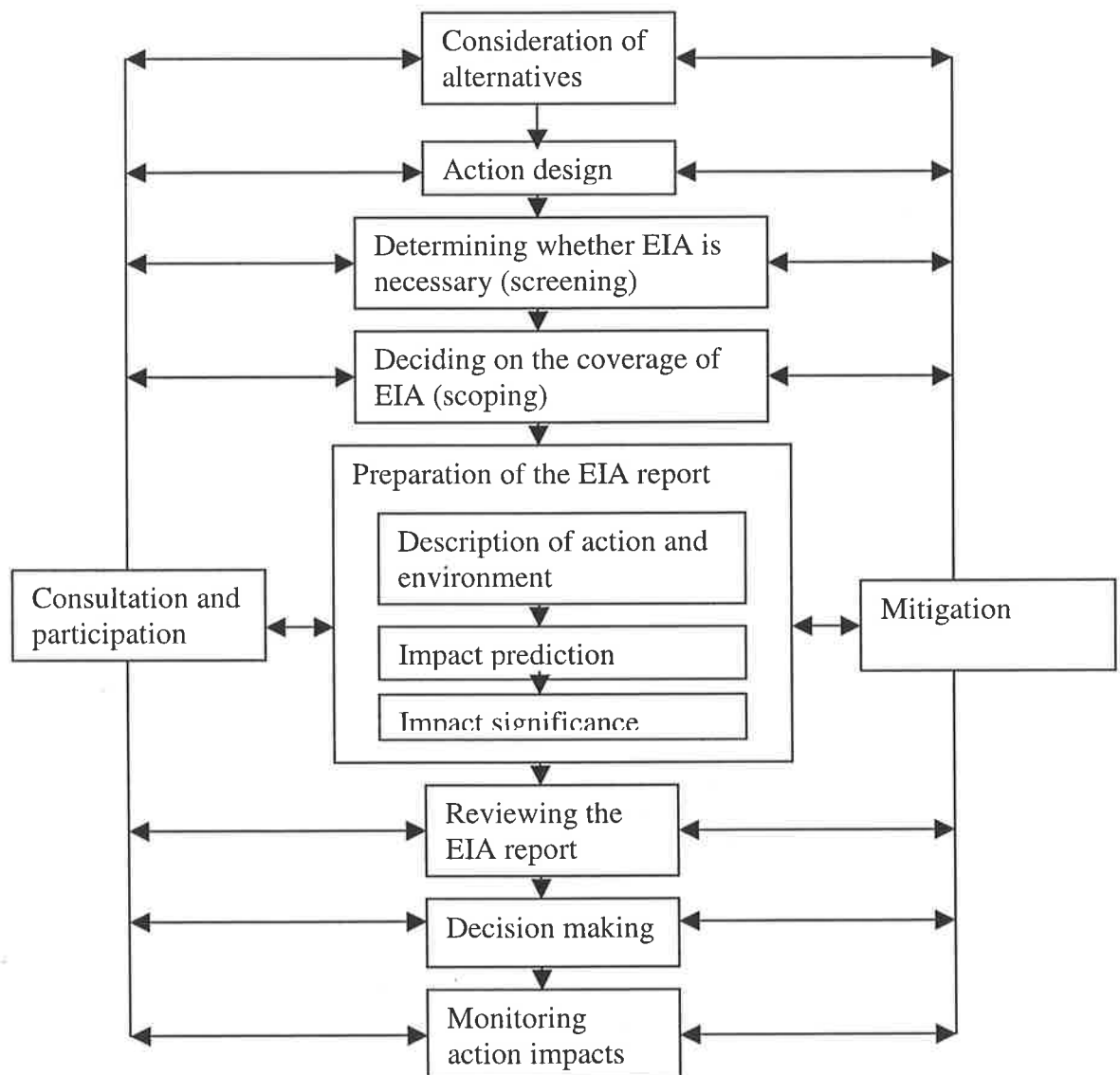
2.1 Monitoring and Auditing within the EIA Framework

Although the EIA process varies considerably in its application, procedures and practices from country to country, there is a wide consensus about the essential elements of an effective EIA system. Most of the prominent authors argue that EIA should be a cyclical activity, with feedback and interaction between the various steps (see Glasson et al., 1999, 2005; Wood, 1995, 2003; Morrison-Saunders & Arts, 2004). Wood (2003) suggests a number of common iterative steps for a cyclical EIA process (Figure 2.1). However, in most of the EIA jurisdictions around the world EIA is being implemented in a linear fashion as a one-off process that stops after the decision-making (Morgan, 1998; Sadler 1988). Morrison-Saunders and Arts (2004, p.3) argue that “it is not enough to simply identify and investigate environmental protection options before decisions are made; it is equally important to monitor and evaluate what happens afterwards and to take corrective action when needed”. Gilpin (1995) recognizes post-project analysis (auditing) as the most effective tool for improving the entire EIA process (Figure 2.2). In fact, monitoring and auditing is the only way to establish a feedback mechanism in the EIA process and to ensure its operation as a cyclical process.

Bailey and Morrison-Saunders (1988) emphasize an iterative EIA process that operates throughout the life of a proposal and recognize the role of monitoring and auditing in establishing an effective feedback mechanism in it. Petts (1999a, p.5) suggests four main stages in the EIA system with similar components as suggested by Wood (2003): (1) activity definition; (2) EIA report preparation; (3) decision; (4) implementation (Figure 2.3). Petts (1999a) considers follow-up is an essential quality assurance stage of the EIA process. The generic steps in the EIA process, as suggested by Sadler (1996) come under three main stages: preliminary assessment, detailed assessment and follow-up (Box 2.1). Morrison-Saunders and

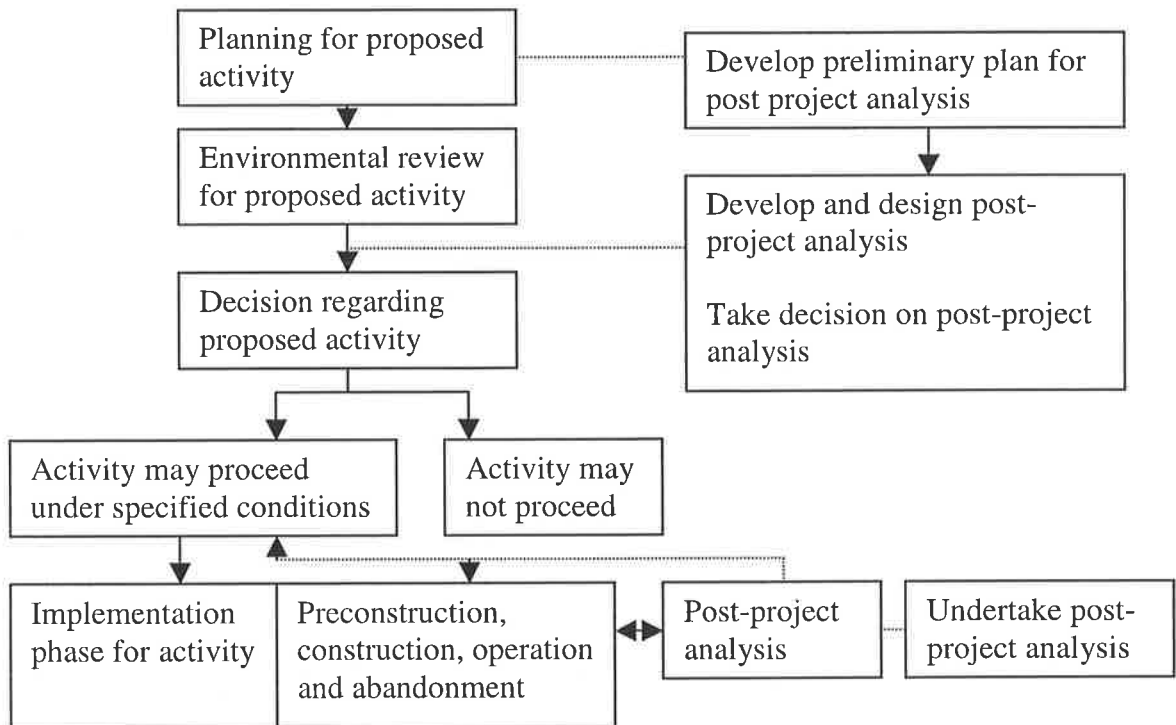
Arts (2004) divide the EIA process into two main stages: pre-decision stage (including project planning, screening, scoping, impact prediction and mitigation design, and decision making) and post decision stage (including final detailed design, construction, operation, and decommissioning phases; project and environmental management). They consider follow-up as an integral part of the EIA process, particularly in the post-decision stage. Similarly, Glasson et al. (1999) consider monitoring and auditing as an integral part of the EIA system and emphasizes learning from experience (Figure 2.3).

Figure 2.1: Environmental Impact Assessment Process



(Source: Wood, 2003, p.7)

Fig 2.2: Post-project Analysis Framework Linked to the EIA Process



(Source: UNECE, 1990, p.29)

Box 2.1: Generic Steps in the EIA Process

Preliminary Assessment

- ❑ Screening to establish whether EIA is required and the likely extent of process application.
- ❑ Scoping to identify the key issues and impacts that need to be addressed and prepare terms of reference for EIA and proponent's Environmental Impact Statement

Detailed Assessment

- ❑ Impact analysis to identify, predict and evaluate the potential significance of risks, effects and consequences.
- ❑ Mitigation to specify measures to prevent, minimise and offset or otherwise compensate for environmental loss and damage.
- ❑ Reporting to document the results of EIA in an EIS, including recommended terms and conditions.
- ❑ EIS review to ensure the report meet terms of reference and standards of good practice.
- ❑ Decision-making to approve a proposal and establish terms and conditions (i.e. the consent decision).

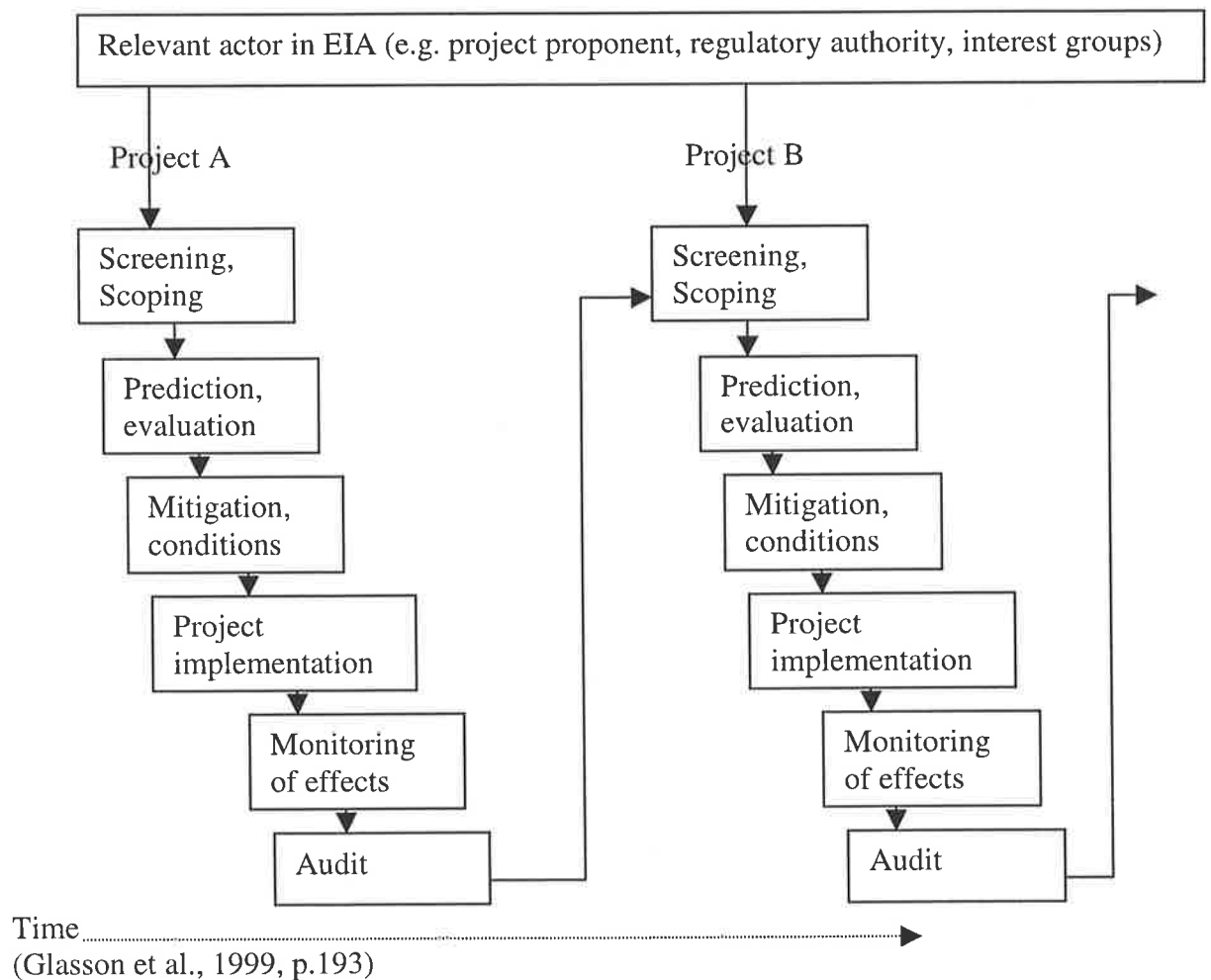
Follow-up

- ❑ Monitoring to check that actions are in compliance with terms and conditions and impacts are within the ranges predicted.
- ❑ Audit/evaluation to compare the monitoring results with standards, predictions, and expectations, to appraise and document the results to learn from experience, and to improve EIA and project planning.
- ❑ Management activities to address unforeseen events or unanticipated impacts.

(Source: Morrison-Saunders & Arts, 2004, p. 2)

Although scoping and project monitoring were not part of the original conception of NEPA, there have been calls for extensive post-project environmental impact monitoring since the 1970s (Ortolano & Shepherd, 1995). Canter (1993) emphasizes the integration of monitoring and auditing in the early stages of the EIA process while Morgan (1998) considers the role of monitoring at the implementation and operation stages to be crucial. According to Morrison-Saunders and Arts (2004) although monitoring and auditing are concerned with the post-decision stage of the EIA process they are based on pre-decision activities. They argue that “identifying significant impacts during the screening and scoping stages of EIA can provide a focus for subsequent impact monitoring and follow-up evaluation” (Morrison-Saunders & Arts, 2005, p. 3). In fact, monitoring and auditing establish a link between the pre- and post-decision stages of EIA (Arts et al., 2001; Marshall et al., 2005). Figures 2.4 and 2.5 illustrate this linkage.

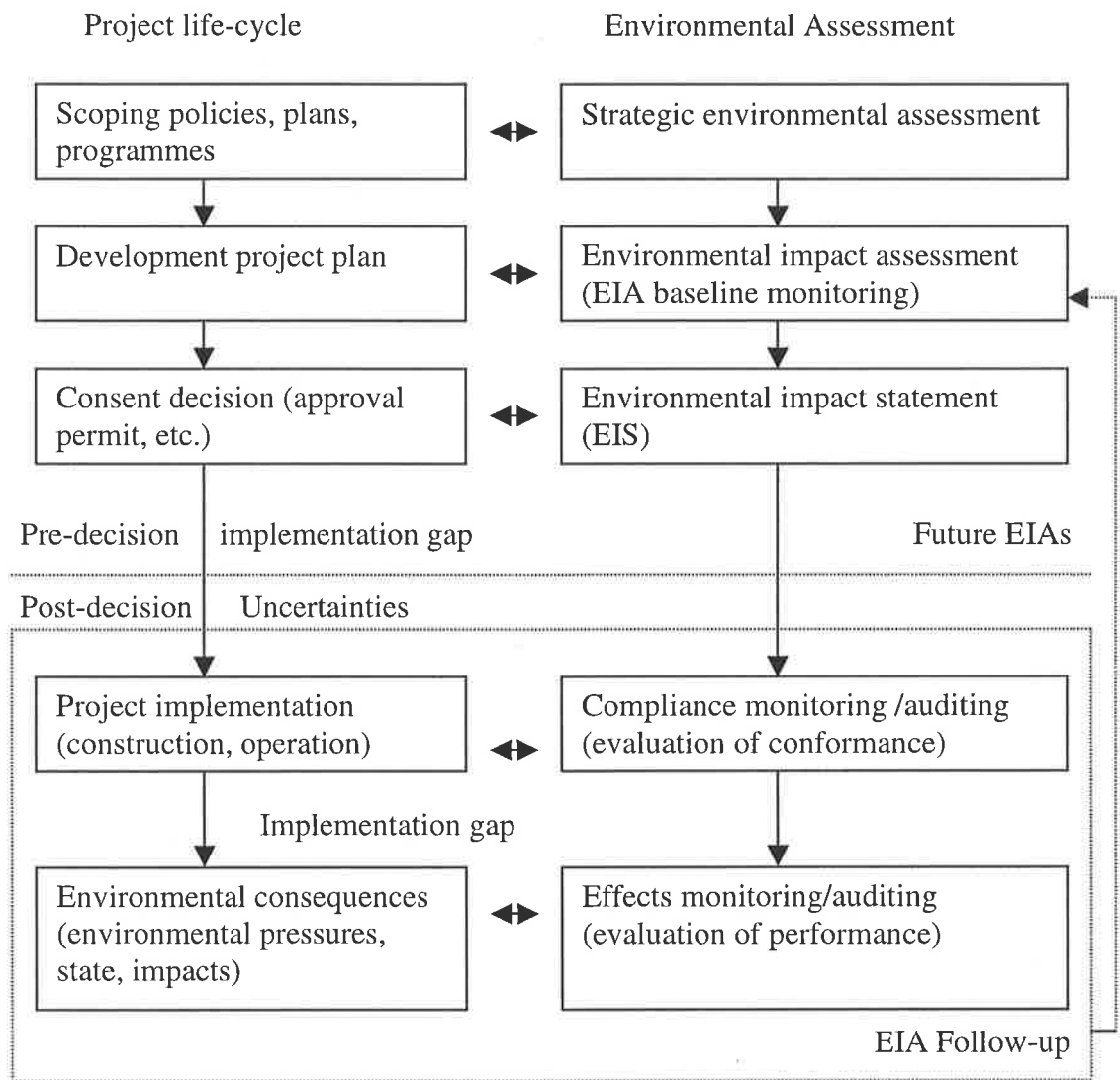
Fig. 2.3 Monitoring and Auditing and Learning from Experience in the EIA Process.



Two prominent propositions in support of monitoring and auditing in EIA are found in the literature: enhancing forecasting capabilities; improving project output. As argued by Caldwell et al. (1982) post-project monitoring provides an opportunity for scientific advances. Arts et al. (2001) believe that feedback from EIA follow-up provides an opportunity to improve EIA practice. According to Holling (1978) monitoring provides an opportunity to identify adverse impacts and intervene with mitigation measures if impacts are unacceptable. Gilpin (1995) emphasizes the control mechanism of the EIA process arguing that the primary purpose of monitoring is to ensure that the terms and conditions imposed by the initial EIA process and its associated development consent or planning approval. As argued by Wilson (1998) the purposes of monitoring and auditing in the EIA process are both scientific and management-related. Bailey and Hobbs (1990) emphasize the importance of impact management. Wood (2003) supports this approach arguing, "one of the principal purposes of EIA is to ensure that appropriate mitigation measures are utilized to minimise the impacts of approved actions" (Wood, 2003, p. 244). Sadler (1996) emphasizes the verification of compliance with the terms and conditions of the project approval and environmental performance and adjustment of mitigation measures as major purposes of monitoring and auditing in EIA. Shepherd (1998) argues that monitoring is important to ensure compliance with mitigation measures and improve forecasting capabilities and the outcome of the adaptive environmental management.

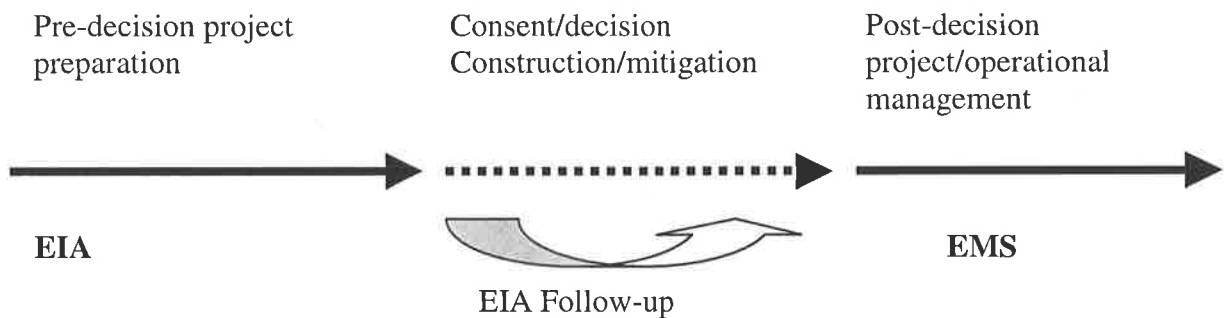
There are different methodological approaches to monitoring and auditing in EIA. Some ecologists and scientist have a strictly scientific and quantitative approach, centred on quantitative baselines, predictions and statistical comparison. Holling (1978) and Beanlands and Duinker (1984) argue that predictions in the EIS should be audited quantitatively on the basis of statistically testable hypotheses. Others oppose this approach due to complexity and uncertainty in the environment, and lack of capability of prediction methods emphasizing impact management (Bailey and Hobbs, 1990; Carbon, 1995; Morrison-Saunders et al., 2004). Morrison-Saunders et al. (2004) emphasize an adaptive environmental management approach to EIA follow-up (monitoring and auditing) arguing that it is important to manage the potential impacts rather than engaging rigorous impact prediction techniques (Box 2.2). Wilson (1998) advocates a qualitative approach for auditing in EIA which he considers more practical. Some argue that although the value of predictions in the EIA report does not depend on their strict auditability, precisions should be feasible and appropriate (Culhane et al., 1987; Bartlett & Kurian, 1999).

Figure 2.4: EIA follow-up as a Link between EIA and Project Implementation



(Source: Arts et al., 2001, p. 177)

Figure 2.5: EIA Follow-up Bridging the Implementation Gap



(Source: Marshall et al., 2005, p. 178)

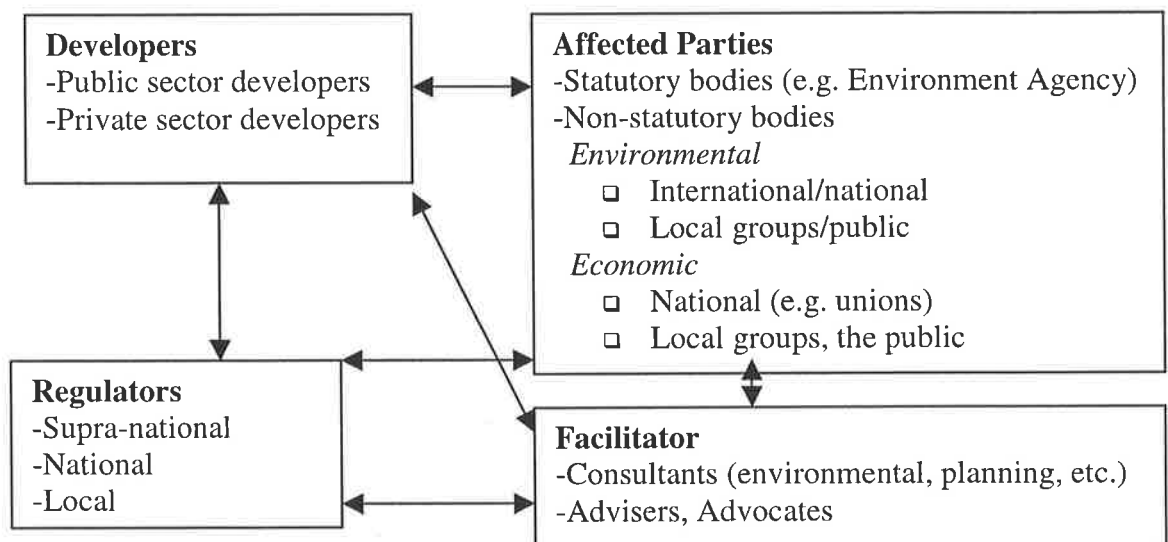
Box 2.2: Adaptive Environmental Management Approach to EIA Follow-up

- ❑ Focus on impact management activities.
- ❑ Proponents clearly responsible for environmental management.
- ❑ Establish management objectives for important environmental issues during the scoping stage of EIA.
- ❑ Permit the preparation of EMP after a proposal is approved but prior to commencement in which details of environmental management strategies are provided.
- ❑ Require proponents to report on their progress in meeting environmental objectives.
- ❑ Encourage proponent to adopt EMS.
- ❑ Involve the public, especially local communities, in follow-up programmes.
- ❑ Link environmental monitoring programmes to mitigation and environmental management activities.
- ❑ Have legally enforceable follow-up requirements, but which permit a flexible rather than prescriptive approach.

(Morrison-Saunders et al., 2004, p. 169)

Although monitoring and auditing are not strictly considered as essential components of the EIA process in many countries, they somehow exist in practice at least in a weaker form (Sadler, 1996; Arts, 1998; Arts et al., 2001; Wood 2003; Morrison-Saunders & Arts, 2004). The key issues and problems associated with EIA monitoring and auditing have been mentioned in the previous chapter. In fact, EIA involves various parties having different interests (Figure 2.6). Monitoring and auditing in EIA obviously affect the interest of one or more participants. According to Glasson et al. (2005), monitoring activities should include a partnership between the parties involved.

Fig. 2.6: Principal Actors in the EIA, Planning and Development Process



(Source: Glasson et al., 1999, p. 56)

2.1.1 Key factors of monitoring and auditing in EIA

Arts et al. (2001) note that there is a considerable body of literature on EIA monitoring and auditing but very little of them address issues such as how to do EIA follow-up, good practice and future directions. However, some of the recent literature focus on the issues of EIA monitoring and auditing and provide future directions (see Sadler, 1996; Arts et al., 2001; Arts & Morrison-Saunders, 2004a, 2004b; Morrison-Saunders & Arts, 2004, 2005; Morrison-Saunders et al., 2003; Barker, 2004; Marshall et al., 2005). Barker (2004) suggests a framework for EIA monitoring and auditing that includes five basic components: determination of need; designing a monitoring programme; implementation; evaluation; and issue management (Figure 2.6). He also suggests stakeholder communication throughout the follow-up process. IAIA (1999) recognizes that EIA follow-up should strive to be: goal-oriented and focused; practical and relevant; cost-effective and efficient; adaptive and flexible with orientation towards continuous improvement; participative (inclusive all stakeholders); interdisciplinary; and transparent and credible. The literature review shows that the following factors are important for the implementation of EIA monitoring and auditing effectively and efficiently.

Box 2.3: Sound Practice Principles for Follow-up

Premise:

Follow-up activities on a scale consistent with the estimated significance of project impacts should be undertaken to ensure compliance with approvals, and to facilitate environment management and performance review.

Requirements:

These include appropriate legislation, regulations/and /or administrative provisions and mechanisms to provide for inspection, enforcement of terms and conditions, monitoring and control of unanticipated impacts.

Follow-up Actions and Principles:

Major functions and activities include:

- Inspection and surveillance to check that terms and conditions are met
- Effects monitoring to measure environmental changes resulting from project implementation
- Compliance management to ensure that regulatory standards and requirements are being met
- Impact management to respond to adverse changes and environmental performance audit to verify effectiveness of EIA, mitigation and other components.

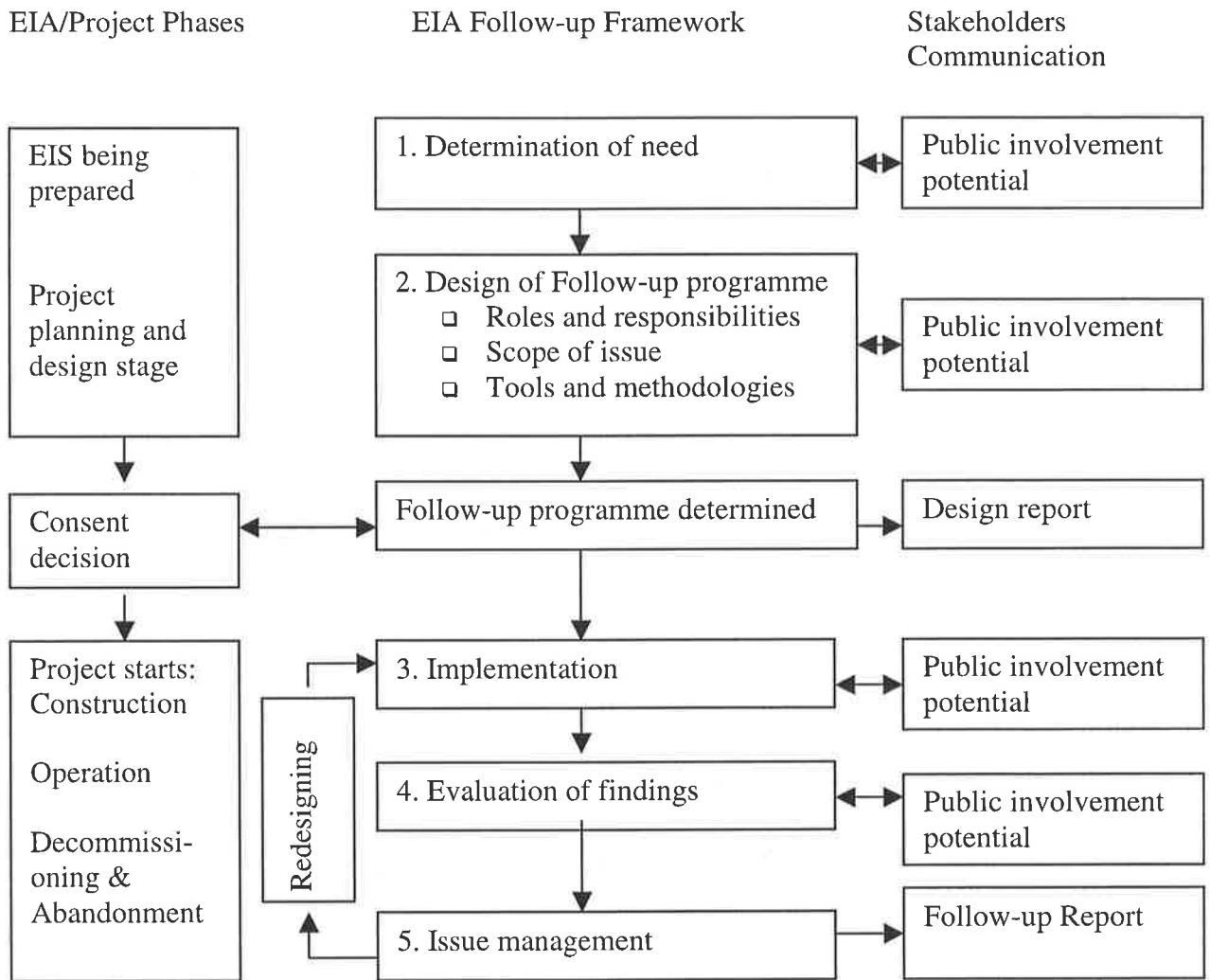
Inspection and surveillance should be undertaken as either a routine or periodic activity depending on project terms and conditions.

Monitoring, audit and other follow-up activities should be undertaken when:

- Potential impacts are uncertain or unknown but likely significant
- Species or areas of concern act as a trigger
- Changes can be realistically detected against natural variability

(Source: Sadler, 1996, p.130).

Fig 2.7: Environmental Impact Assessment Follow-up Framework



(Source: Barker, 2004, p. 46)

Determining the need for monitoring and auditing

The legal provision is first in determining the need for monitoring and auditing. However, in the absence of legal provisions, EIA monitoring and auditing should essentially include project surveillance and compliance verification, and other follow-up requirements should be determined on an as needed basis (Au & Sanvicens, 1995). According to Barker (2004) the need for monitoring and auditing should be determined in the early stages of the EIA process where impact predictions are made and mitigation measures are being proposed. Sadler (1996) suggests that a decision on the follow-up requirements should be made at the same time as project approval and incorporated into terms and conditions.

There are some factors that need to be taken into consideration in determining the need for EIA monitoring and auditing. Firstly, monitoring and auditing should demonstrate some

added value (Barker, 2004; Arts & Nootboom, 1999). Secondly, they should focus on three core purposes: control, information and communication (Arts & Nootboom, 1999; Meijer & Van Vliet, 2000). Thirdly, it should bring some environmental management outcomes (Morrison-Saunders et al., 2004). According to Wood (2003) the need for EIA monitoring and auditing should be determined on the basis of the environmental significance of a proposal and /or the uncertainty associated with the predicted impacts. Although regulators play the prime role in determining the need for monitoring and auditing, the role of proponents and the public is also equally important in this regard (Marshall, 2001).

The practice of EIA monitoring and auditing is a costly exercise. Therefore, it requires appropriate targeting and prioritisation (Au & Sanvicens, 1995). Austin (2000) argues that in determining the need, consideration must be given to time and human and financial resources involved, as well as to the values of the affected people. Therefore, some form of screening to decide whether monitoring and auditing in EIA are essential and useful (Arts & Nootboom, 1999). If there are already systems for monitoring and auditing outside the EIA framework, EIA monitoring and auditing should not overlap with those. In this way the cost of EIA follow-up can be reduced. The following criteria are important in determining the need for monitoring and auditing requirements. Once the need for monitoring and auditing is determined, there should be a mechanism that will allow for a response (such as taking extra mitigation measures (Barker, 2004).

Box 2.4: Criteria for Determining the Need for EIA Monitoring and Auditing.

- The legal requirements to conduct monitoring and auditing.
- The extent of uncertainty in the analysis and predictions of the EIA.
- Limited experience by the proponent in implementation of the type of project proposed.
- The extent of unfamiliarity with the effectiveness of mitigation measures.
- Where the mitigation measures may not fully address the predicted effects.
- The complexity of the predicted environmental impacts.
- Significance of potential impacts and the risk of improper implementation control actions.
- Where new or unproven technology or techniques are proposed.
- Where significant cumulative effects are predicted to occur.
- The sensitivity of or scale of the project in relation to the risk associated with risk failure of proposed mitigation measures.
- Public concerns and need for ongoing communication.
- Potential for new developments or changes to the project during implementation.
- Where adaptive management is being proposed in the EIA as a mitigation approach.

(Based on Arts & Voogd, 1996; Au & Sanvicens, 1995; Sadler, 1996; Wood, 1995; Arts & Nootboom, 1999; Barker & Dobos, 2001).

Setting objectives

It is important to set monitoring and auditing objectives in order to make them more focused, goal-oriented and cost-effective. The design of monitoring objectives has to be such that impacts can actually be assigned to a particular project, instead of the data just going to waste (Nixon, 1998). In setting monitoring objectives two things are important: selecting variables and defining the magnitude of a change (Bisset & Tomlinson, 1988). Bisset and Tomlinson (1988) recognize the need for involvement of both ecologist and statisticians in formulating monitoring objectives. This strictly scientific approach may not be applicable for all cases. In some cases, the involvement of social scientists and use of indigenous knowledge could be more relevant. Munn (1979) suggests at least nine objectives for EIA monitoring and auditing:

- ❑ To determine the present conditions
- ❑ To determine trends
- ❑ To understand phenomena
- ❑ To validate and /or calibrate environmental models
- ❑ To make short-term predictions
- ❑ To make long-term predictions
- ❑ To make long-term assessments
- ❑ To optimise the utility and /or cost-effectiveness of any of the above
- ❑ To control the activity

Arts and Nootboom (1999) argue that monitoring and auditing in EIA should achieve any of the following four objectives (Table 2.1). They consider control of the activity as the most important objective in all cases. Actually, other objectives should be taken into account on the basis of a specific project.

Table 2.1: Key Objectives of EIA Monitoring and Auditing.

Objective	Reasons
❑ Control the activity	❑ Check and adjust
❑ Enhance scientific knowledge	❑ Uncertainty in predicting impacts and unfamiliarity with the effectiveness of the mitigation measures of a particular type
❑ Increase acceptance and legitimisation	❑ Controversial project with huge public concerns
❑ Integration with other activity-related environmental information	❑ Such information is produced additional to EIA monitoring and auditing

(Based on Arts & Nootboom, 1999)

Scoping of issues in EIA monitoring and auditing

Once the need for EIA follow-up is determined, it is important to decide what needs to be or can be monitored. Scoping of issues in EIA monitoring and auditing is not a common practice (Sadler, 1996). According to Arts and Nooteboom (1999), the scope has to be reduced to the indicators that are expected to produce meaningful information in a specific case. The scope of monitoring and auditing should depend on the potential significance of the impacts and uncertainties about predictions and outcomes (Sadler, 1996). The EIS, approval conditions and issues that received much attention can be useful sources of information in determining the scope of EIA monitoring and auditing. Barker and Dobos (2001) suggest a number of useful criteria for determining the need for monitoring an issue. They mainly include: residual effects; most adverse and cumulative effects; valued ecosystem components; gaps in knowledge; predictive uncertainty; and public sensitivity. The following principles can be applied in determining the scope of EIA monitoring and auditing.

Box 2.5: Scoping Principles of EIA Monitoring and Auditing

- ❑ The scoping of issues relating to monitoring and auditing should be undertaken as an integral part of the EIA process during the pre-decision stage when mitigation measures are proposed.
- ❑ The final decision on the scope of follow-up requirements should be made prior to project approval so that such requirements may be incorporated into the terms and conditions of the project approval.
- ❑ There is a need to focus on the important issues, not necessarily on all the issues, and it is important to focus on collecting appropriate information at an appropriate scale and effort.
- ❑ It is not equally important to address every issue to the same level of details. The scale, sensitivity and the complexity of the issue should be reflected in the level of details.
- ❑ The scope of monitoring and auditing should include the impacts of activity from other factors in addition to environmental indicators.

(Based on Arts & Nooteboom, 1999; Barker, 2004; Sadler 1996).

Designing a monitoring programme

The effectiveness and efficiency of EIA monitoring and auditing depend on the design of a monitoring programme (Barker, 2004). In designing a monitoring programme two main issues are – what are the essential components of a monitoring programme and when should it be designed? (Barker, 2004). Wood (2003) suggests that monitoring should be linked to the earlier stages of the EIA process. According to Glasson et al. (2005), an EIS should include a detailed monitoring programme. Barker (2004) argues that a monitoring programme should be designed prior to a consent decision in order to facilitate the decision-making process, and it should be formally documented to help ensure the accountability of all stakeholders

involved. A monitoring programme should be well defined and targeted in order to avoid the involvement of excessive time and resources (Wood, 2003; Beanlands & Duinker, 1984). The following recommendations made by Beanlands and Duinker (1984) clearly suggest the design of a monitoring programme at the early stage of the EIA process involving the public and regulators:

- Monitoring and auditing should be considered as an integral part of the design of impact studies. The guidelines or terms of reference of EIA should place emphasis on it.
- Environmental impact statements should specify the monitoring requirements with adequate technical details and rationale.
- The responsibilities of different government agencies and developers for conducting and reviewing monitoring results should be outlined in the EIS.

A monitoring programme requires some flexibility so that it can be adapted to the dynamic nature of the environment (Holling, 1978). Arts and Nooteboom (1999, p. 242) argue that “a monitoring programme should specify for each indicator the measurement technique, frequency, locations, responsibilities, reporting and data storage methods etc depending on the type of activities, the indicators selected for monitoring, the time scale of impacts and the characteristic of the area, particularly of dispersion media and sensitive targets”. According to Glasson et al. (2005, p. 187) a monitoring programme should have clear objectives, temporal and spatial control, an adequate duration (e.g. covering the main stages of the project’s implementation), practical methodologies, sufficient funding, clear responsibilities, and open and regular reporting. The following principles can be useful in designing a monitoring programme.

Box 2.6: Key Components of a Monitoring Programme

A monitoring programme should include:

- Monitoring objectives;
- A summary of all significant impacts identified in the EIS;
- The monitoring requirements for specific impacts;
- Full details of the mitigation measures suggested for each significant impact;
- The monitoring requirements for specific mitigation measures;
- Description of performance indicators which provide linkages to impacts and mitigation measures identified in the EA;
- The person or agency responsible for monitoring and mitigation;
- Implementation schedule (i.e. timing and frequency of monitoring);
- Monitoring procedures (description of the parameters to be measured, methods to be employed, sampling locations, frequency of measurements, detection limits where appropriate, and definition of thresholds that will signal the need for remedial actions);
- Estimated costs and financing provisions;
- Reporting requirements and procedures; and
- The agency/agencies responsible for supervising the implementation, policing and reviewing the monitoring results.

(Based on Glasson et al., 2005; World Bank, 1996, 1999)

Box 2.7: UNEP Guidelines on Good Practice in EA Monitoring

Before approval establish responsibility for:

- Undertaking and paying for monitoring
- Managing the monitoring information
- Implementing any action required

Monitoring provides information on impact:

- Nature
- Magnitude
- Geographical extent
- Timescale
- Probability of occurrence
- Significance
- Confidence in prediction

Effective monitoring programmes have:

- a realistic sampling programme (temporal and spatial)
- sampling methods relevant to source and/ or type of impact
- a targeted approach to data collection
- comparability of data with baseline and other relevant data
- quality control in measurement and analysis
- systematic record keeping and database organisation
- reporting requirements for internal and external checks
- provision for input from and response to third parties
- presentation of results to the public

(Adapted from UNEP, 1997; 2002)

Methodological approaches and techniques

There is no standard methodology so far that can be commonly used in EIA monitoring and auditing. Several approaches and tools can be used to implement EIA monitoring and auditing. Morrison-Saunders et al. (2003) suggest at least five EIA follow-up approaches including: pragmatic approach; permits and contracts; scientific monitoring; simple but rigorous techniques; and flexibility and adaptive management. They also suggest that EIA follow-up approaches need to be selected in accordance with the local culture for EIA practice. Barker (2004) provides an account of methodologies and techniques that can be used in EIA monitoring and auditing (Box 2.8).

The selection of methods and tools of EIA monitoring and auditing should be project-specific (Barker, 2004). Depending on a specific project EIA monitoring and auditing could be a quantitative analysis of meticulously defined indicators or it could be a qualitative analysis of overall indicators. Bisset and Tomlinson (1988) advocate a quantitative approach which is strictly scientific. It attempts to set up a comprehensive monitoring programme before the

project is implemented, and the entire audit concept is developed at the time the EIA document makes its predictions. The basic components of this model are: establishment of paired treatment-reference locations; pre-operational sampling; and creating hypothesis for monitoring. In contrast, Wilson (1998) suggested a nine-step procedure for EIA auditing on the basis of the qualitative approach arguing that this procedure is more practical than the scientific audit. The basic steps of this audit procedure include: selection of project EIAs to audit; identification of likely project impacts; initial review to determine if EIA may have incorrectly predicted impacts; prioritising impacts for further investigation; preparation of protocols for field investigation; identification of actual project impacts; comparing actual effects to predicted impacts; determination of cause of error; and application of lessons learned. Wilson (1998) notes that in the absence of regulatory requirements and adequate resources the scientific approach to EIA monitoring and auditing is inoperative. However, this does not mean that the scientific procedures should be ignored. According to Arts and Nooteboom (1999), the problem is institutional. Therefore, the problem should be addressed properly no matter whether the audit procedure is quantitative or qualitative.

Box 2.8: Methodologies and Tools for EIA Monitoring and Auditing

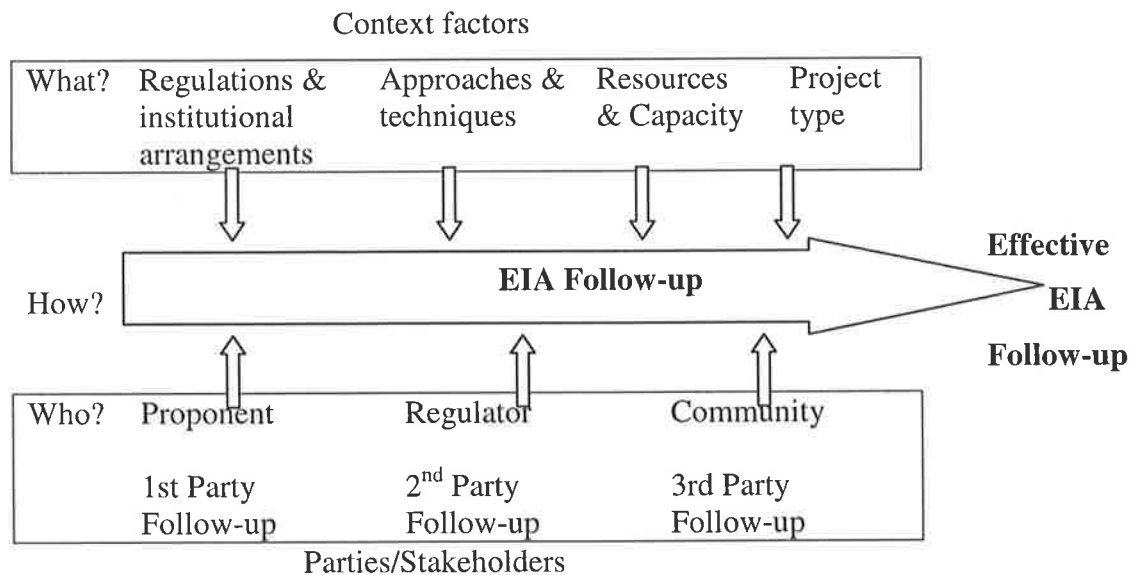
- Environmental monitoring (baseline, effects and compliance)
- Environmental audits
- Site visits or inspection
- Proponent's environmental manager and environmental management system
- Multi-stakeholders advisory committees (may be an independent third party appointed by the decision-maker or may be community based)
- Integration of follow-up terms and conditions into authorisation, licenses, permits or approvals
- An adaptive management approach (must be integrated with the proposed mitigation strategy)
- Financial assurances, staged approvals or progressive funding arrangements
- Regional environmental initiatives
- Area-wide monitoring (general state of the monitoring schemes)
- Analysis of (secondary) monitoring data, documents, calculations, modelling, mapping and expert judgements
- Field research, inventories, interviews with people and registration of activities
- Project log books (deviation from regular development/operation)
- Complaint register
- Camera or monitoring equipment streaming images or data onto a publicly accessible internet site

(Source: Barker, 2004, p.51)

Assigning roles and responsibilities

A clear understanding of the roles and responsibilities of different stakeholders is crucial for the efficient implementation of EIA monitoring and auditing (Barker, 2004). In the absence of clearly defined responsibilities and a good coordination between different stakeholders it is very likely that monitoring and auditing in EIA will ultimately become nobody’s responsibilities. A good coordination between the relevant agencies is needed to avoid overlapping of responsibilities. According to Glasson et al. (1999) for ideal monitoring activities, a partnership between the parties involved is required. Morrison-Saunders et al. (2001, 2003) recognize the role of three principle stakeholders in EIA monitoring and auditing: the proponent, the regulator and the public (Figure 2.7). According to them “EIA follow-up may be initiated by proponents, regulators or the public: the three stakeholder interests are often intertwined and their combined interest or pressure may initiate follow-up programmes and each stakeholder may benefit differently from EIA follow-up programmes” (Morrison-Saunders et al., 2001, p.295).

Figure 2.8: Contextual Factors and Parties Relevant for Successful EIA follow-up



(Source: Morrison-Saunders et al., 2003, p. 45)

The responsibility for designing and implementing the monitoring programme usually lies with the proponent in the current practice of most EIA jurisdictions. According to Barker (2004) proponents should design and implement the monitoring programme in consultation with all stakeholders, including the people affected by the project. He suggests that regulators may provide significant input into the design of a monitoring programme, primarily discussing with the proponent the requirements and conditions that must be included.

Marshall (2001) gives an account of roles and responsibilities of the proponent in situation where monitoring and auditing is not a regulatory requirement. He argues that the voluntary role of the proponent is crucial in the project management that integrates EIA recommendations into project plans. Wood (2003) points out that there is an increasing trend where the responsibility lies more on the proponents. Beanlands and Duinker (1984) recognise the need for the involvement of both government agencies and proponents in impact monitoring and stress that their responsibilities should be clearly established early in the EIA process. Glasson (1994b) believes that while government personnel should be responsible for all monitoring the proponent should bear the cost of monitoring. He argues “assigning responsibility for monitoring to the proponent [is] akin to assigning a fox to guard the chickens” (Glasson, 1994b, p. 312). However, Arts and Nooteboom (1999) emphasize the shared responsibility of monitoring by the proponent and environmental authorities. They argue that although it is obligatory for the proponent to carry out monitoring as specified in the monitoring plan or licensing condition, the environmental authorities should verify the proponents’ monitoring activities. Generally, the responsibility of monitoring should go with the proponents until the monitoring results show that the proponents are not confronted with strict permit conditions.

George (2000) argues that the developer should have some voluntary role as part of good management practice in addition to the mandatory role. In fact, the sole responsibility of impact monitoring on the proponent in the post-decision stage seems to be impractical. Regulators should have a role here particularly to ensure the quality of job done by proponents. The proponents can be made primarily responsible to bear the cost of monitoring based on the polluters pay principle. However, the review of monitoring results is mainly the responsibility of regulators. Therefore, the government should bear the cost of scrutiny. The guidance on good practice monitoring provided by UNEP (1997) recognizes the value of monitoring by other actors in the EIA process than just the developer and the competent authorities.

Formal regulation

There is a growing support in favour of EIA regulations to provide for monitoring and auditing during construction and operation of the project. Legislative provisions for EIA monitoring and auditing exist in a number of countries including Portugal, the Netherlands, Canada, Australia, Hong Kong, Malaysia and Nigeria (Morrison-Saunders et al., 2003). It is widely accepted that having regulations in place is an important first step in initiating EIA

monitoring and auditing. Boyden (2002) notes that in the absence of legislative requirements for monitoring and auditing in the UK they rely on the effectiveness of existing planning procedures, and good practice of developers. Glasson et al. (1999) note that in the absence of a mandatory procedural requirement it is difficult to persuade developers to involve their best interest in the post-development environmental management activities. Beanlands and Duinker (1984) suggest that monitoring should be formally recognized as an integral part of the assessment process. Treweek (1996) advocates the importance of the mandatory legal provisions for EIA monitoring and auditing. According to Malone (1997) environmental impact monitoring should be included within the EIA legislation in order to make it effective. She argues that a formal requirement of monitoring and auditing can help establish a clear and concise framework bringing certainty in the implementation procedures and providing a base for public participation. However, the studies by Jesus (2002), Van Lamoen and Arts (2002), Dayo et al. (2002) and Mohamad-Said (2002) show that the presence of regulations does not necessarily guarantee that EIA monitoring and auditing actually occur. Similarly, Arts and Meijer (2004) note that although the EIA regulation in the Netherlands contains mandatory legal provisions for monitoring and auditing, they often occur under other regulatory tools.

There are examples where self-regulatory initiatives of proponents have played an important role in EIA monitoring and auditing in the UK (Marshall, 2001; Marshall et al., 2001). Morrison-Saunders et al. (2003) suggest that self-regulation may fill the gap in EIA regulations where monitoring and auditing are not mandatory requirements. They argue that strong regulations alone may not be sufficient for the successful implementation of EIA monitoring and auditing, and hence self-regulation and public pressure may have an important role (Table 2.2). A mandatory requirement of environmental monitoring may promote rigidity and make the procedures excessive bureaucratic. Monitoring is a wasteful exercise if it does not have any purpose to do it. Monitoring requirements for all types of activities cannot be of equal importance. Again, some projects may require monitoring throughout its whole life cycle while in other cases it can be for a limited time. However, the advantages of mandatory monitoring requirements seem to be greater than its disadvantages. It can lead the EIA process one step forward towards achieving its goal. Morrison-Saunders et al. (2003) note that mandatory requirements for EIA monitoring and auditing can help to get more transparent division of roles and tasks between proponents, regulators and the public. More importantly, regulations can make EIA monitoring and auditing more structured and systematic in practice. Without the mandatory legal provisions for EIA monitoring and auditing, the proper institutional arrangements with adequate resource allocation is very unlikely to exist.

Table 2.2: Regulatory and Institutional Arrangements for EIA Follow-up

Aspects of EIA follow-up	Regulatory Setting		
	Command and Control	Self-regulation	Public pressure
Who: main driving force	Regulator	Proponent	Community
How: instruments	Formal EIA regulations Legal instruments	EMS (eg ISO 14001)	Public concern/ media
What: output	Compliance with law and insight in environmental performance	Third party accreditation, compliance with industry standards, management of the activity, green profile	Transparency of management of activity, information about project, enhancement of local environmental knowledge, public involvement

(Source: Morrison-Saunders et al., 2003, p. 46)

Wright and Smith (1992) note that detailed monitoring programmes are more common in the statutory licensing system. Monitoring and auditing requirements under the planning approval conditions or environmental licensing conditions are yet to show any satisfactory results in most cases because under the planning approval system the enforcement mechanism is often weak and it does not work (Arts et al., 2001). Malone (1997) notes that the remedy for breach of conditions is still inappropriate. In fact, a formal monitoring requirement by the law can force the developer to be committed to monitor the project impacts with the realisation that EIA is a continuous process that does not end at development approval. It is very likely that the developer will try to reduce their financial involvement as less as they can where they do not have any incentives or legal obligations. However, there are alternatives to the formal requirement of EIA monitoring and auditing. In the absence of mandatory legal provisions it is important to establish an obligation for monitoring and regular reporting under different legal licensing/ permit system with an effective enforcement mechanism. It is also important to establish a mechanism that requires developers to report regularly on compliance with commitments and imposed conditions in addition to reporting of monitoring and auditing results. Introduction of new regulations for EIA monitoring and auditing requires some extra staff and financial resources in the relevant agency (Morrison-Saunders et al., 2003). For example, Jesus (2002) notes that the environmental agency in Portugal experienced difficulties in dealing with additional workload after the introduction of regulations for

follow-up. Similarly, Dayo et al. (2002) notes that without an effective enforcement ability mandatory provisions for EIA follow-up remain inadequate.

Institutional arrangement and inter-agency coordination

An appropriate institutional arrangement and a good inter-agency coordination can contribute significantly to the implementation of EIA monitoring and auditing (McCallum, 1987; Canter, 1996). Different types of agency can establish the purpose of EIA in different ways. For example, a planning agency usually dominated by planning personnel is more likely to be concerned with economic growth and employment generation rather than environmental protection. In principle, EIA seeks to protect the environment and therefore EIA should not be used merely as a planning tool. Accordingly, the environmental agency should be responsible for conducting EIA not the planning agency. A close relationship exists between planning, development and the environment. Therefore, EIA may provide a link to the planning process but it should be at a strategic level.

Different government agencies with the responsibility of EIA, pollution control and natural resource management are likely to promote complexity to some extent in the implementation of monitoring and auditing in EIA. Therefore, it is important to have a good coordination between different government agencies. It can help reduce government expenditure by avoiding duplication. It could be also useful in making the implementation of EIA monitoring and auditing more effective and efficient by sharing information. Based on the Canadian experience, McCallum (1987) suggest that in order to maintain credibility of the follow-up process it is important to involve an independent agency in the audit process. He also suggests that the use of follow-up committees and environmental protection plans can provide for effective means of coordination in EIA monitoring and auditing.

Timeframe for monitoring

The expected duration of monitoring should be outlined in the EIS and it should be flexible enough to incorporate any changes necessary to meet its objectives (Beanlands and Duinker, 1984). Some argue that monitoring impacts of an action should be carried out throughout the action's life cycle (George, 2000; Morris & Therivel, 1995; Malone, 1997; Thomas, 1998; Morrison-Saunders & Arts, 2004). However, Morrison-Saunders and Arts (2004) suggest long-term high frequency monitoring in situations where resources and capacity are adequate. According to Wood (2003) monitoring and auditing should not involve excessive time and resources. In fact, monitoring in EIA is a costly exercise. This issue is very much relevant in

determining the timeframe for monitoring. Therefore, the timeframe for monitoring should be determined on the basis of the significant impacts of a particular project and availability of resources and capacity. All impacts of a project may not require to be monitored within the same timeframe. A timeframe for the review and audit process is very important in order to implement EIA monitoring and auditing in an effective and efficient way. Proponents should submit their reports within a specific time frame. Similarly, they should get a response from regulators within a certain period of time because sometimes both of proponents and regulators may need to take action on the basis of reports or review outcomes in an appropriate time. Delays in the review process are most like to discourage proponents to do a thorough job.

Implementation stage

Implementation of EIA monitoring and auditing at the post-decision stages of EIA is a common practice. Most EIA practitioners identify EIA monitoring and auditing at the beginning of post-decision stages of EIA. Barker (2004) suggests that implementation of EIA monitoring and auditing should be project specific; it may start along with project construction or may not be necessary until operations begins. Jesus (2002) notes that monitoring during construction is helpful in changing the environmental behaviour of developers and contractors. It is important to prioritise actions in the implementation of EIA monitoring and auditing. According to Barker (2004) the implementation of a monitoring programme should start with data collection in order to verify impact predictions and to implement mitigation measures. In fact, baseline monitoring during the EIA study forms the basis of EIA monitoring and auditing. Therefore, EIA monitoring and auditing should be considered in the early stage of the EIA process.

Reporting

Reporting is a key component of EIA monitoring and auditing. An effective monitoring programme should require regular reporting, evaluation and an immediate response on the basis of monitoring results. Monitoring is only useful if the observations are formally reported, evaluated and properly responded to (Arts & Nooteboom, 1999). Arts et al. (2001) suggest that proponents should submit monitoring reports periodically to the relevant authority. According to Jesus (2002), publication of monitoring reports by the environmental agency may be helpful to increase the responsibility of developers. He found environmental compliance reports useful to define mitigation, monitoring and to obtain public feedback. The reporting requirements may be determined by the magnitude of the issues and by the length of

the proposed project. An extensive web-based reporting system has been very effective in ensuring increased public participation in EIA monitoring and auditing in Hong Kong (Au, 2001). However, Morrison-Saunders et al. (2001) argue that Hong Kong's unique approach may not suit other EIA jurisdictions. The following principles are important in establishing an effective reporting system.

Box 2.9: Reporting Principles of EIA Monitoring

- ❑ Monitoring reports should provide information on those components of EIA monitoring and auditing to which the stakeholders have agreed, focusing on the degree to which commitments have been met and on the success and failure of implemented mitigation measures.
- ❑ Reporting scheme should be flexible enough so that any unexpected findings can be acted upon quickly.
- ❑ Reporting scheme should ensure accountability by those responsible for the implementation of EIA monitoring and auditing.
- ❑ Reporting should not only provide data and results but should endeavour to facilitate building on existing knowledge, thereby improving the quality of future EIAs.
- ❑ Reporting should comment on what is working, in addition to what is not working.
- ❑ The public should have access to monitoring reports.

(Based on Barker, 2004)

The key components of a monitoring report have been noted by Arts and Nooteboom (1999), Arts (1998), Meijer and Van Vliet (2000) and Barker (2004). According to Barker (2004) a monitoring report should have essentially the following components.

- ❑ Purposes of EIA monitoring
- ❑ Issues identified
- ❑ Implementation of the monitoring programme (mechanism used to operationalize the programme).
- ❑ Results (data, information)
- ❑ Data analysis and evaluation
- ❑ Management steps that have been undertaken
- ❑ Further management steps proposed to be taken to deal with outstanding issues effectively
- ❑ Lessons learned through the monitoring process and recommendations for future EIA and monitoring programmes (Barker, 2004, p.57).

Evaluation

Evaluation is a critical step in the monitoring process. The evaluation of monitoring results should be conducted to ensure that the information provided is meaningful. Monitoring data may not be useful if the meaning is not extracted. A well-designed and executed monitoring programme ensures that information is provided in the correct form and at the right time to trigger the appropriate supervisory response (World Bank, 1996). The recommendations of Barker (2004) seem to be important in the evaluation of EIA monitoring and audit results (Box 2.10).

Box 2.10: Approaches to Evaluation of Monitoring Results

- ❑ The evaluation of EIA monitoring results should determine the completeness and adequacy of information provided.
- ❑ Results and outcomes need to be compared to base-line information as well as to EIA predictions in order to determine the accuracy of the assessment and the effectiveness of the mitigation measures.
- ❑ Monitoring and audit results need to be compared with the relevant guidelines or regulatory standards to determine compliance, where applicable.
- ❑ Any unforeseen effects should be taken into account for further assessment.
- ❑ The findings of the evaluation should be reported to all stakeholders/ participants involved in the monitoring programme in order to ensure accountability and to make it a transparent and credible process.

(Based on Barker, 2004)

More often the regulatory authorities play the key role in evaluating monitoring and audit results under the strict command and control approach. However, according to Barker (2004) any one or several stakeholders involved with EIA monitoring can be involved in the evaluation of monitoring or audit results depending upon the monitoring programme and regulatory settings. Malone (1997) suggest that an independent agency should be involved in the collection, analysis and reporting of monitoring data in order to ensure the effectiveness and objectivity of impact monitoring, and the proponent should bear the cost. There are some unique examples of independent evaluation. For example, in Hong Kong, monitoring results are evaluated by an independent third party (EPD, 2002). In Canada, an independent monitoring agency comprising the government, proponent and members of the community is responsible for evaluating monitoring and audit results (Ross, 2004).

Issue management

The evaluation of monitoring and audit results may identify some issues and require further actions in order to in order to manage them. According to Włodarczyk (2000), the improvement of EIA follow-up need to be made in an incremental but continuous fashion.

Similarly, Morrison-Saunders et al. (2004) suggest an adaptive management approach with flexibility on the part of the proponent with respect to monitoring programmes for managing the issues. According to O'Beirne et al. (2000), an adaptive management approach is very effective if the monitoring programme is designed during the planning stage of the project and implemented during the construction of operation stage. Barker (2004) suggests that depending upon the findings of the evaluation, further actions may be required in situations where:

- Proposed mitigation measures have not been implemented or are ineffective;
- Monitoring results identify unexpected environmental impacts or adverse environmental effects;
- EIA predictions are incorrect; and
- Proposed methodologies are ineffective or inoperative (Barker, 2004).

Public accountability and disclosure of information

Generally, the EIA process recognizes the need for mandatory public consultation and making information available to the public before a decision is made. In the post-decision stage the involvement of public and disclosure of information is largely discretionary. In fact, the opportunities for public involvement in the post-decision stages are very limited (Arts et al., 2001). In most cases, only the project approval conditions or licensing conditions are made public but the monitoring or audit reports are not required to be published. In principle, the EIA process is a public process with considerable openness. Therefore, the implementation of monitoring and auditing under the EIA framework should be a transparent and publicly accountable process (Morrison-Saunders et al., 2003; Marshall et al., 2005). It is widely accepted that the public should be informed of monitoring outcomes at least. In fact, the public should have the right to know the performance of the project for which they have already put some inputs. Over all, the public should have the right to evaluate the project through their non-technical (qualitative) observations. According to Jesus (2002), reporting of monitoring and auditing results could be made more useful to the public if the review authority publish them with their evaluation.

Public involvement and community consultation

There is wide support for public involvement and community consultation in EIA monitoring and auditing. Morrison-Saunders et al. (2003) support direct involvement of the public in monitoring programmes. Some believe that community participation should be a key consideration in EIA monitoring and auditing (Austin, 2000; Dennis, 2000; Barker, 2004).

Arts et al. (2001) recognise the importance of communication and public participation for the effective implementation of EIA monitoring and auditing. Malone (1997) argues that the public have the right to be involved in the evaluation of a project, especially in its environmental performance although the involvement of an increased number of parties may cause delay and complexity in it. Both NGOs and the public can play a significant role in monitoring the project impacts at no cost to the developer or the authorities. Eckman (1996) gives the example of the successful involvement of local people and NGOs in monitoring programmes. There may be some problems with public involvement in EIA monitoring and auditing. Environmental monitoring and auditing in EIA is a technical exercise. Sometimes, without proper technical expertise public involvement in EIA monitoring and auditing may not be meaningful. Sometimes, the public may not be able to interpret the monitoring results. In that case there is a possibility for misinterpretation of monitoring results. Moreover, the variety of public interest within different communities may create a complex situation in the implementation process. The business/industrial community often raise the issue of commercial confidentiality in publishing monitoring and auditing results. It is also argued that regulators with proper professional knowledge act on behalf of the public; why should the public without any technical expertise be involved again?

However, the public/ community can be an important resource for both regulators and proponents in the implementation of EIA monitoring and auditing (Morrison-Saunders et al., 2003). Public consultation and community involvement were found very useful in ensuring in an effective EIA follow-up in Canada (Denis, 2002; Ross, 2002). Austin (2000) suggests that community participation in the monitoring programme can ensure an enhanced and better-informed communications about projects and can help incorporating local environmental, social and cultural knowledge into the decision-making process. It is widely believed that public access to monitoring results and public involvement in the implementation process can involve an extra-supervisory role that can compel the proponent or the competent authority to act appropriately (Ross et al., 2001; Van Vliet, 2000; Arts, 1998; Morrison-Saunders, 1998; Morrison-Saunders et al., 2001). However, according to Barker (2004) the nature and extent of public involvement in the implementation of monitoring and auditing should be determined on the basis of the specific nature of projects but public consultation should be considered for all steps of a monitoring programme. The local community and other stakeholders may not be interested in involving themselves in EIA monitoring and auditing if they are not consulted genuinely. Furthermore, they should have the opportunity to evaluate the outcomes of the monitoring programme.

Arts et al. (2001) suggest two complementary approaches to public participation in EIA monitoring and auditing: 1) use of an independent agency in which various stakeholders are represented; and 2) ensuring the right of the public to access the monitoring data. Introduction of a web-based cyber environmental monitoring and auditing system in Hong Kong in early 2000 is another different approach to public participation. Barker (2004) suggests that a formal follow-up committee comprising different stakeholders can be usefully involved in EIA monitoring and auditing. Denis (2002) found public consultation and community involvement very useful in ensuring an effective EIA follow-up in a major hydraulic project in Canada. Ross (2002) gives another example of community involvement in major mining projects in Canada where the role of the public is more formal. Under this approach an independent committee, comprising of the proponent, regulators and local communities, carries out monitoring and evaluation activities as environmental watch dog. Hunsberger et al. (2005) recognize opportunities for community involvement in EIA monitoring and auditing through the use of local knowledge.

Resources and capacity

Sufficient resources (financial and human) and capacity both within the regulatory agencies and proponents are essential for successful EIA monitoring and auditing (Morrison-Saunders et al., 2003; Arts et al., 2001). Limitations in resources and capacity pose barriers in the implementation of EIA monitoring and auditing in practice (Au & Sanvicens, 1995; Arts & Nootboom, 1999; IAIA, 2002; Arts & Morrison-Saunders, 2004a, 2004b). However, Arts et al. (2001) point out that EIA monitoring and auditing need not place huge burden on proponents and regulators. Some of the recent literature suggest that the benefits of EIA monitoring and auditing can justify and outweigh the associated costs and effort (Marshall, 2004, 2005; Sánchez & Gallardo, 2005). Sánchez and Gallardo (2005) report that costs associated with EIA monitoring and auditing represent 1.4% of the total costs. Morrison-Saunders et al. (2003) suggest that EIA monitoring and auditing can be conducted with limited resources and capacity if simple approaches are undertaken. There are some good examples of simple approaches that enabled EIA monitoring and auditing to occur with limited human resources in the regulatory agencies (Morrison-Saunders et al., 2001; Van Lamoen & Arts, 2002). Capacity building and professional training may play an important role in educating EIA practitioners and make EIA follow-up a normal part of profession (Arts et al., 2003). In addition to that staff continuity is an important factor in ensuring the implementation of EIA monitoring and auditing (Mohammad-Said, 2002). A multi-institutional approach to EIA follow-up was found to be effective in a major road project in

Brazil (Gallardo & Sánchez, 2004). Technological resources may have an important role in EIA follow-up. Hui and Ho (2002) provide an example of using sophisticated internet-based monitoring and reporting system in Honk Kong. The public/ community can be an important resource for both regulators and proponents in the implementation of EIA monitoring and auditing (Morrison-Saunders et al., 2003).

Table 2.3: Approaches to EIA Follow-up with regard to Resource and Capacity

Approach	Key Actors	Mechanism
Multi-institutional follow-up	Regulators, proponents	Intense supervision, reporting, coordination, and a system of check and balance; sharing cost by proponents and various regulatory agencies.
Professional practice	Regulators, proponents	Capacity building, professional training, staff experience and continuity.
Technological resources	Regulators, proponents	Web-based follow-up and reporting; investment in sophisticated information technology infrastructure.
Community Resources	Regulators, proponents, local communities	Public consultation and community involvement.

(Based on Morrison-Saunders et al., 2003)

All these approaches may not be useful in all cases. Selection of these approaches should be made carefully on the basis of project types and socio-cultural and economic conditions of a particular EIA jurisdiction. Gallardo and Sánchez (2004) note that a multi-institutional approach to EIA follow-up may not be successful in smaller projects and in situations where both regulators and proponents suffer from resource constraint.

Economic incentives

EIA monitoring and auditing usually do not bring any direct financial profit or rewards to the developers. It is very likely that the developers will not be interested in a non-profit investment. One way is to compel them to do it and another is to encourage them. Regulatory incentives and disincentives can be useful to encourage proponents to involve themselves in EIA monitoring and auditing (Arts & Morrison-Saunders, 2004b). This idea is becoming popular among regulators (Rose et al., 2004). Anton et al. (2004) reports that market-based incentives have led firms to voluntarily adopt environmental management systems (EMSs). They found market-based pressures encourage institutional changes in the management of environmental concerns. Arts and Morrison-Saunders (2004b) suggest that environmental

performance bonds (refundable upon successful implementation of mitigation) or contractual agreements may be used in this regard. It is very likely that rewards for doing certain actions may not reduce the case of inactions. However, it will encourage the good-doers to continue their actions. Reputations and goodwill are considered important in any business. Therefore, the competent authority should release reports regularly on the basis of monitoring /auditing reports published by the developers identifying the best and worst environmental performance of industries.

2.2 Monitoring and Auditing Outside the EIA Process

Monitoring and auditing exist outside the EIA framework under different regulatory instruments and general environmental management practices in many EIA jurisdictions. They include: legal permit system, area-wide monitoring, and voluntary EMS. In the Netherlands an elaborate, highly developed system of environmental regulations and monitoring exists outside the EIA framework (Morrison-Saunders et al., 2003). Arts (1998) notes that in the Netherlands monitoring and auditing actually take place under the environmental permit system. In Hong Kong, environmental permits are required for the construction, operation and/or decommissioning of designated projects and all requirements in the EIR report, including any environmental monitoring and audit requirements, are included in the environmental permits (Arts et al., 2001). The project proponents and contractors in Honk Kong are legally bound by the permit conditions since the environmental permits are legal documents (Hui, 2000). In Australia, environmental monitoring and auditing occur under a different legal permit system (CEPA, 1994). In the United Kingdom, the permit framework covers post-decision monitoring and auditing under some specific laws (Wood, 2003). Dias and Sánchez (2002) note that the permit system in Brazil is useful in enabling EIA monitoring to occur.

The terms and conditions set for environmental monitoring under the environmental licensing system may have some similarities with EIA approval conditions. However, the monitoring requirements under a specific legal permit system usually focus on some specific issues excluding some other issues identified in the EIS. For example, the environmental permit system in most cases focuses on the pollution or harmful emission issues only. Moreover, monitoring and auditing in EIA are more open to public participation because EIA provides an information tool with greater flexibility and openness, which is usually more politically and socially relevant than the permit procedure (Arts & Nooteboom, 1999).

The permit system framework normally covers some stages of the EIA process. However, the EIA framework is not always additional to the permit system. In many countries, permit requirements are limited to the pollution impacts of industrial activities. Impacts of other activities need to be covered by the EIA framework. Therefore, monitoring and auditing under the legal permit system cannot substitute for the monitoring and auditing requirements of EIA. However, they can supplement the monitoring and auditing requirement of a project subject to an EIA because they usually have a formal enforcement tool in place. In some cases, strengthening the relevant legislation and allocating adequate resources in the relevant regulatory agency can bring better results. According to Wood (2003), there is a need for better coordination between EIA and ongoing environmental management of projects or with other environmental monitoring programmes.

There is also area-wide monitoring as part of pollution control activities. The authority responsible for granting environmental permits usually does area-wide environmental monitoring and auditing. Arts and Nootboom (1999, p.247) argue that “like post-EIA monitoring and auditing area-wide monitoring can provide scientific knowledge, acceptance of projects and integration of different monitoring frameworks”. It can give the information needed for adjustment of activities. However, area-wide monitoring involves significant physical and financial resources through the public not the polluters. Again, it cannot make developers responsible for any specific action.

There are instruments outside the ‘command-and-control system’ that are widely being used for ongoing environmental management of an activity. These include voluntary EMS, eco-labelling of environmentally friendly product, voluntary agreements between polluting industrial sectors and government. Arts and Nootboom (1999) note that activities (e.g. housing, road construction, retailing, agriculture, etc.) not requiring an environmental permit usually involve voluntary EMS that require monitoring and auditing. According to Glasson et al. (1999, p. 394), “an EMS, like EIA, is a tool which helps organizations to take more responsibilities for their actions, by determining their aims, putting them into practice and monitoring whether they are being achieved.” The terms and conditions of a legal permit system or a planning approval may include the voluntary implementation of environmental management systems (EMS) by the activity owner. An EMS strongly emphasizes organizational procedures in the management of an activity. With the commitment of continuous improvement in environmental performance, it has a built-in system of follow-up. Sometimes an EMS is subject to external verification and public review. Although the EMS

standards (e.g. ISO 14000, EMAS, etc.) are intended for industrial activities, these can be used by any organization for managing an activity with environmental risks (Arts & Nooteboom, 1999). Glasson et al. (1999) recognize the prospect of voluntary EMS in EIA.

However, without some sort of external verification and regulatory supervision the implementation of a voluntary EMS may not work properly. It is very like that in a voluntary approach developers, especially the medium or small-sized companies, will try to set their objectives to fulfil only the minimum requirements. Some companies are still among the worst polluters even they have a voluntary EMS in place. Therefore, the success of the voluntary EMS depends on the developers' sincerity and a mechanism that establishes some sort of accountability. The following sections discuss in detail the scope of the voluntary EMS.

2.2.1 Environmental self-regulation

There has been a recent trend of introducing a self-regulatory approach in environmental governance. According to Morrison-Saunders et al. (2003), a strict regulatory 'command and control' approach is not enough to ensure that EIA monitoring and auditing take place. They believe self-regulation can play an important role in this regard. Both the business/ industrial communities and the regulators are showing interest in this approach although they vary in nature. The government is sometimes unable to handle environmental problems using the regulatory tool because regulations sometimes do not work against large and powerful companies and such an approach involves time and resources. Again, failures to tackle environmental problems affect the credibility of the government's performance. Therefore, it is good for regulators if they can shift their regulatory burdens to the business and industrial communities who are primarily responsible for environmental problems. It is argued that increased international trade and foreign direct investment compel governments to lower production costs within their jurisdiction by neglecting to enact or enforce laws to protect the environment (Drenzer, 2000). Globalized corporate culture has a significant influence in the development of environmental self-regulation (Petra & Taylor, 2001). Globalization expands the field of organizations concerned about their environmental performance to include actors beyond the nation state. Individual firms respond to global norms to the extent they are pressured to legitimize themselves by adhering to these norms (Bansal & Kendall, 2000). The main benefits of self-regulation include: 1) flexibility in achieving their environmental objectives; 2) opportunity to reduce cost with a minimum requirement; 3) opportunity to avoid costly regulatory burden; 4) opportunity to receive government incentives; 5)

opportunity to create marketing advantages; and 6) opportunity to cope with global corporate culture (Grabosky & Gant, 2000).

There are several good examples of voluntary compliance and self-regulation initiatives in Europe, USA, Canada and Australia. All these create a scope for its wider application globally. Walker (2001) argues that environmental self-regulation requires firms, consumers and government to develop appropriate organizational forms for its successful application. In particular, environmental self-regulation must adopt contracts with government or vertical organization and uniform standards. There are also problems with the self-regulatory approach. The Environmental Commissioner of Ontario (1997) identifies the following weaknesses:

- Voluntary compliance does not guarantee performance; it only guarantees participation. Participation is related more to the development of Environmental Management Systems.
- There is a public confidence issue. It is very likely that the public will be doubtful if the companies/ developers are meeting the regulatory requirements in the absence of openness and public accountability.
- Self-regulatory approach may not fit in all types of companies. For example, it may be difficult for smaller companies to meet voluntary compliance and self-regulatory goals.
- 'Command and prevent' approach is more likely to be effective than the self-regulatory approach.
- The regulatory approach is fundamental to the rule of law and it has got the public trust. Public trust will be lost in the absence of a regulatory base. There is growing support for stronger regulation.
- There is no evidence that the voluntary approach is cheaper. It can be made cheaper if it aims at fulfilling the minimum requirements which in turn result in poor outcomes.
- The absence of transparency, evaluation and enforcement in the current form of self-regulatory approach makes it problematic.
- Regulations are put in place for specific purposes. Self-regulatory approach cannot achieve them all (Environmental Commissioner of Ontario, 1997).

In recent years, considerable effort has been expended in Australia and overseas in the design and implementation of self-regulation systems. Among these is the Standard on Compliance Programs (AS 3906) published by Standards Australia in 1998, as well as the ISO 14000

series of international standards for environmental management (Grabosky & Gant, 2000). However, in different Australian States the experiences of EPA with a self-regulatory approach is not satisfactory (Harvey, pers. comm., 2006). Most large companies have their voluntary EMS in place in addition to complying with regulatory requirements. Some companies, specially the small or medium-sized ones, are still among the worst polluters with a voluntary EMS in place.

A pure command and control approach may result in an unsustainable economy. Again, a purely voluntary approach may not make the environment sustainable. Therefore, neither pure command and control nor pure voluntarism is effective at making the environment and economy sustainable. The solution could be somewhere in the middle where a regulatory approach, to some extent, allows flexibility. It is better to have both 'carrot and stick' in environmental governance. In reality, self-regulation cannot work without some sort of control. Therefore, 'co-regulation' could be a better option where laws would establish minimum performance standards and voluntary compliance should start at this point. Walker (2001) notes that environmental self-regulation is more likely to appear where consumer demand is high or government pressure is strong.

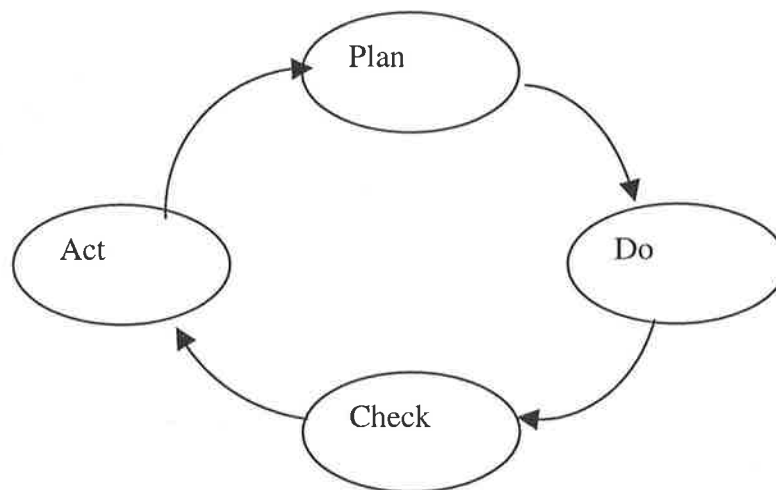
2.2.2 Environmental management systems and environmental auditing

EMS has evolved from environmental audit, and like EIA it had its roots in the USA. In the 1970s an environmental audit first carried out by private firms in the USA as the Securities and Exchange Commission expressed concerns that the annual reports of companies were underestimating potential environmental liabilities (Glasson et al., 1999; Petts, 1999b). Auditing later spread to private firms in Europe and became a high profile management tool parallel to EIA during the later 1980s and 1990s. In the early 1990s environmental auditing was strengthened and expanded to encompass a total quality approach to organizations, operation through the development of a number of formal and standardized EMS (such as International Standardization Organizations' ISO 14001, Eco-Management and Audit Scheme (EMAS) and British Standard BS 7750).

According to Glasson et al. (1999) the growth in EMS is important to EIA. The study of Marshall (2005) reveals that EIA monitoring and auditing practiced through self-regulated EMS framework can significantly improve stakeholder acceptance of development proposals and reduce opposition. An EMS under ISO 14000 series includes four basic components that work in a cyclical process for continuous improvement (Figure 2.9). The British Standard

Institute (1994, p.6 cited in Welford, 1996, p.36) defines an environmental management system as “the organizational structure, responsibilities, practices, processes and resources for determining and implementing environmental policy”. Similar definitions are found in the EU eco-management and audit scheme and ISO 14000 standards. Gilbert (1993) recognizes the following basic principles for an EMS.

Fig. 2.9: Cycle of Continual Improvement of an EMS



Box 2.11: Principles for an EMS

- ❑ A policy statement indicating commitment to environmental improvement and conservation and protection of natural resources;
- ❑ A set of plans and programmes to implement policy within and outside the organization;
- ❑ Integration of these plans into day to day activity and into the organizational culture;
- ❑ The measurement, audit and review of the environmental management performance of the organization against the policy, plans and programmes;
- ❑ The provision of education and training to increase understanding of environmental issues within the organization; and
- ❑ The publication of information on the environmental performance of the organization.

(Source: Gilbert, 1993, pp.7-8).

An EMS involves the review, assessment and incremental improvement of an existing organization’s environmental effects. It therefore has a built in system of follow-up and verification. Verifications usually take place by means of environmental audits. According to Glasson et al. (1999 p. 394), “EMS can thus be seen as a continuation of EIA principle into operation stage of a project”. However, Petts (1999b) argues that the decision-making context and characteristics of EIA and environmental auditing vary considerably (Table 2.4).

Table 2.4: Decision-making Context and Characteristics of EIA and Environmental Auditing.

	EIA	Environmental Audit
Who undertakes it?		
-Government/ decision authorities	(✓)	(✓)
-Public sector organizations	✓	✓
-Private sector	✓	✓
What is it used for?		
-Policy Assessment	X	X
-Plan assessment	X	(✓)
-Pre-implementation site-specific project/ activity assessment	✓	X
-Post-implementation/ operational project assessment	X	✓
-Technology assessment	X	X
-Product Assessment	X	X
Regulation based?	✓	X
Process components		
-Impact Identification	✓	(✓)
-Impact prediction	✓	X
-Evaluation	✓	✓
Issues dealt with		
-Environmental (including human health) impacts	✓	✓
-Social impacts	✓	(✓)
-Economic impacts	✓	(✓)
-Costs	X	(✓)
Spatial extent		
-Not site specific	X	X
-Defined site/area	✓	(✓)
-Specific company/operations	X	✓
Time focus		
-Specific current	X	✓
-Specific future	✓	X
-Past	X	(✓)
-Not specified	X	X
Data sources		
-Literature	✓	✓
-Expert opinion	✓	(✓)
-Primary data collection/surveys	✓	(✓)
Evaluation		
-Multi-criteria	✓	(✓)
-Regulatory /standards	✓	✓
-Single criteria	X	X
Public participation	✓	X

✓, always relevant or appropriate; (✓), sometimes relevant or potentially appropriate; X, not relevant.

(Source: Petts, 1999b, p.52)

2.2.3 Problems with the EMS process and standards

There are some problems with the EMS process and EMS standards which can compromise the effectiveness of EMS. There has been a great deal of criticism and debate about the value of EMS standards in terms of their actually improving environmental performance and significantly reducing environmental impacts, and whether the systems approach is actually appropriate at all. Due to the fact that the organization sets its own environmental objectives

and targets for improvement it can improve its environmental performance as little or as much, as fast or as slow as it likes. Shayler et al. (1994) argue that the targets an organization sets itself through an EMS might represent environmental tokenism rather than a solid commitment to decreasing environmental impact. According to Netherwood (1996), a self-regulated EMS does not guarantee significant improvements in performance, so in environmental terms EMSs are fundamentally flawed.

EMS is being largely criticized for its approach very similar to the total quality management (TQM) system that emphasizes consistency rather than the quality. There is a tendency for organizations to concentrate on satisfying the programme of achieving quality in TQM systems rather than the resulting achievement of quality (Spedding et al., 1993). The auditing process of the EMS is concerned mainly with the audit of the system rather than auditing environmental performance (Welford, 1993). In fact, the EMS standards do not set specific limits upon energy or resource consumption, levels of emissions, or levels of performance, other than those based on national compliance, nor is there a requirement within their framework to tackle all of the organization's environmental effects. EMS and the standards only require a commitment to continual environmental improvement through the management loop and do not aim for environmental protection. According to Netherwood (1996, p.54), "organizations will use the EMS standards as a marketing device, and as a smoke screen to pacify concerns regarding environmental performance, instead of as a catalyst for cultural change within the organization in order to provide real and significant improvements in environmental performance".

The EMS is seen in many sectors as being too bureaucratic, and there has also been criticism regarding the potential benefits of registering with the standards, and whether they will outweigh the costs. Netherwood (1996) notes that organizations are reluctant to develop an EMS after the policy and review stages due to the financial costs and time involved, and because of the significant documentation requirements involved. There are strong doubts about the ability of an EMS to deliver sustainable practices within organizations. Gray et al. (1993) argue that EMS may be a necessary condition for sustainability but is most certainly not a sufficient condition. According to Room (1992, p. 23), "only strategies based on an integrated total EMS, and the introduction of environmental thinking and ethics into company practices, offer any real prospect of achieving pathways to environmentally sustainable action". Welford (1993) argues that because EMSs are based upon a self-regulated rate of

environmental improvement, sustainable practices will take a long time to achieve, except in most forward thinking organization.

The EMS does not provide the 'paradigm shift' of organizational thinking regarding its environmental impacts in terms of global economy and sustainable development concepts (Collenbach et al., 1993). Although environmental management systems may represent a theoretical example of best practice in environmental management and would represent a further step towards sustainable management in organizations, their applicability in the real world is doubtful because of their voluntary and defensive nature and the dominance of business in society. Therefore, the paradigm shift in organizational thinking is unlikely to be derived through EMS due to economic, political and organizational necessities.

Legislation has a role to play especially in determining the long-term effects of organizations adopting EMSs. One of the main motivations for organizations to undertake environmental management initiatives is compliance with legislation and not a sense of responsibility or wish to become sustainable. If environmental legislation is tough then industry, business and other sectors react, so it could be argued that only legislation-driven targets and objectives within organizations will lead to significant environmental improvements (Netherwood, 1996).

2.3 Conclusion

Monitoring and auditing within the EIA framework is not only needed for the better environmental performance of a project through its entire life cycle, it has a specific role to improve the EIA process by creating efficiency. The successful implementation of monitoring and auditing within the EIA framework depends on a number of factors discussed in this chapter. All other options for implementing monitoring and auditing outside the EIA framework can contribute significantly to the EIA process. However, they cannot be considered as substitutes. In reality, existence of environmental monitoring and auditing outside the framework of EIA is more prominent. Therefore, EIA should utilize other tools through proper institutional arrangement and coordination.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter outlines the theoretical approach, methods and techniques used in data collection, data analysis process and limitations of this research. According to Hesse-Biber and Leavy (2006, p. 20), “it is in methodology that theory and method come together in order to create a guide to, and through, research design, from question formulation through analysis and presentation”. The EIA process in different Australian States involves multi-stakeholders and it is primarily implemented at the project level. Bearing this in mind methods and techniques of this research have been carefully chosen in order to have a clear understanding about the procedures and practices of EIA in Australia. As noted by Liamputtong and Ezzy (2005), methodological and procedural rigour is very crucial for any research report. According to Altheide and Johnson (1994, p. 319) the following factors are important in this regard:

- ❑ “how access was obtained to organizations and individuals;
- ❑ how the researcher approached and presented himself or herself to participants;
- ❑ the development of trust and rapport;
- ❑ how mistakes and surprises were dealt with;
- ❑ how the data was collected and recorded;
- ❑ the method of data coding and analysis; and production of report”.

3.2 Methodological Approach

There are a number of approaches and techniques applicable to research in the social sciences. According to Patton (1990) suitable methods should be selected to meet the requirements of the particular inquiry. Therefore, it is important to determine at the very outset which approach the proposed research should take to construct a particular kind of knowledge. It is also important to develop a clear conception about the purposes, goals, types and methods of social research. There are at least three purposes of conducting social research: to explore a new topic; to describe a social phenomenon; and to explain why something occurs and a particular research may have more than one purposes (e.g., explore and describe), but one purpose usually becomes dominant (Neuman, 2000). Based on the research question (e.g. what, why and how questions) Blaikie (2003) identifies seven objectives in social research (Table 3.1).

The process of constructing a particular kind of knowledge with specific approaches and methods of analysis refers to the ‘epistemology’ of the research. Blaikie (1993) identified at least seven approaches to social enquiry, including positivism, critical rationalism, interpretivism, critical theory, realism, structuration theory, and feminism (Table 3.2). There

exist two epistemological positions in the social research in terms of methods and techniques of data collection and data analysis: qualitative and quantitative research (Table 3.3). Qualitative research produces descriptive data – people’s own written or spoken words and observable behaviour involving ‘participant observation’ and ‘field work’, while quantitative research produces statistical data (data in the form of numbers) involving surveys, measurements, etc. (Taylor & Bogdan, 1998). There has been much debate on the strengths and weaknesses of both qualitative and quantitative research (Bryman, 1988, 2001; Denzin & Lincoln, 1998; Guba & Lincoln, 1998; Ritchie & Spencer, 1994; Patton, 1990).

Table 3.1: Research Questions and Objectives

Research Objectives	Research Questions		
	What	Why	How
Exploration	✓		
Description	✓		
Explanation		✓	
Understanding		✓	
Prediction	✓		
Intervention			✓
Evaluation	✓	✓	
Assess impacts	✓	✓	

(Source: Blaikie, 2003, p.14)

Table 3.2: Different Approaches to Social Enquiry

Types	Features
Positivism	Based on sensory experience; Involves experiments, surveys and statistics and prefer quantitative data; Objective observation.
Critical rationalism	Based on theoretical assumptions not the sensory experience; Knowledge is tentative and subject to continuing evaluation; Hypotheses are compared with observation statements.
Interpretism	Based on human experience about social reality; Attempts to grasp socially constructed meanings; Involves interpretation rather than sensory material apprehension of external physical world.
Critical Theory	Based on both natural and social realities; Involves knowledge of <i>empirical-analytic</i> sciences, <i>historical-hermeneutic</i> sciences and human social existence.
Realism	Based on underlying structures and mechanism of observable phenomena; Provides explanatory and predictive knowledge of nature.
Structuration Theory	Based on recurrent social practices and their transformation; Concerned with the nature of human action, the acting self, social institutions and the interrelations between action and institutions; Provides the ground for obtaining knowledge of the social world.
Feminism	Based on women’s experience of natural and social worlds; Feminism is committed to change, to producing a better world for women and, hence for men.

(Based on Blaikie, 1993)

Table 3.3: Quantitative Style versus Qualitative Style

Quantitative style	Qualitative Style
Measurable objective facts	Construct social reality, cultural meaning
Focus on variables	Focus on interpretive process, events
Reliability is key	Authenticity is key
Value free	Values are present and explicit
Independent of context	Situationally constrained
Many cases, subjects	Few cases subjects
Statistical analysis	Thematic analysis
Researcher in detached	Researcher is involved

(Source: Neuman, 2000, p. 16).

Patton (1990) suggests that quantitative data are systematic and they allow for a standardised and easy presentation but qualitative data are neither systematic nor standardised and therefore a qualitative analysis is more difficult. There are some weaknesses in quantitative research. According to Guba and Lincoln (1998), the quantitative data separate actors from their experience and can not explain the context, meaning and purpose. They also criticise qualitative research as soft or flabby science that lacks validity and quality. However, Ritchie and Spencer (1994) suggest that the qualitative research is particularly useful in providing insights, explanations and theories of social behaviour. “Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. They seek answers to questions that stress how social experience is created and given meaning” (Denzin & Lincoln 1998, p.8). Marshall and Rossman (1989) recognise qualitative research as a valid form of research. According to them “the strength of the qualitative study that aims to explore a problem or describe a setting, a process, a social group, or pattern of interaction will be its validity” (Marshall & Rossman, 1989, p. 145). However, Chess (2000) believes that both qualitative and quantitative research methods complement each other and none of them is better than the other.

Research in social sciences usually involves one or more techniques of data collection. Bryman (2001) suggests the combination of qualitative and quantitative methods because both types of research share areas of overlap and commonality. The value of employing both qualitative and quantitative techniques is also recognized by Marshall and Rossman (1989). According to them a combined approach using multiple data gathering techniques is useful in strengthening external validity of the research and such an approach can be easily transferred to another settings. One of the commonly used approaches in social research for combining different types of data gathering techniques is ‘triangulation’. The main purpose of

triangulation is to validate research finding through verification, elaboration, contrast or illumination (Miles & Huberman, 1994). Bryman (2001) suggests another approach which he calls complementarity. Here the main purpose is not to cross-validate but to combine different aspects of the research in a way so that they fit well, complement one another and thus give an overall view.

This research is designed under the paradigm of positivist and interpretive knowledge because it will construct knowledge on the basis of external observations and interpretations. The implementation of monitoring and auditing in EIA involves different stakeholders and it is very much related to the socio-economic and political processes and institutional mechanisms of a particular jurisdiction. Therefore, this research will adopt the triangulation (complementarity) approach combining different data gathering techniques in order to capture an overall view of how monitoring and auditing are being implemented in practice, what are the procedures for their implementation and why or why not they are effective. The objectives of the research seek to find out answers to a number of questions involving what, how and why. Therefore, a combination of exploratory, descriptive and explanatory study was conducted in this research involving primarily a qualitative methodology. Although it mainly relied on the analysis of qualitative data, quantitative analysis was employed to support the qualitative interpretations.

3.3 Methods and Techniques Used

Based on the above-mentioned epistemological position this research employs three methods such as observation (e.g. the review of literature, document analysis, secondary data analysis), survey (including, questionnaire surveys and interviews), and case study. Table 3.4 shows the method/methods used to achieve the particular objectives of this research.

3.3.1 Review of the literature

Review of the literature is widely considered an essential early step in the research process. A review of the literature on a given topic helps identify a research problem and find answers to the following questions.

- “How have other researchers approached your topic?
- What has been the history of research on this topic?
- What are the research controversies within the literature?
- Where is their agreement and disagreement?
- What specific questions have been asked?
- What has been found out?

- ❑ What findings seem most relevant?
- ❑ What remains to be done, that is, what burning question still need to be addressed concerning your topic?
- ❑ Where do you find gaps in the literature?"(Hesse-Biber, 2006, p. 56).

Table 3.4: Research Methods Used with Respect to the Objectives.

Objectives	Research methods	Outcomes
To explore various concepts, ideas and principles in relation to procedures and practices of monitoring and auditing in the EIA process of the major EIA jurisdictions from the developed and developing world.	Review of the literature (including books, journals, reports, conference proceedings, regulations, policies, procedures, guidelines, etc.)	Knowledge and understanding about the significance, best practice and approaches to monitoring and auditing in EIA in different socio-cultural, economic and political environment all over the world.
To synthesise the current procedures and practices of monitoring and auditing in the EIA process of South Australia, Western Australia and New South Wales focusing on the legislative provisions and procedural guidelines in place, institutional arrangements, coordination mechanism, transparency, accountability, public involvement, resources and capacity, compliance and enforcement status, and environmental management outcomes.	Review of the literature and analysis of documents (including EIA legislation, policy documents, procedural guidelines, reports other relevant documents etc.); case studies; interviews; questionnaire surveys; field visit.	Understanding about different procedures and practices within Australia and identify key issues.
To examine the effectiveness of monitoring and auditing practices in the EIA process of selected jurisdictions.	Questionnaire survey; interviews; case studies;	Opportunities for the improvement in procedures and practices.
To analyse the gap between procedural requirements and actual practices in implementing monitoring and auditing in the EIA process of selected EIA jurisdictions.	Analysis of documents (Primary EIA documents, annual reports, audit reports, environmental management plans and other relevant documents); case studies; interviews.	Opportunities for removing inconsistencies.
To develop criteria in order to evaluate the procedures and practices of monitoring and auditing in the EIA process of selected EIA jurisdictions.	Literature review	Identify best practice principles.

According to Neuman (2000, p.445), “a literature review is based on the assumption that knowledge accumulates and we learn from and build on what others have done”. Neuman (2000) recognises at least four purposes of a literature review:

- ❑ “to demonstrate a familiarity with a body of knowledge and establish credibility;
- ❑ to show the path of prior research and how a current project is linked to it;
- ❑ to integrate and summarize what is known in an area;
- ❑ to learn from others and stimulate new ideas” (Neuman 2000, p.446).

An extensive review of the literature was conducted during the first year of my study period. Since then it continued until the end of the research. Much of literature review contained in Chapters 1 and 2 provided the background and context for the thesis. Five kinds of literature review, as suggested by Neuman (2000), including self-study reviews, context reviews, historical reviews, theoretical reviews, and integrative reviews, were conducted (Box 3.1).

Box 3.1: Different Types of Literature Review

- ❑ **Self-study** reviews increase the reader’s confidence.
- ❑ **Context** reviews place a specific project in the big picture.
- ❑ **Historical** reviews trace the development of an issue over time.
- ❑ **Theoretical** reviews compare how different theories address an issue.
- ❑ **Integrative** reviews point out how methodology varies by study.

(Source: Neuman, 2000, p. 446)

With this particular research it was necessary to use many government documents. Sometimes these are not peer reviewed and some are not public documents. The literature review of this thesis includes relevant published and/ or printed materials including journal articles, books, thesis papers, newsletters, conference proceedings, and various government and private documents. They range from relevant policies, legislation, procedures, guidelines, public reports, and internal reports to various topic-related publications and general publications on the EIA process and environmental governance. The literature review sets the context of understanding of the research topic and forms the basis of analysis in this research.

3.3.2 Content analysis

Content analysis technique is used in social research for gathering and analysing the content of the text. “The *content* refers to words, meanings, pictures, symbols, ideas, themes or any message that can be communicated. The *text* is anything written, visual, or spoken that serves as a medium for communication” (Neuman, 2000, p. 292). Like all research techniques,

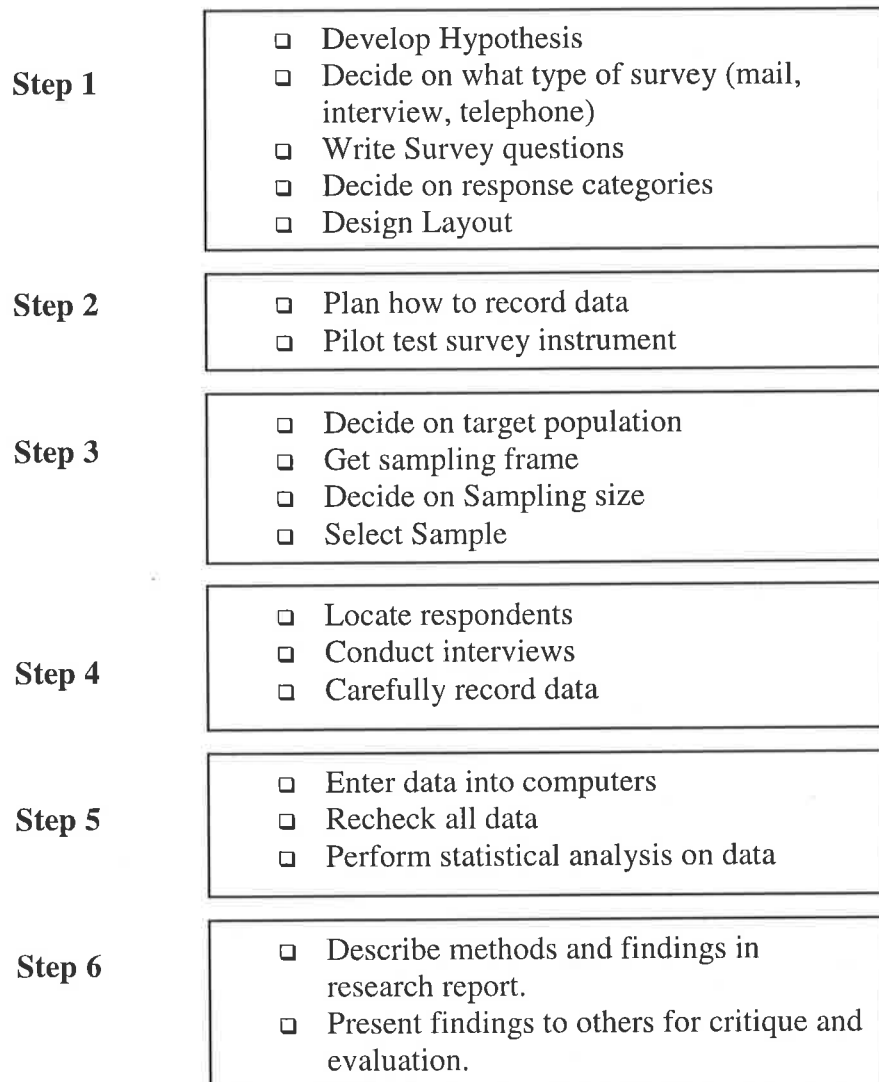
content analysis is not free from limitations. Bryman (2004) notes that content analysis does not necessarily answer 'why ?' questions and the emphasis is on measurement. It is mostly used as a quantitative method (McNeil & Chapman, 2005). However, Hesse-Biber (2006) suggests it can be employed both qualitatively and quantitatively. According to Ezzy (2002) in qualitative research content analysis should be in conjunction with other forms of data analysis because it is the most deductive form of data analysis. This research employs content analysis in the form of text analysis where written text represents the primary form of data (Hesse-Biber, 2006) and it mainly focuses on ideas, meanings, facts and figures. A huge number of documents was viewed for this purpose. They mainly included: primary EIA documents (EIS guidelines, EIS, Assessment Reports, Approvals); Environmental Management Plans; Annual Environmental Reports; Environmental Audit Reports; Procedural Guidelines; Legislation; annual reports; internal reports; memoranda; letters; minutes of meetings; newsletters; corporate plans; and policies.

The primary EIA documents of selected projects were analysed to find out the monitoring and auditing requirements in each selected project. How monitoring and auditing in EIA is being implemented in practice was investigated by analysing consent conditions, annual environment reports, audit reports, environmental management plans currently in place, and other related documents. Various procedural and institutional aspects of monitoring and auditing in EIA were analysed through various published and unpublished printed materials and electronic sources.

3.3.3 Survey

Survey research is the most widely used method of data collection in the social sciences and this technique is very useful in descriptive, exploratory and explanatory research (Chadwick et al., 1984; Neuman, 2000; McNeil & Chapman, 2005; Hesse-Biber, 2006)). However, Bryman (2004) identifies a number of deficiencies in this research technique. They mainly include: problem of meaning (different interpretations of key terms); problem of omission (respondents may avoid the key questions); problem of memory; social desirability effect (answers may be influenced by respondents' perceptions/ desirability); question threat (respondents may not give a honest reply); interviewer characteristics (influence on answers by the interviewer); and gap between stated and actual behaviour. According to Gorard (2003), surveys are generally inferior as a research method compared with other methods in social research. This weakness, however, can be overcome by using it in combination with one or more other methods.

Figure 3.1: Steps in the Survey Research process



(Source: Neuman, 2000, p. 251)

In this the study, questionnaire surveys and semi-structured interviews were employed in accordance with the process (Figure 2.1) suggested by Neuman (2000) in order to collect qualitative and quantitative data. Based on the literature review the hypothesis made in this research is that monitoring and auditing are still weak areas in the EIA process of different Australian jurisdictions. Therefore, the purpose of surveys in this research is to find out opinions of EIA stakeholders particularly the EIA practitioners on different aspects of EIA monitoring and auditing in selected jurisdictions in terms of procedures and practices and various issues associated with them. Two types of questionnaire were designed for the survey targeting the EIA practitioners in both government and private agencies. One questionnaire was designed for quantitative response providing multiple options for answers with an opportunity of qualitative response. Another questionnaire was designed particularly for

interviews containing open-ended questions with a view to obtaining an insight into some particular issues already mentioned in the first questionnaire. This is because it was assumed that a respondent might not provide a qualitative response to all questions in the first questionnaire due to its lengthy size.

Sampling

In qualitative research, the primary purpose of sampling is to collect specific cases, events or actions that can clarify and deepen understanding but not necessarily generalization and accuracy of results (Hesse-Biber, 2006; Neuman, 2000). For qualitative researchers, “it is their relevance to the research topic rather than their representativeness which determines the way in which the people to be studied are selected” (Flick, 1998, p.41). Non-probability (or non-random) and purposive (or judgemental) sampling tend to be useful in qualitative research (Hesse-Biber, 2006; Neuman, 2000; Patton, 2002). According to Neuman (2000), purposive sampling is appropriate in the following three situations: “a researcher uses it to select unique cases that are specially informative”; “a researcher may use purposive sampling to select members of a difficult-to reach, specialized population”; and “when a researcher wants to identify particular type of cases for in depth investigation” (Neuman, 2000, p.198). In accordance with the purpose of the study, the participants in this research represented a purposeful small sample rather than random sample. In other words, this research selects participants for questionnaire surveys and interviews with a specific purpose in mind.

The reason for choosing a particular kind of respondent (i.e. EIA practitioners) is that they are one of the key EIA stakeholders who have a direct and major role in the process. The other key stakeholders such as the public and project proponents were kept outside the scope of the survey since it was not considered feasible due to limited time and resources. Given the fact that project proponents usually undertake EIA study with the help of private consultants, responses from the private consultants are therefore very relevant in this research since they deal with both proponents and regulators.

Questionnaire

Advantages of questionnaires include convenience and flexibility in getting information from respondents (Marshall & Rossman, 1989) and validity of information (Sproull, 1995). There are also some disadvantages in different administering techniques (Neuman 2000). The main problem as a whole perhaps is – sometime they fail to bring out the actual meaning making the research subject simplified or distorted (Wadsworth, 1997). However, in qualitative

research, questionnaires and surveys are useful in collecting supplemental data (Marshall & Rossman, 1989). Neuman (2000, p.251) suggests “two key principles for good survey questions: avoid confusion and keep the respondent’s perspective in mind.”

There has been a long debate about open versus closed questions in survey research. Neuman (2000) suggests that closed-ended questions are useful in large-scale surveys because they are quicker and easier for both respondents and researchers. Therefore, the survey designed in this research uses closed-ended questions. However, there were opportunities to add comment. The survey was conducted in a number of ways including: self-administered (e.g. mail); face to face interviews; and technology-based delivery (e.g. telephone interviews and e-mails) (Gorard, 2003; McNeill & Chapman, 2005). Before finalizing the questionnaire a pilot survey was conducted in order to find out problems with the wording of the questionnaire. As part of the pilot survey questionnaires were sent to a number of research colleagues and contacts in the relevant agency for their comments and necessary changes were made in the draft questionnaires on the basis of the pilot survey. The respondents were contacted over telephone or through e-mails and in person and were requested to participate in the survey. Questionnaires were distributed to respondents who consented to volunteer. However, it did not result in a 100% return. Bryman (2004) notes that a certain amount of non-response is very common in social survey research. According to Gorard (2003), a response rate of 70% or above can be considered good. In order to conduct surveys among the officials of key government and private agencies permission was sought from the appropriate authority of the relevant agencies. The responses of respondents were considered as their personal view, not that of the relevant agency.

Table 3.5: Number of Requested Persons and Completed Surveys

Number of requested persons				Number of surveys completed				
SA	WA	NSW	Total	SA	WA	NSW	Total	Return rate (%)
30	30	30	90	26	22	15	63	70

Table 3.6: Types of Survey Conducted

Type of survey	Number		
	SA	WA	NSW
Face to face	24	8	2
Telephone	-	2	3
E-mails	2	12	10

Interview

This research employs in-depth interviews to obtain qualitative data focusing on some particular issues that relate to monitoring and auditing in EIA in order to supplement the questionnaire surveys. While the purpose of an interview is to obtain accurate information (Neuman, 2000), interviews in qualitative research are designed to get at deep information and knowledge (Johnson, 2002). “In-depth interviews are a particular kind of conversation between the researcher and the interviewee that requires active asking and listening” (Hesse-Biber, 2006, p. 119). This is a commonly used method of data collection in qualitative research and it can be used to yield explanatory, descriptive and explanatory data (Hesse-Biber, 2006). According to Warren (2002, p. 85), in-depth interviews are appealing and appropriate “when the topic under investigation is not linked to a particular setting”. Some of the advantages of the interview technique are: it is less time consuming; it can obtain large amounts of data rapidly; and it provides an opportunity for immediate clarification or explanation and follow-up questions (Marshall & Rossman 1989; Sproull, 1995). However, like other research tools it is not free from problems. Some of these are: respondents may not have a clear conception of what is expected from them and also they may not understand questions exactly as intended by the interviewer; and maintaining objectivity and neutrality in the interview process by the interviewer seem to be very difficult (Neuman, 2000).

In accordance with the research questions and research objectives semi-structured interviews were considered appropriate in this research (Hesse-Biber, 2006; McNeill & Chapman, 2005). Accordingly, a questionnaire with a series of open-ended questions was designed for the interview purpose allowing some flexibility and discretion (McNeill & Chapman, 2005). It also allowed the “conversation to flow more naturally making room for the conversation to new and unexpected directions” (Hesse-Biber, 2006, p. 126). Interviews were conducted face to face and over the telephone depending on the availability of respondents, distance and accessibility. Respondents who participated in the survey were requested to take part in the interview. Since it was voluntary, all respondents of the survey did not take part in the interview. Some respondents only took part in the interview but they did not complete the survey at all. In this research most of the respondents of the survey participated in the interview or most of the interviewees participated in the survey. Therefore, they are not necessarily the same people.

Table 3.7: Number of Interviewees in Three Australian States

Number of people interviewed				Number of people participating in both survey and in-depth interview				Number of people participating in only in-depth interviews			
SA	WA	NSW	Total	SA	WA	NSW	Total	SA	WA	NSW	Total
23	18	17	58	17	14	11	42	5	4	7	16

Table 3.8: Types of Interviews Conducted in Three Australian States

Type	Number		
	SA	WA	NSW
Face to face	22	9	11
Over telephone	1	9	6

3.3.4 Case studies

Case studies are commonly used methods in the social sciences. According to Yin (2003, p.1) “case studies are the preferred strategy when ‘how’ and ‘why’ questions are being posed”. Although the case study approach primarily employs qualitative methods it is not exclusively concerned with qualitative methods (Gillham, 2000a). Yin (2003) suggests that the case study method relies on multiple sources of information and therefore it can be based on any mix of qualitative and quantitative evidence. Different sub-methods commonly used within the case study include “interviews, observations, document and record analysis, work samples, and so on” (Gillham, 2000b, p.13). There are different applications of the case study method in social research. As a research tool it can be applied to explain, to describe, to illustrate, to explore and to evaluate different social phenomena (Yin, 2003). Since this research involves a number of ‘how’ and why questions in its investigation and the objectives of the research is to explore, describe, explain, illustrate and evaluate procedures and practices of the monitoring and auditing in EIA, the case study approach is considered appropriate in this research. This method helps this research “retain the holistic and meaningful characteristics” of the organisational and managerial process in terms of EIA monitoring and auditing (Yin, 2003, p.2). The case study method designed in this research involves ‘multiple’ and ‘embedded’ cases and different sub-methods such as interviews, document and record analysis.

Case selection and justification

According to Herriot and Firestone (1983) multiple case studies can be conducted to make the evidence more compelling and to make the overall study more robust. The embedded case study approach (with more than one units of analysis) provides an opportunity for extensive analysis, enhancing the insight into every case (Yin, 2003). Based on the logic of

“replication” multiple cases have been carefully selected predicting similar or contrasting results from each case (Yin, 2003). In designing the multiple-case method limitations in time and resources have been taken into account. Moreover, with the increase in number of cases “the distinctiveness of the case study approach becomes questionable, especially since the emphasis on the unique context that is the feature of the case study is easily lost” (Bryman, 1989, p.172). Therefore, out of eight Australian States and Territories only three States (South Australia, Western Australia and New South Wales) have been selected in order to get as much understanding as possible about Australian procedures and practices in regard to EIA monitoring and auditing.

Since this research adopts an embedded case study approach where a particular EIA jurisdiction forms the main unit while the major development projects subject to an EIA under that particular jurisdiction are considered sub-units (or embedded units), it is again necessary to select the number of development projects under each of the selected EIA jurisdictions. According to McClintock (1985), embedded units can be selected through sampling or cluster techniques, although Yin (2003) suggests that it is not important at all how the embedded units are selected. Whilst it would be ideal to examine all major development projects subject to EIA under each selected EIA jurisdiction, the huge number of major development projects and significant constraints in time and resources need to be taken into account in this regard. Therefore, it was necessary to select a limited number of embedded cases for this research. Accordingly, only certain categories of projects which have undergone the highest level of environmental impact assessment and have been approved and implemented within a certain time period from each EIA jurisdiction were selected. Development projects of national, regional and local environmental significance from each of the three States were carefully selected in order to make them comparable. Development projects approved and implemented between 1999-2003 under the category of mining and coastal development were considered appropriate as embedded cases because only these categories of projects were found more or less common in all of the selected EIA jurisdictions during that particular period. There was also an attempt to select as many projects as possible from a particular category depending on the availability of the accessible relevant information and project proponents’ necessary cooperation.

‘Low-structure’ (or ‘open-ended’) interviews with relevant officials from the State government and local government agencies, private companies and consulting agencies who are directly or indirectly involved in the current operation of the selected development

projects have been conducted. Interviews were conducted over telephone and face-to-face depending on the location and people's availability. The main purpose of the interview was to collect necessary information that was not available in the relevant document or when the relevant document was not accessible and when additional information or clarification was required. All relevant documents and records such as primary EIA documents, annual environmental reports, audit reports, environmental management plans, compliance reports, inquiry reports, minutes of meetings, letters, memoranda, government gazette, relevant approvals and licenses, etc. were consulted and analysed in order to obtain required information and evidence. Information from interviews and documents/records supplements each other in supporting the findings of the case study.

3.3.5 Field research

According to Neuman (2003), field research, which generally involves interviews and observations, is appropriate to learn about, understand or describe a particular social process. This study does not involve any visit to project sites as part of the field research. However, 'field interviews' were conducted as part of the field research in order to get a clear understanding about the institutional and procedural framework and interagency relationship in terms of EIA process in the selected EIA jurisdictions. Accordingly, field visits were made to New South Wales and Western Australia. In these field visits the key government agency responsible for the implementation of EIA and other relevant agencies were visited and interviews were conducted with key personnel. Interviews were unstructured, non-directive and in-depth, which were different from survey interviews (Neuman, 2003). The following table describes the schedules and participating agencies of the field interviews.

Table 3.9: Government Agencies Participated in Surveys/ Interviews

Field (State)	Period	Participating agencies
New South Wales	13-30 March 2005.	Department of Planning, Infrastructure and Natural Resources (DIPNR), Department of Environment and Conservation (DEC), Department of Primary Industries, Sydney Water, Sydney Port Corporation, Department of Land.
Western Australia	17-26 October 2005.	Department of Environment (DoE), Environment Protection Authority (EPA), Department of Industry and Resources (DOIR), Department of Planning (DoP), Department of Fisheries.
South Australia	2005	Planning SA; Environment Protection Agency (EPA); Department for the Environment and Heritage (DEH); Department of Primary Industry and Resources, South Australia (PIRSA); Department of Water, Land and Biodiversity Conservation; Transport SA.

3.4 Data Analysis

“In general, data analysis means a search for patterns in data – recurrent behaviours, objects, or a body of knowledge. Once a pattern is identified, it is interpreted in terms of social theory or the setting in which it occurred” (Neuman, 2003, p.447). According to Jorgensen (1989, p. 107) data analysis is the process of “breaking up, separating, or disassembling of research material into pieces, parts, elements or units” in a meaningful or comprehensible way. In all social research the main purpose of data analysis is to answer the research questions or to test the theoretical hypothesis (Blaikie, 2003). “In all data analysis, a researcher places raw data into categories that he/she manipulates in order to identify process” (Neuman, 2003, p. 440). Data analysis generally involves two basic steps: looking for patterns in a set of information and displaying these patterns in a clear and meaningful way (Betts et al., 2001). Hesse-Biber (2006) and Neuman (2003) suggest that there is not one correct way of qualitative data analysis while some believe that it mostly involves ‘intellectual competence’ and the ‘art of interpretation’ (Tesch, 1990; Denzin, 2000). According to Richards (2005, p.67) “the quality of the analysis is dependent on the quality of data records and the skill of the researcher for working up from them to ideas and explanations”.

There is much discussion about procedures for data analysis (for example, Hesse-Biber, 2006; Neuman, 2003; Richards, 2005; Blaikie, 2003; Betts et al., 2001; Ezzy, 2002; Liamputtong & Ezzy, 2005). Blaikie (2003) suggests four types of data analysis: univariate descriptive, bivariate descriptive, explanatory and inferential. The first two are concerned with characteristics and patterns of data, the third with causation and the fourth with generalising from samples to population. Neuman (2003) suggests seven strategies for qualitative data analysis: the narrative; the ideal types; success approximation; the illustrative method; path dependency and contingency; domain analysis; and analytic comparison (see Box 3.2). According to Blaikie (2003) the choice of data collection largely depends on the methods of data collection. However, there is a general consensus that data analysis in qualitative research should begin early particularly during data collection (Ezzy, 2002; Neuman, 2003; Hesse-Biber, 2006; Liamputtong & Ezzy, 2005). According to Neuman (2003) “the results of early data analysis guide subsequent data analysis”(p. 440). Ezzy (2002) suggests following techniques of data analysis concurrent with early data collection:

- “Team meetings and peer debriefing.
- Checking interpretations with participants.
- Transcribing, reading and coding early data.
- Writing journals and memos” (Ezzy 2002, p65).

Box 3.2: Strategies for Qualitative Data Analysis

- ❑ *The narrative.* Tell a detailed story about a particular slice of social life.
- ❑ *Ideal Type.* Compare qualitative data with a pure model of social life.
- ❑ *Success approximation.* Repeatedly move back and forth between data and theory, until a gap between them shrinks or disappears.
- ❑ *The Illustrative method.* Fill the empty boxes of qualitative data.
- ❑ *Path dependency and contingency.* Begin with an outcome and trace a sequence of events back to its origin to see a path that constraints the set of events.
- ❑ *Domain analysis.* Locate the included terms within cover terms that make up the cultural domain.
- ❑ *Analytic comparison.* Identify many characteristics and key outcomes, then check agreement and difference among the characteristics to learn which one is associated with the outcome.

(Source: Neuman, 2003, p.458)

This research utilizes both qualitative and quantitative data. Although there are some similarities between qualitative and quantitative data analysis there are at least four differences between them as mentioned below (Table 3.10). Data analysis in this research utilizes ‘analytic comparison’ strategy (Neuman, 2003) and passes through four basic phases: data preparation, data exploration, data reduction and interpretation (Hesse-Biber, 2006). It involves “examining, sorting, categorising, evaluating, comparing, synthesizing and contemplating the coded data as well as reviewing the raw and recoded data” (Neuman 2003, p.448). Audiotapes were used to record interviews and interviews were then transcribed. Every transcription includes the entire interview session. Transcriptions were checked and important texts were marked in terms of key research issues. The selected texts were then coded and stored in the PC as a word document. Interviews and transcriptions were done simultaneously.

Table 3.10: Quantitative and Qualitative Data Analysis

Quantitative data analysis	Qualitative data analysis
❑ It is more standardised and is highly developed and builds on applied mathematics.	❑ It is less standardised.
❑ It usually begins at the end of the data collection.	❑ It begins during the data collection.
❑ It attempts to test an abstract hypothesis with variable constructs.	❑ It attempts to create new concepts and theory by blending empirical evidence and abstract concepts.
❑ It is clothed in statistics, hypothesis and variables.	❑ It is less abstract than statistical analysis and closer to raw data.

(Based on Neuman, 2003, pp. 439-40).

Coding

Coding is clearly central to the analysis process (Charmaz, 2002; Dey, 2004; Marvasti, 2004). Coding generally “refers to data reduction either by a system of symbols or by numbers” (Richards, 2005, p. 85). However, it has different role and meaning in quantitative and qualitative analysis (Neuman, 2003; Richards, 2005). In quantitative analysis, coding usually involves converting observations and responses into scales and measurements (Gorard, 2003). In qualitative analysis coding involves extracting meaning from non-numerical data such as text, audio and video (Hesse-Biber, 2006) by organizing raw data into conceptual categories and creating themes or concepts (Neuman, 2003). According to Bryman (2001), there is no one correct approach for coding data. However, Straus and Corbin (1998) and Neuman (2003) describe three main coding procedures: open coding, axial coding and selective coding. These categories of coding may follow a developmental path as shown in Table 3.11. Hesse-Biber (2006) suggests that qualitative coding is a dynamic process consisting of cycles of coding, memoing and coding as mentioned in the following figure (Figure 3.2). According to Liamputtong and Ezzy (2005) coding can be a one-step or two-step process as mentioned below.

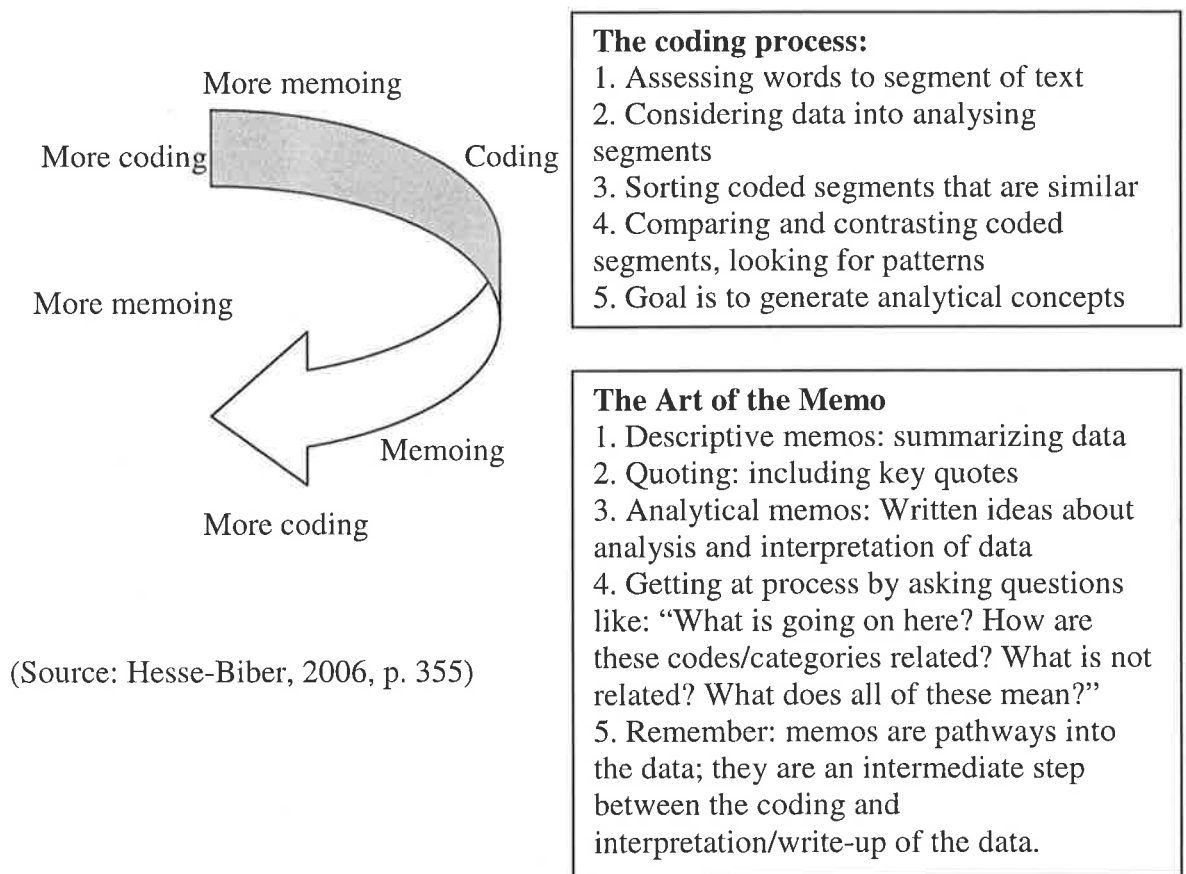
- ❑ One-step process. “Coding directly into the computer”.
- ❑ Two-step process. “Coding manually on the transcripts and then entering codes into the computer” (Liamputtong & Ezzy 2005, p.280).

Table 3.11: Different Types of Coding

Stages of Coding	Basic tasks
Open coding	<ul style="list-style-type: none"> ❑ First pass through the data ❑ First attempt to condense mass into categories ❑ Read data slowly to generate themes ❑ Write memos and notes
Axial coding	<ul style="list-style-type: none"> ❑ Second pass through the data focusing on the initial codes and concepts ❑ Review and examine initial coded ❑ Organize ideas and themes ❑ Identify axis of key concepts ❑ Find out causes and consequences, conditions and interactions, strategies and process. ❑ Look for categories or concepts that cluster together ❑ Compare different themes and find new themes
Selective coding	<ul style="list-style-type: none"> ❑ Last pass through the data ❑ Reorganize specific earlier themes and elaborate them ❑ Look selectively for cases illustrating or contrasting themes

(Adapted from Neuman, 2003, pp. 442-445).

Figure 3.2: Coding and Memoing Process



There is also debate on the benefits and disadvantages of using computer programmes for coding purposes. Kelle (1995, 2004) advocates using computer softwares particularly when there is a large data set. According to Kelle (1995), the prime benefit of computer software lies in the speed and ease of retrieval. However, Liamputtong and Ezzy (2005) express concerns about the time and energy required in the computer-based analysis while Lee and Fielding (1995) note that it distances the researcher from the data. Liamputtong and Ezzy (2005, p.282) argue that “computer programmes are not always required, nor do they solve many problems of qualitative research” because they do not analyse data but only assist in some qualitative data analysis techniques.

This research employs the procedure (Fig 3.2) as suggested by Hesse-Biber (2006) for coding the textual data generated from interviews and surveys. Considering the size of the data set it did not use any computer software for coding the data. Cut and paste techniques were used in identifying chunks or segments in the textual data stored in the word document.

Data presentation

This research generates both numerical and textual data. The frequency of responses from all respondents for every survey question was calculated manually and recorded in the PC as a word document. Different descriptive statistical techniques such as charts, graphs or tables have been used to present the numerical data and to summarize its features. The textual data have been presented as quotations in order to highlight different themes and to support interpretations made in this research. Codes were used for respondents in order to make them anonymous. For example, a respondent coded with NSR12 means he /she is a researcher from New South Wales responding through the survey in a numerical order 12. Here, the first letter of a code stands for a particular jurisdiction (for example, 'W' for Western Australia, 'S' for South Australia and 'N' for New South Wales). The second letter stands for source of information (for example, 'I' for interview and 'S' for survey). The third letter indicates the type of respondent (for example, 'G' for government official, 'P' for private consultant, 'N' for NGO official, and 'R' for researcher). The fourth letter indicates the numerical order of respondents of a particular jurisdiction. Grammatical inconsistencies and speaking hesitations (the 'ahs and 'ums') have been omitted and some words have been inserted in square brackets for clarity.

3.5 Limitations

Limitations of this study include the usual problems associated with the survey and interview methods employed such as non-response, different interpretations of questions, question threat, etc. In addition there are some other things that may affect the quality of this research. Although this research employs multiple methods to achieve its objectives it relies heavily on case studies. Selection of cases is crucial in case study research. In addition the main weakness of the case study research lies in its subjectivity and its inability to generalize the research findings (Gillham, 2000a; Yin, 2003). Case studies in this research were based on multiple sub-methods requiring different kinds of evidence. With a non-English speaking cultural background it was very difficult for me to interact with relevant agencies and persons in Australia or to obtain required cooperation and assistance. Some project proponents directly refused to provide any information. It was not possible to replicate cases equally in all of the selected Australian States. The amount and quality of information also vary with cases. There are problems in comparing cases due to their different size and type.

There are limitations in the interview and questionnaire techniques applied in this research. The main weakness of the survey relates to its sample size and length of questionnaire. This

research used a purposive sample for its survey. Therefore, a 100% participation in the survey was expected but in reality the return rate was 70%. Bryman (2004) and Neuman (2003) note that there is a declining tendency in public cooperation in survey research. However, the nearer it is to 100% response the better (McNeil & Chapman, 2005).

Officials of the key government agency who are directly involved in implementing the EIA process had less participation in the survey. Again, some of the respondents are not directly involved in the EIA process. Therefore, responding to some questions seems to be very difficult for them. They may fail to explain what they actually mean, making the research subject simplified or distorted (Wadsworth, 1997). Responses to some survey questions (e.g. Question Nos. 28, 29, 30) were not considered in presenting results because many respondents did not answer these questions. These questions mainly focused on the effectiveness and efficiency of current practices in terms of monitoring and auditing in EIA. Most respondents actually found them difficult to answer because they were not directly involved in the implementation of EIA monitoring and auditing. However, this problem with the survey was overcome by case studies that also focus on such practices. Survey responses are very likely to be influenced by the distance between the researcher and participants, the 'cultural incompetence' of the researcher and the fear that the release of the research result may have career implications (Lee, 1993). Although respondents were given an opportunity to write their comments none of them provided qualitative responses for all relevant questions. The size of the questionnaire may have influenced the respondents' attitudes.

Transcriptions of interviews show that some participants may not have understood what is expected from them (Neuman, 2000). They may have also tried to please the interviewer and appear politically or socially correct (Taylor & Bogdan, 1998). Again it was not always possible to maintain objectivity and neutrality in the interview process. Some participants may have an ambivalent attitude towards some policies and procedures and they may say something different under different circumstances (Taylor & Bogdan, 1998). Not all of the survey participants volunteered for an interview and some of the interviewees did not take part in surveys. However, this research adopts a triangulation approach that allows different research methods to complement each other. "By combining multiple observation, theories, methods and data sources, researchers can hope to overcome the intrinsic bias that come from single-methods, single observer, and single-theory studies" (Denzin, 1989, p. 307).

CHAPTER 4: PROCEDURES AND PRACTICES IN EIA MONITORING AND AUDITING AND DEVELOPMENT OF EVALUATION CRITERIA

4.1 Introduction

In Chapter 2, the theoretical and methodological context of EIA monitoring and auditing have been discussed. This chapter provides an overview of international procedures and practices that are widely recognised as more advanced than Australia's. Then, it analyses the procedural framework for EIA monitoring and auditing in three Australian States (New South Wales, Western Australia and South Australia), and then frames criteria for their evaluation in Chapter 9. There are many approaches to EIA monitoring and auditing depending on the cultural context (Arts & Morrison-Saunders, 2004). While it is difficult to determine which approach is ideal, there are some widely accepted principles applicable to EIA monitoring and auditing (see Chapter 2).

4.2 The Current Global Trend

The importance of monitoring and auditing in EIA was realized in the early 1970s when the EIA process began operating (Morrison-Saunders and Arts, 2004). An attempt was made in Canada in 1985 to discuss EIA follow-up techniques and outcomes in a professional forum (Sadler, 1987a, 1987b). Since then many studies have dealt with the performance of EIA systems in an international context (e.g. Sadler, 1996; Wood, 1995, 1999, 2003; CEC, 1993; UNECE, 1991; Barker & Wood, 1999; Rzeszot, 1999; Briffett, 1999; Brito & Verocai, 1999; Clark & Richards, 1999; Bond & Wathern, 1999). The International Study of the Effectiveness of Environmental Assessment by Sadler (1996) is widely considered as the most comprehensive review of EIA practice.

The key issues in the early literature (e.g. Beanlands & Duinker, 1984; Bisset, 1984; Culhahane et al., 1987) were concerned with the accuracy of impact predictions and the quality of EISs. Some of the recent research on EIA follow-up has focused more on the relationship of EIA with the subsequent stages of implementation, mitigation and environmental management of EIA activities (e.g. Morrison-Saunders & Bailey, 1999; Marshall, 2001, 2002; Morrison-Saunders & Arts, 2005; Glasson, 2005). The issues in EIA follow-up have shifted from mainly technical and scientific to management aspects.

Some of the most recent literature proposes different approaches to institutional arrangements and techniques in relation to EIA follow-up (e.g. Arts et al., 2001; Barker, 2004; Hulett & Diab, 2002; Morrison-Saunders et al., 2001, 2003; Morrison-Saunders & Arts, 2004, 2005; Arts & Morrison-Saunders, 2004a, 2004b; Ross et al., 2001; Storey & Jones, 2003; Storey & Noble, 2005; Noble, 2003, 2004; Gallardo & Sanchez, 2004; Sanchez & Gallardo, 2005; Marshall, 2004, 2005; Marshall et al., 2005; Au & Hui, 2004). The spectrum of follow-up approaches include: formal requirement of EIA follow-up with a command and control approach; self-regulation by proponents (e.g. EMS) combined with regulatory requirements; different regulatory instruments under the command and control approach (e.g. permits, standards, surveillance, enforcement, and prosecution of offences for non-compliance); an independent follow-up review body; disclosure of information, community involvement, public pressure; and monitoring of social impacts. In terms of follow-up techniques, some of the recent literature emphasizes informal and pragmatic approaches involving simple checks and existing management systems and data sources (Arts et al., 2001; Morrison-Saunders et al., 2001, 2003).

The idea of formal regulation for EIA follow-up has gained more popularity in recent times (Morrison-Saunders & Arts, 2004). Legislation on EIA monitoring and auditing exists in a number of countries including Portugal, The Netherlands, Canada, Australia, Hong Kong, Malaysia and Nigeria (Morrison-Saunders et al., 2003). There are considerable variations in the procedural approach to EIA monitoring and auditing among these countries. In an international review of Environmental Impact Assessment conducted by the Commonwealth (of Australia) Environment Protection Agency (1994) it was recognized that The Netherlands, Canada and Hong Kong are good examples that Australia can follow. The following section analyses the current EIA follow-up procedures of The Netherlands, Canada and Hong Kong in more detail.

4.3 EIA Monitoring and auditing in The Netherlands, Canada and Hong Kong

An analysis of EIA follow-up procedures and practices in the Netherlands, Canada and Hong Kong is contained in appendices (see Appendices 5, 6 and 7). Table 4.1 shows the procedural aspects of these three prominent EIA jurisdictions. The analysis also shows that approaches, techniques and institutional arrangements for EIA follow-up vary from country to country depending on the cultural approaches to EIA. Although the introduction of formal regulations is important in order to make EIA follow-up occur, it does not necessarily ensure the best implementation (for example, in Canada and The Netherlands).

Table 4.1: Procedural Aspects of EIA Follow-up in The Netherlands, Canada and Hong Kong.

Procedural Aspects	The Netherlands	Canada	Hong Kong
<input type="checkbox"/> Mandatory legal requirement for EIA follow-up	✓	✓	✓
<input type="checkbox"/> Clearly defined objectives	✓	✓	✓
<input type="checkbox"/> Clearly defined follow-up procedures	✓	✓	✓
<input type="checkbox"/> Clearly defined roles and responsibilities of different parties involved in EIA follow-up	✓		✓
<input type="checkbox"/> Specific criteria for determining the need for EIA follow-up requirements		✓	✓
<input type="checkbox"/> Specific criteria for determining scope of EIA follow-up requirements	✓	✓	✓
<input type="checkbox"/> Linkage of EIA follow-up with other regulatory tools (e.g. licence, permits etc.)	✓		✓
<input type="checkbox"/> Considering EIA follow-up as an integral part of the EIA process	✓	✓	✓
<input type="checkbox"/> Considering EIA follow-up early in the EIA process	✓	✓	✓
<input type="checkbox"/> Linkage of EIA follow-up with decision-making			✓
<input type="checkbox"/> Linkage of EIA follow-up with ongoing environmental management (adaptive management approach)		✓	✓
<input type="checkbox"/> Use of proactive approach by the regulators			✓
<input type="checkbox"/> Coordination between relevant agencies	✓	✓	✓
<input type="checkbox"/> Reporting system	✓	✓	✓
<input type="checkbox"/> Review/evaluation of follow-up activities	✓	✓	✓
<input type="checkbox"/> Legal provisions for taking ameliorative action on the basis of follow-up results	✓	✓	✓
<input type="checkbox"/> Independent verification		✓	
<input type="checkbox"/> Flexibility in implementation techniques			✓
<input type="checkbox"/> Full transparency and public accountability		✓	✓
<input type="checkbox"/> Dissemination of information widely		✓	✓
<input type="checkbox"/> Public engagement throughout the follow-up process and use of public pressure			✓
<input type="checkbox"/> Effective enforcement mechanism			✓
<input type="checkbox"/> Adequate resources			✓

✓ = In existence

Along with a strict command and control approach, EIA follow-up in Hong Kong emphasizes public accountability and transparency and has some flexibility. The Netherlands utilizes the opportunities of monitoring under existing regulations outside the EIA process while the Canadian system aims to build trust and confidence among different stakeholders by involving an independent organization. The cultural norms and expectations that operate in a particular jurisdiction should be taken into account when determining the approach for that particular jurisdiction (Arts & Morrison-Saunders, 2004b).

4.4 Procedures for EIA Monitoring and Auditing in WA, NSW and SA

Unlike the EIA system in Canada, The Netherlands, or Hong Kong, the requirement of monitoring and auditing in the Australian EIA systems is discretionary. However, they take place on an ad hoc basis in a number of EIA jurisdictions in Australia. Other regulatory instruments such as environmental permits/ licences, mining approvals etc usually require monitoring and auditing. In SA and NSW developers are required to carry out EIA monitoring and auditing under planning consent conditions while in WA they derive from environmental authorisation. Morrison-Saunders and Bailey (1999, 2000) note that EIA influences effective environmental management outcomes in Western Australia.

4.4.1 EIA monitoring and auditing in Western Australia

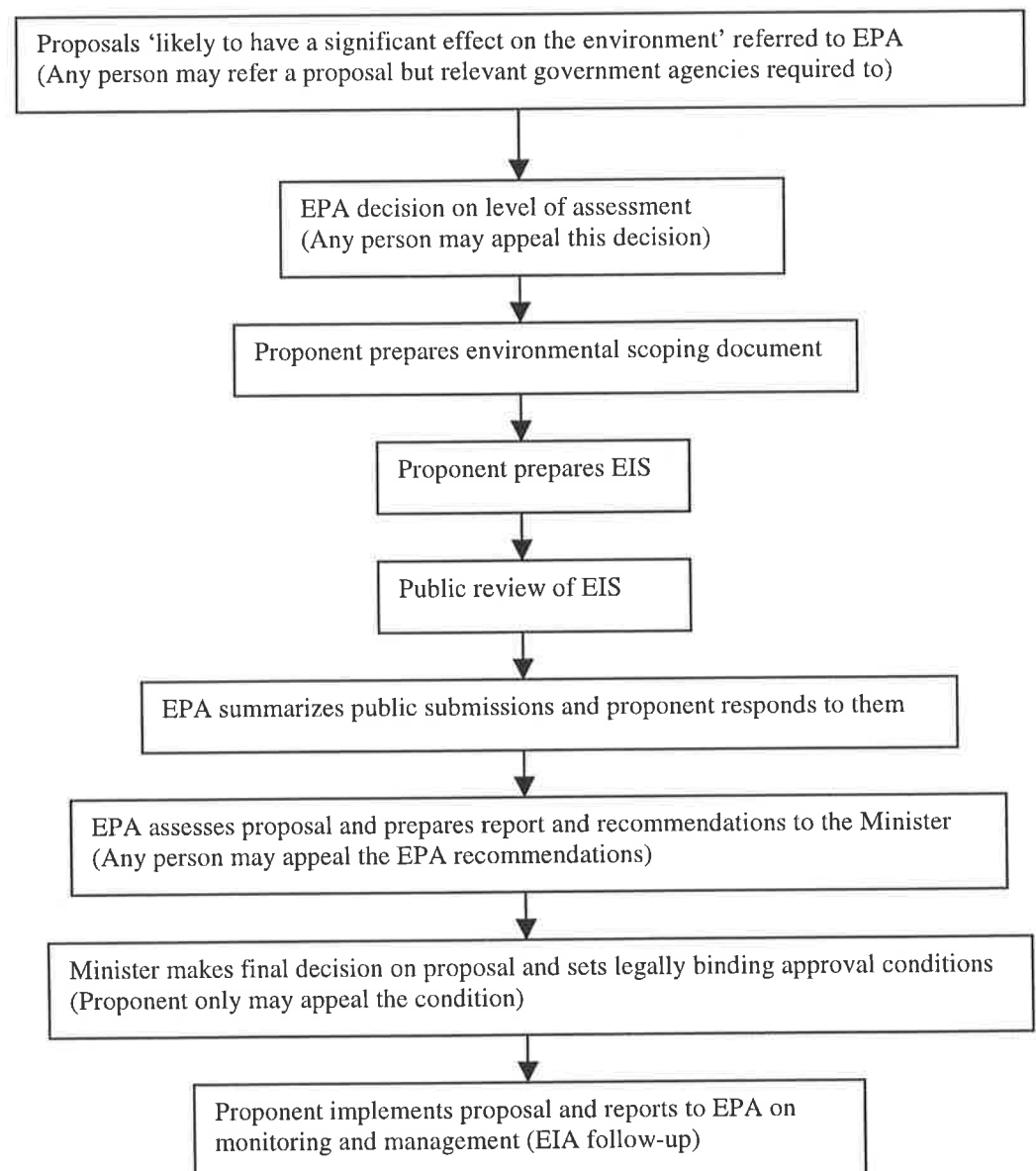
The procedures and practices of EIA monitoring and auditing in Western Australia have been documented in a number of studies (see Bailey & Hobbs, 1990; Bailey et al., 1992; Bailey, 1997; Morrison-Saunders & Bailey, 1999, 2000; Morrison-Saunders et al., 2004). Most of these studies have explored the relationship between follow-up and ongoing environmental management and all show that the EIA process in Western Australia produces environmental management outcomes. There is a strong emphasis on environmental management actions in EIA follow-up (see Figure 4.1).

In Western Australia, the Environmental Protection Authority (EPA) is responsible for overseeing the EIA process (EPA, 2002a). The EPA, a statutory advisory body, is independent from the government (EPA, 1998a, 2003a). It determines whether a development proposal requires an assessment and which level of assessment should be applied to the proposal. The EPA also assesses projects and provides advice to government (via the responsible Minister) on whether or not a proposal should be granted approval and what conditions should apply to it. During the screening and scoping stages of EIA, the EPA identifies 'relevant environmental factors' for a proposed action and establishes environmental management objectives for each factor (DEP, 1997).

The proponents are responsible for environmental management of the proposal and achieving management objectives. Proponents make commitments in relation to environmental management of a proposed action in the EIS. The EIS should demonstrate that the identified environmental factors can be satisfactorily managed and the EPA's objectives can be achieved. The EPA assessment and advice to the Minister for Environment and Heritage focus on the ability to manage the proposal so as to meet the EPA objectives for each relevant

environmental factor (Morrison-Saunders & Bailey, 2000). Proponent commitments in the EIS and the EPA recommendations form part of the conditions of approval set by the Minister and thus are legally binding. Proponents are required to prepare detailed environmental management programmes (EMPs) and an audit table following the approval decision. The Department of Environment (formerly Department of Environmental Protection) approves the audit table and EMPs.

Figure 4.1. The EIA Process in Western Australia



(Source: Morrison-Saunders et al., 2004, p. 159).

During the post-decision stages of the process, the proponents are required to submit regular compliance reports to EPA and to adapt their environmental management programmes as required to satisfy the Ministerial conditions (Morrison-Saunders et al., 2004). DoE officials

visit project sites from time to time and conduct compliance audits during the construction, operation and decommissioning of projects (DEP, 1997). Compliance auditing focuses on the extent to which there has been compliance with Ministerial conditions (Morrison-Saunders et al., 2004). In Western Australia, approval conditions are not necessarily fixed; they can be reviewed and amended. Conditions may be altered to extend time limits, to enable project changes and to/or adapt management practices. This provision in Western Australia provides an important mechanism for adaptive environmental management (Morrison-Saunders et al., 2004).

Part IV of the *Environmental Protection Act 1986* establishes provisions for environmental impact assessment (EIA) in Western Australia. Section 3 of the Act defines environmental impact assessment as “an orderly and systematic process for evaluating a proposal including its alternatives and its effects on the environment including mitigation and management of those effects. The process extends from the initial concept of the proposal through implementation to commissioning and operation and where appropriate, decommissioning” (EPA, 2002a, p.4). According to this definition, the EIA process in Western Australia is an ongoing process and it does not stop at consent decision. The Environmental Protection Authority (EPA), the responsible agency for carrying out EIA in Western Australia, sets five objectives. Three of them relate to environmental protection or environmental management:

- “To ensure that proponents take primary responsibility for protection of the environment influenced by their proposals.
- To ensure that best practicable measures are taken to minimise adverse impacts on the environment, and that proposals meet relevant environmental objectives and standards to protect the environment, and implement the principles of sustainability.
- To encourage proponents to implement continuous improvement in environmental performance and the application of best practice environmental management in implementing this proposal” (EPA, 2002a, p.5).

Under Section 44 of the Act, the EPA is required to report to the Minister on the environmental factors relevant to that proposal, conditions and procedures to which any implementation of the proposal should be subject, and any recommendations that it sees fit. According to the provisions of Section 45 of the Act, the approval conditions served by the Minister are legally binding on proponents. The Act clearly establishes that non-compliance with any condition of the Ministerial Statement is an offence (Section 47). Section 47 of the Act enables the Chief Executive Officer of the Department of Environment (DoE) to require

proponents to submit reports and information in respect of the implementation of the proposal and of any conditions and procedures set out in the Ministerial Statement. Section 48 of the Act provides for the Chief Executive Officer of the DoE or a relevant decision-making authority to monitor 'the implementation of any proposal insofar as that implementation is subject to any condition or procedures'. The administrative procedures for EIA note that the review documents of proponents should 'include an audit table with environmental management commitments that will form part of conditions of approval and will be legally binding and be audited if the proposal is implemented' (EPA, 2002a, s6.3.6). The audit procedures are outlined in the guidelines (DEP, 1997) prepared by the then Department of Environmental Protection (Box 4.2). Figure 4.2 describes the key procedural steps of EIA monitoring and auditing in Western Australia.

Box 4.1: Western Australian Approach to EIA Monitoring and Auditing

- ❑ Proponents are encouraged to make commitments for environmental management.
- ❑ Incorporation of environmental management considerations into the EIA process
- ❑ Establishment of environmental management objectives by the EPA.
- ❑ Flexibility in project implementation and management that encourages proponents to plan and design their project over time.
- ❑ Requirements for proponents to prepare detailed Environmental Management Programmes (EMPs) following the approval decision but prior to project implementation.
- ❑ Requirements for proponents to comply with conditions, procedures and commitments and to report on compliance.
- ❑ Provisions to change or modify environmental conditions.
- ❑ Authority of the environmental agency or other responsible agency to monitor project implementation and compliance and evaluate reports submitted by proponents.
- ❑ Preparation of an audit programme including an audit table in consultation with the proponent that forms the basis for the audit procedures of the Department and reporting procedures of proponents.

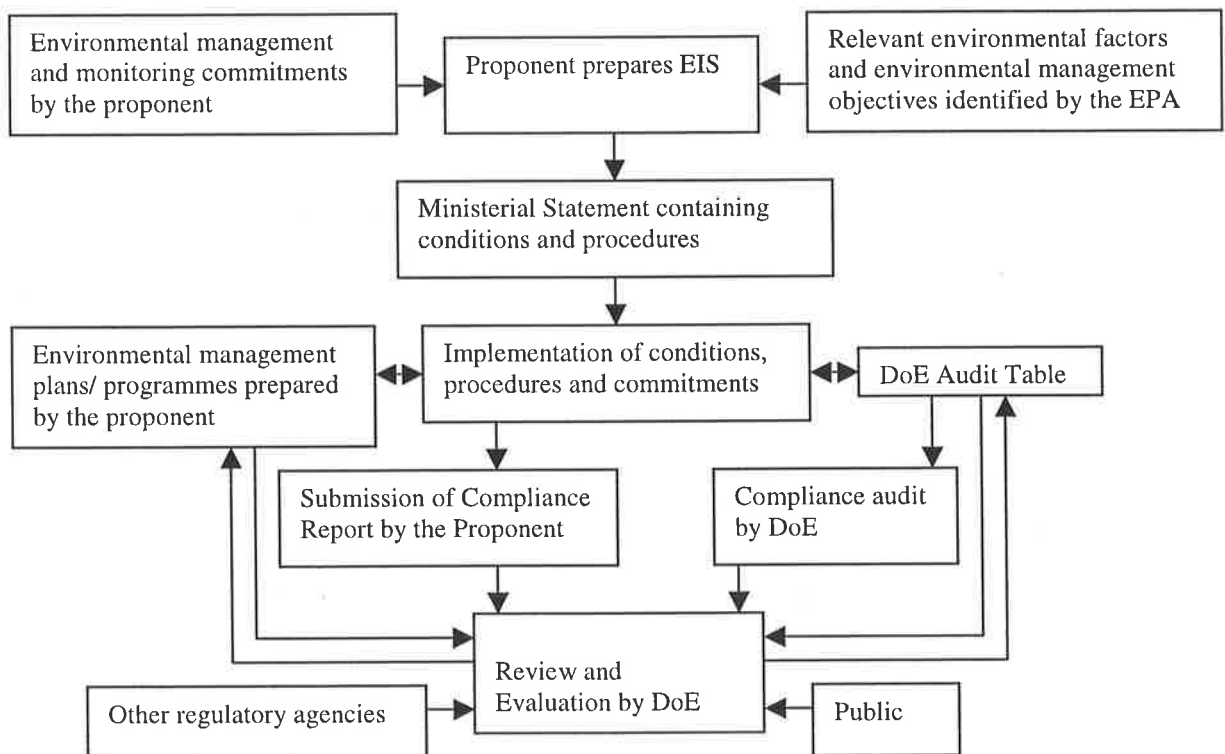
(Based on DEP, 1997; EPA, 2002a; Morrison-Saunders & Bailey, 1999, 2000; Morrison- Saunders et al., 2004)

Box 4.2: Western Australian Procedures for EIA Monitoring and Auditing

- ❑ During the screening and scoping stages of EIA, the EPA identifies ‘relevant environmental factors’ for a proposed action and establishes environmental management objectives for each factor.
- ❑ Proponents make commitments for environmental management of a proposed action in the review document.
- ❑ The Minister for the Environment approves the proposal subject to conditions taking into account the commitments of the proponent and the EPA recommendations.
- ❑ The Ministerial Statement containing conditions and procedures is released.
- ❑ Following the approval decision, proponents prepare a detailed environmental management programme (EMP) and the Department prepares an audit programme in consultation with the proponent. The audit programme includes an audit table forming the basis for the audit procedures of the Department and reporting procedures of the proponent.
- ❑ Proponents comply with the conditions, procedures and commitments and reports on compliance to the Department.
- ❑ The Department confirms compliance by evaluating the reports received and from information obtained from the site environmental compliance audit programme and from other regulatory authorities and the public.
- ❑ The Department corresponds with proponents to advise them whether the requirements of the conditions/ commitments have been met or not.
- ❑ When an instance of non-compliance is identified, the Department works with the proponent to correct the situation co-operatively although the Department has the power to require compliance. Failure to comply is an offence.

(Based on DEP, 1997)

Figure 4.2: EIA Follow-up Process in Western Australia



(Based on DEP, 1997)

The main purpose of EIA follow-up in Western Australia is impact management (Morrison-Saunders & Bailey, 1999, 2000a, 2000b; Morrison-Saunders et al., 2004). However, the emphasis is on compliance and not on the accuracy of the predictions or impact monitoring. Hence the assumption is that implementing proposed mitigation measures as planned and the compliance with the Ministerial Statement will ensure environmental protection. However, compliance alone may not ensure desired environmental performance (Morrison-Saunders et al., 2004). There is no mechanism that forces the proponent to take ameliorative action on the basis of monitoring results. The Act does not provide for any provision in relation to disclosure of monitoring information and public accountability. The Act does not define any components of EIA follow-up. There are no criteria for determining the need for EIA follow-up and its scope. Monitoring is not linked to the earlier stage of the EIA process. Monitoring programmes and audit tables are prepared after the consent decision is made. These are basically outcomes of the negotiation between the DoE and proponents. The Western Australian approach to EIA follow-up heavily relies on proponents. Moreover, planning projects that require a formal assessment by the EPA are outside the scope of the DoE (Chandler, pers. comm., 2005). The Act or the administrative guidelines do not provide any guidance on what actions are to be taken if monitoring results indicate something wrong. The EPA is responsible for assessing proposals but they are not involved in EIA follow-up. The responsibility of overseeing EIA follow-up lies with the DoE but this is not obligatory.

4.4.2 EIA monitoring and auditing in New South Wales

The New South Wales EIA provisions were previously contained in Part IV and Part V of the *Environmental Planning and Assessment Act 1979*. Part IV of the Act applied to proposals requiring development consent from the consent authority, usually the local council. Proposals which did not require a development consent but an approval from the determining authority (either public authority or Minister) came under Part V of the Act. Thomas (2001) notes that the EP&A Act of New South Wales is more concerned with environmental planning, and the EIA process is not intended to have a major status within the overall environmental planning system. Recently, amendments to the EP&A Act have been made (New South Wales Government Gazette No.96, 2005). A newly introduced Part (Part 3A) consolidates the assessment and approval regime for all major projects that need the approval of the Minister for Infrastructure and Planning (DIPNR, 2005). Previously, these were dealt with under Parts 4 (Development Assessment) and 5 (Environmental Assessment) of the Act.

According to DIPNR (2005) the new Part 3A applies to major infrastructure projects, developments previously classed as State significant, and other projects, plans or programmes declared by the Minister. The amendments (New South Wales Government Gazette No.96, 2005) provide a streamlined assessment and approvals regime for major infrastructure and other projects of State or regional significance. According to DIPNR (2005) the amendments also improve the mechanisms available under the EP&A Act to enforce compliance with approval conditions. The monitoring, compliance, and enforcement provisions of the EP&A Act have been strengthened to enforce conditions of approval. These include additional powers to gather evidence and to issue orders or notices to remedy or restrain a breach of an approval or of the Act. Additional powers have been introduced to require monitoring and environmental audits and to provide evidence to demonstrate compliance. Provisions make it an offence to provide false or misleading information. The new provisions have also strengthened environmental safeguards and community participation. The Department of Planning (formerly known as Department of Urban Affairs and Planning) is responsible for administering the Act and it oversees the overall EIA process. The responsibility for releasing EISs, receiving public comments and preparing assessment reports lies with this Department. Several categories of development exist in New South Wales under the EP&A Act. These categories determine which level of assessment applies to a particular development and how the environmental factors are taken into account with that development (Thomas, 2001).

The current EIA process in New South Wales (as shown in Figure 4.3) under Part 3A of the EP&A Act has three main phases: 1) preparation of environmental Assessment; 2) lodgement, exhibition, consultation and review; 3) assessment and determination (DIPNR, 2005). A number of DIPNR publications available on the DIPNR website provide guidance on various aspects of the NSW EIA process. The proponent is required to submit an application to the Department of Planning with an outline of the proposal and a preliminary assessment. On receiving such an application the Department confirms if Part 3A applies to the development. The Department then convenes a planning focus meeting (PFM) with relevant government agencies and local council(s) for more complex projects, and seeks written comments from them. Where the project is not complex, the Department usually conducts a site visit and seeks inputs from the relevant agencies and council(s) without a PFM. The Director-General of the Department then issues the proponent with requirements for the environmental assessment identifying the key issues to be addressed and the level of assessment required. They also require the proponent to prepare a 'Statement of Commitments' setting out how the project will be managed in an environmentally sustainable manner. The proponent must

consider the Director-General's requirements in the preparation of an environmental assessment document.

Box 4.3: Different Categories of Development in New South Wales

Exempt Development. Minor developments with a minimal impact on the local environment (e.g. small fences, barbecues and pergolas), which do not require a development consent.

General Development not Requiring Consent. A development consent is not required for the development (as classified in the State Planning Policy no.4) but its environmental impacts might need to be assessed.

Development that Requires Environmental Impact Assessment. Private activities (such as forestry and agriculture, and major public works such as motorways and electricity transmission lines) that do not require development consent from the local council but they may require other types of approval (e.g. licence or permits). These approvals may require an EIS to be prepared before granting the approval.

Complying Development. Its impact on the local environment must be predictable and minor. The development application must accompany a complying development certificate from the council or a qualified professional (accredited certifier) to carry out the development.

Other Local Development. Proposals (not routine or common) that require development consent from the local council.

State Significant Development. Major infrastructure or other major projects of State or regional environmental planning significance (as identified in Schedule 1 of the State Environmental Planning Policy) that require the consent from the Minister for Planning.

Integrated Development. Proposals that not only require a development consent from the council or the Minister but also a permit or licence from a state government agency.

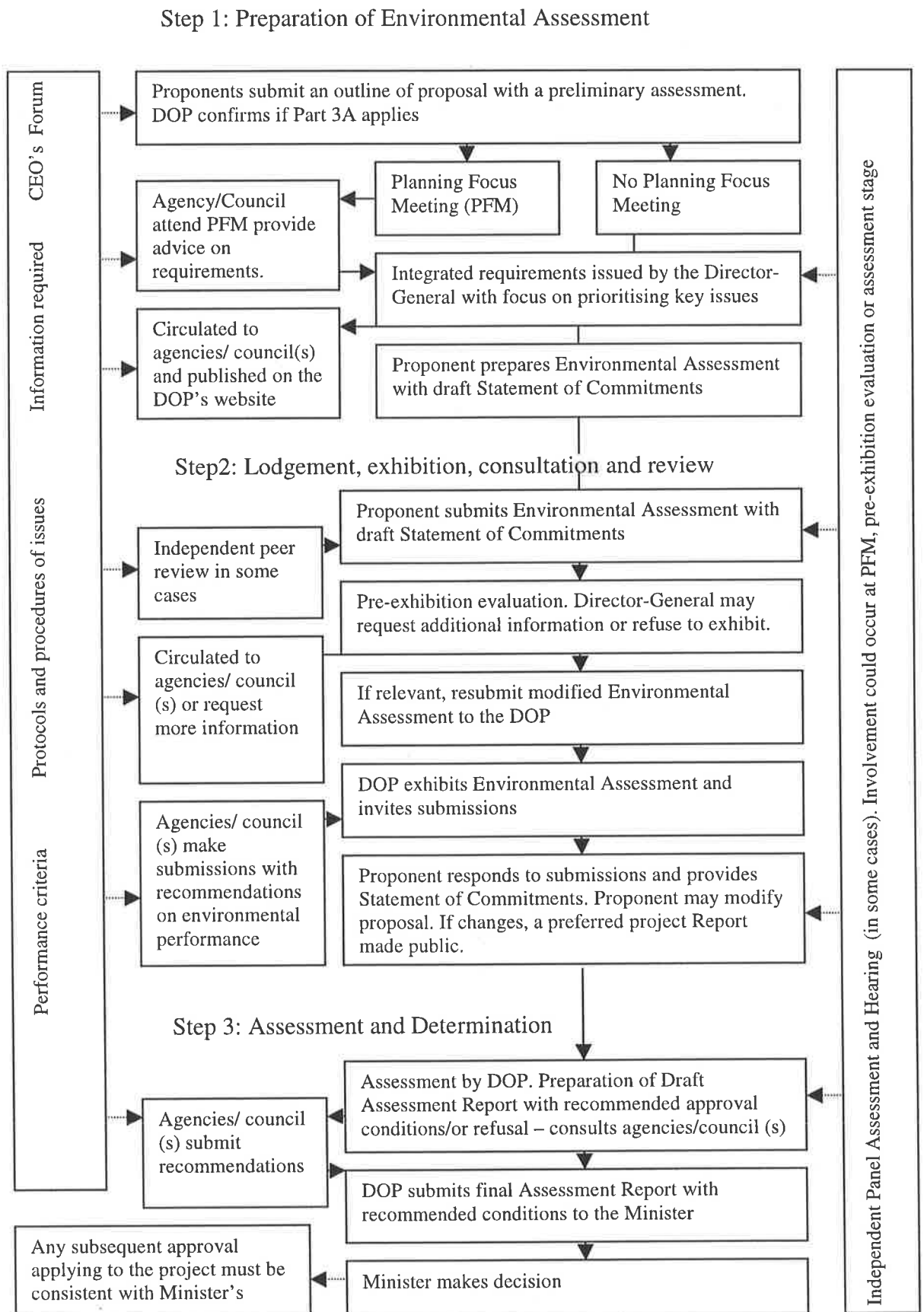
Concurrence Required for Development. Proposals that require the agreement of a state agency before their implementation.

Designated Development. These developments (e.g. industries that have high potential to pollute, large scale developments and developments that are located near sensitive environmental areas) are listed in the Schedule 3 of the Environmental Planning and Assessment Regulation 2000. An environmental impact statement (EIS) must be submitted with the development application.

Prohibited Development. Developments that are prohibited according to the council's local plan.

(Based on NSW Department of Planning Website (www.planning.nsw.gov.au); Thomas, 2003).

Fig 4.3: The EIA Process in New South Wales



(Source: DIPNR, 2005, p. 9)

Once the environmental assessment document is lodged with the Department, it is made available to the public. At the same time, the Department seeks advice from its officers, relevant agencies, and councils. Submissions received by the Department are provided to the proponent for response, and then the Department completes its assessment by taking into account the views of relevant government agencies, councils and the community. Once the Department completes its assessment, a draft assessment report is prepared for the Director-General, which may include recommended conditions of approval. The Director-General then consults with relevant agencies and takes into account their views on the recommended conditions prior to finalising the assessment report. The recommended conditions usually refer to the proponent's statement of commitments and may modify them and /or add additional provisions. The Minister then decides on the basis of the Assessment Report. The Minister may reject the project, or approve it with any conditions considered appropriate. The Minister may at any time during the assessment process convene an 'Independent Hearing and Assessment Panel' to provide advice on any aspects. Alternatively, for major complex projects where there are a range of issues and a high level of community concern, the Minister may direct that a Commission of Inquiry be held to independently assess the proposal and make recommendations.

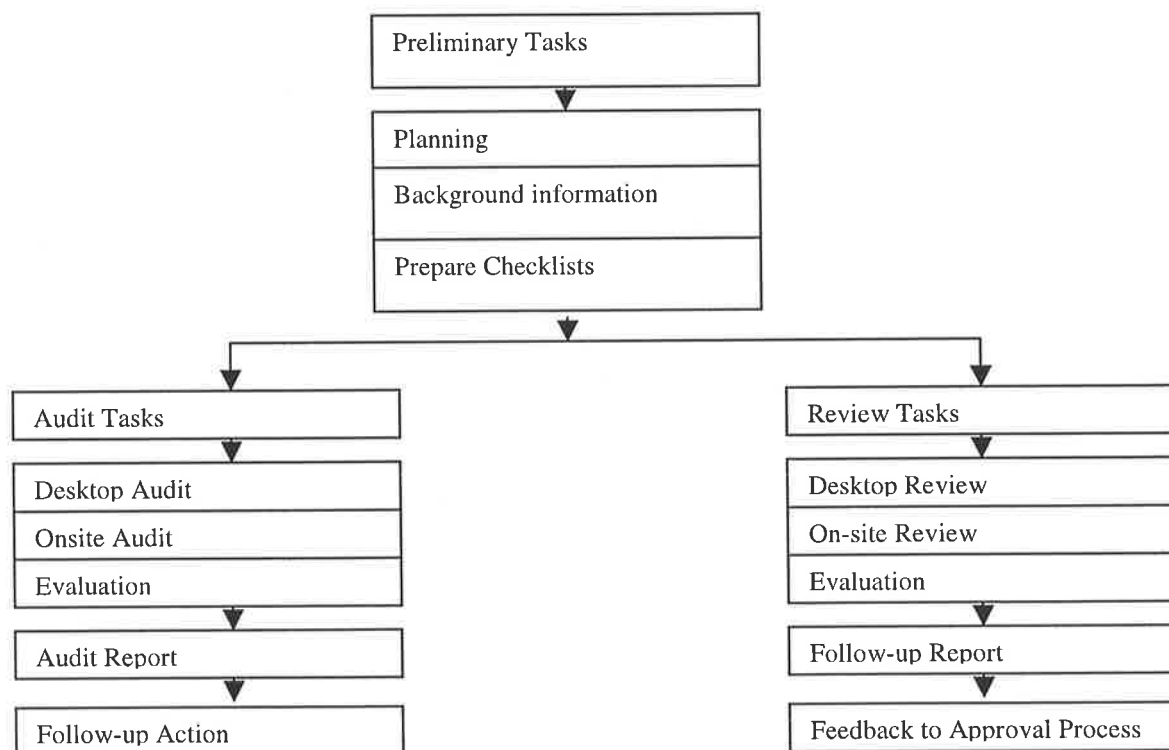
Section 7(f) of the EP&A Act empowers the Minister to monitor progress and performance in environmental planning and assessment, and to initiate the taking of remedial action where necessary. In addition to that Part 6 (Section 122A-F) of the Act makes provisions for environmental monitoring and audits. Section 122C under Part 6 enables the Minister to impose conditions at the time of approval or at any time requiring monitoring or audits to be undertaken by the proponents to the satisfaction of the Minister. These conditions are legally binding on proponents (Section 122B). Section 122B of the Act defines monitoring and an environmental audit:

“monitoring of a project is the monitoring of the carrying out of the project to provide data on compliance with the approval of the project or on the project's environmental impact” [s122B(1)].

“an environmental audit of a project is a periodic or particular documented evaluation of an approved project to provide information to the proponent of the project and to the persons administering this Act on compliance with the approval of the project or on the project's environmental management or impact”[s122B(2)].

According to these definitions, the purpose of monitoring and environmental audits is to ensure compliance and impact management. Section 122D of the Act makes provisions for reporting, accuracy and completeness of monitoring and audits. Providing false and misleading information in monitoring and auditing is an offence under the Act (Section 122E). Section 122F empowers the Minister to publish any information in monitoring data or in an audit report or other documents supplied to the Minister. With the introduction of new enforcement provisions in the EP&A Act, the Department now has additional and effective means of enforcing conditions of approval. Section 122T makes provisions for criminal proceedings for non-compliance. The then Department of Infrastructure, Planning and Natural Resources (DIPNR) formulated procedures for compliance audits in 2003 (DIPNR, 2003a). The Department also launched a compliance programme in the same year (DIPNR, 2003b). The audit procedures provide guidance for staff undertaking compliance audits and review of approval conditions. The purpose of the audit is to evaluate a proponent's activities in order to determine whether it is meeting the conditions of approval issued under the *Environmental Planning and Assessment Act 1979*. Whilst the preferred method of auditing is by self-monitoring and reporting, compliance audits of approved activities are conducted by the Department to verify self-monitoring and reporting.

Figure 4.4: The Audit Process in NSW.



(Source: DIPNR, 2003b, p.2).

Box 4.4: The Audit Procedures in New South Wales

Aims

- Evaluate consistency with the Minister's approvals, against the fundamental elements of:
 - a) the consistency of a project's design and installation with the conditions of approval and any specific undertakings made in the development proposal;
 - b) the compliance of construction and operational activities with the conditions of approval and any specific undertakings made in the development proposal;
 - c) comparison of the actual impacts of a project with the impacts predicted in the project proposal.
- Report audit findings and recommend follow-up action to address non-compliance.
- Provide information for reviewing the environmental impact assessment (EIA) process by:
 - a) reviewing approval conditions, particularly their clarity, consistency, enforceability and adequacy;
 - b) identifying areas of potential improvement to the EIA process.

Scope

The scope of the audit will depend on the risk of impacts to the environment and the risk of non-compliance with approval condition. It may include any of the following:

- specific environmental issues or specific activities or all activities associated with the development.
- key approval conditions or all approval conditions
- commitments made by the proponent such as mitigation measures committed to in the project proposal.

Need determination

- Under an 'initial audit phase' developments associated with significant controversy/contention at the approval stage or whose environmental impact assessment involves a significant degree of uncertainty or with the potential for significant risk to the environment will be targeted.
- Following a review of the initial phase of audits, an ongoing programme will be developed which includes campaign audits and individual audits. The selection criteria include environmental sensitivity, information available to the Department, and any actions by other authorities.

Audit procedures

Two concurrent process including:

- The compliance audit, which involves auditing the compliance of approved projects against the conditions of approval;
- The review of approval conditions, which involves the auditing the quality of the approval conditions for feedback to the approval process.

Reporting

- The draft audit report will be sent to the proponent and to the relevant regulatory authorities for comment. Comments received will be given consideration in the final report, which will be made public.

(Based on DIPNR, 2003b)

Box 4.5: The Compliance Programme in New South Wales

Compliance means 'ensuring an approved projects is designed, installed/ constructed and operated in accordance with the requirements of the approval.'

The fundamental components of compliance

- The activity is constructed and is being operated as approved;
- The activity complies with the conditions of approval and commitments made in the development proposal; and
- The actual impacts compare with the impacts predicted in the project proposal (and used as the basis for the approval).

Objectives of the compliance programme

- To ensure high levels of compliance with the requirements of approvals granted by the Minister
- To achieve a co-ordinated whole of government approach to ensuring compliance with the Minister's approvals, including local government;
- To achieve continuous improvement in the quality of environmental impact assessment and instruments of approval; and
- To engender community confidence in the environmental impact assessment, approval and compliance enforcement process.

Key activities

- Establishing an inter-agency taskforce and engaging with local government to deliver a consistent and co-ordinated compliance programme;
- Strengthening self-monitoring and reporting of approved development projects;
- Conducting targeted, campaign and individual auditing of approved development projects;
- Delivering a strengthened enforcement programme including use of punitive action where warranted;
- Reviewing the legislative framework to enhance powers for auditing, enforcement and prosecution; and
- Developing Departmental systems and procedures for compliance.

Risk-based approach

- The key activities of auditing and enforcement are based on risk factors;
- The degree of environmental sensitivity and /or implications to amenity and the project area of potential impacts;
- The level of community concern;
- The level of risk of non-compliance occurring (and implications);
- The past performance of the project or the proponent.

Response to Non-compliance

Responses to non-compliance may vary from providing support and encouragement to effect rectification, to enforcement activities which at the highest degree would involve the institution of criminal proceedings.

(Based on DIPNR, 2003a).

The audit procedures and compliance programme in New South Wales have been introduced recently with the establishment of a new Compliance Unit within the then DIPNR. Unlike

WA, the NSW Act defines monitoring and auditing. The procedural guidelines specify criteria for determining the need for EIA monitoring and auditing and their scope. The recent amendments to the Act make the enforcement mechanism stronger. However, the Act or the administrative guidelines do not provide any guidance on what actions are to be taken if monitoring results indicate something and who is responsible for taking such actions. The recent amendments to the Act require proponents to make environmental management commitments in the EIS and like WA, EIA monitoring and auditing in NSW clearly puts emphasis on management of project impacts. Unlike WA, however, EIA monitoring and auditing in NSW do not involve a formal audit table for an approved project. In NSW, the emphasis is on compliance and monitoring is not considered in the early stage of the EIA process. There are legal provisions in NSW for disclosure of monitoring information and public accountability but these are discretionary (these do not exist in WA). The role of the DoP in EIA follow-up is not mandatory and it largely relies on proponents doing it themselves.

4.4.3 EIA monitoring and auditing in South Australia

South Australia has a long history of EIA experience commencing from 1973 (Harvey & Farguson, 1994; Harvey, 1995). From 1973 until 1982, EIA in South Australia was conducted under administrative arrangements or through the provisions of Commonwealth EIA legislation, i.e. the *Environment protection (Impact of Proposal) Act 1974* (Harvey, 1995, 1998). EIA was formally introduced in South Australia as part of planning and development control process through the *Planning Act 1982*, which was subsequently superseded by the *Development Act 1993*. The *Planning Act 1982* integrated EIA provisions into the state's planning system (Fookes, 1987a; Harvey, 1998). Fookes (1987b) notes that with the earlier Planning Act there are gaps between the EIA procedures and practices in South Australia. Clarke and Harvey (2006) discuss the changing role of EIA in South Australia under the *Development Act 1993* in detail. Currently, the *Development Act 1993* is the core legislation establishing EIA procedures within the planning and development system framework. Clarke and Harvey (2006) note that under the current legislative provisions the EIA system in South Australia meets majority of Wood's criteria. Since its introduction in 1994, the *Development Act 1993* has been amended on several occasions. The most recent amendment to the *Development Act* took place in 2006. One of the objectives of this Act is:

“to provide for the creation of Development Plans—

- (i) to enhance the proper conservation, use, development and management of land and buildings; and

- (ii) to facilitate sustainable development and the protection of the environment; and
- (iia) to encourage the management of the natural and constructed environment in an ecologically sustainable manner; and
- (iii) to advance the social and economic interests and goals of the community” [s3 (c)].

The *Development Act 1993* recognizes three levels of environmental assessment for major development projects depending on project types: environmental impact statement (EIS); public environment report (PER); and development report (DR)(DTUP, 2003; DTUPA, 2002). An EIS applies to the highest level of assessment. Section 4(4) of the *Development Act 1993* defines an Environmental Impact Statement (EIS) as “a document that includes a detailed description and analysis of a wide range of issues relevant to a development or project and incorporates significant information to assist in an assessment of environmental, social or economic effects associated with the development or project and the means by which those effects can be managed”[s4(4)]. Provisions for the EIA procedures in relation to major developments or projects are contained in the Division 2 of the *Development Act 1993* (Sections 46-48) and Part 10 of the *Development Regulations 1993*. Currently, the Minister for Urban Development and Planning is responsible for administering the statute in South Australia. However, under Section 75 of the Act the Minister of Mines has the power to require an environmental assessment for mining projects and to approve the EIS. The Environmental Impact Assessment Unit of Planning SA, which currently operates under the Department of Primary Industries and Resources, South Australia (PIRSA), is responsible for overseeing the EIA process.

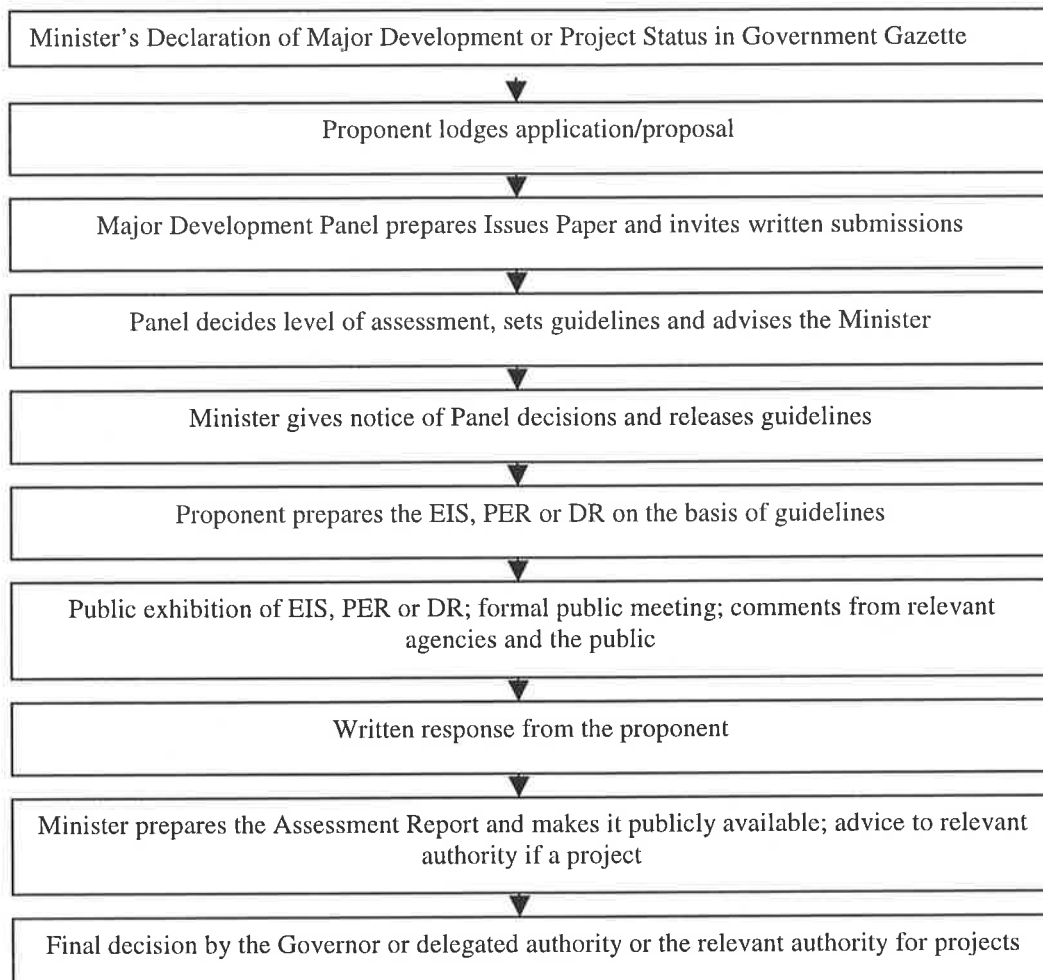
The South Australian *Environment Protection Act* is relevant to the EIA process. Section 46B (4)(c) of the *Development Act 1993* makes a linkage with the *Environment Protection Act 1993* stating that “the EIS must include a statement if the development or project involves, or for the purposes of, a prescribed activity of environmental significance as defined by the *Environment Protection Act 1993*, the extent to which the expected effects of the development or project are consistent with –

- (i) “the objects of the Environment Protection Act, 1993; and
- (ii) the general environmental duty under the Act; and
- (iii) the relevant environment protection policies under that Act” [s46B (4)(c)].

Section 46B (5) (a) of the Act connects the EIA process and the *Environment Protection Act 1993* as follows: “after the EIS has been prepared, the Minister must, if the EIS relates to a development or project that involves, or is for the purposes of, a prescribed activity of

environmental significance as defined by the Environment Protection Act 1993, refer the EIS to the Environment Protection Authority” [s46B (5) (a)].

Figure 4.5: Major Steps in the EIA Process in South Australia*



(Based on DTUPA, 2002; DTUP, 2003)

* According to the recent amendment to the *Development Act 1993* the Major Development Panel no longer exists and no issue paper is required to be released. Instead of the Major Development Panel, the Development Assessment Commission (DAC), an independent statutory body, is responsible for determining the level of assessment. The amendment was introduced in June 2006 and did not take effect until January 2007. (Wheaton, pers. comm., 2006).

Box 4.6: The EIA Process in South Australia*

- ❑ South Australian EIA process begins with the Minister's declaration in the South Australian Government Gazette regarding a Major Development. A Major Development is subject to the EIS, PER or DR procedures with a decision being made by the Governor.
- ❑ Following the Minister's declaration under s.46 of the Act, a proponent must submit an application to the Minister.
- ❑ The Minister then refers proponent's application or proposal to the independent 'Major Development Panel' for decisions on level of assessment.
- ❑ The Major Development Panel consults criteria in regulations; requests additional information if needed; consults with Environment Protection Authority if appropriate; ranks each main issue for inclusion in the guidelines.
- ❑ The Major Development Panel then reports to the Minister on Panel decisions regarding the assessment level and contents of guidelines.
- ❑ The Minister then gives public notice of panel decisions; and provides guidelines to the proponent making them public.
- ❑ The differences in the legislative steps in the EIS, PER and DR options relate to timing, requirements of the proponent and administrative variables. There are many common aspects of the three paths, with the level of assessment dependent upon the characteristics of the particular application.
- ❑ On the basis of the guidelines proponents prepare the EIS, PER, or DR. The Minister then places the EIS, PER or DR on public exhibition inviting comments and refers them to the Environment Protection Authority, other relevant authorities and local council(s) for their comments. Public meetings are also held during the public exhibition period.
- ❑ The Minister gives copies of all submissions to proponents for their response. Proponents respond to all submissions and matters raised by relevant authorities and the public in a response document.
- ❑ The Minister then prepares an Assessment Report including comments from other authorities and makes it publicly available. Minister makes advice to relevant authority for a project.
- ❑ The Governor decides on the development, including any further requirements, limitations and timeframes. The Governor can delegate this power to the independent 'Development Assessment Commission'. The relevant authority makes decision for projects. There is no appeal right against the Governor's decision.

(Based on DTUPA, 2002; DTUP, 2003;)

* According to the recent amendment to the *Development Act 1993* the Major Development Panel no longer exists and no issue paper is required to be released. Instead of the Major Development Panel, the Development Assessment Commission (DAC), an independent statutory body, is responsible for determining the level of assessment. The amendment was introduced in June 2006 and did not take effect until January 2007. (Wheaton, pers. comm., 2006).

EIA follow-up has received legislative status in South Australia in 1996 through an amendment of the *Development Act 1993*. Section 48C of the Act enables the Minister to require a person undertaking or benefiting from a development or project for which an environmental assessment was done:

- “to carry out specified tests and monitoring to the development or project and to make specified reports to the Minister on the results of the tests and monitoring;
- to comply with requirements of an audit programme specified by the Minister to the satisfaction of the Minister” [s48(c)].

Section 48D allows the Minister to conduct tests and monitoring and to recover the costs from the developer or the proponent. However, the Act neither defines such monitoring and audit nor mentions their purposes. No administrative guidelines in relation to monitoring or audit procedures have yet been formulated so far. The two major administrative guidelines that provide general guidance on the current EIA procedures include: a *Guide to the Assessment of Major Development or Projects* (DTUPA, 2002); and *The Guide for Proponents: the ‘Major Developments and Projects’ Process under the Development Act 1993* (DTUP, 2003). The former guidelines (DTUPA, 2002) note that the Minister may require monitoring and testing regarding a development at any time from the declaration before or after the decision is made.

The guidelines also note the purpose of such monitoring or testing and the audit programme:

- “to check the effectiveness of the assessment process;
- to confirm or amend predicted impacts of development;
- to improve environmental management practices; and
- to serve as the basis for reporting requirements” (DTUP, 2002, p. 22).

The Governor may amend the conditions attached to a development approval at any time on the basis of monitoring results (DTUPA, 2002). The monitoring provisions in the *Development Act 1993* are discretionary, inadequate and there is a lack of clarity. It is not clear which agency is responsible for overseeing the EIA follow-up. However, the assessing agency often conducts informal site inspections to review the progress of the construction and operation of the development or project (DTUP, 2003). There is no reporting requirement and there are no criteria for determining the need for monitoring and auditing and their scope. According to the administrative guidelines the purpose of audits includes verification of effectiveness of the assessment process, accuracy of predictions, management of impacts and establishment of a reporting system. The Act or the administrative guidelines do not provide any guidance on what actions are to be taken if monitoring results indicate harm is being done. There is no mechanism to enforce proponents to take ameliorative actions on the basis of monitoring results.

Unlike, WA and NSW, no procedural guidelines on EIA monitoring and auditing exist in South Australia. The Act does not provide for any provision in relation to disclosure of monitoring information and public accountability in EIA monitoring and auditing. The study of Nixon (1998) on the major developments projects approved under the *Planning Act 1982* concluded that environmental impact monitoring (EIM) was not a part of the official EIA process in South Australia. They were carried out at the discretion of the proponent with little consistency between their implementation and EIM proposals in EISs or the recommendations of Assessment Reports. Clarke and Harvey (2006) note that the South Australian EIA system ends with an approval and it does not link the pre and post-construction stages of a development.

4.5 Evaluation Criteria

Wood (2003) used 10 evaluation criteria to evaluate the procedures/ practices of EIA monitoring and auditing in seven developed countries (Box 4.7) while Leu et al. (1996) suggested 12 evaluation criteria for compliance monitoring and enforcement in the context of developing countries (Box 4.8). Wood's criteria focus on only some of the key procedural aspects. Moreover, one is very broad and of a generic type. Some of the factors that are widely recognized being relevant to EIA monitoring and auditing are not reflected in the evaluation criteria suggested by Wood (2003) and Leu et al. (1996). They mainly relate to regulations and institutional arrangements, approaches and techniques, resources and capacity, parties and stakeholders, participation and transparency, and communication and learning. Arts and Morrison-Saunders (2004b) suggest the core values and principles for EIA monitoring and auditing taking into account the above-mentioned factors. Sadler (1996) in his international EIA effectiveness study used evaluation criteria regarding monitoring and auditing components of EIA (Box 4.9). Lawrence (2003) suggests a number of criteria for good regulatory practice in relation to EIA monitoring and auditing (Box 4.10). According to Barker (2004, p.44), EIA monitoring and auditing should strive to be: "goal oriented and focused; practical and relevant; cost-effective and efficient; adaptive and flexible, with orientation towards continuous improvement; participative (inclusive of all stakeholders); interdisciplinary; transparent and credible." Marshall et al. (2005) suggest the following 17 principles for EIA monitoring and auditing:

- "EIA follow-up is essential to determine EIA (or SEA) outcomes
- Transparency and openness in EIA follow-up is important
- EIA should include a commitment to follow-up
- The proponent of change must accept accountability for implementing EIA follow-up
- Regulators should ensure that EIA is followed up

- The community should be involved in EIA follow-up
- All parties should seek to co-operate openly and without prejudice in EIA follow-up
- Follow-up should be appropriate for the EIA culture and social context
- EIA follow-up should consider cumulative effects and sustainability
- EIA follow-up should be timely, adaptive and action-oriented
- EIA follow-up should promote continuous learning from experience to improve future practice
- EIA follow-up should have a clear division of roles, tasks and responsibilities
- EIA follow-up should be objective-led and goal-oriented
- EIA follow-up should be fit for purpose
- EIA follow-up should include the setting for clear performance criteria
- EIA follow-up should be sustained over the entire life of the activity
- Adequate resources should be provided” (Marshall et al., 2005, pp.178-80).

Box 4.7: Evaluation Criteria Suggested by Wood (2003)

- Must monitoring of the implementation of the action take place?
- Must the monitoring of action impacts take place?
- Is such monitoring is linked to the earlier stages of the EIA process?
- Must an action impact monitoring programme be specified in the EIA report?
- Can the proponent be required to take ameliorative action if monitoring demonstrates the need for it?
- Must the results of such monitoring be compared with the predictions in the EIA report?
- Does published guidance on the monitoring and auditing of action implementation and impacts exist?
- Must monitoring and auditing results be published?
- Is there a public right of appeal if monitoring and auditing results are unsatisfactory?
- Does Action monitoring function effectively and efficiently?

(Wood, 2003, p. 245)

Box 4.8: Evaluation Criteria for EIA Compliance Monitoring and Enforcement

- Are there formal EIA compliance monitoring programme in place?
 - Carried out by the core environmental agency
 - Carried out by competent authorities
 - Involvement of independent review bodies in the programme
 - Submission of regular monitoring results by the proponents
 - A formal mechanism for reviewing the results of compliance monitoring
 - Involvement of local communities in the programme
 - Access to the results of the compliance monitoring and enforcement programme by the public.

- Can EIA decision be formally be enforced?
 - Defined penalties/sanctions against non-compliance with EIA decisions
 - Channels for public to appeal against non-compliance with EIA decisions
 - Involvement of judicial agencies in EIA enforcement
 - Linked with the permitting/licensing system

- Are international donor agencies involved in the national EIA compliance monitoring/enforcement?

(Adapted from Leu et al., 1996, pp.121-22)

Box 4.9: Evaluation Criteria Used in the International EIA Effectiveness Study

Institutional Arrangements

- Is the EIA process based on, or does it include requirements for monitoring and follow-up?
 - a) All proposals subject to EIA?
 - b) As and when considered necessary?

Implementation and Operational Performance

- Are monitoring and auditing carried out appropriately?
 - a) As provided for by a consent decision?
 - b) Consistent with the potential significance or degree of uncertainty of impacts predicted for the project?
 - c) As warranted by the information from follow-up study (monitoring and evaluation) or activities undertaken during project implementation and environmental management?
 - d) Results of the follow-up study are communicated to the external parties

(Adapted from Sadler, 1996, pp.61-65)

Box 4.10: Criteria for Good Regulatory Practice of EIA Follow-up

Management

- Identification of potential triggers for follow-up work
- Monitoring guidance (e.g., compliance, environmental changes, effects, mitigation, effectiveness, public concern etc)
- Identification of types of parameters that may require monitoring
- Enforcement requirements
- Guidance: contingency provisions
- Liability provisions
- Requirements and guidance: terms and conditions
- Provisions for links to joint areawide monitoring and management
- Guidance: integration of individual measures within overall programme
- Legal authority specified (e.g., enforcement, power to remedy damages, offences, penalties, responsibilities)
- Identification of links between monitoring and baseline analysis, impact prediction, significance determination, proposal characteristics, and mitigation
- Cumulative effects monitoring
- Monitoring record keeping provisions
- Identifies links between proposal monitoring and adaptive environmental management

Auditing

- Provisions to audit document quality, methods use and effectiveness, prediction accuracy, influence on sensitive and significant environmental components and processes, mitigation measures effectiveness and monitoring, and enforcement effectiveness
- Provisions to review relevant research
- Provisions to audit efficiency and effectiveness of EIA legislation, regulations, guidelines and procedures
- Provisions to audit responsiveness to agency and public comments and suggestions
- Provisions to audit sustainability contribution
- Links to auditing of the State of the environment

(Adapted from Lawrence, 2003, pp.38-39)

On the basis of the above-mentioned evaluation criteria, values and principles the following criteria have been developed to evaluate the appropriateness and effectiveness of EIA monitoring and auditing procedures in three Australian jurisdictions. They mainly focus on four broad areas that are widely considered as being important to EIA monitoring and auditing: institutional arrangements; public accountability, community involvement and transparency; approaches and techniques; and resources and capacity.

Institutional arrangements

- Are monitoring and auditing considered as an integral part of the EIA process?
- Are there mandatory legal provisions for monitoring and auditing in EIA?
- Are there detailed published guidelines in place for the implementation of monitoring and auditing in EIA?
- Are the procedural steps of EIA monitoring and auditing clearly defined?
- Are the objectives of EIA monitoring and auditing clearly defined?
- Are there screening criteria for EIA monitoring and auditing?
- Are there scoping criteria for EIA monitoring and auditing?
- Are the roles and responsibilities of different stakeholders clearly defined?
- Is there a central government agency to oversee and coordinate the implementation of EIA monitoring and auditing?
- Is there a formal reporting system in place in relation to compliance?
- Is there any formal mechanism for reviewing the monitoring results?
- Are there mandatory legal provisions for taking ameliorative actions on the basis of monitoring or audit results?
- Is there any independent agency to review or respond to monitoring results?
- Is there any formal mechanism for interagency coordination in the implementation of EIA monitoring and auditing?
- Is there an enforcement mechanism in place in the implementation of EIA monitoring and auditing?

Public accountability, transparency and community involvement

- Is EIA monitoring and auditing a fully transparent process?
- Is EIA monitoring and auditing a publicly accountable process?
- Does the public have the legal right to get engaged throughout the process of EIA monitoring and auditing?
- Does the public have an easy access to information?
- Is there any formal tribunal process in place for the public to appeal if monitoring and auditing result show any harmful trend?
- Is there any formal mechanism in place for public consultation in EIA monitoring and auditing?
- Is there any formal mechanism in place for handling complaints/ concerns of the local community during implementation, operation and decommissioning of projects?

Approaches and techniques

- Is EIA monitoring and auditing considered in the early stages of the EIA process?
- Is baseline monitoring a mandatory requirement of the impact study?
- Is the EIA report (commonly known as EIS) required to include a detailed monitoring programme with baseline monitoring data?

- Is EIA monitoring and auditing linked with other regulatory tools (e.g. licences/ permits etc.)?
- Is EIA monitoring and auditing linked with ongoing environmental management of project operations?
- Is EIA monitoring and auditing linked with decision-making?
- Is the implementation of EIA monitoring and auditing flexible in terms of methods and techniques?
- Is there a proactive and pragmatic regulatory approach to EIA monitoring and auditing in place?
- Does the scope of monitoring include identification of both anticipated and unanticipated impacts?
- Does the scope of monitoring include cumulative effects?
- Does the scope of audits include verification of compliance and predictions and identification of environmental performance?
- Is there any mechanism in place to feedback the information collected through monitoring and auditing into the EIA process?
- Are monitoring programmes and management plans required to be revised on the basis of monitoring results?
- Is the development consent / environmental authorisation required to be revised on the basis of monitoring or audit results?
- Does the responsible government agency have a mandatory role in EIA monitoring and auditing?
- Are the monitoring results (submitted by proponents) verified through occasional parallel monitoring by the responsible agency?
- Is there any mechanism for external (third party) audits and independent review of monitoring results?
- Is there any formal government accreditation system in place for private consultants who get engaged in EIA monitoring and auditing?
- Are the voluntary initiatives of the proponent encouraged in addition to regulatory obligations?
- Is the good performance of proponents rewarded?

Resources and capacity

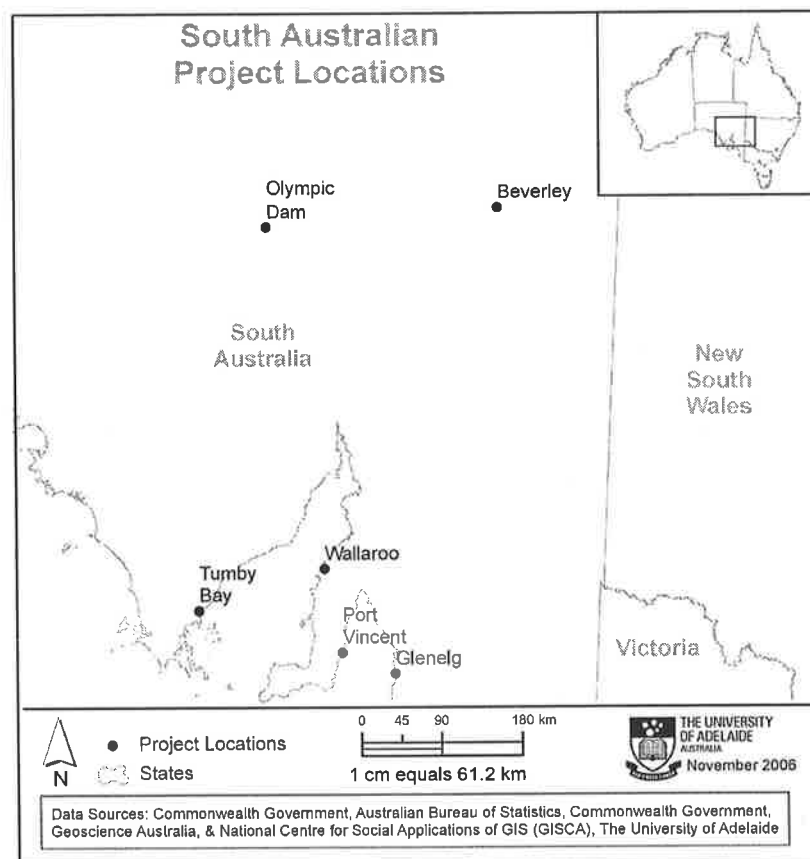
- Is the responsible agency adequately equipped with human, physical, and technical resources?
- Are there established data sources readily available to use in EIA monitoring and auditing purposes?
- Are proponents legally bound to bear the cost of monitoring?
- Are proponents required to employ appropriate environmental personnel through out the life of the project?
- Is an environmental agency responsible for EIA monitoring and auditing?
- Do the proponent and responsible agency maintain continuity of staff responsible for EIA monitoring and auditing?
- Is there any specific time frame for the responsible agency to review and respond to monitoring and audit reports?
- Is there any specific time frame for the responsible agency to conduct audits and submit audit reports?
- Is there any economic tool in place to ensure the implementation of EIA monitoring and auditing in EIA?

CHAPTER 5: EIA MONITORING AND AUDITING PRACTICES IN SOUTH AUSTRALIA

5.1 Introduction

This chapter analyses the environmental monitoring and auditing practices of six South Australian major development projects (subject to EIA) at the operational stage. The selection criteria for the case study projects have been discussed in Chapter 3. Development projects selected are the Olympic Dam Expansion Project, Beverley Uranium Mine, Glenelg Foreshore Development and Environs Project, Wallaroo Marina, Tumby Bay Marina and Port Vincent Marina (see Figure 5.1 and Appendix-8 for background information on the case study projects). This chapter outlines the case studies and descriptions are mainly based on the relevant EIA documents, annual environmental reports, audit reports, environmental management plans/programmes, and EPA licenses. The relevant persons in the State government and local government agencies and private companies were contacted for information and clarification, when required.

Figure 5.1: Location Map of South Australian Case Study Projects



5.2. Olympic Dam Expansion Project

Environmental Management Manual

WMC prepares a triennial plan called an Environmental Management Manual (EMM) according to the requirement of the *Roxby Downs (Indenture Ratification) Act 1982*. All environmental management and monitoring activities of the Olympic Dam operations are undertaken on the basis of an EMM approved by the South Australian Minister for Mines. The EMM addresses the monitoring commitments of the EIS, requirements of EPA and other regulatory agencies and details environmental performance requirements for a range of areas concerning environmental and waste management at the Olympic Dam facility. The EMM includes a voluntary environmental management plan (EMP) and monitoring programmes. The monitoring programmes are subject to annual revision. Minor modifications to the EMM are not subject to an approval. Annual revisions require further Ministerial approval if the changes are significant and they diminish the effectiveness of the programme. The Environmental Management Plan (EMP) sets out voluntary targets internally for the continuous improvement. WMC undertakes monitoring activities in six major areas: groundwater (level and quality); GAB water; fauna and flora; airborne emissions monitoring; and annual radiation dose to members of the public (WMC, 2005a).

Reporting Procedures

WMC produces two annual reports (Environmental Management and Monitoring Report and Great Artesian Basin Report) and a quarterly report (Quarterly Environment Report). WMC is obliged to report some specific matters relating to environmental management and monitoring activities to different agencies under different regulatory requirements. Most of them are reported through the annual and quarterly reports. Annual Environmental Monitoring and Management Reports are submitted to the Minister for Mines and are distributed to different South Australian government agencies including the Department of Primary Industry and Resources, Department for Environment and Heritage, Environment Protection Authority, Department for Water, Land and Biodiversity Conservation, Great Artesian Basin Coordinating Committee, and Arid Areas Catchment Water Management Board. WMC reports the overall performance of its operations at Roxby Downs to the Olympic Dam Environment Consultative Committee (ODECC) represented by the Commonwealth and State regulators. WMC publishes an Annual Sustainability Report (with CO₂, SO₂ and energy data). In terms of the implementation of environmental management programme in 2004, the annual report (WMC, 2005a) shows that the company achieved 88% of its targets/activities for continuous improvements. The annual report includes a monitoring summary.

Annual reports on GAB wellfields are submitted to the Minister for Mines and are officially distributed to the Department of Primary Industry and Resources, South Australia, GAB Coordinating Committee (GABCC), Arid Areas Catchment Water Management Board, Aboriginal Lands Trust, Golder Associates and South Australian Pastoralists. The GABCC, constituted by an agreement between the relevant government ministers, has the primary role of providing Commonwealth, State and Territory governments strategic directions for the management and use of GAB water resources. The wellfields report presents data relating to the operation of the GAB water supply wellfields by the company during the one-year reporting period. One of its objectives is to determine the actual impacts as compared to the predictions in the environmental impact statement (WMC, 2005b). The quarterly reports mainly review the radiation results during the reporting period. However, according the requirements of the regulators it discusses some other issues such as groundwater abstraction, fauna, emission control, etc. Quarterly reports are distributed only to the State regulators including PIRSA, EPA and DWLBC.

Environmental Audit

WMC undertakes both internal and external environmental audits annually. The company employs an external auditor to undertake an independent audit of the Environmental Management and Monitoring Report. The audit is a Commonwealth and State Government requirement. The company is also obliged to undertake an external review (audit) as a signatory to the Australian Minerals Industry Code for Environmental Management. The audit principally involves the review of the environmental report against the requirements set out in the EMM document. The scope of the audit is set out in the contract between the auditor and the client. The scope of the audit neither includes the verification of the accuracy or completeness of the data nor the environmental field monitoring or testing. This audit verifies the conformance with the commitments made in the EMM, not the environmental performance of the company. Neither does it make any attempts to review the substance of the EMM document or audit reports public. The 2003 audit report notes that the site is being operated in accordance with the monitoring, data analysis and management requirements stipulated in most respects (Parsons Brinckerhoff, 2004).

Review of Reports

The annual and quarterly reports are distributed to the relevant regulatory agencies. However, the Department of Primary Industries and Resources, South Australia (PIRSA) has the prime

responsibility of reviewing the reports as the primary regulatory authority. PIRSA coordinates with other regulatory agencies to collect their responses. The Environment Protection Authority (EPA) specifically looks at the issues related to air emissions and radiation issues. The issues related to fauna, flora and groundwater usage are looked at by the Department of Land, Water and Biodiversity Conservation (DWLBC). In response to the annual and quarterly reports regulators usually provide their feed back in quarterly and half-yearly meetings with WMC representatives. The regulators sometimes conduct their own monitoring operations in order to verify the monitoring results supplied by the ODC (Schultz, pers. comm., 2005). For example, DWLBC has its own monitoring bores within the GAB region; EPA Radiation Protection also maintains radiation monitoring equipment at Roxby Downs for calculating radiation dose to the public (Schultz, pers. comm., 2005). Olympic Dam Environment Consultative Committee (ODECC) sits in meetings every six months. In addition, representatives of the WMC sit with the state regulators in meetings every three months. The annual and quarterly reports and monitoring results are reviewed in those meetings.

Disclosure of Information

The confidentiality provision of the *Roxby Downs (Indenture Ratification) Act 1982* makes an obligation to both the State Government and proponent not to disclose any information without obtaining prior consent from the other party. The confidentiality provision of the Indenture has attracted much public criticism. The annual and quarterly environment reports and the Environmental Management Manual are not made public but they are publicly available on request. The outcome of meetings with regulators in terms of environmental management and monitoring are not made public. Some monitoring data are kept confidential and are not even viewed by the external auditor. All incidents of spills or leakages are not reported publicly. Only spills which are classified as non-compliances are reported publicly. Spills are deemed to be non-compliances if they breach the criteria and procedures for recording and reporting incidents at South Australian uranium mines.

Community Consultation and Public Involvement

Communities in the Olympic Dam region include the Roxby Downs, Woomera and Andamooka townships, pastoralists, indigenous groups and communities situated in the 'Iron Triangle' region of Whyalla, Port Augusta and Port Pirie. WMC make financial contributions to the Roxby Downs Municipal Council. WMC undertakes regular liaison with indigenous, pastoral, educational regional and local communities and sponsors a number of social welfare

amenities for the communities (WMC, 2005a). They include: organising Olympic Dam family day, providing a subsidy to the privately owned medical practice at Roxby Downs; providing financial assistance to the local broadcasting authority; publishing a community-based newspaper; running environmental education programmes for schools; involvement in the heritage management community development initiatives; commitment to engage with local and regional communities; financial contribution to the boredrain programme; organising site visits for environmental groups and industrial associations; and facilitating restoration of the arid-zone ecosystem (WMC, 2005a). The policy of ODO allows its representatives to discuss any issues with the public. However, there is no formal public consultation process in place with regard to environmental monitoring and management activities.

5.3 Beverly Uranium Mine

Environmental Management Plans

All environmental management and monitoring activities at Beverley are undertaken on the basis of an Environmental Monitoring and Management Plan (EMMP), a Radioactive Waste Management Plan (RWMP) and a Radiation Management Plan (RMP). The major environmental parameters, which are being monitored under this EMMP, include: surface hydrology, groundwater level, groundwater chemistry, groundwater balance, GAB water, vegetation and general landscape, fauna, radiation, airborne emissions, meteorology, waste, on-site chemical management, heritage management and community relations (Heathgate Resources, 2000a). Ecosystem function analysis monitoring is to be included soon as required by the regulators (Carter, pers. comm., 2005). The EMMP is subject to revision every three years. However, the current EMMP, which was prepared in September 2000, is almost five years old. A new EMMP is currently being prepared to replace the previous one (Paluka, pers. comm., 2005). The EMMP is available for public viewing (Paluka, pers. comm., 2005). The EMMP, in particular, addresses non-radiological environmental management issues and associated environmental safeguards relating to the operation of the Beverley Uranium Mine.

Heathgate Resources Pty Ltd has designed a Radiation Management Plan (RMP) for occupational radiation issues, and a Radioactive Waste Management Plan (RWMP) for radioactive waste management issues. Heathgate reviews the radiological impact of the Beverley processing plant and associated wellfield and undertakes the radiological assessment of vegetation under the RWMP. The RWMP is being reviewed annually, updated and approved as required by the regulatory authority. The RWMP includes monitoring

programmes for liquid waste, solid waste, airborne wastes and restricted release zone. The RWMP specifies five types of reporting requirements: Quarterly Report, Annual Report, LLR Pit Operation Report, Monitor Well Plans, and Incident Reports. Of these the Annual Reports and Incident Reports are made public. The public can access the Quarterly Report on request.

Heathgate Resources Pty Ltd prepared a Radiation Management Plan (RMP) in June 2000. The RMP is required to be reviewed and re-submitted for approval every three years. However, this was not done as of 2005. The radiation monitoring programme under the Radiation Management Plan includes three components such as personal monitoring, area monitoring and surface contamination monitoring (Heathgate Resources, 2000b). The Radiation Management Plan sets out requirements for both verbal and written reports. The written reports are to be submitted on a quarterly and annual basis. The Radiation Management Plan is to be audited internally every six months and externally on an annual basis. However, in practice this is not happening.

Reporting Procedures

The Beverley mine is required to provide quarterly and annual environment reports. Annual reports are submitted to the Minister for Mines and Minister for the Environment and Conservation. Quarterly reports are submitted to the Chief Inspector of Mines and Manager, Radiation Protection Branch, EPA. There are several other reporting procedures. These include: incident reports; the Beverley Environmental Consultative Committee (BECC); The Radiation Review Committee; Production and Shipping Reports; Pipeline Licence; PIRSA's requirements; and the Adnyamathanha and Kuyani Advisory Committees. At the present reporting arrangement, there is no obligation to report to any responsible Commonwealth authority in relation to environmental management and monitoring. Monitoring results are published in the annual and quarterly environment reports. The annual reports are made public but the quarterly reports are submitted to the regulators. However, the public can access the quarterly reports on request (Carter, pers. comm., 2005).

The annual reports include an internal audit report every year and an external audit report every three years. The quarterly reports cover the environmental and radiation aspects of the Beverley Mine operations under the Mineral Lease No. 6036. This report includes some additional data according to the request of the regulatory agencies. The quarterly reports are officially distributed to the EPA (Radiation Protection Division); EPA (Air Quality); PIRSA, Department for Administrative and Information Services (Workplace Services); and

Department of Industry, Tourism and Resources (Commonwealth). The quarterly reports compare the monitoring results with that of the previous quarter but they do not include all monitoring aspects. There are widespread concerns about the delay, inadequacy and public unavailability of incident reports (The Senate Committee, 2002).

There still remains a debate on the adequacy and effectiveness of monitoring programmes undertaken by the proponent (The Senate Committee, 2002). Some community organizations (i.e. Australian Conservation Foundation, Friends of the Earth) are critical to the role of the Commonwealth and South Australian governments in relation to environmental monitoring. Their criticisms focus on the adequacy, effectiveness and independence of monitoring activities (The Senate Committee, 2002). Specifically, the disclosure of information and a greater level of independent monitoring still remain as major issues.

Environmental Auditing

Heathgate Resources Pty Ltd conducts an internal audit every year and an external audit (independent) of the EMMP for the Beverley Uranium Mine every three years. External audits are conducted with the help of consultants appointed by the company. Environmental aspects that are managed or monitored at the site under the EMMP are considered for auditing. Issues under the *Radiation Protection and Control Act 1982* are specifically excluded from the scope of the audit although some of them are included in the EMMP. The implementation of environmental safeguards and management commitments in the EIS has not yet been audited. There is in place a voluntary Environmental Management System (EMS) auditable by a third party. There are concerns about the self-regulatory approach in the environmental governance of uranium mining. Its success and effectiveness are yet to be proved (The Senate Committee, 2002).

The internal audit for 2003 showed that all environmental monitoring requirements were completed. The 2004 Audit Report (external) concluded that environmental monitoring and management activities satisfied the requirements of EMMP with a few exceptions. The only non-compliance relates to legislative change (Heathgate Resources, 2004). The 2004 annual report shows performance of the mine in relation to surface hydrology, ground hydrology, vegetation and landscape, fauna, meteorology, radiation, waste management, chemical management, energy management, rehabilitation, community consultation and audit (Heathgate Resources, 2005). It does not show any significant impacts of the mine on environment.

Review of Reports and the Role of Different Regulatory Agencies

The Annual and Quarterly reports are reviewed in the quarterly (ISL) and half-yearly (BECC) meetings. PIRSA chairs the quarterly and half-yearly review meetings and coordinates with other regulatory agencies (Commonwealth and State) in relation to ongoing environmental management and monitoring of the Beverley mining operation. PIRSA is the prime reporting authority of EMMP implementation.

The Department of Primary Industries and Resources, South Australia (PIRSA) is the lead State Government regulatory agency for mining. PIRSA is responsible for regulating and promoting mining industries in South Australia under the provisions of the South Australian *Mining Act 1971*. PIRSA approves the EIS, mining lease and all environmental management and monitoring programmes. It regulates environmental reports and oversees environmental performance of mining operations. Heathgate Resources Pty Ltd is obliged to report annually and quarterly to the PIRSA. In addition to that the company submits monthly progress reports to the PIRSA on wellfield and plant operations, exploration/retention leases, water monitoring; and occupational health and safety incidents. The PIRSA provides necessary advice and directions time to time as it thinks appropriate and collaborates closely with the Radiation Protection Branch of the EPA on the application and enforcement of regulatory codes regarding radiation protection and management. PIRSA consults with DWLBC, DEH and Department for Administrative and Information Services (DIAS) before approving the EMMP and circulates the environmental reports to these departments for information and comments. PIRSA also provides information to the Government and community on the mine's operation. PIRSA officials do visit the mine site regularly but they not undertake any parallel monitoring to verify the results submitted by the company (Randall, pers. comm., 2005).

The EPA plays its regulatory role under the *Environment Protection Act 1993* and the *Radiation Protection and Control Act 1982*. Under Schedule 1 Part A of the *Environment Protection Act 1993* certain activities require an environmental authorisation from the EPA. The environmental authorisation sets out some specific conditions that must be complied with. A License (EPA 12918) has been issued to Heathgate Resources under the *Environment Protection Act 1993* for chemical works (inorganic) and fuel burning (rate of heat released exceeding 5 megawatts). In addition, under the *Radiation Protection and Control Act 1982*, a licence (LM4) to mine has been issued by EPA. The licensing conditions require Heathgate Resources Ltd to comply with the Code of Practice on Radiation Protection in the Mining and

Milling of Radioactive Ores 1987 and Code of Practice on Management of Radioactive Wastes from the Mining and Milling of Radioactive Ores 1982.

Heathgate Resources Pty Ltd submits quarterly and annual reports to the EPA on occupational issues under the Radiation Management Plan, and radioactive waste management issues under the Radioactive Waste Management Plan. The EPA officials have regular quarterly and six monthly meetings with the representatives of the Heathgate Resources Ltd to discuss the occupational and radioactive waste management issues and monitoring results. These meetings also include officers from PIRSA and Workplace Services. Six monthly consultative meetings that are held with state government agencies, Heathgate Resources and Commonwealth agencies examine EIS commitments and other issues.

EPA officials neither duplicate the monitoring nor verify the monitoring results produced by the company through a parallel monitoring. They observe the operations during their visit to the project site and examine the monitoring and reported results through the regular meetings (Johnston, pers. comm., 2005). The EPA does not have any formal environmental monitoring programme for Beverley Mine. However, sometimes the EPA conducts environmental monitoring in relation to soil contamination level or in other areas as issues arise, and conducts occupational radiation monitoring during each site visit (Johnston, pers. comm., 2005). The EPA is in the process of developing a structured auditing programme to be implemented from 2006 to coincide with a revised code of practice on radiation protection and radioactive waste management (Johnston, pers. comm., 2005). There is also an incident reporting procedure in place to notify the EPA, PIRSA and Workplace Services of spills of radioactive materials or other incidents. A statutory advisory committee called the Radiation Protection Committee comprising experts from different areas has been set up under Section 9 of the Radiation Protection Act. Section 12 of the RPC Act defines the role of the Committee as providing advice to the Minister in relation to setting regulations and granting licenses (including conditions) under the Act and to investigate and report on any other matters relevant to the administration of the Act.

Heathgate Resources required a well construction permit from the South Australian Department of Water, Land and Biodiversity Conservation (DWLBC) to construct extraction/injection and monitoring well. The Company currently holds a license from the DWLBC for groundwater extraction. DWLBC provides expert advice on groundwater and surface water issues, and also on flora and fauna. In addition to that the DWLBC has its own groundwater

monitoring programme (Sampson, pers. comm., 2005). The Department for the Environment and Heritage (DEH) gives general comments on flora and fauna.

The South Australian Department for Administrative and Information Services (Work Place Services) is concerned with occupational safety issues. As a member of the radiation review committee this department reviews and responds to monitoring data relating to occupational safety issue. The Commonwealth environmental agency (Environment Australia under the Department for the Environment and Conservation) reviews the implementation of EMMP and overall environmental performance of the Beverley operations. However, the Department of Industry, Tourism and Resources (DITR) is the prime regulatory agency at Commonwealth level. The DITR requires six monthly reports from the company on production statistics and shipments. Officials from both agencies sit with the representatives of the company in BECC meetings every six months (The Senate Committee, 2002).

The Beverley Environment Consultative Committee (BECC) comprising the Commonwealth and State regulators and the Radiation Review Committee (ISL Committee) comprising State regulators provide two separate platforms for interagency coordination at the Commonwealth and State levels. BECC establishes a mechanism to liaise and exchange information between the Commonwealth Government, State Government and the Company. However, it does not have a role in dispersing information to the community. The radiation management issues are discussed in quarterly meetings. Information on spillage or leakage is communicated orally at these meetings but the outcomes of these meetings are not reported publicly. The Senate Committee (2002) identifies shortcomings in the present regulatory system, particularly with regard to the monitoring and reporting mechanisms. BECC is not accountable to the Commonwealth environmental agency and it does not report publicly all reviews of environmental performance at Beverley (The Senate Committee, 2002).

Community Consultation and Public Involvement

Heathgate Resources undertakes various community consultation activities and reports them to the regulators. Some major community consultation activities includes: meetings with Indigenous communities; supporting and sponsoring research activities; educating members of the community on the minimal impact of the environment; organising site visits for various organisations, environmental groups, community groups, scientists, researchers, media personnel, etc. (Heathgate Resources, 2005). The company organizes quarterly meetings with the representatives of two affected Aboriginal communities (Adnyamathanha and Kuyani)

and provides information addressing their questions. The company also organizes informal meetings with local pastoralists every six months and reports on the operation and progress of mining and its ramifications for them (Heathgate Resources, 2005).

Heathgate maintains a website and publishes a newsletter to provide information about its operations. However, the website does not document all mine related events. The company officials make public addresses and attend many community gatherings to provide information on its mining activities. The company has established a Visitor and Aboriginal Heritage Centre at Beverley mine to expand community knowledge of the project and to enhance understanding of Indigenous issues (Heathgate Resources, 2005). However, there are criticisms of unresponsiveness to suggestions and inadequacy of consultation with local Aboriginal people (The Senate Committee, 2002). There is no formal mechanism in place for public involvement other than providing information through a website, annual reports, mine site visits, and informal meetings with the Indigenous communities.

The Senate Inquiry 2000

Beverley Uranium Mine Operations along with three other Australian uranium mines faced an inquiry by a Senate Committee in 2000. This inquiry was initiated in response to numerous leaks and spills at the Beverley mine and growing public concerns on LSL (*in situ* leach) mining method, which is employed at the Beverley Mine. The number of spills at Beverley was found to be higher compared with the mines in USA using the ISL technique during the similar time period (The Senate Committee, 2002). It brings the current regulatory regime and management practices under criticism in terms of their effectiveness. The Committee identified weaknesses in some specific areas such as monitoring, the role of Commonwealth and State Government and their agencies, incidents reports, public reporting, consultative committees and research. The major recommendations of the Senate Committee include: application of strict regulatory control; ongoing and regular independent monitoring; public release of information including all reports and monitoring results; regulatory responsibility of environmental agencies at the State and Commonwealth level; and public accountability of BECC (The Senate Committee, 2002).

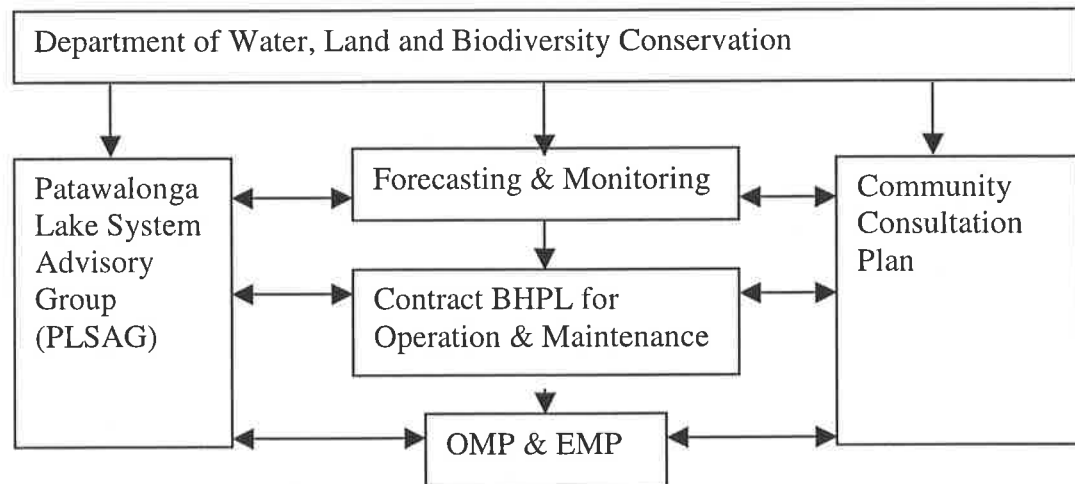
5.4 Glenelg Foreshore and Environs – Holdfast Quays Proposal

The Operation and Management of the Project

The development approval for the construction and ongoing operation of the Patawalonga Seawater Circulation and Stormwater System (PSCSS) was granted by the Governor in December 1999, and it was amended in July 2000, subject to a number of conditions. The development approval requires the proponent to prepare and implement two separate environmental management plans (EMP) for the construction and operation phase of the development. The PSCSS has two components: 1) design and construction; and 2) operation and maintenance (URS, 2001a). The construction of the project was managed by an agency called the Office for Infrastructure Development. A contract was signed between the State Government and the contractor for the construction work. The Department of Information and Administration Services (DIAS) was the signatory to the contract. The operation commenced in August 2001(URS, 2001a). The Minister for Water Resources took the responsibility of the system as owner/operator. The Major Project Group (MPG), in conjunction with the Minister and its nominated contractors, is undertaking the project management. Boulderstone Hornibrook Pty Ltd (BHPL) was the nominated contractor for the operation of the PSCSS initially for three years (2001-2004) with a provision of further three years extension. The local Council (City of Holdfast Bay) is responsible for ongoing management of the landscaped areas adjacent to the Patawalonga Lake.

There are other organisations responsible for the management, operation or maintenance of the PSCSS. The Patawalonga Catchment Water Management Board (PCWMB) is responsible for upstream water quality improvements and monitoring of freshwater basins. The Coast and Marine Section of the EPA is responsible for the prevention of pollution and monitoring ambient water quality under the *Environment Protection Act 1993* and the relevant policy/strategy of the State Government. The Coast Protection Branch of the Department for Environment and Heritage undertakes activities relating to sand management and seaweed. The Coast Protection Board has an advisory role in different coastal and marine issues under the *Coast Protection Act 1972*. Currently, the Department for Water, Land and Biodiversity Conservation (DWLBC) is the agency responsible for the operation and management of the project (PSCSS) since it is the relevant agency under the Minister for Environment and Conservation. A contractor (Boulderstone Hornibrook Pty Ltd) has been appointed for the operation and maintenance. The management and operation of this project is being conducted under the following model (Figure 5.2).

Figure 5.2: Operation and Management of PSCSS



(Based on Mouveri, pers. comm., 2005)

A contract between the government and Baulderstone Hornibrook Pty Ltd (BHPL) is central to this model. The DWLBC has a forecasting and monitoring process to help the contractor in its operation and maintenance. The DWLBC monitors the weather and water quality and passes information on to the BHPL to help them maintain the system efficiently. The contractor has its own ongoing operation and maintenance plan, and on the basis of this plan they operate, maintain and monitor the infrastructure. The DWLBC has an emergency management plan for emergency situations such as heavy rainfall, high storm events or an abnormally high tide. In an emergency, the contractor implements the emergency management plan in consultation with the DWLBC. Under this model an advisory committee called Patawalonga Lake System Advisory Group (PLSAG) comprising various stakeholders provides advice to the DWLBC. The DWLBC ensures that the advice of the PLSAG has been taken into account in the operation and maintenance of the system. There is a community consultation plan in place regarding the operation and maintenance of this. Any decision or action taken by the DWLBC is communicated to the community through meetings, telephone hotline and website. Other than this there is no formal mechanism for reporting monitoring results. However, some critical information may be included the annual reports of the DWLBC (Mouveri, pers. comm., 2005).

Environmental Management and Monitoring Practices

An EMP was prepared by Baulderstone Hornibrook (BHPL) and Connell Wagner in July 2000 for the construction stage. The contractor (BHPL) has an operational phase EMP prepared by the URS Ltd to address environmental issues associated with the ongoing operation and monitoring of the system. The EMP (URS, 2001a) sets out an 'Environmental

Improvement Plan' (EIP) and a 'Format for Operational Procedures' including sediment control procedure, non-point source pollutant control procedure (built environment), non-point source pollutant control procedure (natural ground areas), gross pollutant control procedure, raw sewage control procedure, introduced species control procedure, erosion control procedure, noise control procedure, procedure to maintain amenity, waste management, storage of hazardous materials (URS, 2001a). The EMP details the environmental aspects and impacts associated with the PSCS System and recommends the corrective actions with responsibilities of different stakeholders and reporting requirements for some environmental aspects. The EMP also recommends specific monitoring requirements for sedimentation, silt build-up, water quality of the lake and sea, impacts on the marine ecosystem, turbidity during dredging operations, and bank stability. In addition to ongoing regular monitoring, the EMP includes a water quality monitoring programme for the PSCSS involving laboratory analysis for specific microbiological analytes and other physical properties. This programme specifies a reporting procedure.

The Environmental Improvement Plan (EIP) identifies potential environmental aspects/impacts in eight major areas and suggests required action with objectives and responsibilities of different stakeholders. The potential for poor water quality discharges due to catchment practices resulting in potential impact upon water quality in the gulf and associated health impacts to the public across a range of parameters was a major factor considered (URS, 2001a). The responsibilities in relation to required action lies with different government agencies and the local council. The EMP does not include a detailed monitoring programme with specific parameters, methods, objectives, time frames, responsibilities, and reporting procedures. The EMP is not consistent with the recommendations of the Assessment Report in relation to monitoring; however, the EMP has not been reviewed since its introduction in 2001 despite recommendations in the EMP that it requires an annual review.

The current monitoring practices are entirely different from what was envisaged in the EMP. There are several processes in place at the moment for monitoring. Several agencies are currently involved in monitoring of different environmental parameters. They include EPA, DEH, DWLBC, PCWMB and City Holdfast Bay. In most cases, monitoring is being conducted under the agenda of the relevant agency. These are not done under the EMP (Mouveri, pers. comm., 2005). The DWLBC has an operation and maintenance plan as a support plan for environmental monitoring and management of the PSCSS. "The DWLBC is doing monitoring and management properly but whether they coincide with EMP which was

in the EIS is another question, and it is necessary to bring them together. An EMP was written to get through the planning process. At the completion of the construction phase, after 2-3 years, new plans came in and a new scenario came in and that had no link to go back to the EMP" (Mouveri, pers. comm., 2005).

The EPA monitors water quality on the beaches and in the Patawalonga Lake to assess the impacts of the Barcoo Outlet and ensure that flow from the outlet does not affect the health of bathers and marine life. Currently, the EPA is monitoring faecal bacteria and water clarity (turbidity) in relation to water quality for swimmer health and safety. The monitoring results are being regularly published on the EPA website. The Coast Protection Branch (of the Department for Environment and Heritage) monitors sand movement and sea grass accumulation in the beach but there is no reporting system in place for publishing monitoring results. The Marine Section of Transport SA is responsible for sand management and maintenance of water quality in the Harbour Basin under the EPA license (for dredging). A contractor has been engaged for this purpose. Transport SA is also monitoring the water quality and siltation in the Harbour Basin under their own EMP with the help of a consultant. Monitoring results are being reviewed both internally and externally on an annual basis. The EMP is being reviewed during the time of contract renewal. Monitoring and auditing reports are not made public. Recently, DEH has taken over the role of Transport SA in relation to sand management and water quality maintenance in the Harbour Basin (Trueman, pers. comm., 2005).

The Patawalonga Catchment Water Management Board (PCWMB) was established under the *Catchment Water Management Act 1995*. The role of the Board was expanded with the introduction of the *Water Resources Act 1997*. It has been given the authority to control water-affecting activities as defined in the Act. The role of the Board is to develop and implement its Catchment Management Plan and provide advice to the Minister and constituent Councils. It also promotes public awareness of the importance of sustainable watercourse and water resources management within its catchment (PCWMB, 2002). The PCWMB developed a comprehensive catchment water management plan in 1997 (PCWMB, 1997). Before formulation of this plan the EIS (amended) for the Glenelg Foreshore and Environs proposal was reviewed twice with the help of private consultants (PCWMB 1997). The PCWMB is monitoring storm water quality particularly suspended solids and nutrients under an ongoing water quality monitoring programme (PCWMB, 2002). Suspended solids are measured on an event basis (load monitoring). Regular checks on silt and sediment

collection in silt traps, weirs and wetlands are also carried out. PCWMB also monitors industry and community impacts to catchments.

The catchment management plan of PCWMB does not have any relationship with the EMP implemented by other agencies although some of the EMP components have similarities with the Board's plan (Ockenden, pers. comm., 2005). However, the operational EMP for the PSCSS (under the development consent) clearly sets some responsibilities for the PCWMB. The PCWMB reviews the monitoring results internally in consultation with other relevant agencies. There is no formal public reporting mechanism in place. However, the PCWMB published its first report in 2002 with the help of Australian Water Quality Centre bringing together all the major chemical and biomonitoring surveys of the catchment. The Holdfast Bay Council does not have any control on the operation and management of the PSCSS, although the Council owns the Lake. However, the Council has its own monitoring programme for a public health perspective, which is being conducted with the assistance of Flinders University (Gregory, pers. comm., 2005). This monitoring programme is aimed at storm and recreational impact on sediments and it does not include any chemical parameters.

There is no formal reporting mechanism for the PSCSS. However, the information is passed on to the community through the community consultation process (Mouveri, pers. comm., 2005). There is an advisory committee (Patawalonga Lake System Advisory Group) headed by the DWLBC in place comprising representatives from the different relevant agencies. This advisory committee discusses various management and environmental issues and monitoring results in meetings, and provides necessary advice to the Minister. This is the only formal way of coordination and reporting between different agencies. The major fish kill event in Patawalonga Lake in 2003 received a wide media coverage and subjected the regulators to huge public criticism for their failure in maintaining the lake's water quality. In fact, after this event an initiative for inter-agency coordination was taken. A voluntary group comprising members of the community and other stakeholders of the PSCSS called the 'PatWatch' has recently been formed (Mouveri, pers. comm., 2005). The members of this group sit in meetings every two months to discuss various issues relating to operation and maintenance of the PSCSS. The relevant officer of the DWLBC acts as the coordinator of this forum.

5.5 Wallaroo Marina

Environmental Management and Monitoring Practices

According to the planning approval conditions, the developer has to monitor the water quality and sand movement under the water quality monitoring plan and sand dune mediation plan respectively. Monitoring results are reported to the EPA and the Coast Protection Branch (of DEH) on an annual basis (Ferguson, pers.comm., 2005). There is no formal mechanism in place to review and respond to the monitoring results. The assessing agency has no role in post-development environmental management and monitoring and there exists no public reporting system and consultation process. However, the local Council is supplied with the monitoring results (Ferguson, pers.comm., 2005). The developer has engaged a private consultant (Soil and Groundwater Consulting) for monitoring purposes. An independent audit of monitoring results conducted in January 2004 confirmed groundwater contamination resulting from an abandoned copper smelter site close to the waterways of the marina, which was affected by the contaminated groundwater flow (Ferguson, pers.comm., 2005). The developer claims that maintaining water quality in waterways is difficult due to contamination by groundwater and sea water (Ferguson, pers.comm., 2005).

The local Council is currently responsible for monitoring and management of stormwater. According to the agreement signed between it and the developer, the council was expected to take over the control of waterways, breakwaters, curves and road in 2006. Overall, there is no ongoing environmental monitoring programme in place as recommended in the Assessment Reports. The implementation of the sand dune mediation plan is expected to continue for the next 2-3 years. The current water quality monitoring programme will continue until the Council takes over control of the waterways. However, it does not have enough resources and manpower to maintain the entry channel, marina basin and waterways. Moreover, the development of a marina at Wallaroo could be a burden to the Council instead an asset (Hutchison, pers.comm., 2005).

The developer (CrystalCorp Developments Pty Ltd) holds an EPA license (EPA License No. 14667) for moorings and dry storage. This license requires the developer to comply with the ANZEC 1997 strategy 'Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat harbours in Australia and New Zealand'. The EPA license does not require the developer to undertake any environmental monitoring programme. However, it is the responsibility of the licensee to maintain standards of environmental parameters as required by the EPA license. The EPA relevant official visits the marina site at least twice a year and

observes the relevant environmental aspects (Peat, pers. comm., 2005). The EPA also conducts monitoring by collecting samples if any serious environmental problem arises.

The Wallaroo marina was developed on a contaminated site but the EIS did not address the site contamination issue at all. Moreover, issues of water quality, entry channel and water circulation were not properly addressed (Hutchison, pers.comm., 2005). The current environmental problems such as the growth of sea grass in the marina basin and the degradation of water quality are believed to be due to the failure of the EIA to address those issues properly during assessment (Hutchison, pers.comm., 2005). Hence, the EIA has failed to ensure environmental management outcomes. However, the land management agreement, which was signed between the developer and the Council in 1999, is the only legal instrument in place that can help ensure some environmental management practices. In addition to that the EPA has a regulatory role under its licensing system that is not linked to EIA outcomes.

5.6 Tumby Bay Marina

Environmental Management and Monitoring Practices

There is no formal environmental monitoring programme in place as recommended in the Assessment Reports. However, the Council does monitor water quality with the help of a consultant engaged by the Council. The concerned council officer claims that monitoring of water quality is being done on an annual basis (Collins, pers. comm., 2005). However, the 2003 monitoring report (KBR, 2003) prepared by the consultant shows that there were only two previous samplings conducted in 1999 and 2001. The current water quality monitoring complies with the Environment Protection (Marine) Policy 1994 that sets out the EPA water quality criteria for South Australia. The 2003 monitoring report shows that the major physical, chemical and biological parameters of the monitoring programme include total combined (Kjeldahl) Nitrogen (TKN), phosphorus, E.coli, pH, electrical conductivity (EC), total suspended solids (TSS), total dissolved solids (TDS), and turbidity (KBR, 2003). The report concludes that the construction of the marina has had no reported effect to date on the water quality of the marine aquatic ecosystem both in First Creek and Tumby Bay. There have been no reported changes to the mangrove community upstream of the First Creek culvert. The current monitoring programme does not appear to include rigorous scientific monitoring. Monitoring samples are collected once a year.

Monitoring results are reviewed internally and are compared to results of previous years. The Council takes appropriate actions on the basis of changes in monitoring results. There is no

external review and reporting mechanism in place. Monitoring results are not published but they are available for public viewing on request (Collins, pers.comm., 2005). No independent audit of monitoring results has yet been done. There is no mechanism of public consultation in place in relation to the current water quality monitoring. The Council does have a land management agreement with landholders as required by planning approval in order to address land management issues. This agreement is a legally binding on both the Council and landholders. The agreement sets out the respective responsibilities of each party in relation to the development of the allotment, maintenance of the riprap walling, waterway reserve and waterway land.

5.7 Port Vincent Marina

Environmental Management and Monitoring Practices

According to the requirement of the development consent, a land management agreement was signed between Paradise Development (Investments) Pty Ltd and District Council of Yorke Peninsula in 2001. Clause 5 of the agreement describes obligations of the proponent during the initial maintenance period of five years, starting from 1 April 2003. Ensuring water quality and navigable depth within the entrance channel and Waterway Reserve are among the major obligations. Upon the expiry of the initial maintenance period these obligations will be shifted to the Council for the period of the project's life. The agreement does not specify any monitoring requirements in relation to water quality and navigable depth although the assessment report required an agreement (between the proponent and the local Council) with both management and monitoring components.

During the last three years of the operation stage the proponent did not undertake any formal monitoring programme on the basis of recommendations of the Assessment Report/ Amended Assessment Report (Wilkinson, pers. comm., 2005). Under the 'Reef Watch' programme coordinated by the Conservation Council of South Australia, students of the Port Vincent Primary School and Aquatic Centre are monitoring the marine environment of the Port Vincent Reef, which is two nautical miles away from the marina site. Survey results (monitoring data) are made available to the general community, schools, government bodies and research institutions. The proponent claims that they provide some funding to the school for this monitoring programme (McDonnel, pers. comm., 2005). In addition to that Port Vincent Primary School and Aquatic Centre has undertaken a 2-year project titled 'monitoring sea floor colonisation within Port Vincent Marina' funded by the Coast Protection Board (an advisory body of the State Government that provides advice to the

Minister for the Environment) and District Council of Yorke Peninsula. Under this project the biodiversity of the marina basin was monitored but the project ended in July 2005.

There have been several inspections by officers of the Coast Protection Board. During the construction stage an EPA license was required for the project. After the expiry of this license there is no involvement of the EPA in relation to monitoring in the operation phase. The planning authority (responsible for environmental assessment and planning approval) is simply unaware of anything with regard to post-decision environmental management and monitoring. A lack of supervision is distinctly evident in this regard. The proponent claims that they have not noticed any deterioration in water quality or other environmental parameters during the last three years of operation and, in fact, everything is going fine (McDonnel, pers. comm., 2005). However, the relevant officer of the local council has expressed concerns in relation to the deterioration of water quality and other environmental parameters in recent times (Wilkinson, pers. comm., 2005). Currently, the Council is maintaining facilities such as rock walls and sand movement. The Council has recently solved the concern relating to the build-up of rats nesting in the rocks. The Council recognises the monitoring need over time especially for water run-off, sand movement, fish stocks, and loss or build-up of sea grasses (Wilkinson, pers. comm., 2005). Marinas with 50 berths or more require an EPA license for its operation under Schedule 1 Part A of the *Environment Protection Act 1993*. Port Vincent Marina has an EPA License (No. 14485) for marina or boating facility (with moorings or dry storage), which has been issued in favour of the Cruising Yacht Club of SA Inc.

According to the EPA licensing conditions, the licensee must ensure that all facilities and operations at the premises conform with the ANZECC guidelines on marinas. The licensee is required to prepare a report detailing all aspects of the operations and facilities that do not conform with the ANZECC guidelines, and setting out a time frame for the amendment of those operations and facilities. This report should be independently verified in accordance with the EPA guidelines titled 'Independent Verification of Monitoring Programs'. There is as such no formal monitoring programme in place. The EPA officials inspect the marina site at least twice a year and monitor the environmental aspects visually. In the case of any serious environmental issue, the EPA coordinates with other relevant agencies (Peat, pers. comm., 2005). For example, Transport SA would be consulted for an accidental oil spill. Overall, the role of EPA in the construction and operation stages is to ensure that the ANZECC guidelines and the Environment Protection (Water Quality) Policy and Explanatory Report 2003 are

being followed properly. The EPA does not necessarily take into account the monitoring requirements of the planning approval process in its licensing process.

5.8 Summary of Findings

Environmental monitoring and auditing practices do exist for the major development projects of South Australia and they vary from project to project. The bigger projects (i.e. mining projects) have established monitoring regimes but they exist outside the EIA framework. However, monitoring and auditing have not yet been found to be effective in managing impacts of the project. These monitoring and auditing are mostly self-regulatory. They neither establish an effective feedback loop in the EIA process nor a regulatory control over the project operation. In South Australia, development consents often include conditions requiring proponents to monitor impacts of their actions. Accordingly, it is the responsibility of proponents to monitor impacts of their actions/ operations on the environment and to report monitoring results to the relevant government agency/ agencies. Proponents are made responsible for conducting audits, both internally and externally. Proponents usually engage private consultants to conduct audits on their behalf. These audits usually involve verification of compliance with various environmental management plans/ programmes approved by the relevant government agencies or the internal environmental management policies of a company. Proponents prepare one or more environmental management plans once the EIA process is completed. Proponents usually make commitments in the EIS to undertake environmental management measures including monitoring and auditing during the project operation. An EIS rarely includes a draft environmental management plan/monitoring programme in detail. There is a lack of transparency, public accountability and community involvement in the post-development environmental management and monitoring practices. The regulatory arrangements vary from project to project. There is no central agency to oversee the monitoring and auditing in EIA. For mining projects, the Department of Primary Industries and Resources, South Australia (PIRSA) is the key agency for approving monitoring programmes and reviewing monitoring results of mining projects. In the case of other projects, the planning agency approves the EMP or monitoring programmes but it does not review the monitoring results.

The EPA and other environmental agencies review monitoring results of specific environmental parameters that come under their departmental responsibilities. They are not related to EIA follow-up. EIA in South Australia is not linked to ongoing environmental management of the project at the operation stage. Once planning approval is given, the

planning agency loses its link with the project since it does not require any report on compliance and project operation. There is no mechanism to verify commitments and recommendations of EIA and compliance with planning approval conditions. The implementation of ongoing environmental management and monitoring depends on other regulatory tools although the planning approval conditions usually require environmental management and monitoring to be undertaken. Monitoring requirements under the EPA licensing or other licensing /permit system do not necessarily take into account the EIA recommendations, and they do not cover all significant issues identified in the EIS.

South Australian EISs recognise environmental management and monitoring requirements for the implementation and operation of the project. In most cases the guidelines issued for the preparation of EIS do not require a monitoring programme to be included in the EIS. A formal mechanism for community consultation in relation to ongoing environmental management and monitoring is lacking in South Australia. However, sometimes members of the community get involved in the process but this is very rare. No compliance audit is conducted in SA by the regulators or the project proponents. Table 5.1 show the monitoring status of significant issues/impacts of six South Australian projects studied. Of six projects studied only one (Beverley Uranium Mine) was found to fully monitor issues/impacts according to the commitment made in the EIS. In most cases the number of issues/impacts that were monitored is less than the commitment made in the EIS. In all six projects studied, the number of issues/impacts with monitoring requirements under the EPA license is much less (e.g. in the highest case it is below 30%) compared to issues/impacts identified as being significant. Therefore, the EPA license actually does not replace the monitoring requirements under the EIA framework.

Table 5.1: Number of Issues/Impacts Monitored in South Australian Projects.

Monitoring Status	OD	BU	GF	WM	TM	PM
Number of issues/impacts identified as being significant in the EIS or Assessment Report	11	15	12	10	8	13
Number of issues/impacts with monitoring commitments by proponents	12	11	-	8	-	-
Number of issues/impacts with monitoring recommendations in the Assessment Report	7	7	9	12	8	11
Number of issues with monitoring requirements under the EPA license or other regulatory tools	3	4	2	1	1	1
Number of issues/impacts that were monitored in practice	10	11	7	2	2	1

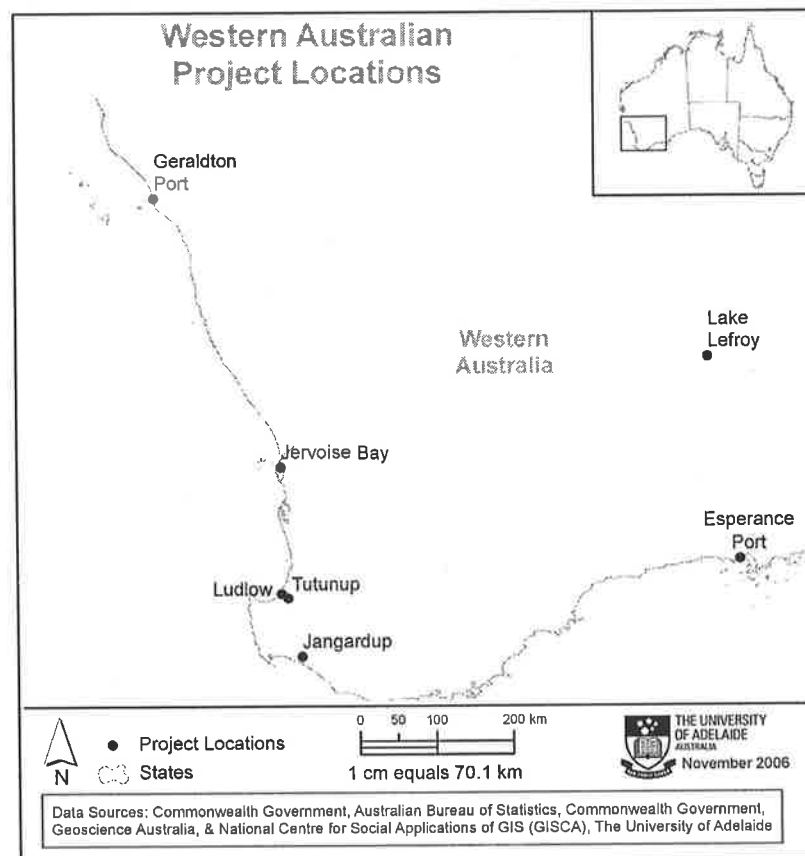
OD, Olympic Dam Expansion; BU, Beverley Uranium Mine; GF, Glenelg Foreshore Development and Environs Project; WM, Wallaroo Marina; TM, Tumbay Bay Marina, PM, Port Vincent Marina.

CHAPTER 6: EIA MONITORING AND AUDITING PRACTICES IN WESTERN AUSTRALIA

6.1 Introduction

This chapter analyses the environmental management and monitoring practices of seven Western Australian development projects (subject to EIA) at the operational stage. Development projects selected include Lake Lefroy Gold Mine, Jangardup Mineral Sand Project, Ludlow Titanium Mineral Mine, Tutunup Titanium Mineral Mine, Jervoise Bay Industrial Infrastructure and Harbour Development Project, Geraldton Port Upgrade Project, and Esperance Port Upgrade Project (see Figure 7.1 and Appendix 9 for background information on the case study projects). This chapter describes the case studies according to the relevant EIA documents, annual environmental reports, audit reports, environmental management plans/programmes, and DoE licenses. The relevant persons in the State government and local government agencies and private companies were contacted for information and clarification, when required.

Figure 6.1: Location Map of Western Australian Case Study Projects



6.2 Lake Lefroy Gold Mine

Environmental Management and Monitoring Practices

In November 2001, the St Ives Gold Mine operations were purchased by Gold Fields Australasia Ltd from WMC Resources Ltd. St Ives has developed a series of internal operational policies covering a wide range of areas. They include: Environmental Management Systems, Compliance, Environmental Assessment, Closure and Rehabilitation, Biodiversity and Landuse, Contaminated Sites, Tailings and Heap Leach, Water, Environmentally Hazardous Substance, Wastes and Residue, Noise and Vibration, Air, Energy, Acquisition and Divestments (WMC, 1999). There is an Environmental Management System (EMS) in place for the overall operation of the mine. The environmental aspects of Lake Lefroy Gold Mine have been identified in the EMS and it includes detailed environmental management programmes. The EMS is consistent with ISO 14001 Environmental Management Systems and the Australian Mineral Industry Code for Environmental Management. In addition a number of Environmental Procedures have been developed to address a range of environmental management issues. The procedures are regularly reviewed and updated in the light of changes in practices, scientific knowledge and regulations. The fundamental aspects of the EMS are policy, objectives and targets, legal requirements and audit (WMC, 1999). The EMS involves a biennial system and technical audits and annual Management Review for identifying environmental issues relevant to the operations.

The EMS requires both internal and external environmental communications and reporting. Internal reporting is undertaken on a weekly, monthly, quarterly, and annual basis through St. Ives Gold Mine (SIGM) Weekly Environment Reports, Environmental commentary for the SIGM Monthly Management Report, Quarterly Environment Management Report to Gold Fields Ltd corporate office, and annual reporting as required under the Global Reporting Initiative (GRI). St Ives Gold reports to external stakeholders on its environmental performance through the National Pollutant Inventory Report (Department of Environment), License Report (Department of Environment), Annual Dewatering and Borefield License Report (Water Resource Commission), Annual Environment Report (Department of Industries and Resources), Annual Environmental Management Plan (Department of Environment, Department of Conservation and Land Management, Department of Industries and Resources, and Environment Protection Authority), and Declared Rare Flora Report (Department of Conservation and Land Management) (Goldfields, 2005). These reports are not made public but where applicable, EMS documents are made available to all employees

upon request. SIGM maintains an internal reporting standard for any environmental incident that occurs on-site. It has developed procedures for handling and investigating non-conformance, taking action to mitigate any impacts caused, and for initiating the completing corrective and preventive actions (Goldfields, 2005).

The SIGM has developed a mine operating strategy and a seepage management plan. Monitoring and measurement of St Ives Gold site activities that may have a significant impact on the environment are undertaken on a regular basis. SIGM is monitoring groundwater (quality and level) and surface water quality as prescribed by the DoE Operating License (4570/9) (Goldfields, 2005). The other monitoring parameters include dust, non-process waste and feral animals. Outcomes of monitoring programmes conducted are reported in the AEMP. Within the Lake Lefroy area, several monitoring programmes and long-term studies have been established or completed (Goldfields, 2005).

SIGM's environmental performance, its compliance with the ministerial conditions of approval and the environmental management commitments made for this project are reviewed on an annual basis in the Annual Environmental Management Plan (AEMP) and Annual Environmental Report (AER). The AEMP includes a review of the project development during the previous 12 months and a detailed description of the mining developments proposed for the next 12 months (Goldfields, 2004). The AER provides: a description of the current SIGM mining project; the site is compliance with relevant environmental lease and license conditions; mining activities across various facilities; proposed mining and processing activities; sitewide environmental issues, environmental incidents and environmental management activities; rehabilitation; findings of environmental investigations (monitoring results); and research and development initiatives (Goldfields, 2005).

The AEMP is submitted to the DoE and other relevant government departments (such as CALM, DOIR) and the local Council on an annual basis for review and comment. The relevant agencies respond to the AEMP separately. There is no formal mechanism for interagency coordination to review the AEMP. Officials of the DoE, DoIR and CALM conduct site visits to verify the compliance with requirements of the respective regulatory instrument. They do not conduct any parallel monitoring. The DoIR officials inspect the mine site annually and they are mainly concerned with the rehabilitation of the mine site. The DoIR officials did not undertake any environmental inspection during the 2004-2005 reporting

period. The DoE (Audit Branch) officials conducted two inspections during the reporting year 2004-2005. These were related to environmental incidents but they have not conducted any compliance audit during the last five years. Both internal and external (third party) environmental audits are conducted annually to verify compliance with commitments of the proponent and Ministerial conditions. Audit reports are submitted to the regulators. The 2004 AER notes that regulators are slow in responding to audit reports (Goldfields, 2005). The audit is conducted in accordance with the guidelines prepared by DoE (DoE, 2000). In addition to compliance audits, SIGM undertakes an annual external audit of tailings storage facilities (TSF) to ensure compliance with relevant standards and legislation and to facilitate proactive management of these facilities. TSF audit reports are submitted to DoIR and DoE (Goldfields, 2005).

SIGM operates under the conditions of the mining leases, DoE Operating License, DoE license to take water, DoE license to construct and alter wells, and Ministerial Statement 548. During the 2004-2005 reporting period, a site-wide legal compliance audit was undertaken at SIGM by an external legal firm. An external audit was also undertaken for the re-certification of the ISO 14001 EMS. The external audit conducted in 2005 identified one potential non-compliance (Greg Barnett & Associates, 2005). It relates to Condition M1-1 whereby the total area of disturbance exceeds that outlined in Schedule 1 of Ministerial Statement 548. The AEMP, AER and audit reports are not made public. The Operating License issued by DoE sets conditions relating to air pollution control, water pollution control, and solid waste control. The license requires monitoring of water and annual reporting. SIGM submits Annual License Reports to the DoE regularly. SIGM was found to comply with DoE Operating License in the reporting period for 2004-2005.

SIGM submits Annual Environmental Reports (AER) to the Department of Industries and Resources (DoIR) in accordance with the requirements of the mining leases. The AER also satisfies the requirements for the Annual License Report and the Dewatering Discharge Report under the conditions of the Department of Environment (DoE) Operating License. SIGM is required to submit a detailed Notice of Intent (NOI) to the DoIR for assessment and approval prior to the commencement of any new mining activity on Lake Lefroy. The NOI should satisfy the requirement of Ministerial Condition (M8.1). In practice, SIGM uses the AEMP as NOI. The AER required by DoIR under the project tenement conditions is similar in content to requirement of the DoE for an AEMP under the Ministerial Statement 548 (Condition 6.2). There is clearly a duplication of environmental reporting systems. There

seems to be a lack of coordination between DoIR and DoE in this regard. The DOIR raised objections in its review of the 2004 AEMP that the AEMP did not contain sufficient detail to enable the Department to assess the environmental impacts of the proposal and determine the acceptability of any proposed management actions to minimise the environmental impact of the project (Greg Barnett and Associates, 2005). Actually, the AEMP does not include monitoring results and rehabilitation performance in detail. The 2005 AER shows that there were 24 externally reportable environmental incidents in the year 2005-05 (Goldfields, 2005).

There is no formal mechanism for community consultation regarding environmental management and monitoring. However, the company maintains community relations through a number of community initiatives. Some of them are: goldfields land rehabilitation group and goldfields environmental forum; school excursions and extended site visits; university students tour programme; financial support for community-based activities; supply of native seed packs and information sheet; and a community participation team to provide a direct link between the Kambalda community and the company (Goldfields, 2001).

6.3 Jangardup Mineral Sand Project

Environmental Management and Monitoring Practices

Jangardup Mineral Sand Project has an environmental management and monitoring plan approved by the Department of Environment (DoE) for the Heavy Minerals Mine at Jangardup (Cable Sands, 1990). This is not a public document and nor is it available for public viewing. The EMMP includes detailed programmes for groundwater and surface water monitoring, and vegetation monitoring, and policies for 'Dieback Hygiene' and 'Rehabilitation' (Cable Sands, 1990). Cable Sands Ltd. conducts some monitoring with the help of consultants. The monitoring programme for the groundwater and surface water was reviewed and amended in 1993 as suggested by the EPA, Department of Conservation and Land Management (CALM) and the Water Authority of Western Australia (WAWA). The amended monitoring programme (Cable Sands, 1993) incorporates changes in monitoring sites, monitoring methods and parameters. Cable Sands produces an Annual Environmental Report to document the environmental performance of the reporting year. This report is intended to satisfy requirements of DoE licence under Part V the *Environment Protection Act 1986* (EP Act), Ministerial Conditions set under Part IV of the EP Act, mining lease under the *Mining Act 1978* and water extraction licence under the *Rights in Water and Irrigation Act 1914*.

The Annual Report 2004 (Cable Sands, 2005) includes monitoring information on rehabilitation, dust, noise, groundwater abstraction, production bore and process water, groundwater level, groundwater quality, surface water quality, surface water flow, radiation, and vegetation. Monitoring results are reviewed both internally and externally. The Annual Environment Report also incorporates an 'Annual Performance and Compliance Report' in relation to the Ministerial Conditions and other licences. No non-compliance is reported in the 'Performance and Compliance Table'. Monitoring results are submitted to the relevant agencies annually through the Annual Environment Reports. Annual Environment Reports are neither made public nor are they made available for public access. Monitoring results are reviewed by the respective agencies separately. There is no formal mechanism for coordination among the different agencies in reviewing and responding to monitoring results. The predictions made in the EIS have not yet been audited so far. However, the Annual Environment Report 2004 notes that the monitoring results have not indicated any adverse impact or unacceptable deterioration of environmental quality yet. An independent review of groundwater monitoring report done in 2003 pointed out four weaknesses in monitoring methods.

Since the extension of the mine into the state Forest and Class 'C' Reserve 44705, Nelson Location 13471 the Audit Branch of DoE conducted three audits. The DoE audit mainly involves site inspection to verify compliance status and review the monitoring programmes and monitoring results. They do not conduct any parallel monitoring or impact auditing. Again, each site visit only focuses on a specific component. For example, the site inspection in February 2000 focused only on the status of rehabilitation. Similarly, the site inspection in May 2002 focused on vegetation monitoring programme. The 2/2000 Audit Report (DEP, 2000) indicated non-compliance in relation to rehabilitation. The 06/2002 Audit Report (DEP, 2002a) noted that the existing vegetation monitoring programme could not detect potential vegetation impacts. The DoE usually makes delays in publishing audit reports.

In addition to EMMP, Cable Sands Ltd is implementing a 'Mining and Restoration Plan (MRP)' and 'Sulphate Assessment and Management Plan (SAMP)' prepared in 1999 and 2003 respectively. Other management plans in place are a Flora and State Forest Management Plan and National Park (Reserve) Management Plan. These management plans are subject to review as needed. An external auditor has audited the implementation of the MRP and SAMP in 2004 but these audit reports are not made public. According to the environmental policy Cable Sands Ltd it has its own Environmental Management System (EMS), which is ISO

14001 certified. The EMS requires external auditing every six months. The re-certification requires a full audit every three years. The auditing mainly involves a system audit and internal reporting. Cable Sands does not involve any community consultation for Jangardup Mine in relation to environmental management, monitoring and rehabilitation. The site is currently in the final stages of rehabilitation.

6.4 Ludlow Titanium Minerals Mine

Environmental Management and Monitoring Practices

Cable Sands Ltd has an Environmental Management and Monitoring Plan (EMMP) approved by the DoE for the Ludlow Mine (Cable Sands, 2004). It has been revised 5 times since its first approval in 2004. The Ludlow EMMP has been prepared to fulfil the requirements of the Ministerial Conditions under Part IV of the EP Act, Pollution Control Licence under Part V of the EP Act, Mining Lease under the Mining Act, and Ground Water Abstraction Licence under the *Rights in Water and Irrigation Act 1914* (Cable Sands, 2004). In addition to the EMMP, there are a number of management plans in place to address some specific environmental issues. These are Ludlow Mining and Rehabilitation Management Plan, Soil Profile Reconstruction Plan, Water Resources Management Plan, Fauna Management Plan, Noise Management Plan, Aboriginal Heritage Contingency Plan, and Tuart Preservation Plan (Cable Sands, 2005). These plans are being revised as needed. For example, The Noise Management Plan and Fauna Management Plan have been revised 4 and 6 times respectively. There are also a number of procedures applied to Ludlow Mine. Some of the major procedures include Environmental Reporting, Identification and Management of Environmental Issues, Environmental Management Programme, Structure and Responsibility, Communication, Non-conformance and Prevention Action, Internal Audits and Formal Management Review, Purchasing, Process Control, Control of Inspection, Testing and Measuring Equipment, and Training (Cable Sands, 2005).

The current EMMP addresses the environmental management issues relating to community relations, land form, wetland, vegetation communities, declared and Rare Priority Flora, rehabilitation, surface water quality, surface water quantity (fines management), groundwater, noise, particulates (dust and smokes), greenhouse gases, decommissioning and closure. It requires routine monitoring of some specific environmental parameters and external reporting. However, it does not require an external audit (Cable Sands, 2004). It also sets out requirements for monitoring of rehabilitation activities, dust, noise, water (groundwater abstraction, production bore and process water, groundwater level, groundwater quality and

surface water quality), Tuart health, soil profile and fauna. Monitoring results are reported to regulators and the Ludlow Working Party through Annual Environment Reports (Cable Sands, 2005). Summaries of key monitoring data (e.g. water and vegetation health) are reported to regulators more frequently (quarterly) (Jennings, pers. comm., 2005). The relevant government agencies review and respond to the monitoring data separately in different times. There is no formal mechanism for coordination in reviewing and responding to monitoring data.

The implementation of the EMMP is being audited internally. The 2004 Annual Environment Report (Cable Sands, 2005) does not indicate any non-compliance or complaint. However, it does report two environmental incidents: exceedence of PM10 concentration and decline in health of Tuart trees. Tuart health monitoring results suggest that mining operations are having some influence on Tuart trees in close proximity. It has been reported that Cable Sands' environmental management process is helping to arrest the decline in Possum population. A Report on Possum Studies in Central Ludlow (2004) has been attached to the Annual Environmental Report 2004. However, it does not require Cable Sands to make its reports public. In addition to EMMP and other management plans, Cable Sands Ltd has its own environmental management system (EMS) under the environmental policy of the company. Its EMS has an ISO 14001 certification. The EMS requires an internal audit every six months and this mainly involves a system audit. A full review (system and technical) is required every three years for recertification. The EMS does not involve any external review or external reporting.

Ludlow Mine involves community consultation in the implementation and formulation of the EMMP. The Ludlow Working Party, with representatives from regulators (CALM), local community, environmental interest groups and Cable Sands, is briefed on the project implementation and has input into the EMMP. The Ludlow Working Party met 5 times in 2004 (Cable Sands, 2005) but the outcomes of the working party meetings are not published. However, the Annual Environmental Report discusses some of the outcomes. The October 2004 meeting provided members with the opportunity to tour the mine site. Some of the issues raised by the working party include:

- Update on progress of Environmental Management Plan;
- Success and failures of the consultation process; and
- Presence of troglolitic fauna within the soil profile within the mining lease (Cable Sands, 2005).

The Ludlow Mine site has been inspected 4 times up to 2005 by the officials of the DoE (Audit Branch). The DoE officials do not conduct any parallel monitoring but they review the environmental performance and conduct compliance audits of the Ministerial Conditions. The audit conducted by the DoE officials in September 2004 made observations/comments on 8 Ministerial Conditions and 6 proponents commitments. In general, the pre-mining and site preparation works were found to have been carried out in accordance with agreed environmental management plans and procedures. No evidence of non-compliance with Ministerial Conditions was found. However, the audit report expressed concerns about the use of generic plans that may apply to more than one of the company's operation. No audit has yet been conducted either by the proponent or the DoE to determine the actual environmental impacts although the proponent claims that the mining operation has not resulted in any adverse impact on the environment. The 2004 Annual Environmental Report shows full compliance with Ministerial Conditions and other regulatory instruments.

6.5 Tutunup Titanium Minerals Mine

Environmental Management Monitoring Practices

Cable Sands Ltd has an Environmental Management and Monitoring Plan (EMMP) approved by the DoE for the Tutunup Mine. It has been revised once since its approval in 2003. In addition to the EMMP, there are a number of environmental management plans in place to address some specific environmental issues. These are: Noise Management Plan, Groundwater Management Plan and Operation Strategy, Road Upgrade Management Plan, Vegetation Monitoring and Management Plan, Mining and Rehabilitation Plan, Radiation Management Plan, Decommissioning and Closure Plan. None of these management plans are public documents.

The current EMMP (Cable Sands, 2003) addresses the environmental management issues relating to landform, site rehabilitation, vegetation, dieback, groundwater, surface water (quality and fines management), noise, dust, radiation, haulage (road traffic), visual amenity, Indigenous and Non-Indigenous cultures (Heritage), greenhouse gases, and decommissioning and closure. It requires routine monitoring of some specific environmental parameters and external reporting. However, it does not require community consultation in the implementation and formulation of EMMP and an external audit. The EMMP sets out requirements for monitoring of rehabilitation, dust, water (hydrological setting, rainfall, groundwater abstraction, water level, bore and process water quality, regional groundwater, local minesite groundwater), discharge, and vegetation (vegetation health, soil moisture and

plant stress) (Cable Sands, 2003). Monitoring results are reported to regulators through annual environment reports. Summaries of key monitoring data are reported to regulators more frequently (e.g. water level - fortnightly, vegetation health - quarterly) (Jennings, pers. comm., 2005). The relevant government agencies review and respond to the monitoring data separately at different times. There is no formal mechanism for coordination between different government agencies to review and respond to monitoring data.

The implementation of the EMMP is being audited internally. The 2004 Annual Environment Report (Cable Sands, 2005) does not indicate any adverse environmental impact or non-compliance. However, it includes four environmental incidents including a lower level in soak wells, loader noise from minesite after hours, low water level in cattle supply soak, loss of production in paddock through flooding. The AER indicates that groundwater monitoring results have been reviewed by an expert. Like Ludlow Titanium Mine, weaknesses in monitoring methods have been identified in this review. Annual Environmental Reports are not made public but the public can access them on request. The 2004 Annual Environmental Report includes an audit table indicating full compliance with the Ministerial Conditions and other regulatory requirements. There is no formal community consultation process in place for ongoing environmental management and monitoring of the mine site. However, the company responds to the concerns of individuals of neighbouring communities informally. The minesite supervisor and environmental staff maintain informal contact with neighbours, landowners and residents along the haulage route.

Like other Cable Sands mine sites the company has an ISO certified EMS for the Tutunup Mine. The EMS requires an internal audit every six months, mainly involving a system audit. It does not involve any external review or external reporting. However, a full external review (system and technical) is required every three years for recertification. The DoE officials (Audit Branch) have inspected the mine site once (in September 2005) since the commencement of site development in April 2003. The DoE officials do not conduct any parallel monitoring but they review the environmental performance and conduct compliance audits of the Ministerial conditions during the site inspection. Neither the DoE nor the proponent conducts an audit to determine the actual environmental impacts.

6.6 Industrial Infrastructure and Harbour Development, Jervoise Bay

Environmental Management and Monitoring Practices

Currently, the Jervoise Bay Infrastructure Project is being operated and managed by the Australian Marine Complex and LandCorp respectively (Ryan, pers. comm., 2005). Initially, three Environmental Management Plans (EMPs) were prepared for the construction of Southern Harbour and Associated infrastructure (PPK, 1999a), operations of the harbour (PPK, 1999b), and interim works for the closure and realignment of Cockburn Road (HGM, 1999). In addition, a seagrass management plan (Lord & Associate, 2000) was prepared. The preliminary EMP prepared for operations addresses the operational issues including monitoring requirements, stormwater and waste management, navigational issues and erosion (PPK, 1999b). A final EMP was later prepared in association with the Australian Marine Complex Facilities Manager and this plan has been submitted to the DoE for approval (Parsons Brinckerhoff, 2005). Meanwhile the DoE has approved an Interim Operations Plan. Currently, the wharf area operates under the commitments made by the proponent in the Interim Operations Plan and preliminary EMP for operations. In addition to these, the Australian Marine Complex management has an operational EMP in order to address the environmental issues. Subcontractors on the site undertake monitoring activities under this EMP and the AMC submits a monthly operational report to LandCorp (Ryan, pers. comm., 2005).

Currently, monitoring is being undertaken for water quality in Jervoise Bay, marine water quality and sediment. Monitoring results are published annually and they are made public; EMPs are available for public viewing. The proponent conducts compliance audits with the help of consultants and lodges the Performance and Compliance Reports (PCR) to DoE every year. The 2005 Compliance Report (Parsons Brinckerhoff, 2005) shows that the scope of the audit included a total of 17 components with reference to Ministerial Conditions and Proponent Commitments. Of these, 11 components relate to the overall phase and the rest are for ongoing operations of the project. The proponent was found to comply with the DoE Audit Table, which was approved in August 2005. The 2005 PCR concludes that the proponent has complied with the “overall” project Conditions and Commitments during year 4 of the project. However, it notes that the TBT concentrations in the harbour sediments and mussels have been found above the recommended level. The levels of arsenic in mussel tissue reported during 2005 were considered a risk for human consumption.

The DoE conducted at least two audits during the last five years. The DoE audit involves site inspection and observation on overall environmental performance and compliance status (DEP, 2001a, 2002b). The DoE does not conduct any parallel monitoring and environmental performance audits in detail. The actual environmental impacts of the Jervoise Bay project have not yet been audited. The DoE is very slow to respond to monitoring results and other relevant management plans and reports (Ryan, pers. comm., 2005). There is no public consultation process in place in relation to ongoing environmental management and monitoring. The annual compliance reports and various environmental management plans are not made public but they are made available for public viewing on request.

6.7 Geraldton Port Upgrade Project

Environmental Management and Monitoring Practices

The Ministerial Conditions and commitments of the proponent relating to environmental management and monitoring are being implemented under an Environmental Management Programme (EMP) prepared by the proponent. The EMP (URS, 2002) details specific management responses by the proponent to minimise or mitigate environmental impacts and issues identified in the PER and during the environmental impact assessment process. It defines management objectives and performance indicators, describes the resource to be used, the management practices to achieve the objectives and critical dates for their implementation. The EMP also allocates responsibilities to organisations for implementing the management actions, to ensure accountability. It includes monitoring and reporting tasks as part of the management strategy. The major management plans/programmes included in the EMP are a dredging management plan, breakwater construction and town beach reclamation management plan, water quality management and monitoring programme, seagrass management and monitoring programme, artificial reef management programme, marine mammal management and monitoring programme, and northern beaches stabilisation programme. The EMP is not required to be revised. The Environmental Management Plans and Programmes are publicly accessible through the website of the Geraldton Port Authority. The EMP is also available upon request from the Geraldton Port authority, with hard copies available at relevant government departments and libraries (Mulligan, pers. comm., 2005).

The proponent submits a compliance report annually to the Department of Environment (DoE) in accordance with the audit table approved by the Department in August 2002. The Second Compliance Report (GPA, 2004) prepared by the proponent clearly specifies the status of compliance with conditions and commitments. Only one Ministerial condition

relating to Town Beach Management has been reported pending. None of the commitments was reported pending. The compliance audits were done internally. The Department of Environment conducts compliance audits on an irregular basis. The DoE has conducted two audits since the project's commencement in 2002 (Mulligan, pers. comm., 2005). This audit did not verify the compliance status of all Ministerial Conditions and proponent's commitments. However, GPA was found to have substantially complied with the relevant conditions for implementing dredging operations (DEP, 2002c). DoE does not carry out any parallel monitoring to verify the monitoring results produced by the proponent. An independent audit by a third party is not a requirement of DoE.

The current monitoring components include water quality, sea grass, plume dynamics, and whale migration (Mulligan, pers. comm., 2005). Monitoring results are submitted to the relevant agencies as required in the EMP or at least annually. The Department of Environment, Department of Conservation and Land Management (CALM), Environment Australia, and City of Geraldton are key agencies that review and respond to monitoring results. The Department of Environment is the main one to review the overall environmental performance and coordinates with other agencies. However, there is no formal interagency coordination mechanism in place. Monitoring results are not made public but they can be accessed through the Department of Environment on request put under the 'Freedom of Information' process. There is no public consultation process in place concerning environmental management and monitoring. Geraldton Port Authority has been implementing a voluntary environmental management system (EMS) for the last few years. The EMS includes an environmental policy, an environmental aspects register, objectives and targets, roles and responsibilities, incident reporting and auditing. The port authority has recently applied for certification under the Australian and New Zealand Standard AS/NZ ISO 14001 (Mulligan, pers. comm., 2005).

6.8 Esperance Port Upgrade Project

Environmental Management and Monitoring Practices

Esperance Port Authority is implementing a voluntary Environmental Management System (EMS) to manage the relevant environmental factors associated its operation. The EMS fulfils the requirements of the conditions of the Minister's statement (Grasty, pers.comm., 2006). The EMS involves external and internal reviews and audits. An EMP (with monitoring protocols) approved by DoE was implemented during the construction stage to manage environmental issues associated with construction activities. Currently, an approved

environmental management programme is in place to address the environmental issues associated with the port's operations. A number of environmental plans are being implemented as part of this programme. They include a Dredging and Reclamation Management Plan, Noise Management Plan, Dust Management Plan, and Sediment Quality Management Plan (Grasty, pers.comm., 2006).

Esperance Port Authority is implementing a number of monitoring programmes in relation to water quality, sediment quality, dust, noise, and seagrass (Grasty, pers.comm., 2006). None of these plans and programmes are made public. Monitoring results are submitted to regulators through the annual compliance reports. These are not also available for public viewing. DoE is the key agency to review and respond to monitoring results. Usually, the response of the DoE to the compliance reports is very slow. For example, the port authority has got the response for the 2005 compliance report after almost 12 months (Grasty, pers.comm., 2006). The Officials of the DoE (Audit Branch) also conduct irregular compliance audits during their site inspection. DoE does not conduct any parallel monitoring or impact auditing. The DoE has conducted two compliance audits so far since the port was upgraded. The DoE audit conducted in June 2001 (DEP, 2001b) found the port authority compliant with the relevant conditions and commitments at that stage of the project although the DoE audit conducted in November 2002 (DEP, 2002d) pointed out that noise and dust as major issues that still need to be addressed. The Esperance Port won the 'Australian Port of the Year Award' in 2003 and a number of prestigious awards in previous years for its environmental performance (Esperance Port Authority, 2003). It has been reported that dust and noise levels are below the regulatory requirements, seagrass is thriving and the quality of marine sediment is good. Currently, iron ore is being stored and handled through a completely enclosed, dust-free system, which is cleaner, quieter and unobtrusive (Esperance Port Authority, 2003).

Esperance Port Authority undertakes community consultation through a community consultation programme. The consultation process includes: regular meetings; open days, bus tours and a designated viewing area; site meetings; publicity through local media, newsletters and a website; a formal feedback system; and an independent Port Development Consultative Committee (Esperance Port Authority, 2003). The port authority claims that it pioneered a unique, dust-free solution for handling iron ore involving rigorous community consultation and ultimately the initial community fears at the prospect of handling iron ore in Esperance have been turned into widespread support (Esperance Port Authority, 2003). A local

community group known as CBUMS is being assisted to undertake research on the seagrass communities around Esperance (Esperance Port Authority, 2003).

6.9 Summary of Findings

All seven Western Australian projects studied have established monitoring and auditing regimes within the EIA framework. In Western Australia, proponents are solely responsible for the environmental management, monitoring and reporting on the environmental performance of their actions/operations. Proponents are required to make specific environmental management commitments in the EIA documents (e.g. PER, ERMP). These commitments form part of the Ministerial Statement, which is legally binding upon proponents. In addition to their commitments the Ministerial Statements often require monitoring of impacts and reporting on environmental management aspects of projects. The Ministerial Statements also require proponents to report annually on compliance with conditions attached to the approved development. Proponents' commitments usually include preparing and implementing various environmental management plans for project construction, operation and decommissioning. Monitoring and auditing of impacts are part of different management plans.

Proponents negotiate with the Department of Environment (DoE) to get approvals of various environmental management plans once the Ministerial Statement is released. Proponents also negotiate with the DoE to obtain approval of an Audit Table, which forms the basis of audits. The environmental agency of the State Government (the Department of Environment) is responsible for conducting compliance audits. However, auditing is not an obligatory role of the DoE. Proponents often undertake audits both internally and externally and they usually engage private consultants to conduct audits on their behalf. These audits usually involve verification of compliance with the Ministerial Statements and various internal company policies. The DoE audit is usually a desk-based job but it sometimes involves site inspections focusing on one or more specific issues/matters of serious concerns. The DoE is responsible for reviewing and responding to the monitoring results. The DoE sometimes consults with other specialized agency/agencies of the government in the review or audit activity. The Department of Industries and Resources (DOIR) also conducts audits of mining projects during its annual site visits. The DOIR is mainly concerned with rehabilitation of any disturbed land.

The EPA guidelines on proposed developments usually do not specify any monitoring requirements. They only identify relevant environmental factors and set environmental management objectives to be achieved by proponents. The EIA documents (e.g. PER/ERMP) for all case study projects recognise ongoing environmental management and monitoring requirements for the project life cycle. However, in most cases the PER/ERMP documents do not include a detailed draft environmental management plan /monitoring programme. Monitoring and auditing are not considered in the early stages of the EIA process in Western Australia. Environmental monitoring and auditing are practiced as part of ongoing environmental management at the implementation and operation stages. They do not establish a feedback loop in the EIA process. They establish a regulatory control over the project operation. There is a lack of transparency and public accountability in EIA monitoring and auditing in WA. Some major controversial projects may be required to involve community consultative committees. However, the Ministerial Statement does not determine their function and scope.

Most of the projects are found to comply with the Ministerial conditions and other regulatory instruments. However, they do not necessarily achieve the desired environmental performance. The DoE is often slow to respond to monitoring results/ audit reports submitted by proponents. For example, the DoE took almost one year to clear the audit report submitted by the Esperance Port Authority. “The DoE issues new guidance statements for various environmental factors and expect them to be applied to projects already completed. DoE needs to be knowledgeable about what they are auditing, so that they make practical decisions” (Grasty, pers.comm., 2006). Table 6.1 shows the monitoring status of significant issues/impacts of seven Western Australian projects. Six out of seven projects studied were found to fully monitor or even more issues/ impacts as commitments were made in the EIS.

Environmental monitoring and auditing also occur in WA under different regulatory licensing /permit system (e.g. DoE license, mining tenement, etc.). These regulatory tools are not linked to the EIA process. Moreover, they do not deal with the wide range of issues involved in a formal environmental assessment. The DoE license (under Part V of the *Environmental Protection Act 1986*) was found to cover only a portion of the total number of issues/impacts identified as being significant in the EIA documents. In the best case the DoE license was found to cover only 42% of the total number of issues /impacts identified as being significant. All seven projects studied are found to have voluntary environmental management systems in place. Of these four projects have ISO 14001 certified EMS. Environmental monitoring and

auditing under the voluntary EMS are usually concerned with compliance but not a company's environmental performance.

Table 6.1: Number of Issues/Impacts Monitored in Western Australian Projects.

Monitoring Status	LR	JM	LT	TT	JB	GP	EP
Number of issues/impacts identified as being significant in the PER/ ERMP document or Assessment Report	7	9	9	9	11	12	7
Number of issues/impacts with monitoring commitments by proponents	4	4	-	6	2	6	6
Number of issues/impacts with monitoring requirements under the Ministerial Statement	-	-	3	-	4	2	3
Number of issues with monitoring requirements under the DoE license or other regulatory tools	3	2	3	3	-	4	3
Number of issues/impacts that were monitored in practice	5	8	9	7	2	6	5

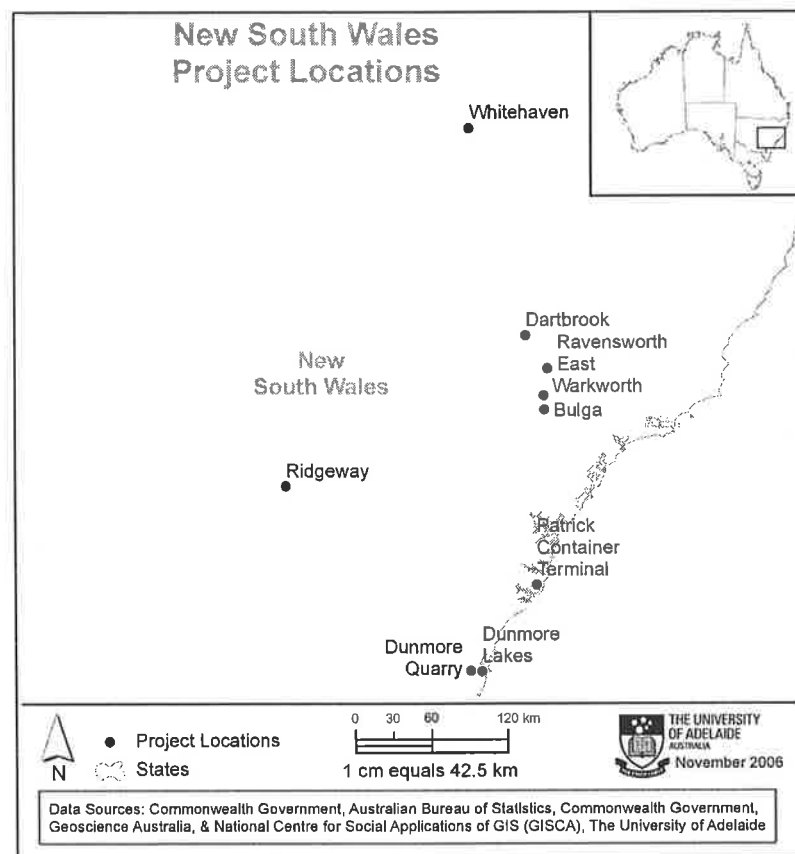
LR, Lake Lefroy Gold Mine; JM, Jangardup Heavy Minerals Mine; LT, Ludlow Titanium Mine; TT, Tutunup Titanium Mine; JB, Jervoise Bay Infrastructure Project; GP, Geraldton Port Expansion Project; EP, Esperance Port Upgrade Project.

CHAPTER 7: EIA MONITORING AND AUDITING PRACTICES IN NEW SOUTH WALES

7.1 Introduction

This chapter analyses the environmental monitoring and auditing practices at the operational stage of nine development projects (subject to EIA) in New South Wales. Development projects selected include the Ridgeway Gold Mine, Dunmore Hard Rock Quarry, Dunmore Lakes Sand Extraction Project (Stage-1), Bulga Open Cut Coal Mine, Dartbrook Underground Coal Mine, Warkworth Coal Mine (Extension), Whitehaven Coal Mine, Ravensworth Open Cut Coal Mine, and Patrick Stevedores Container Terminal Upgrade (see Figure 7.1 and Appendix-9 for background information on the case study projects). This chapter describes the case studies based on the relevant EIA documents, annual reports, audit reports, etc. The relevant persons in the government and local government agencies and private companies have also been contacted for information and clarification, when required.

Figure 7.1: Location Map of the Case Study Projects in New South Wales



7.2 Ridgeway Gold Mine

Environmental Management and Monitoring Practices

Cadia Holdings Pty Ltd. has a Mining Operation Plan (MOP) (Cadia, 2003) approved by the Department of Mineral Resources (DMR) for three years. It was updated in 2004 to accommodate the necessary changes required as a result of the extension of the South Dump. It provides the basis for implementing mining operations, environmental management and ongoing monitoring and satisfies the requirements of development consent and other statutory approvals (Morris, pers. comm., 2005). In addition, an Environmental Management Strategy (Cadia, 2004) was prepared to the satisfaction of the then DUAP in December 2004. The Environmental Strategy is currently being updated to reflect the site management. Cadia prepared all environmental management plans as required by the development consent. They are being reviewed and updated as required (Morris, pers. comm., 2005). They were placed on public display in the relevant local council libraries for a limited time but they are not retained at the local Council library for public viewing.

Cadia undertakes environmental monitoring for Ridgeway Gold Mine on the basis of a monitoring programme. This programme specifies monitoring sites, monitoring parameters and frequency. Monitoring results are published annually through the Annual Environmental Management Report (AEMR). Copies of this report are submitted to the relevant government agencies including DUAP, EPA, DLWC, NPWS, NSW Fisheries, the CCC and other members of AEMR Committee and are made available for public viewing at the local Councils. The AEMRs are reviewed in an annual AEMR meeting with the presence of representatives of the company, relevant State agencies, local Councils and the CCC. In the annual AEMR meeting held on 16 September 2004, 14 members out of 24 were present. No representative from DIPNR, Dam Safety Committee and the CCC, however, was present at that meeting (Cadia, 2005).

The 2005 AEMR (Cadia, 2005) indicates some localised groundwater impacts which are not believed to be a risk to water quality or groundwater supply systems at the present time. An independent review of groundwater and surface water monitoring programme was conducted in January 2005. It concluded that the increase in downstream salinity and chemical parameters is related to drought conditions and was not a result of current mining activities (Cadia, 2005). Dust deposition levels of the reporting year 2004-05 were found to comply with the EPA Air quality guidelines although they were higher than for the same period last year. The noise level remained below the specified noise criteria. An independent operator

attended and logger-based noise survey was conducted in the reporting year. The vibration limit was also found to comply with the regulatory limit. Four environmental incidents were reported to the EPA in the reporting year 2004-2005, including tailings spill, failure of rockwall, diesel spill, and discharge of treated effluent. One community complaint was received during the reporting period regarding Blayney Concentrate Dewatering Facility (Cadia, 2005). It referred to occasional noise generation.

Cadia undertakes an independent external audit as required by the development consent. The independent compliance audit conducted in 2005 reviewed the development consent conditions relevant to the operation and assessed the project's compliance with the development consent conditions. The 2005 audit report (Matrix, 2005) concluded that in general the site achieved significant compliance with the development consent. However, there are still some opportunities for development which will ensure full compliance. The previous external audit was conducted in 2001. The 2005 audit identified 7 non-compliances, six substantial compliances and two conditions in progress. Actions relating to 11 conditions are not yet applicable while for 7 conditions actions are no longer required. The audit reports are not made public.

Cadia submits an Annual Return to the EPA reporting on the environmental performance of the development as set out in the licence (5590) under *the Protection of Environment Operations Act 1997*. Five conditions in the licence require monitoring to be undertaken. These are concentration limit, noise limit, concentration of pollutants discharged, volume or mass, and weather. The reporting requirements include an Annual Return (comprising a statement of compliance; and a monitoring and complaints summary), Notification of Environmental Harm, Written Reports on Events, and Annual Environmental Management Report. Nine community complaints have been reported in the 2004 Annual Return. They mostly refer to noise, blasting and vibration, and dust. Five environmental incidents were reported in the 2004 Annual Return, being leak in tailings pipeline, overflow of sediment dam, failure in diversion, spill of diesel, and discharge of treated effluent. Ridgeway Gold Mine has been found non-compliant with EPA licensing conditions once in 2002. The non-compliance relates to one of the reporting conditions (i.e. submission of monthly sediment plans).

The 2005 AEMR notes that Cadia undertook a number of initiatives in relation to community consultation during 2004-2005. Some of them are an annual site open day, educational site

tours (88), community information forum, research scholarship, donation to educational, charity and community projects, and newsletters. Four Community Consultative Committee meetings were held during this period. Minutes of the CCC meetings are not made public. The AEMR does not discuss the outcome of the CCC meetings. A total of 164 conditions of the development consent under 12 broad categories apply to the Ridgeway Gold Mine. Seven conditions were reported non-compliant in the 2004-2005 AEMR.

The Community Consultative Committee receives a copy of the AEMR and during the course of the year any anomalous results are discussed at CCC meetings. The monitoring results have not yet suggested any new mitigative measures or changes in current mitigative measures. The current environmental monitoring and auditing practices of Ridgeway Gold Mine neither involve any audit to verify the accuracy of predictions made in the EIS nor does it determine the actual impacts of the mine operation. However, for some environmental aspects such as groundwater and surface water flows the company reviews the monitoring results internally with the EIS predictions every six months (Morris, pers. comm., 2005). The following comment made by the company's environmental manager reflects the actual status of the effectiveness of environmental management and monitoring practices in the Ridgeway Gold Mine operations. "There is an inherent lack of flexibility to modify any aspect of the monitoring program – the company monitor for monitoring sake rather than to drive operational change. We do not get enough rigorous review of our data by the regulators and this can lead to a credibility gap with the community. You pay the consultants so of course you get the results you want" (Morris, pers. comm., 2005).

7.3 Dunmore Quarry

Environmental Management and Monitoring Practices

Boral was granted a new consent in 2004 and the majority of the conditions are still being implemented. Boral has prepared an Environmental Management Strategy, an Environmental Monitoring Programme and all environmental plans as required by the development consent (Worden, pers. comm., 2005). These are neither public documents nor are they made publicly available. Currently, the company is monitoring noise, water, dust and blasting (over-pressure and vibration) (Worden, pers. comm., 2005). There was no formal mechanism to review the monitoring results, neither were there reporting requirements under the previous consent. Boral used to submit monitoring results to the Department of Environment and Conservation (DEC) either on request or annually in the annual return (Worden, pers. comm., 2005). The new (2004) consent significantly increases the level of reporting including preparation of an

annual environmental management report (AEMR) (Worden, 2005, pers. comm.). Under the current consent condition the first AEMR is expected to be prepared in 2006. No independent (external) environmental audit was conducted because it is not a requirement.

The Dunmore Quarry operation has an approved Community Consultative Committee (CCC). The CCC members have meetings every six months and review and provide advice on the environmental performance of the development. The CCC also provides information to the community and any concerned resident or other stakeholders can obtain information on environmental monitoring from the CCC. Written minutes are prepared for the CCC meetings and these are publicly available (Worden, pers. comm., 2005). Noise and dust are constant issues for Dunmore Quarry. Significant upgrades have been undertaken to the crushing plant to reduce noise and dust emissions, while noise ameliorative measures have been put in place on mobile equipment. The DEC undertakes occasional parallel monitoring of water and dust.

There is a voluntary EMS in place as part of the company's internal environmental policy, which is not ISO certified. It involves an internal audit every six months and internal reporting on compliance with development consent conditions; the audit report is not made public. Boral is following Commonwealth guidelines on best practice environmental management in mining. They include: community consultation and involvement, environmental management systems, environmental monitoring and performance, rehabilitation and revegetation, environmental auditing, noise, vibration and air blast control, dust control and water management (Worden, pers. comm., 2005).

Boral submits an Annual Return to the EPA reporting on the environmental performance of the development as set out in the licence (77) under the *Protection of Environment Operations Act 1997*. Five conditions in the licence require monitoring to be undertaken. They relate to concentration limit, pollutants discharged (into air, water and land), noise, blast, and weather. A total of 164 community complaints was reported in the 2004 Annual Return relating mostly to noise, blasting and vibration, and dust. No environmental incidents were reported in the 2004-05 Annual Return. Dunmore Quarry has been found non-compliant with EPA licensing conditions twice (1999-2000 and 2003-04) over the last six years. During 2003-04 two non-compliances were recorded about operating conditions (dust). Two non-compliances were also recorded during 1999-2000, concerning blasting. The 2004 Annual Return does not report any non-compliance.

7.4 Dunmore Lakes Sand Extraction Project (Stage 1)

Environmental Management and Monitoring Practices

Dunmore Sand and Soil Pty Ltd has been issued a new development consent in June 2005 for Stages 2, 3, and 4 of the Dunmore Lakes Sand Project. Boral Resources Ltd. purchased the ownership in early 2005 and currently, the project is operational under the new consent conditions and new ownership (Johnson, pers.comm., 2005). There is an Environmental Management Plan (RWC, 2005a) in place to guide the operational environmental management throughout its 25 years operational time. This document incorporates the various plans and programmes produced within three months of the date of consent. These were subsequently amended on the basis of comments from DEC, DIPNR and specialist consultants (groundwater and surface water). The Environmental Management Plan should be updated every three years following commencement of operations. The current EMP includes environmental monitoring programmes for air, noise, groundwater and surface water monitoring. The environmental management plans that have been included in the EMP are a Water Management Plan (incorporating the site water balance and erosion and sediment control plan), Flora and Fauna Management Plan, and a Rehabilitation Management Strategy (RWC, 2005a). A single Environmental Monitoring Protocol has been prepared as part of all monitoring programmes undertaken for the Dunmore Lakes Sand Project. This protocol addresses those matters relevant to managing environmental pollutants and /or contaminants generated by the project and operation of various monitoring programmes. These are compliance criteria, community consultation, environmental controls and mitigation measures, management of complaints, and monitoring methods (RWC, 2005a).

A Complaints Recording and Handling Protocol was initially prepared in 2000 with input from the Community Consultative Committee and the then Environment Protection Authority. It has been reviewed and updated recently. The protocol comprises four parts: an outline of procedures to be followed by a complainant; documentation to be maintained by DS&S about each complaint; a complaint register; and reporting procedures to the Community Consultative Committee (RWC, 2005a). The current Community Consultative Committee comprises 2 company representatives, 1 Council representative, and 6 community representatives (Johnson, pers.comm., 2005). The CCC members must meet every six months but only one meeting was held in the reporting year 2004-2005.

An 'Annual Compliance Report' is prepared every year with the help of a consultant. This report discusses the compliance status of the development consent. An external environmental

audit was commissioned in August 2005 (RWC, 2005b). The audit assessed the status of compliance with 95 conditions of the development consent and ten non-compliances were identified. Six non-compliances were recorded in the previous reporting year (2003-2004). The non-compliances relate to reporting, monitoring and environmental performance. They include extraction sequence, carp eradication, Community Consultative Committee meetings, sand product quality control (exceedence of TOS levels), monitoring groundwater levels (failure to record groundwater fluctuation continually in Bore DG5), quarterly reports to Council (failure to submit quarterly reports), inconsistency with EIS/ EMP, exceedence of load limits, and delayed annual reporting. These non-compliances simply diminish the available data to assess the site's performance (RWC, 2005b). The Company conducted investigations by an expert in relation to the exceeding 0.03% TOS levels in the product sand. This investigation, however, concluded that there has been no environmental harm caused by this action.

The Annual Compliance Report makes a comparison of environmental performance of the development (quarry) against EIS predictions. The 2005 compliance report (RWC, 2005b) notes that local residents continue to acknowledge the quarry's satisfactory environmental performance. Concerns initially expressed regarding traffic congestion, air quality and noise have not materialised. The monitoring data collected to date in relation to groundwater levels and surface water quality generally supports the EIS predictions and does not indicate any adverse impacts. This is despite the fact that some increases in groundwater salinity at depth have been recorded. However, the actual levels are found to be consistent with those located throughout the Rocklow Creek Catchment (RWC, 2005b).

The proponent submits an Annual Return to the EPA on the environmental performance of as set out in the licence (11147) under the *Protection of Environment Operations Act 1997*. Four conditions in the licence require monitoring to be undertaken, particularly in regard to dust, noise, water and odour. The reporting requirements include an Annual Return (comprising a statement of compliance; and a monitoring and complaints summary), Notification of Environmental Harm, and Written Reports on Events. No community complaints or environmental incidents have been reported in the 2004-05 Annual Return. Dunmore Quarry (Sand) has been found non-compliant with EPA licensing conditions twice (2000-01 and 2001-02) during the last five years. During 2000-01 the only non-compliance recorded was related to monitoring conditions (dust). The same non-compliance was also recorded during 2001-02.

7.5 Bulga Open Cut Coal Mine

Environmental Management and Monitoring Practices

Bulga Coal Management Pty Ltd prepared a-year Mining Operation Plan (MOP) in to the satisfaction of DMR. It provides the basis for implementing mining operations, environmental management and ongoing monitoring and it satisfies the requirements of development consent and other statutory approvals (Bragg, pers. comm. 2005). This is not a public document. In addition, an Environmental Management Strategy (EMS) was prepared to the satisfaction of DUAP in 2001. The EMS was updated once in 2003 (Bragg, pers.comm. 2005). Copies of the EMS have been distributed to the relevant departments, local Council and CCC. There are at least 12 environmental management plans in place as part of the overall Site Management Plan or Mining Operation Plan. They are approved by the relevant government agencies but none of them was updated as of December 2005. The approved plans are made publicly available at the local Council for only a limited period and are not retained in the Council Library. Environmental monitoring for Bulga Open Cut Coal Mine is being conducted on the basis of a number of monitoring programmes. Monitoring results are published annually through the Annual Environmental Management Report (AEMR). The 2004 AEMR (Umwelt, 2005) shows that the current environmental monitoring in relation to Bulga Open Cut Coal Mine relates to meteorology, dust deposition and air quality, surface water, groundwater, noise and blast, native vegetation, and rehabilitation. Environmental monitoring is undertaken by the contractors. They have quality assurance (QA) in place in regard to sampling methods and techniques.

Copies of the AEMR are submitted to the relevant government agencies including DUAP, EPA, DLWC, NPWS, local Council, and the CCC and are made available for public information at the local councils. Unlike the Ridgeway Gold Mine there is no formal mechanism for inter-agency coordination (e.g. AEMP Review Committee) in relation to the AEMR review. The DPI officials visit the mine site annually to review compliance with the environmental requirements of relevant approval instruments, including the Mining Lease, Mining Operations plan and the AEMR of the previous year. In the 2005 site inspection conducted by the DPI officials the mine complied with the relevant statutory approval instruments administered by the DPI. The DPI inspection primarily focuses on the rehabilitation progress. However, they also look at other issues such as tailings emplacement, CCC, water management of Hunter River, etc. AEMRs are also reviewed by the CCC in their meetings held in every 6 months (Bragg, pers. comm., 2005). A total of 78 conditions of the development consent under 12 broad categories apply to the Bulga Open Cut Coal Mine.

None of the consent conditions were found non-compliant in the 2004 AEMR. No audit has so far been conducted as of 2005 to determine the actual impacts of the mining operation on the environment.

There is a voluntary Environmental Management System (EMS) in place for the Bulga Open Cut Coal Mine. It complies with the Xstrata EMS, developed in accordance with ISO 14001. It was initially developed in 2001 and updated in 2004 as part of an Annual Management Review. The 2004 AEMR (Umwelt, 2005) shows that a voluntary EMS audit is undertaken every year by an external auditor. Bulga Open Cut Coal Mine scored 93% conformance with the Xstrata EMS during the last four years. An external environmental audit is conducted every three years in accordance with the guidelines of ISO 1410 and ISO 14011 standards. Copies of the audit report are distributed to the relevant government agencies, local Council and the CCC (Bragg, pers. comm., 2005). The 2004 AEMR shows that a complaint registry system has been established for the community in relation to the operation of Bulga Open Cut Coal Mine. There were eleven community complaints throughout the reporting period (2004). Nine of these complaints related to blasting, one related to blast flames and one related to noise. A summary of complaints is provided to the DIPNR, DEC, local Council and the DPI.

The CCC holds 2 meetings each year, one every 6 months and members of the CCC include two representatives from the local Council (including the chairperson), two from the company, and one from DPI. Written minutes of the CCC meetings are produced and they are distributed to each CCC member. They are also made available for public access (Bragg, pers. comm., 2005). The company undertakes a number of initiatives in relation to community consultation. One of them is the distribution of a newsletter to the local community to inform them of the mining activities and measures used at Bulga Complex that reduce environmental impact. The other major initiatives include organising public workshops, sponsoring community events, visitor information centre, site visit tour, etc (Umwelt, 2005).

The company submits an Annual Return to the EPA reporting on the environmental performance of the development as set out in the licence (563) under the *Protection of Environment Operations Act 1997*. Five conditions in the licence require monitoring to be undertaken. They relate to monitoring of air quality and dust, water quality, blasting, weather, and Hunter River Salinity Trading Scheme Discharge. Bulga Coal Mine has been found non-compliant with EPA licensing conditions every year during the last six years. Nine community complaints were reported in the 2004 Annual Return, concerning mostly noise,

blasting and vibration, and dust. Five environmental incidents were reported in the 2004 Annual Return: leaks in tailings pipeline, overflow of sediment dam, failure in diversion, spill of diesel, and discharge of treated effluent.

7.6 Dartbrook Coal Mine

Environmental Management and Monitoring Practices

Dartbrook has a Mining Operation Plan (MOP) approved by the DMR for its overall operations, environmental management and monitoring (Yench, pers. comm., 2005). The MOP is not a public document. Dartbrook has recently obtained certification of the Safety, Health, Environment and Community Management System (SHECMS) to the ISO 14001 and AS/NZS 4801 standards for management systems (Anglo Coal, 2005). It includes processes for monitoring and auditing during operations, i.e. monitoring and auditing is included in the EMS. The EMS is audited externally every six months, involving both system and technical audits and internal reporting (Yench, pers. comm., 2005). In addition to the voluntary EMS, there are 17 environmental management plans in place as required by the planning approval conditions. The management plans are approved by the relevant agencies and are subject to revision every five years or as required. These plans are made available to the public via the local Council for a limited period after they are approved but they are not retained in the Council Library.

The current environmental monitoring with regard to Dartbrook operations relate to meteorology, subsidence, air quality, erosion and sedimentation, surface water quality, groundwater quality and level, threatened flora and fauna, weeds and feral animals, noise, vegetation, archaeology, land disturbance and REA temperature (Yench, 2005, pers.comm.; Anglo Coal, 2005). The timeframe for monitoring varies with the monitoring parameters. Some parameters are monitored weekly, fortnightly, quarterly or annually. Dartbrook has Quarterly Monitoring Reports prepared for government regulators and members of the Dartbrook Community Consultative Committee (Yench, pers. comm., 2005). An Annual Environmental Management Report (AEMR) is also prepared annually and is distributed to government regulators, DCCC and members of the public via the local libraries (Yench, pers. comm., 2005). The Annual Environmental Management Report predominately reports the Mining Operations plans (MOP), mining lease conditions and development consent conditions. AEMRs are made publicly available via the local libraries. The AEMR includes summary monitoring data. Further data are made available on request (Yench, pers. comm.,

2005). The Department of Primary Industries (DPI) conducts an annual inspection to the site and reviews the environmental performance and the AEMR. The observation of the review and action required for the previous year are mentioned in the next year's AEMR. Other relevant agencies also review the AEMR and respond to the monitoring results separately. There is no formal inter-agency coordination mechanism (e.g. AEMR Committee) regarding this.

The 2004 AEMR (Anglo Coal, 2005) indicates that the Dartbrook operation still faces challenges with water, dust, and noise management and the rejects emplacement area (REA). The relevant Council officer admits that there are still exceedences in dust and noise levels (Yench, pers. comm., 2005). According to the request on the DIPNR, Dartbrook commissioned a groundwater specialist to complete a detailed groundwater assessment. The AEMR does not discuss the environmental performance of the mine against EIS predictions although this is a requirement of development consent. The 2004 AEMR notes that ten complaints were registered in 2004, and there were more of these compared to the previous year. There were three environmental incidents reported to the Department of Environment and Conservation (DEC) in 2004, concerning mine water discharges from the dewatering plant. In all instances, investigations concluded that there was no environmental harm as a result of these mine water discharges.

Anglo Coal prepares annual Safety Health Environment and Community Reports and distribute to members of the local community. The company informs the community regarding its operation through the Dartbrook Mine Community Consultative Committee (Yench, pers. comm., 2005). The members of the DCCC meet every two months but no written minutes are produced. The CCC members verbally communicate outcomes of these meetings to the public. Five meetings of the DCCC were held in 2004. The 2004 AEMR shows that the functioning of the DCCC was queried during the August (2004) meeting, which was adjourned until late December due to disagreement regarding documentation of the DCCC meetings minutes. Dartbrook has established a complaints handling protocol (Yench, pers. comm., 2005). The response process involves recording the complaint, seeking immediate identification of the cause of the complaint, telephone contact with the complainant within 24 hours where possible, and formal follow-up with a letter of response (Anglo Coal, 2005).

The 2004 AEMR shows that an independent compliance audit of the operation was undertaken in August 2004, as required by the development consent. This audit focused on compliance with the development consent and other regulatory instruments, environmental performance and effectiveness of the mine's environmental management. The 2004 audit identified nine non-compliances, one of them relating to monitoring of the success of the revegetation of the box cut area. Another one related to discussing environmental performance in the AEMR against EIS predictions. Another compliance audit was also undertaken by DIPNR against the mine's current conditions of the development consent in December 2004. The audit focused on consistency of the facilities and operations with the EIS and the Development Consent, noise emissions, dust emissions and status of the actions from the Independent Audit. The audit reports are not made publicly available.

Dartbrook submits an Annual Return to the EPA reporting on the environmental performance of the development as set out in the licence (4885) under the *Protection of Environment Operations Act 1997*. The EPA license (4885) requires monitoring of: groundwater, discharge water flow and quality, irrigation area soil quality, concentration of pollutants discharged, blast and Hunter River Salinity Trading Scheme (HRSTS) discharge. The EPA License requires the licensee to submit an Annual Return comprising a statement of compliance and a summary of any monitoring required by the licence (including the recording of complaints). Dartbrook has been found non-compliant with EPA licensing conditions every year during the last five years.

7.7 Extension of Warkworth Coal Mine

Environmental Management and Monitoring Practices

In 2001, Coal and Allied (CNA), a Rio Tinto Group Company purchased an interest in the Warkworth Mine adjacent to its Existing Mount Thorley Operations. In January 2004, Mount Thorley Operations and Warkworth Mining Limited began operating as one business (Coal & Allied, 2004). A Mining Operation Plan (MOP) was prepared in July 2003 for the period of four and half years to the satisfaction of DMR. It provides the basis for implementing mining operations, environmental management and ongoing monitoring. It satisfies the requirements of development consent and other statutory approvals. This is not a public document. All management plans required by the development consent have been prepared (Foster, pers. comm., 2006). There are at least 4 environmental management plans in place as part of the Mining Operation Plan. These are a Flora and Fauna Management Plan, Erosion and Sediment Control Plan, Archaeology and Cultural Heritage Plan, Bushfire Management Plan.

There are also environmental monitoring programmes in place to monitor flora and fauna, air quality, noise, blasting, surface water and groundwater (Coal & Allied, 2004). These plans and programs are periodically reviewed and updated. They are not public documents but they are made available for public viewing at the local Council (Thomas; pers. comm., 2006). The 2004 AEMR (Coal & Allied, 2004) shows that continuous monitoring of meteorological conditions, air quality, water quality (surface and groundwater), noise levels, blasting operations, flora and fauna and rehabilitation areas occurs. Monitoring results are published in the Annual Environmental Management Reports (AEMR).

AEMRs are published annually (Foster, pers.comm., 2006). Since 2004, a single AEMR is prepared for both Mount Thorley and Warkworth operations. The AEMR reviews all environmental management and monitoring aspects, compliance status and mine's environmental performance. It also sets a target for the following year and reviews the targets of the previous year. Copies of the AEMR are distributed to the relevant regulatory agencies (including DEC, DMR, and DIPNR), local Council and the CCC. The AEMR is not made public but it is available for public viewing at the local Council library. Coal & Allied maintains a website that includes reports and bulletins relating to sustainability and environmental performance. These are a Sustainability Report, Social and Environmental Report, Environment News and Community Trust Report.

There is no formal interagency coordination mechanism for reviewing AEMR. Different regulatory agencies review and respond to the AEMR separately. However, the key role lies with the Department of Primary Industries (DPI), Department of Planning (DoP) and the CCC. The DPI and DoP officials and the members of the CCC conduct site inspections annually but they do not conduct any parallel monitoring (Foster, pers. comm., 2006). The 2004 AEMR shows that DPI and DoP officials identified 21 issues during their site inspection in 2003. Of them 8 issues concern surface water management, 6 issues relate to erosion and sediment control, 3 issues refer to rehabilitation, two issues are about groundwater management and one issue relates to weed control. The first external compliance audit was carried out in 2005 according to the requirement of the most recent development consent given in May 2003. The audit report was submitted to the Director General, DoP (formerly DIPNR) but it is not made public. The Warkworth development consent includes 99 conditions. The Annual Report 2004 shows full compliance with the development consent.

The Warkworth operation has a Community Consultative Committee (CCC) that monitors compliance with conditions of consent and provides a forum for community discussion (Foster, pers. comm., 2006). The CCC comprises members from the community, representatives from Coal & Allied, Singleton and Muswellbrook Shire Councils, the DMR, DIPNR and the DEC. The CCC members conduct site inspections of operations and this assists in understanding the issues faced at the mine sites. The CCC meetings are held on site. An independent person prepares written minutes for the CCC meetings. Minutes are distributed to the Council and CCC members who make the information available to the community. The CCC members meet twice a year (Foster, pers. comm., 2006). According to the relevant Council officer, the CCC of Warkworth mine is not as effective compared to Ravensworth mine (Thomas, pers. comm., 2006).

In addition to the CCC there are other community consultation initiatives in place. These include: participation in Upper Hunter Coal Awareness Day; the Coal & Allied/Hunter Valley Research Foundation Business Breakfast; mine tours; face to face meetings between operations General Managers and neighbours; issue-specific presentations to local Council; and media releases (Coal & Allied, 2004). The 2004 AEMR notes that CNA undertakes a number of community programmes including donations, sponsorship and in-kind assistance for a range of environmental, community and educational initiatives. Coal & Allied also undertakes consultation on cultural heritage management and programmes to educate company employees regarding Aboriginal and European cultural awareness.

CNA has established a complaints handling protocol (Foster, pers. comm., 2006). The 2004 AEMR notes that the CNA has a 24 hour Environmental Hotline (1800 656 892) for community issues about any of its mines. Details of each complaint and follow-up actions taken are maintained in a database. Fifty-two environmental complaints were received during the reporting period 2004. Most of the complaints (46) were concerned with blasting. Other complaints were related to dust (2), noise (1) and other issues (3). It is reported that the complaints have declined compared to previous years. Environmental incidents declined since 2004. Twenty environmental incidents were recorded in 2004. Of them 6 relate to dust management, 4 relate to water management, 8 relate to hydrocarbon management, and two relate to blasting. Four incidents were reportable to the NSW Department of Environment and Conservation during 2004.

All mining operations of Coal & Allied have an ISO 14001 accredited Environmental Management System (EMS) prescribing actions and procedures managing environmental impacts such as dust, noise, water quality, spill cleanup, fuel storage, land use, and reporting of incidents. The EMS involves both internal and external audits and an independent auditor carries out four internal EMS audits and an internal compliance audit annually (Foster, pers. comm., 2006). The first external compliance audit was carried out in early 2005 according to the development consent schedule but it was cleared by the DoP late in the year (Foster, pers. comm., 2006). Audit reports are not made public. CNA has implemented a number of system improvements to ensure each operation complies with the ten environmental standards by Rio Tinto in 2003. These standards address a number of environmental issues including land use stewardship, water use and quality control, non-mineral waste management, noise and vibration control, hazardous materials and contamination control, greenhouse gas emissions, and air quality control (Coal & Allied, 2004).

CNA submits Annual Returns to the EPA on the environmental performance of the development as set out in the licence (1376) under the *Protection of Environment Operations Act 1997*. The monitoring requirements under the license include air quality and dust, noise, blasting, water quality and HRSTS discharge. Warkworth Mine has been found non-compliant with EPA licensing conditions every year during the last five years.

7.8 Ravensworth Open Cut Coal Mine

Environmental Management and Monitoring Practices

Currently, Ravensworth East Mine and Mt Owen Mine are being managed and operated as Mt Owen Complex (HVCC, 2005). Both mines are owned by Xstrata Coal Australia (XCA). They are managed by Hunter Valley Coal Corporation (HVCC) and operated by Thiess Pty Ltd (TPL). Mt Owen operations obtained modified development consent in December 2004 (DA 14-1-2004). Ravensworth East Mine continues to operate under DA 52-03-99, which has been modified to reflect the new Mt Owen Consent conditions. This allows for the implementation of a common EMS across the Mt Owen Complex and the development of common environmental management plans (HVCC, 2005). Environmental Protection Licenses for the Mt Owen (No. 4460) and Ravensworth East (No. 10860) premises continue to apply separately.

A 4-year Mining Operation Plan (MOP) was prepared in 2000 to the satisfaction of DMR. Recently, a new MOP has been prepared under the modified development consent and submitted to the regulatory authority for approval (Charnock, pers. comm., 2006). The MOP provides the basis for implementing mining operations, environmental management and ongoing monitoring. It satisfies the requirements of development consent and other statutory approvals but it is not a public document. All other management plans required by the new development consent have been prepared (Charnock, pers. comm., 2006). These are made publicly available at the local Council after their approval for a limited period. Environmental management programs and work procedures are developed in response relevant requirements and may be updated at any time in response to changed circumstances (HVCC, 2005). Individual environmental management plans and monitoring programs are consolidated into an Environmental Management Strategy and Environmental Monitoring Program. Continuous monitoring of meteorological conditions, air quality, water quality, noise levels, blasting operations, flora and fauna and rehabilitation areas is undertaken (HVCC, 2005). Monitoring results are published in the Annual Environmental Management Reports. Monitoring results will be placed on the company's website from 2006 onward (Charnock, pers. comm., 2006).

Mt Owen Complex has a site specific environmental policy. This policy is in addition to, and complements the corporate policies of both TPL and XCA. Mt Owen Complex has an ISO 14001 accredited voluntary Environmental Management System (EMS) in place. Both Xstrata and Thiess are members of the Minerals Council of Australia. An environmental training program is in place to ensure that all employees and contractors who work at Mt Owen Complex are fully aware of their obligations to the environment (HVCC, 2005).

The company publishes an Annual Environmental Management Report (AEMR). The AEMR reviews all environmental management and monitoring aspects, compliance status and the mine's environmental performance. It also sets a target for the next year and reviews the targets of the previous year. Copies of the AEMR are distributed to the relevant regulatory agencies (including DEC, DPI, DoP, and DNR), local Council and the CCC. The AEMR is not made public but it is made available in the Council Library for public viewing. Mt Owen Complex has also adopted annual reporting under the National Pollution Inventory (NPI) reporting process, which is a State legislative requirement. The NPI is an Internet database designed to provide the community, industry and government with information on the types and amounts of certain substances being emitted into the environment. There is no formal

interagency coordination mechanism for reviewing the AEMR. Different regulatory agencies review and respond to the AEMR separately but the major role lies with the Department of Primary Industries (DPI) and CCC. The DPI officials and the CCC members conduct site inspections to observe various aspects of mine operations including environmental management, monitoring and mitigation initiatives. The regulatory agencies do not conduct any parallel monitoring. The Annual Environmental Management Report 2004-05 (HVCC, 2005) shows full compliance with the new development consent received in 2004. Most of the targets set for the period 2004-05 were achieved while others are ongoing.

The Mt Owen Complex has established a Community Consultative Committee (CCC), currently comprising nine community representatives, four mine representatives, and three representatives from Singleton Council who meet quarterly. A Councillor from Singleton Council chairs meetings and an independent minute-taker takes notes. Government representatives periodically attend meetings. Minutes are prepared for each meeting and distributed to all CCC members and the Director General of the Department of Planning (formerly DIPNR). Minutes are made public and they are made available on the company's website. The CCC reviews and provides advice on the environmental performance of the development, including any construction or environmental management plans, monitoring results, audit reports, or complaints. The relevant Council officer states that the CCC works quite effectively (Thomas, pers. comm., 2006). In addition to CCC meetings, annual meetings with the wider community are a recent initiative to provide the local residents and other key stakeholders with important information relating to Mt Owen operations (HVCC, 2005). This provides an opportunity for the community to provide feedback and raise issues directly with mine personnel. HVCC have a Community Liaison Officer who is responsible for facilitating effective stakeholder engagement and responding to any community concerns in a timely manner. Regular six monthly liaison meetings are being organised with the local Aboriginal Community. HVCC undertakes a number of community programmes including donations, sponsorship and in-kind assistance for a range of environmental, community and educational initiatives (HVCC, 2005).

The Mt Owen Complex has established a complaints handling protocol. Details of each complaint and follow-up actions taken are maintained in a database and relayed to Xstrata and Thiess management. During 2004-2005, 11 complaints about Ravensworth Mine were received. This compares to the previous period when 9 complaints occurred. Most of the complaints relate to noise, dust and blasting vibration. The 2004 AEMR (HVCC, 2005) shows

that there are exceedences in dust, noise and vibration levels. The company claims that complaints are most commonly received during cooler times of the year and the prevailing weather conditions have significant impacts upon both the level of impact and complaint frequency (HVCC, 2005).

The Mt Owen Complex undertakes both external and internal environmental audits but the audit reports are not made public. Internal audits are conducted by both of the operators every six months against the voluntary EMS of the company to ensure ongoing general compliance. An external audit is conducted every three years against the Xstrata EMS and the development consent. In addition to the auditing programme, performance indicators are collected in relation to environmental performance, energy use, greenhouse gas emissions, materials use and recycling. This information is reported internally and summary statistics are included in the annual public report.

Thiess Pty Ltd submits Annual Returns to the EPA reporting on the environmental performance of the development as set out in the licence (10860) under the *Protection of Environment Operations Act 1997*. The monitoring requirements under the license include air quality and dust, noise, blasting, and water quality. Ravensworth Coal Mine has been found non-compliant with EPA licensing conditions every year during the last five years. There are still community concerns about noise, dust, blasting, surface and groundwater (Charnock, pers. comm., 2006).

7.9 Whitehaven Coal Mine

Environmental Management and Monitoring Practices

Whitehaven Coal Mine Ltd. (WCM) undertakes all mining, environmental management and monitoring activities generally in accordance with the Mining Operation Plan (MOP), management plans and procedures prepared to the satisfaction of relevant government agencies (Corbett, pers. comm., 2006). All these plans and procedures satisfy the requirements of mining leases, development consent and *Coal Mines Regulation Act 1982*. The 'Corporate Environmental Policy' of Whitehaven requires the company to be committed to responsible environmental management and sound environmental practices within the community (RWC, 2000). According to the requirements of the development consent, Whitehaven prepared a Mining Operations Plan (MOP), an Environmental Management Strategy and 14 separate management plans. The MOP and five management plans were revised or updated until 2004, as required by the relevant agencies. All management plans are

made available for public viewing at the local Council (Corbett, pers. comm., 2006). The current MOP (WCM, 2003) which was ratified in 2003 sets out to implement a comprehensive environmental management programme. It identified 14 areas of environmental risk in the mine's overall operations.

The current environmental monitoring in relation to Whitehaven operations includes the reject emplacements, air quality (dust monitoring), surface water quality, groundwater quality, flora, threatened fauna, operational noise, Aboriginal heritage, rehabilitation and meteorological (WCM, 2004). The timeframe for monitoring varies with monitoring parameters; some parameters are monitored weekly, fortnightly, quarterly or annually. Monitoring results are reported to the relevant government regulators and members of the Community Consultative Committee (CCC) through the Quarterly Monitoring Reports and Annual Environmental Management Reports (Corbett, pers. comm., 2006). The AEMR reports the Mining Operations plans (MOP), mining lease conditions and development consent conditions. AEMRs are not made public but they are publicly available on request. The Department of Primary Industries (DPI) conducts an annual inspection of the site and reviews the environmental performance and the AEMR (Corbett, pers. comm., 2006). The observation of the review and action required for the previous year are mentioned in the AEMR for the next year. The 2004 AMER (WCM, 2004) notes that during the 2003 inspection by the DMR, there was a general compliance with the relevant statutory approval instruments administered by the DMR. No new issues were identified that either required comment or continued management. Other relevant agencies also review the AEMR and respond to the monitoring results separately. There does not exist any formal inter-agency coordination mechanism.

WCM maintains a designated complaints line, with messages checked on a daily basis (seven days/week) by the Environmental Officer and the outcome recorded in his/her diary. During the reporting period for 2003/04, three complaints were recorded. Those complaints were related to blast, mining noise, and road safety. The AEMR discusses the complaints providing information on investigation, action taken and follow-up. Complaints are also reported in the bi-annual report submitted to DIPNR, DPI-Mineral Resources, concerned local councils and the CCC. In accordance with conditions of the development consent, a Community Consultative Committee (CCC) was formed prior to the commencement of Stage 2 mine operations. The CCC initially met quarterly for the first few years and more recently meets when required (Balcombe, pers. comm., 2006). During the 2003/2004 reporting period, only one formal meeting was held and meeting frequency depends on the extent of concerns

expressed by the councils and community (Corbett, pers. comm., 2006). Written minutes are produced for the CCC meetings, and distributed to the CCC members and the local Councils. The CCC for Whitehaven Mine has been a successful mechanism for complaint resolution and the Council representative is particularly supportive of the mining company's willingness to address any concerns raised by the CCC (Balcombe, pers. comm., 2006). The company maintains a very good relationship with its neighbours. WCM representatives maintain regular personal contact with the neighbours to disseminate information and address any potential issues which may arise from time to time (WCM, 2004). A number of environmental issues such as dust, noise and speed of trucks were addressed by the mining company ensuring compliance with the consent and industry standards (Balcombe, pers. comm., 2006). There is no major community concern at the moment except noise (Corbett, pers. comm., 2006).

WMC commissioned an external environmental audit (third party) in 2003 in accordance with the development consent conditions. The Audit Report (RWC, 2003b) concludes that from an environmental management perspective, the Whitehaven Coal Mine is being managed to a good standard and conforming with expected environmental performance – i.e. landform reconstruction and rehabilitation. However, the audit report makes four recommendations for WMC's consideration and action relating to hydrocarbon management, noise reporting, quality assurance/quality control manual for monitoring, and compliance documentation.

WCM has established a complaints handling protocol. During the reporting period 2003-04, three complaints were received, concerning blasting, noise and lighting. Whitehaven submits Annual Returns to the EPA reporting on the environmental performance of the development as set out in the licence (10094) under the *Protection of Environment Operations Act 1997*. The monitoring conditions of the licence relate to blasting and water quality. Whitehaven was found non-compliant with EPA licensing conditions once in 2004 during the last five years, specifically about monitoring conditions.

7.10 Patrick Stevedores Container Terminal Upgrade

Environmental Management and Monitoring Practices

Patrick has an internal environmental policy for the operational and maintenance activity in the terminal. All staff at the facility are aware of the policy (Patrick, 2005). These are reviewed regularly. All employees at the facility receive training in environmental issues and responsibilities. In addition, there is an operational environmental management plan (OEMP)

in place as required by the development consent (Patrick, 2005). The OEMP is reviewed regularly, especially when the operational activity changes and has objectives, targets and milestones (Dorney, pers. comm., 2006). The OEMP addresses management issues related to stormwater, vegetation, transport, waste, energy and operational noise. All environmental plans as required by the development consent have been prepared. Patrick reports both externally and internally on environmental incidents. Environmental incidents are submitted to the EPA. Corrective actions are identified out of incident investigations in order to prevent similar occurrences.

Patrick monitors noise, dust, odour, visual impact and water quality under the regulatory requirements (Patrick, 2005). Effluents (including stormwater) discharged from the site are monitored on a voluntary basis. Monitoring results (noise and water quality) are reported to the EPA every six months but monitoring results are not published. Patrick reports its environmental performance externally via EPA Annual Environment Protection Licence returns, EPA compliance reports and National Pollution Inventory (NPI) reporting. Annual compliance reports are submitted to the Department of Planning according to the requirement of the development consent. This is not available for public viewing. Patrick conducts an internal environmental audit annually to verify environmental performance of the container terminal (Dorney, pers. comm., 2006). It involves internal reporting and an external environmental audit as required by the development consent is not due as of 2006.

The monitoring conditions in the EPA licence (6962) relate to noise, water quality, waste movement, and pollutants discharged to water and land. Patrick was found non-compliant with the EPA licence once in 2001-2001 during the last five reporting years. The non-compliance was related to monitoring of pH. There is a clear lack of transparency and community consultation in the environmental management monitoring practices at the Patrick facility.

7.11 Summary of findings

All nine New South Wales projects studied have established monitoring and auditing regimes within the EIA framework. The development consent, which is legally binding upon proponents, usually sets conditions requiring proponents to prepare and implement various management plans with monitoring components. Like South Australia and Western Australia, proponents in NSW are solely responsible for the environmental management, monitoring and

reporting on the environmental performance of their actions or operations. Furthermore, proponents are usually required to conduct an external audit every three years. Some projects require external audits more frequently (e.g. annually). Proponents usually engage private consultants to conduct an external audit, which usually involves verification of compliance with conditions of the development consent and other regulatory tools (e.g. DEC license, mining lease, etc.). There is no government accreditation system in place for private consultants but proponents usually consult with the relevant government agency (i.e. the Department of Planning) before they engage a private consultant for conducting an external audit. Of 9 projects studied 7 were found to have a voluntary EMS. Under the voluntary EMS proponents also undertake environmental monitoring and auditing. The compliance unit within the Department of Planning (DoP) is also responsible for conducting compliance audits but it is not a mandatory role. They usually conduct audits on a risk basis. The DOP has not yet audited any of these 9 projects studied in NSW. The DPI (Mineral Resource Division) conducts audits of mining projects under the requirements of mining approvals during its annual site inspections.

The EIA documents (e.g. Guidelines, EISs) of all of the case study projects recognise ongoing environmental management and monitoring requirements for the implementation and operation of the project. In most cases the guidelines do not require a monitoring programme to be included in the EIS. Like WA, monitoring and auditing is not considered at the early stages of the EIA process in NSW; they come as part of the ongoing environmental management of an operation. EISs do not usually include a detailed draft environmental management plan/monitoring programme. Proponents prepare various environmental management plans once the Minister approves a development proposal. They negotiate with the DOP to get approvals of various management plans/monitoring programmes. The approved plans/programmes are made available in the local Councils for public viewing.

The development consents usually require proponents to submit an Annual Environmental Management Report (AEMR)/ Annual Compliance Report (ACR) to the DOP. The AEMR/ACR usually contains monitoring results and an audit report. It also reviews the effectiveness of an operation's environmental management. The DOP is mainly responsible for reviewing annual reports submitted by proponents. Sometimes, the review process involves other relevant government agencies (e.g. DEC, DPI etc.). The DOP coordinates with the other agencies in this regard. Furthermore, an AEMR committee comprising representatives of relevant government agencies is formed to review the annual reports but

this practice is very rare. The AEMR committee usually meets annually and conducts site visits. The development consents usually require proponents to maintain a community consultative committee (CCC) comprising one or more members of the community, representatives of the local councils, relevant government agencies and the proponent. Proponents are required to provide information on environmental management of an operation and monitoring results to the CCC. The CCC members meet and conduct site visits at least once a year and occasionally meet more frequently. The CCC liaises with the proponent and the community about environmental management of an operation and disseminates information. The CCC obtains copies of AEMR and various management plans and copies of AEMR are made available in the local Councils for public viewing.

The development consents usually require proponents to prepare and implement a complaint handling protocol during a project's construction and operation. Through this protocol proponents respond to community complaints/concerns about project operations. Proponents also report the community complaints they received and actions taken by them to the DOP on an annual basis. Although disclosure of information and a formal community consultation process in relation to environmental management and monitoring are evident in most cases, the direct public involvement in the ongoing environmental management and monitoring is virtually non-existent. In NSW, environmental monitoring and auditing occur as part of environmental management at the implementation and operation stages. However, they do not establish an effective feedback loop in the EIA process. Environmental audits are mainly concerned with the compliance status.

Table 7.1 shows the monitoring status of significant issues/ impacts of 9 NSW projects. 7 projects were found to monitor fully the issues or impacts according to the commitment made in the EIS. Most of the projects were found compliant with the development consents but non-compliant with the DEC license. The DEC license was found to cover only a portion of the total number of issues/impacts identified as being significant in the EIS or Assessment Report. This license covered a maximum of 50% of the total number of issues/impacts identified as being significant.

Table 7.1: Number of Issues/ Impacts Monitored in NSW Projects.

Monitoring Status	Projects studied								
	A	B	C	D	E	F	G	H	I
Number of issues/impacts identified as being significant in the EIS or Assessment Report	12	10	10	11	14	12	14	15	10
Number of issues/impacts with monitoring commitments by proponents	16	4	4	6	7	6	10	6	11
Number of issues/impacts with monitoring requirements under the Development Consent	10	6	11	10	16	9	13	12	4
Number of issues with monitoring requirements under the DEC license or other regulatory tools	4	4	3	5	6	6	5	3	4
Number of issues/impacts that were monitored in practice	12	4	4	8	16	11	14	12	8

A, Ridgeway Gold Mine; B, Dunmore Hard Rock Quarry; C, Dunmore Lakes Sand Extraction; D, Bulga Open Cut Coal Mine; E, Dartbrook Underground Coal Mine Extension; F, Warkworth Coal Mine; G, Ravensworth East Coal Mine; H, Whitehaven Coal Mine; I, Patrick Stevedores Container Terminal Upgrade.

CHAPTER 8: RESULTS OF SURVEYS AND INTERVIEWS

8.1 Introduction

This chapter presents the results of surveys and interviews conducted in South Australia, New South Wales and Western Australia. These results presented below are the views of respondents about their ideal methods for implementing monitoring and auditing of EIA. It also reflects the current practices in EIA. Some of the current procedural aspects in monitoring and auditing in EIA such as public accountability, public involvement, compliance and enforcement mechanisms and regulations have been recorded in interviews only. No survey question was designed in regard to these but they will be discussed at the end of this chapter with a qualitative dimension. Table 8.1 below illustrates the respondent types, their education and employment.

Table 8.1: Types of Survey Respondents, their Education and Employment

State	Types of respondent				Educational qualification				Discipline					Work experience			
	GO	PC	NO	R	PhD	PG	UG	T	Sc	Pl	Env	Eng	O	>5	6-10	11-15	16+
WA	14	7	0	1	1	15	5	1	1	4	10	2	5	0	3	5	14
SA	17	8	1	0	2	18	6	0	4	4	10	4	4	4	7	4	11
NSW	9	2	2	2	3	6	6	0	3	1	4	3	4	1	4	4	6

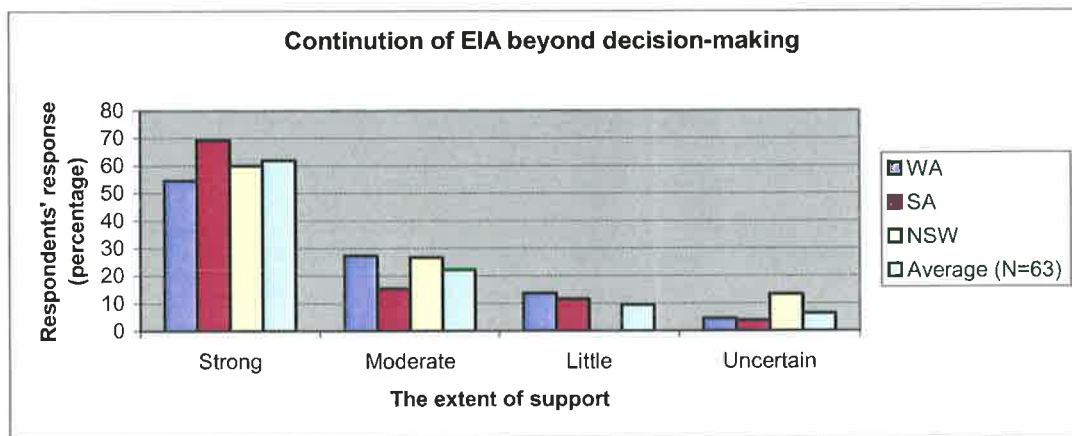
GO, government officials; PC, private consultant; NO, NGO officials, R, researcher; PhD, Doctor of Philosophy; PG, postgraduate; UG, undergraduate; T, TAFE; Sc, science; Pl, planning; Env, environmental science/studies; Eng, engineering; O, other.

8.2 Continuation of the EIA Process Beyond Decision-making

An average 62% of respondents strongly suggest that EIA should not stop at decision-making. Less than 10% of respondents (9.5%) put little emphasis on it. While a limited number of respondents were uncertain about the answer. There are also different opinions on how this is happening in practice. The following responses from EIA experts reflect some arguments on current EIA practices. They also provide an account of the current situation in South Australia, New South Wales and Western Australia.

- “The EIA process in South Australia comes with a very satisfactory conclusion when the Minister signs off where the PLNSA draws lines. I think their role should be extended to include post-approval – that is another story” (SIP1, 2005).
- “The approval is always conditional on the proponent for undertaking additional works. The EIS generally includes only a draft management plan, which is a very general statement of principles and it is almost universal that one of the conditions is for the proponent to finalise the environmental management plan and submit it and have it approved before the operation is finally allowed to go ahead” (SIP8, 2005).

Figure 8.1: Opinions on Continuing the EIA Process Beyond Decision-making.



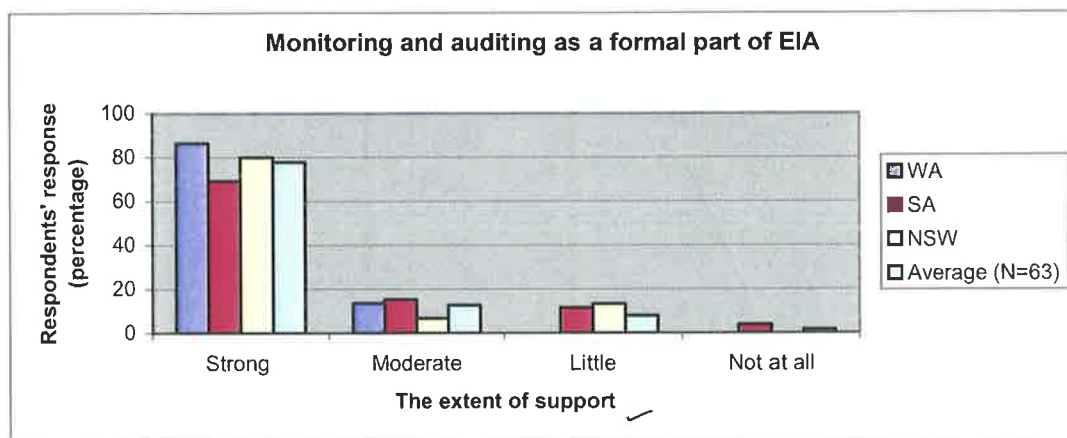
- “I would say that does not probably happen in South Australia. EIA quite often is something to be ticked off for development. You tick it off and it is done” (SIP19, 2005).
- “EIA is a moving process in NSW. It is not just approving the land use; you have to also look at what is the long-term impact of that use and that means how it is operated. The EIA process now under our Act have involved overall of that pace so now we have to worry about the ongoing operations” (NIG1, 2005).
- “It has not traditionally been very much well regulated in NSW. So a lot of people focus on getting approvals and building development and they necessarily think that they can close the chapter. The conditions of consents, which come through EIA, really do not get a lot of attention. A compliance branch has recently been set up in the DIPNR. They are doing compliance audit as part of their start up. It has not been very well progressed. It depends on how much EPA kind of things are involved” (NIP4, 2005).
- “I don’t think EIA should stop at that point. There are ongoing impacts that need to be considered. I don’t think it is performing well in that aspect because very little things to be done once an approval is issued. In NSW as far as we go monitoring and auditing tend to relate more to licensing issues” (NIP15, 2005).
- “The EIA process is deliberately separated in WA with the EPA recommending conditions and the Department of Environment auditing those conditions. The EPA is not involved in auditing. Planning assessments are not subject to any auditing in WA” (WSG4, 2005).
- “When a project goes through formal approvals they have certain commitments and management strategies and those commitments are legally binding upon the proponent. When the Minister signs off the Statement the DoE Audit Branch comes up with an audit table and they list all of the commitments made by the proponent and tick those off on a regular basis. After that process the only real monitoring and auditing the facility might have if they are required to have a license with the DoE” (WIP4, 2005).

- “In WA, EIA does go beyond the decision-making but the focus is on the approval. The conditions are applied but the resource is limited – this is the case with the formal EIA process” (WIG9, 2005).

8.3 Monitoring and Auditing as a Formal Part of the EIA Process

The majority of respondents (77.77%) strongly believed that monitoring and auditing should be implemented as a formal part of the EIA process. Less than 10% of respondents (7.93%) put little emphasis on it, while only 1.58% did not support it as a formal part of the EIA process. The following comments reflect the status of monitoring and auditing in EIA in Western Australia, South Australia and New South Wales in terms of it being a formal requirement.

Figure 8.2: Opinions on Monitoring and Auditing as a Formal Part of the EIA Process.



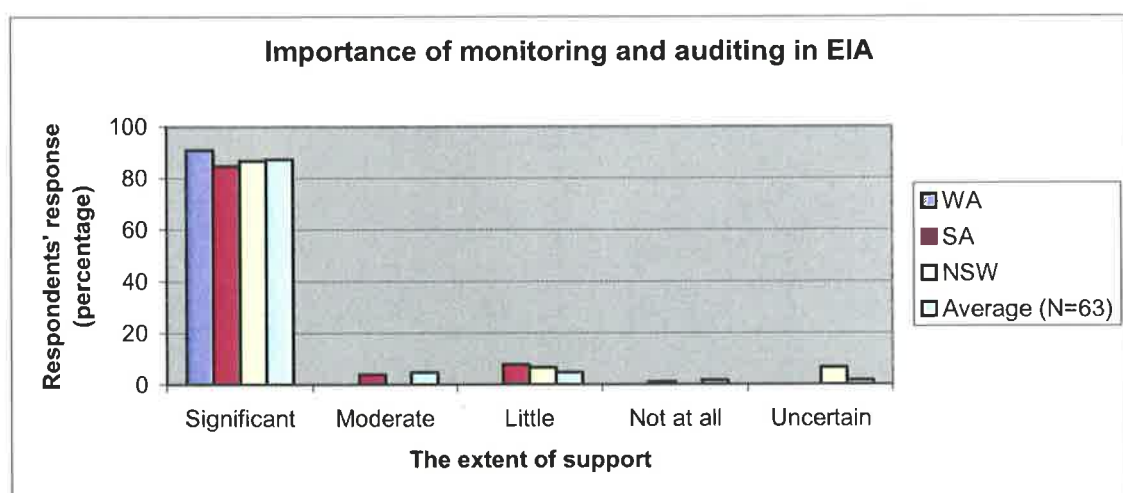
- “I guess someone would argue currently in WA monitoring and auditing are formal requirements but the problem is it needs to be more central to EIA, and that should mean we have a very good quality monitoring system in place that can lead to shut down of a proposal if it is found those standards/conditions are not being met” (WIN11, 2005).
- “If you read the Act, the Act does not formally require follow-up. What happens here is – it is legally binding because the Ministerial Conditions require monitoring. The problem is when you say all projects will be monitored – there are projects that deserves EIA but don’t actually need to be monitored because they are straight forward, no emission, no issue, there is just normal straight forward kind of things. So I think it is better to be discretionary and decided project-by-project basis what should be monitored and what should not” (WIR13, 2005).
- “If it is not formally recognized through legislation it will not happen. I should also say it will not happen despite it is formally required in WA because it is not still adequately resourced” (WIG16, 2005).
- I think it will have some value giving the EIA process a bit more strengths. In South Australia, there is no more formal or legal way of enforcing other than the licensing (SIG4, 2005).

- “It might be a bit of duplication if it is done under the planning legislation in South Australia because there are specific aspects under other parties like the EPA or the Native Vegetation Council” (SIG6, 2005).
- I think that is very important. It is not probably clear in the process in South Australia that monitoring and auditing is part of the process but I accept that it is” (SIP9, 2005).
- “In New South Wales we require monitoring and auditing in the high-risk cases as our conditions of approval. That is not a statutory requirement. The Act does not say that you have to have monitoring but the Act allows for the condition to be imposed which require monitoring and auditing” (NIG2, 2005).
- “I think it should be required by the legislation. The problem is if it is not required by the regulatory authority the proponent are reluctant not to do it because of obviously costs involved. If it is formally required but not enforced then there is another issue. More resources are therefore needed to be available to the agencies” (NIP12, 2005).
- “The problem is it is a costly thing to do. I think that is why in New South Wales we tended to rely on the EPA licensing regime as a sort of default monitoring and auditing regime. I think in our State Government agency (DoP) and as well as local councils resources are under pressure in terms of time and money” (NIP13, 2005).

8.4 Importance of Monitoring and Auditing in EIA

An average 87.30% of respondents recognize that monitoring and auditing in EIA are significantly important for several reasons. The following comments identify some of the reasons why this is so, with reference to Western Australia, South Australia and New South Wales.

Figure 8.3: Opinions on Importance of Monitoring and Auditing in the EIA Process.



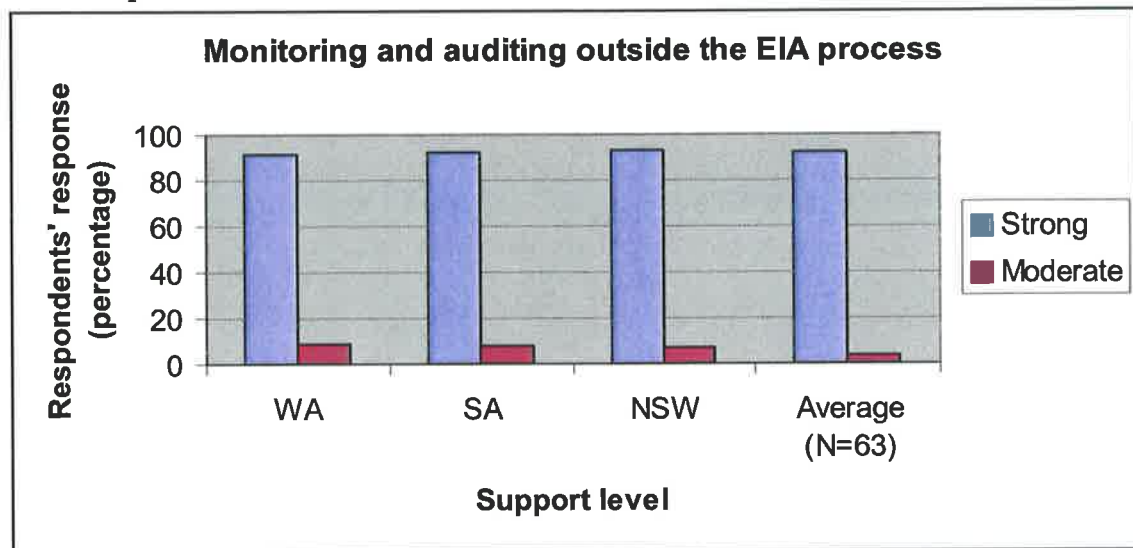
- “Monitoring and auditing confirm and validate earlier predictions (e.g., modelling results) and allows management strategies to be revised or improved if necessary” (WSP15, 2005).

- The importance is two-fold: provide environmental protection with respect to the project; provide information to future similar projects-so that future EIA will be best practice and continual improvement” (WSG12, 2005).
- “The importance relates to enforcement of conditions as well as feedback to the EIA process” (WIG17, 2005).
- “I guess the importance that Western Australia places on monitoring and auditing is reflected by the resources. We have about 44 people in the agency that deals with assessing projects and we have 3.8 positions allocated to auditing. The importance is seen as not particularly important because they are not making a risk sufficient to all” (WIG17, 2005).
- “It is important because quite often we do not have the necessary science to say definitely how things are going to be on the ability of ongoing operation” (SIG11, 2005).
- “Monitoring is a bit of insurance for the developer particularly having a baseline if they are accused of polluting the environment” (SIG13, 2005).
- “Paramount importance. Unfortunately, the practice is poor or not at all in South Australia. I would say the feedback could be used for a collective database. If it is strategic environmental assessment, monitoring and auditing is even more important” (SIP21, 2005).
- “In the report of the Economic Development Board in South Australia there is no issue raised on monitoring and auditing in EIA. We are putting resources in making sure that we are very efficient and we have a well-reputed process to get approval fast. We don’t place attention on follow-up” (SIG17, 2005).
- “I think it is an essential component because if you don’t have a monitoring and auditing process and the necessary feedback loop, you never know whether the initial assessment process was well enough/ rigorous enough to pick up all issues. It is the only mechanism that you are going to be out to improve the overall assessment process” (NIP12, 2005).
- “The importance varies in New South Wales, but in some areas it is of critical importance” (NSG6, 2005).
- “Monitoring/auditing undertaken by government agencies might assist regulators to do a better job, understand the realities of projects and inappropriateness of conditions applied” (NSP15, 2005).

8.5 Monitoring and auditing as Part of General Environmental Management Activities

Most respondents (92%) strongly support monitoring and auditing as part of a general environmental management tool outside the EIA process to complement their requirements within the EIA process. None of the respondents thinks that it is of little importance or it is not important at all. The following comments and Figure 8.4 below illustrate the support levels in the three selected States.

Figure 8.4: Opinions on the Implementation of Monitoring and Auditing Outside the EIA process.

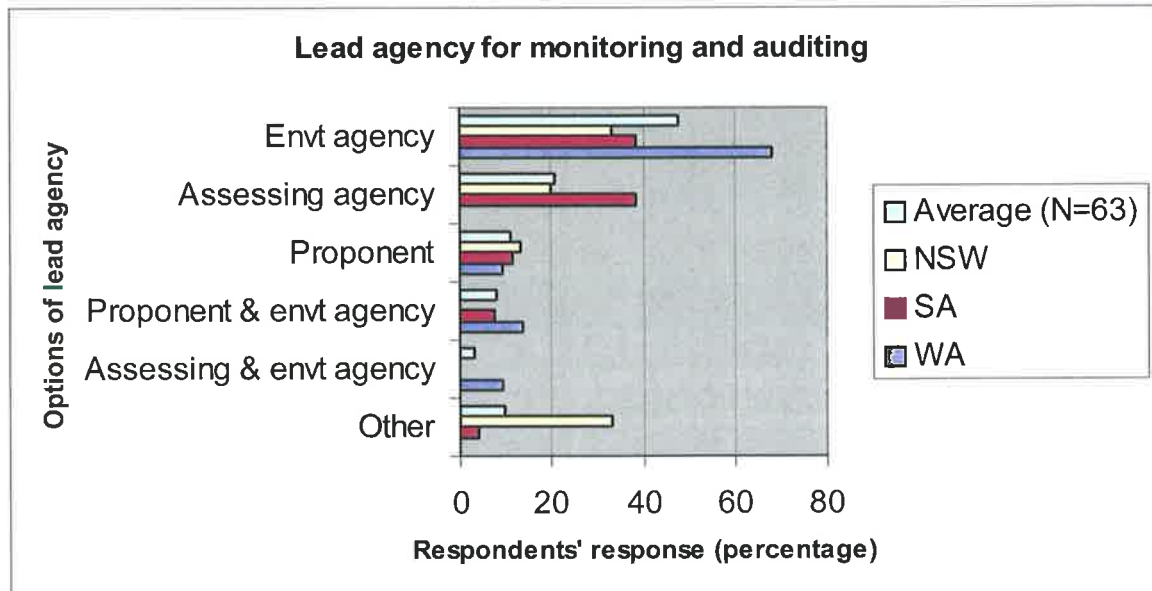


- “A lot of proponents we work with have EMS established and that’s an integral part of that system. I guess for continual environmental improvement and meeting current best practice standards those types of things are important” (WI P4, 2005).
- “I strongly support it but not in place of a formal process. So you need to have a formal requirement in place as well as a purely voluntary system” (WI G7, 2005).
- “I think the State of the Environment reporting is complementary to EIA. The biggest companies have voluntary EMS or things like that but again they complement; they can’t replace the requirement under EIA” (WI R12, 2005).
- “In South Australia, there are plenty of agencies that have the responsibility to do this work outside the EIA process but there is no one coordinating it. The EPA coordinates what are required to do under their legislation” (SIP1, 2005).
- “Yes, they contribute. To have an environmental management system in place is only fine if it is addressing the appropriate parameters. Having an environmental management system does not provide anything. It totally depends on how legitimate components are there, how appropriate they are and what is being monitored” (SIN2, 2005).
- “I think they have a role but I still think people tend to have some statutory incentives to do things. A lot of companies are doing these days for marketing reasons. So there is a good commercial reason why companies do those sorts of things” (SIG17, 2005).
- “In environmental management systems there are monitoring and auditing regimes as part of the standard process. They supplement to the EIA process. We certainly acknowledge it in the EIA process in NSW” (NIG7, 2005).

8.6 Lead Agency

Opinions vary considerably in the three States in terms of which agency should take the lead role in EIA monitoring and auditing. Overall, the environmental agency has got the highest support (47%) as lead agency and the following comments below reflect the opinions of respondents in Western Australia, South Australia and New South Wales.

Figure 8.5: Opinions on the Lead Agency for the Implementation of EIA Monitoring and Auditing in the EIA Process.



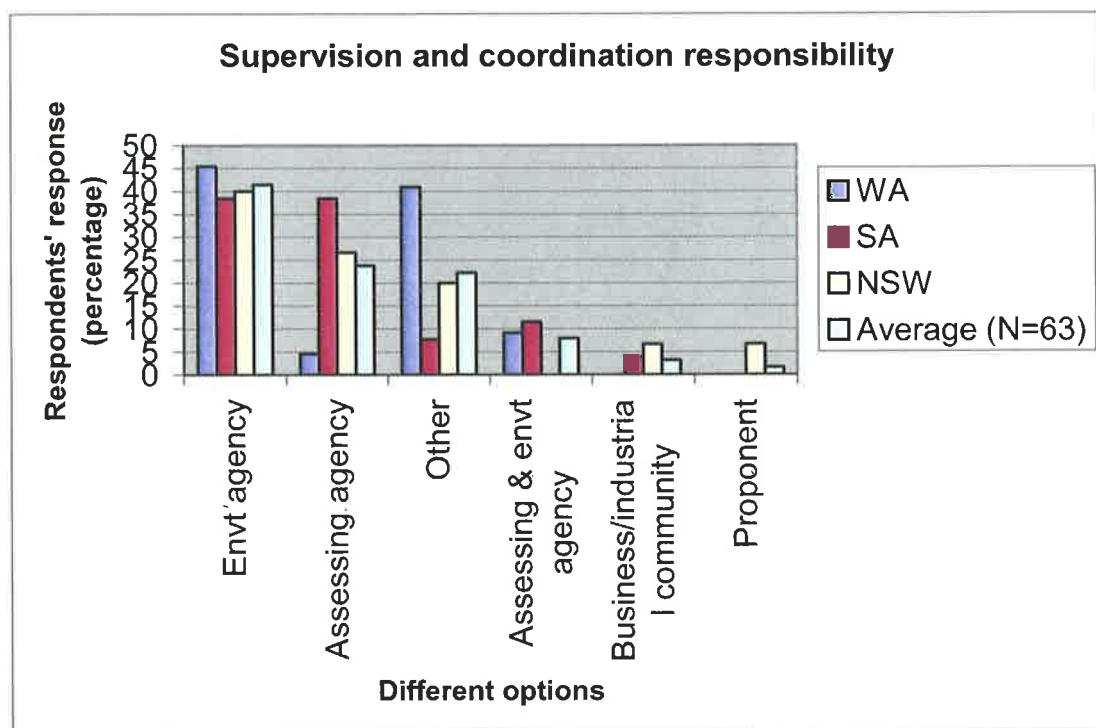
- “Proponents should audit their EMS (their own performance) and the environmental agency should audit compliance with environmental conditions” (WSG1, 2005).
- “Proponents should monitor and the environmental agency should audit” (WSG2, 2005).
- “I am aware of alternative process used in NZ, where the environmental agency undertakes monitoring and auditing. Proponent pays for the costs via licensing arrangements. This has been shown to be effective” (WSP15, 2005).
- “Both proponent and EPA are required; PLNSA is not resourced or legislated for this job in South Australia” (SSG1, 2005).
- “In South Australia, PLNSA should continue to be the lead agency for compliance with conditions and monitoring requirements, which relate to approvals given under the Development Act. EPA will continue its role with regard to activities requiring licenses under the EP Act” (SSG2, 2005).
- “Whichever government department regulates that specific type of development should be the lead agency” (SSG5, 2005).
- “Any agency should attend to the environmental requirements of its own areas of responsibility” (SSR8, 2005)

- “EPA would be good but to an extent there is already an overlap with licensing of the activity. EPA would need the resources. Monitoring costs should be internalised to the applicant/ beneficiary” (SSG18, 2005).
- “I cannot nominate a single agency as lead agency. A number of agencies are responsible for part of the process” (NSG6, 2005).
- “DIPNR in NSW is the most appropriate authority; it is both a planning and an assessment agency for large developments” (NSP8, 2005).
- “In NSW, DPI (DMR), DEC & DIPNR have a significant role. Proponents undertake internal audits which can be ISO-based” (NSG9, 2005).

8.7 Supervision and Coordination Responsibility

There are many opinions about which agency should be responsible for supervising and coordinating the implementation of monitoring and auditing in EIA. Again, the environmental agency received the highest support (41%) for this role, while the second most support (24%) went to the assessing agency, which is often the environmental agency (for example in Western Australia). The following comments reflect respondents' views in Western Australia, South Australia and New South Wales:

Figure 8.6: Opinions about Supervision and Coordination Responsibility



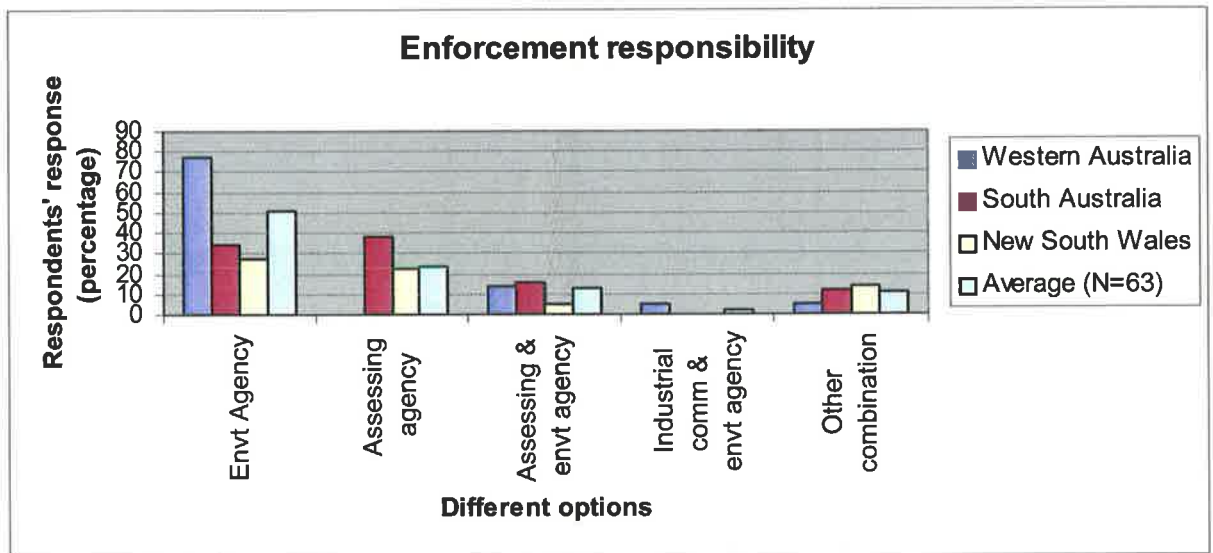
- “Environmental agency and planning agency should be responsible for supervision and coordination depending on the nature of project” (WSG2, 2005).

- “The same government agency should be responsible for environmental assessment and as well as auditing of EIA conditions. These are separate functions in WA at the moment” (WSG20, 2005).
- “The concern I have got is largely that – there needs to be a clear relationship between the people who are doing EIA and people who are then auditing and monitoring compliance with EIA. If they don’t understand what the EIA is trying to achieve, that makes it very difficult for them to understand through monitoring and auditing whether things have been achieved” (WIG16, 2005).
- “The current arrangements in WA are appropriate” (WSG22, 2005).
- “In South Australia, a joint approach could be taken if compliance issues relate to EPA licensed activities, even though the compliance issue may be a ‘planning’ matter only” (SSG2, 2005).
- “An EIA working group or coordinating committee should be set up for this sort of thing” (SSP3, 2005).
- “Assessing agency needs feedback from monitoring to check appropriateness of outcome/ decision. Whereas EPA should be main agency for monitoring environmental impacts across State” (SSG4, 2005).
- “Whichever government department regulates that specific type of development should be responsible for supervision and coordination” (SSG5, 2005).
- “Business and industrial community should coordinate and supervise with checking by approving agency” (SSP19, 2005).
- “Different agencies have varying roles at different times in NSW” (NSG6, 2005).
- “DIPNR are the lead agency; they should coordinate more with the EPA though” (NSP8, 2005).
- “Proponent should supervise - but in larger projects, with conditions of approval/ license requirements set by planning or environmental agencies” (NSG10, 2005).
- “Monitoring is best coordinated by a proponent so that meaningful data is collected. They should likewise be responsible for internal/external auditing” (NSP15, 2005).

8.8 Enforcement Responsibility

Opinions vary considerably about which agency should be responsible for enforcing the monitoring and auditing requirements in EIA. The environmental agency has received the highest level of support (51%), and the assessing agency attained the second most support (23%). Only three comments have been found in this regard.

Figure 8.7: Opinions about Enforcement Responsibility



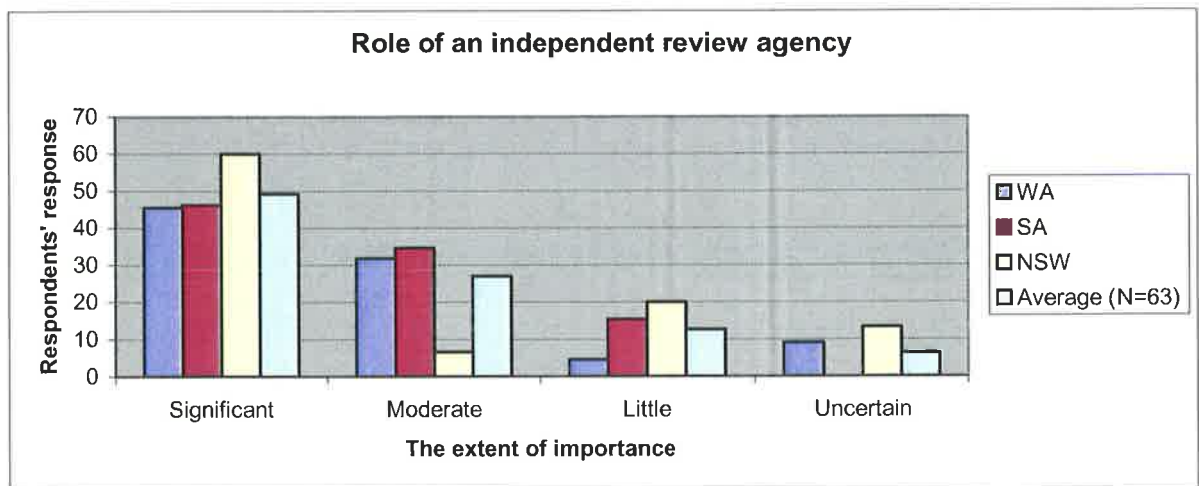
- “Whichever government department regulates that specific type of development” (SSG5, 2005).
- “EPA should have control of EIA process and be responsible for enforcement” (SSP11, 2005)
- “Depends on circumstances. With lesser impact projects, mainly the proponent (with possible environmental agency input if licenses apply). In larger impact projects, still primarily the proponent but subject to conditions of approval set by the assessing agency/ planning agency (one and the same in NSW) or license conditions of environmental agencies” (NSG10, 2005).

8.9 Involvement of an Independent Agency in the Review Process

49% of respondents think that involving an independent review agency is significantly important in monitoring and auditing in EIA, while only 5% of respondents believe that it is not important at all. The following extensive comments indicate the range of positions that respondents took.

- “There is a need to review and respond – but why should it be independent? The police force is not an independent body and that ensures compliance with civil laws – why does environmental law need an independent body?” (WSG12, 2005).
- “The risk is that an independent review body would simply add to an already lengthy, under-resourced and bureaucratic process” (WSP13, 2005).
- “It is significantly important because it would of course make monitoring and auditing more transparent and more accountable” (WIP1, 2005).

Figure 8.8: Opinions on Involving an Independent Agency in EIA Monitoring and Auditing.



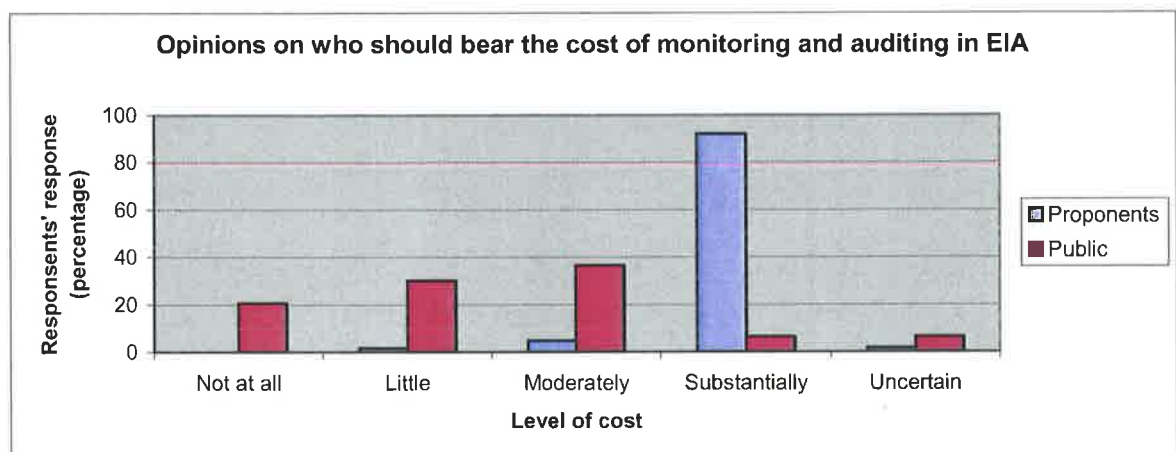
- “I think the system works relatively well in WA without the need for an independent review. An independent review can be done under circumstances where there is community concern or the nature of the proposal being very highly controversial or they do not have enough resources” (WIG7, 2005).
- “I think probably resources is relevant to effectiveness rather than independence. If the regulatory authority and the operational authority are not same I don’t think there is a need for an independent authority to be involved” (WIN10, 2005).
- “I think the immediate independent agency would be the EPA. It would be useful if the EPA could once in a five year or something like that commission not reviewing individual monitoring results but reviews the whole EIA process whether the EIA system is delivering the environmental outcomes that we expect” (WIR12, 2005).
- “I think one could ask a legitimate question as to whether auditing should live in this agency (DoE, WA) or whether the Department of the Auditor General in the State should have an environmental branch. Equally one of our biggest problem areas is – some of our worst projects we have are government projects. There is clearly a political problem in auditing one government agency by another government agency” (WIG18, 2005).
- “Certainly, independence would be a preference because there is a conflict of interest. For example, PIRSA has primarily been the regulatory authority for mining industries in SA but at the same time it is responsible for promoting mining operations. So, the EPA in South Australia necessarily qualifies as an effective independent body” (SIN2, 2005).
- “I think accredited environmental auditors are useful in ensuring the independence and the objectivity of monitoring and auditing. I think to refine the objectivity and independence the auditor should be a government appointed person” (SIG12, 2005).
- “It depends on the type of proponents. If the proponent is a government agency, then it should be independent from the government. If the proponent is a developer, then it could be a government agency I guess because of optimal interest of all” (SIP19, 2006).

- “I think the issue is – who pays the persons? Who do they report to? If you are paid by somebody, you are most likely to look into his or her personal interest; that is human nature; that is the basic commercial commonsense. If the EPA or DIPNR, etc. wants to be truly independent they got to realize that they have actually got staff and somebody is paying for their independence. It can’t be always put on proponents” (NIG6, 2005).
- “We could have an independent authority doing it then the project proponents need to pay for it rather than the taxpayers. In many ways having an independent authority undertaking the monitoring and auditing would give it much more credibility” (NIR9, 2005).

8.10 Cost of Monitoring and Auditing in EIA

92% of respondents believe that proponents should bear the cost substantially while only 6% of respondents make the public responsible to bear the cost. The following comments reflect opinions of respondents in Western Australia, South Australia and New South Wales about cost bearing.

Figure 8.9: Opinions on Cost Bearing by Proponents and the Public



- “Obviously, there is some cost to the public in terms of giving up their time to get involved in anything EIA related. There is also a cost for the environmental agency (i.e., the Audit Branch)” (WSR5, 2005).
- “If you are willing to disturb the environment and prefer business to make profit, part of that should be allocated to make sure that you are responsible for your own action very much” (WIP4, 2005).
- “The proponent should be responsible for it’s own project but the State (public) should be responsible for developing and maintaining a data base so that all monitoring information can be pooled together to provide information for future planning and an integrated State of the Environment Report” (WSG12, 2005).
- “Clearly, the proponent should be responsible for the cost of implementing project related monitoring and auditing programmes, including any remedial action required,

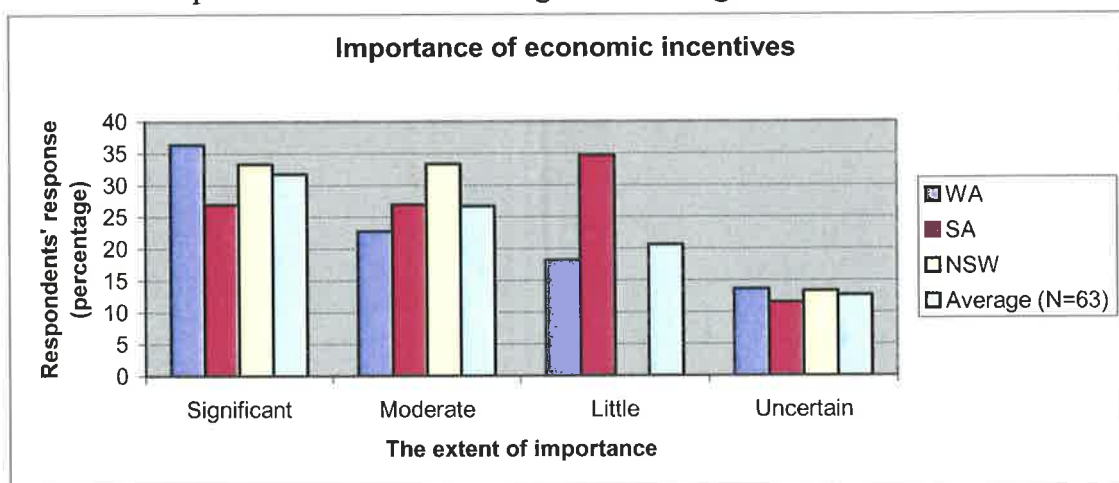
while the regulatory agency should bear the cost of scrutinising the outcomes” (WSP13, 2005).

- “Community groups and local interests should contribute in kind rather than dollars” (WSG22, 2005).
- “Public should not bear the expenses at all unless it is development that is intended for public use. Government should bear little” (Pers. Comm. SAR8, 2005).
- “Ultimately, the public is the end user and ultimately bears costs” (SSP24, 2006).
- “The proponent is responsible largely for demonstrating that they are doing the appropriate things whatever it is in compliance with conditions that were set on the project. The proponent should bear the cost. The assessing agency will need to have appropriate resources in place to assist the proponent in meeting those conditions” (SSP26, 2006).
- “It is the proponent’s project and the proponent needs to be totally responsible – anything else will dilute both monitoring effort and the ongoing environmental management awareness and responsibility of the proponent” (NSG10, 2005).

8.11 Economic Incentives

Only 32% of respondents consider economic incentives significant for implementing monitoring and auditing in EIA, while less than 10% of respondents do not recognize its importance at all. The following comments of respondents in Western Australia, South Australia and New South Wales are recorded.

Figure 8.10: Opinions on the Application of Economic Incentives to Encourage the Implementation of Monitoring and Auditing in EIA.



- “I believe companies cannot use financial excuses to implement monitoring and auditing in this day and age. They need to be accountable to stakeholders and the community in relation to environmental and social impacts” (WSP15, 2005).

- “Companies should not be subsidized by regulators or the government. I think they got to do it now. However, if they get some incentives they probably end up with better products” (WIP1, 2005).
- “I think that would encourage proponents. You have to make the incentive quite larger and stronger” (WIP2, 2005).
- “I think a lot of smaller companies struggle. I think having economic incentives legally provided or not is quite important. If they don’t have the money to do it, it will be a matter of prioritisation – say what are the most important things to do other than monitoring and auditing” (WIP3, 2005).
- “I think governments can provide for certain incentives to encourage companies to monitor and audit and undertake environmental improvement projects. It can improve the situation to a limited extent not widely. I think the industry award to reward good outcomes that companies have achieved in terms of environmental management is a good thing” (WIP4, 2005).
- “I guess it is important apart from having tough supervision. You need both carrot and stick. You need penalties right down to the other level; I think good performance should be rewarded” (WIG9, 2005).
- “Most of the time companies tend to comply because of legal requirements. In some situations there are economic incentives because they believe that if they do the right thing it would be more cost-effective than waiting for things to go wrong” (WIG15, 2005).
- “I am not sure either whether economic incentives or the best way to go. Monitoring and auditing should just become part of the formal process. After a while, developers would just accept it” (SSP3, 2005).
- “Given that monitoring is quite expensive if that provides some sort of off-set for the costs of monitoring, it is more likely that people then monitor and implement the outcomes of monitoring” (SIG4, 2005)
- “Most companies will comply as long as it is an enforced requirement, regardless of legal sanctions. However, these obviously help deal with the recalcitrants” (NSP8, 2005).

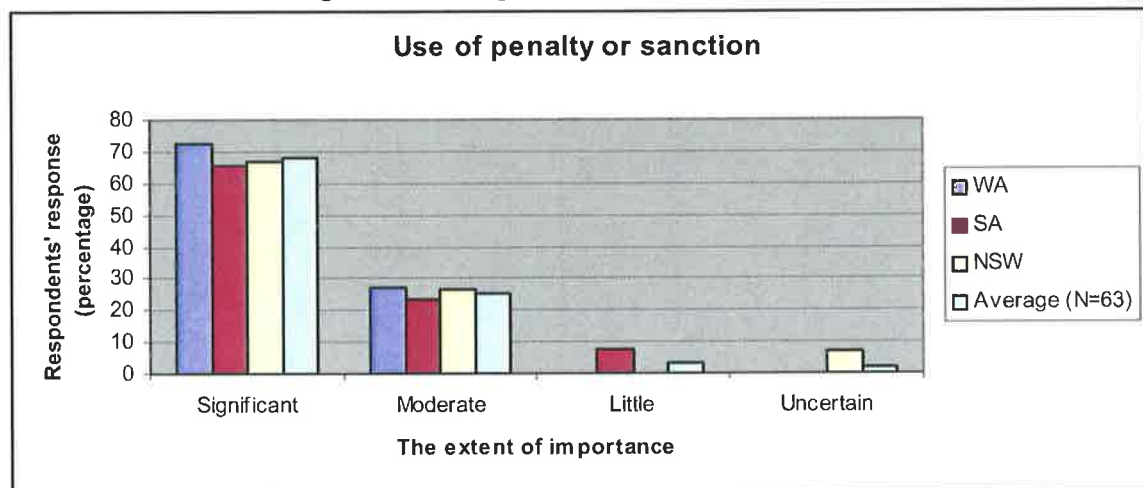
8.12 Use of Penalty or Sanctions

There is strong support in favour of penalties or sanctions in the implementation of monitoring and auditing in EIA. The majority of respondents (68%) believe that penalties or sanctions have a significant role, and following comments reflect respondents’ opinions as well as current practice in Western Australia, South Australia and New South.

- “If you mean successful prosecution in court, then the WA system is very poor. However, I suspect that simply having the potential power to take proponents to court for non-compliance is an important factor” (WSR5, 2005).

- “That is significant because they will come up with companies profit as well and taking into account that publicity and very bad look from the community as well” (WIP1, 2005).

Figure 8.11: Opinions on the use of Penalty or Sanction to Encourage the Implementation of Monitoring and Auditing in EIA.



- “There are some companies they only do things if the penalty is strong enough. People only change their behaviour if the carrot being angled is attractive enough and the pain they are going to go through is strong enough” (WIP3, 2005).
- “I think it is quite important to have that big stick at the end domain. I think it is important to have an education process where regulatory authorities work with companies to rectify the problem or to educate companies. It is not always beneficial for the authority to have certain foe with the industry” (WIP4, 2005).
- “Although penalties exist, the prospect of public shame is usually enough to enforce monitoring commitments” (SSG5, 2005).
- “I do not think they are working well in South Australia at the moment. If you look at a big project, once a project is in operation it becomes political. It is hard for regulators to get their job going because the development is employing people and paying taxes. When penalties/ sanctions apply it should be stronger” (SIP18, 2006).
- “Penalties/ sanctions are very important but I do not believe they are actually strong enough at the moment. In many cases, the conditions are allowed to be breached because the disincentives and the fines you may get are very small compared to the profit you make out of the project” (SIP19, 2006).
- There must be a big stick after those who flaunt/ disregard the commitments in an EIA or in conditions (NSP15, 2005).
- “In NSW, all these generally lie quietly behind best practice environmental management. While they certainly have an influence, the emphasis is on being more positive, achieving best management practice rather than negative “running scared” of possible legal challenge” (NSG10, 2005).

- “The philosophy of our department [Department of Planning, NSW] has been that what we want to do is to solve problems rather than prosecuting. In an extreme case we would probably prosecute them” (NIG1, 2005).

8.13 Procedural Aspects

Responses in the three States regarding twelve different procedural aspects of monitoring and auditing in EIA vary considerably. 15.5% of respondents think that various procedural aspects in WA are excellent but for SA and NSW the support of excellent procedural aspects are 4.80% and 19.4%, respectively. In terms of reputed inadequacy of these twelve procedural aspects the response for SA is 35.8% while it is 31% and 28.8% for WA and NSW, respectively. Figures 8.12 and 8.13 below illustrate the status of different procedural aspects in the three States.

Figure 8.12: Opinions on the Overall Status of Different Procedural Aspects of Monitoring and Auditing in EIA.

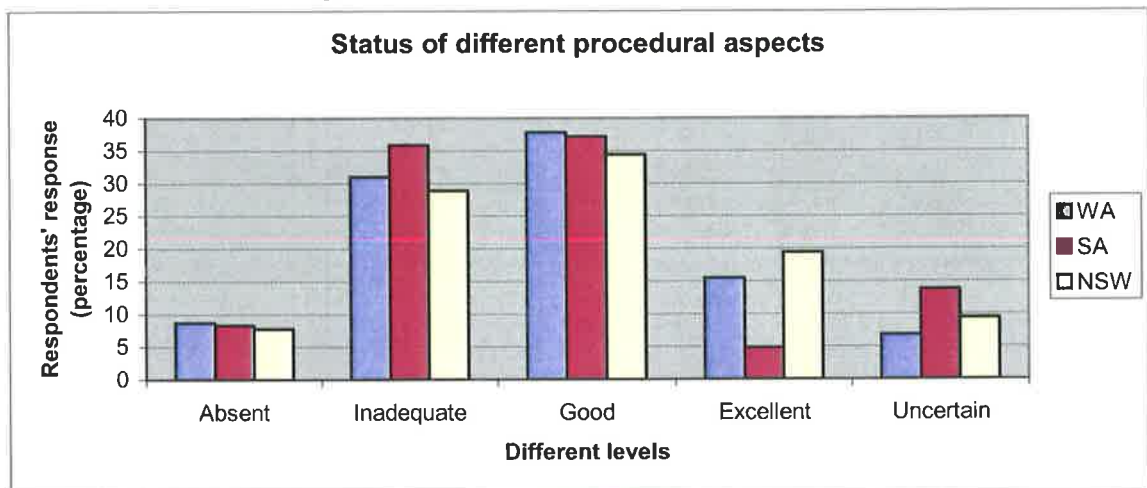
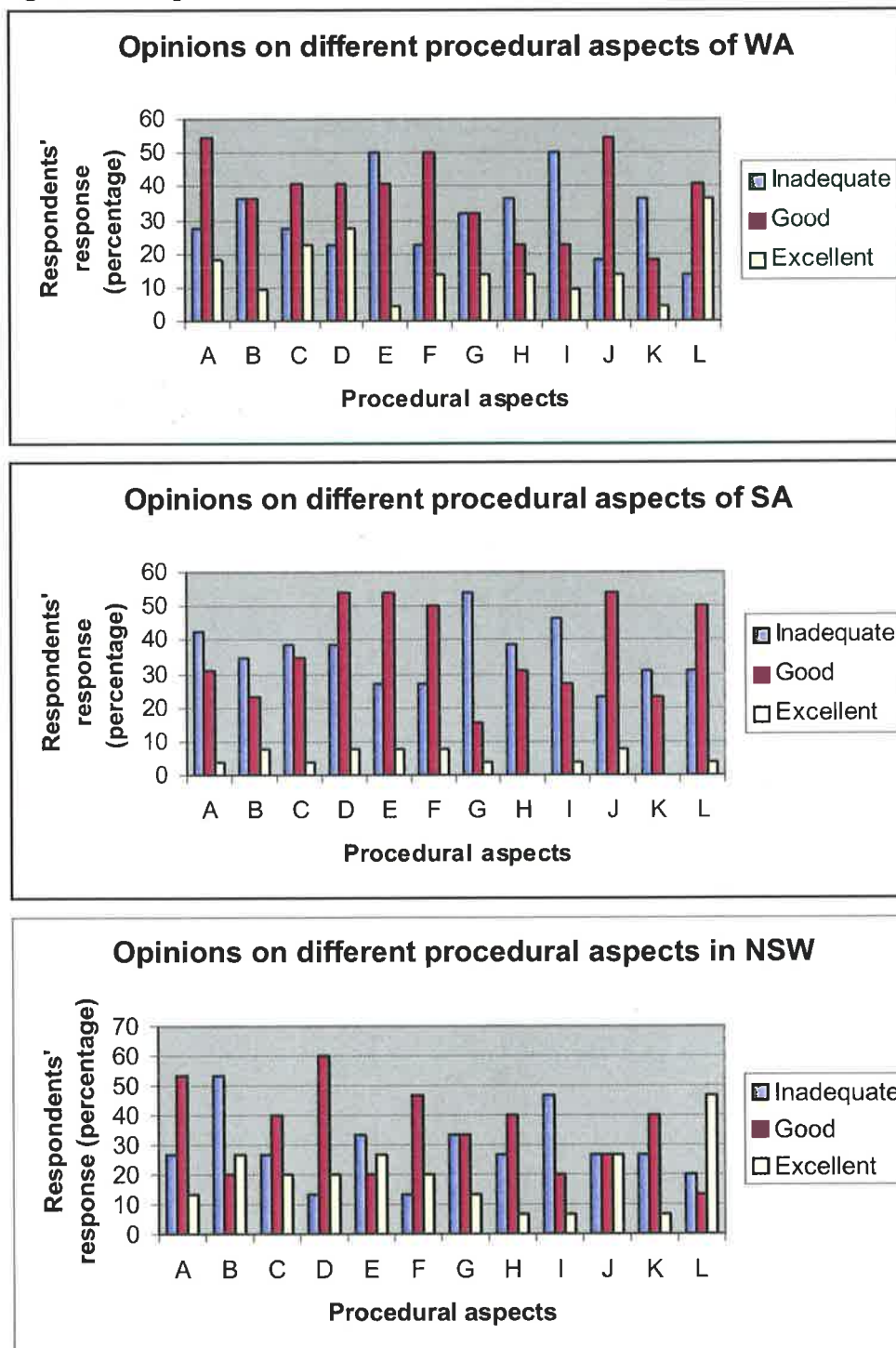


Figure 8.13: Opinions on Different Procedural Aspects of Monitoring and Auditing in EIA

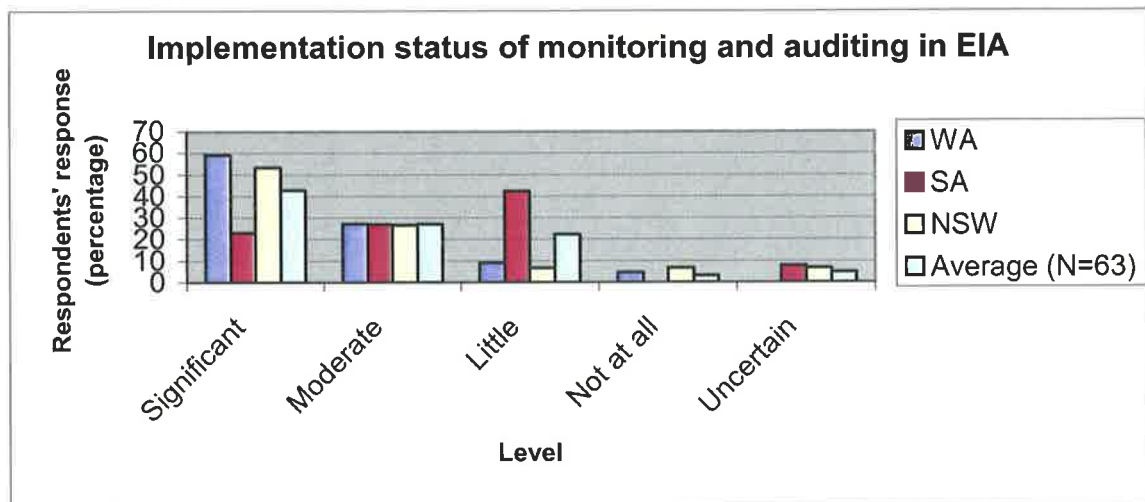


A=Legal provisions for monitoring and auditing in EIA; B= Detailed procedural guidelines for monitoring and auditing in EIA; C= A central agency to oversee and coordinate the implementation process; D= Defined role of different government agencies and the proponent by the law; E= Coordination between the government agencies assigned with different responsibilities; F= Provisions for taking ameliorative actions by the proponent; G= Provisions for publishing monitoring and auditing results; H= Provisions for reviewing and responding to monitoring results by an independent authority; I= Provisions for the right of the public to access and respond to the monitoring and auditing results; J= Formal mechanism for enforcement; K= Formal channels for the public in the compliance and enforcement mechanism; L= Defined penalties /sanctions against non-compliance with the law.

8.14 Implementation of EIA Monitoring and Auditing

59% of respondents believe that monitoring and auditing in EIA is being implemented significantly in Western Australia. In South Australia and New South Wales opinions in support of significant implementation are 23% and 53% respectively. Figure 8.13 below illustrate the levels of respondents' responses.

Figure 8.14: Opinions on the Implementation Status of Monitoring and Auditing in the EIA Process in WA, SA and NSW.



- “In WA, the design of monitoring and auditing comes quite late. Proponents try to actually negotiate things for a minimum amount of monitoring. Public reports do not give a lot of detail. So they are not very useful but easy for the public to interpret them. I think the words arrive from government for actually saying monitoring and auditing to be an important part of EIA but I don't think it matches the reality” (WIP2, 2005).
- “In WA, the environmental performance is assessed through compliance that does not necessarily cover everything. Other aspects of environmental performance are picked up through the Part V approval (license) and the approval under the Mining Act. There is a lack of resources” (WIP3, 2005).
- “Small number of officers undertakes work. They heavily rely on information provided by proponents. There is a political shift from environmental protection to infrastructure development. We have different sections in the DoE (WA); different parts of this organization are not always better linked. Information does not get transferred between sections within the same agency. Information gathered or made available for one process may not be disseminated or shared” (WIG7, 2005).
- “I think WA has that feedback loop in terms of requiring monitoring to be done, having the monitoring reports prepared by the proponents and submitted to the relevant agency. The area where I am unsure as to how complete the feedback loop is. What happens with those monitoring reports? The biggest issue is to draw the data that is gathered” (WIR12, 2005).

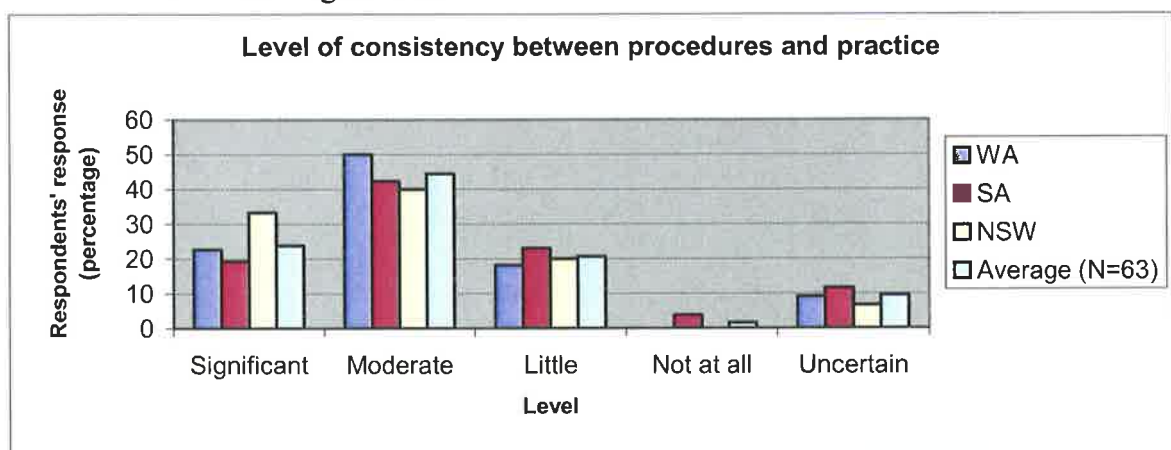
- “The biggest issue is we don’t have a lot of transparency and public accountability of the results of the follow-up in WA” (WIR13, 2005).
- “Our system relies heavily on self-regulation. You can see the Audit Branch in DoE is a typical example of to what extent the government makes delivery. Under the heavy resource boom we rely heavily on industry to do an honest and good job” (WIG15, 2005).
- “In our annual reports we report the number of non-compliant projects for that year. It is generally less than 10% in WA. What we feel is – selected examples have gone horribly wrong. We feel it is reasonably effective based on the low number (less than 10%) of horribly wrong examples of non-compliance” (WIG17, 2005).
- I think there is much less management of environmental impacts that the EPA thinks and that impacts are typically greater than is imagined at the time of assessment. It does not get detected, reported or made very public. That is the dilemma. Critically, the conditions are not written in a way that it is legally enforceable. So, prosecution is extremely difficult” (WIG18, 2005).
- “I do not know of any monitoring of the social side ever in 22 years. When a company undertakes monitoring and that monitoring is given back to the government it does not come back to the EIA process in South Australia; it goes back to the individual agencies. I don’t think those agencies take their responsibility strongly enough” (SIP1, 2005).
- “In South Australia, most of the monitoring is done by the proponents although the EPA and other government agencies do have independent monitoring role. In terms of auditing I don’t know that a great deal of auditing in its formal sense takes place. We go and audit companies’ records on behalf of the third party. There is no protocol as far as I am aware for independent auditing at the moment” (SIP8, 2005).
- “At the present time it is very ad hoc and there is no central body in South Australia that ensures it is happening” (SIP9, 2005).
- “My experience is that there are always conditions in the decisions but there is no formal way these conditions then carried forward into an ongoing regulatory review of their implementation. The ongoing post-decision component only gets satisfactorily implemented for those projects in which there are adequate methods for licensing for the ongoing operation. Where there are no licensing requirements it is poorly recognized and poorly implemented” (SIP10, 2005).
- “We have no formal mechanism as such. A lot of developers do the right thing and do have a standard monitoring programme. We may not do an adequate job. It would be better if we get more resources” (SIG14, 2005).
- “We do it indirectly; there are common approaches through planning approval and EPA licensing. We incorporate planning approval conditions into our licenses. We have a close relationship with the planning authority during the EIA process but after the decision not at all. There is no process in place” (SIG17, 2005).

- “In NSW, during the last five years there has been involvement of management plans, reporting, monitoring, compliance and all these things going on. We always make them to do self-reporting. We have got companies who have got the monitoring going on, the compliance going on. At the other end we have companies totally locked down” (NIG1, 2005).
- “We have formed a specialized unit called the compliance unit within our department (DOP, NSW). In terms of monitoring like most other authorities we require the proponent to monitor and report back on monitoring. We have an audit programme as part of our compliance strategy where we audit a number of projects which have gained planning approval. We generally audit on average 12 major projects every year. We also require in many cases independent auditing to be carried out on an annual basis” (NIG2, 2005).
- “In NSW, it is not done properly particularly in the case of regulators. Monitoring report is of course seen as something to tick it off for compliance. No one actually read the content and assess whether or not projects has the controls that have been effective or that has met the objectives of the monitoring” (NG10, 2005).
- “I am yet to actually see on the ground whether the DIPNR (DOP, NSW) go back to see if the EMP is followed or whether do any serious auditing against that. There are much more rigorous systems in the environment protection license issued by the EPA and they are very well equipped” (NIP17, 2005).

8.15 Consistency Between Procedures and Practices

Only 23% of respondents think that there is significant consistency between procedures and practices in monitoring and auditing in EIA in Western Australia. In South Australia and New South Wales the response is 19% and 33% respectively. The following comments reflect respondents’ opinions on this issue.

Figure 8.15: Opinions on the Consistency Between Procedures and Practices in Monitoring and Auditing in EIA.



- “I would not call it inconsistency. In WA, it may just be that the full expectations are not being delivered because resources are not available” (WSR12, 2005).

- “In WA, different methodologies are used between proponents in some areas” (WSP15, 2005).
- “In WA, small number of offices undertaking work but heavily relies on information provided by proponents – which is highly variable”(WSG22, 2005).
- “In South Australia there are no real procedures, hence no practices either”(SSP3, 2005).
- “Levels of monitoring and auditing vary with the type of activity in South Australia” (SSG14, 2005).
- “In South Australia, it can be seen by comparing EIAs from different consultant groups” (SSP24, 2005).
- “In NSW, monitoring is often poorly done with data not adequately scrutinised by proponents or the government. Auditing is poorly conducted – particularly, internal audits – very few companies know where their document is located” (NSP15, 2005).

8.16 Factors Affecting the Implementation of Monitoring and Auditing in EIA

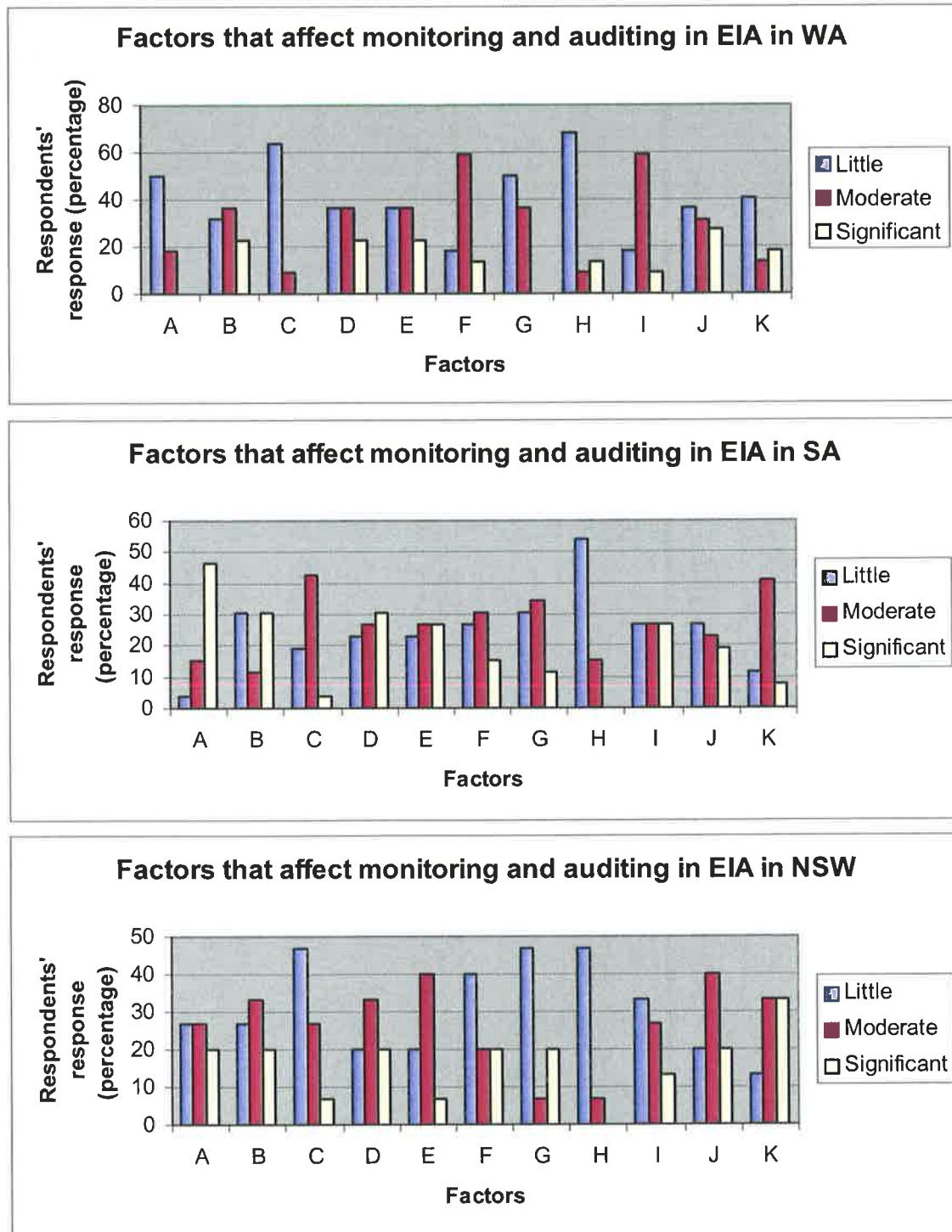
The responses on 11 different factors that affect monitoring and auditing in EIA in three States vary considerably. A lack of mandatory legal provisions has been identified by 46.15% of respondents in South Australia as significantly influencing monitoring and auditing in EIA. The proponent’s reluctance to bear the cost and poor or inadequate baseline studies are also significant factors that rank second (30.76%) in South Australia.

None of the respondents in Western Australia think that a lack of mandatory legal provisions or unwillingness or awareness of bureaucrats and EIA professionals significantly affects the implementation of monitoring and auditing. 22.72% of respondents think that prioritizing development more than the environment significantly affects the implementation of monitoring and auditing. The proponent’s reluctance to bear the cost, poor or inadequate baseline studies, and inadequate and unavailable monitoring data rank second (22.7%) as significant factors.

In New South Wales the most significant factor identified is overlapping of monitoring and auditing activities in EIA with general environmental management practices (33.3%). The other significant factors that rank second (20%) in that State include: lack of mandatory legal provisions; unwillingness of the proponent to bear the cost; poor or inadequate baseline studies; lack of adequate professional knowledge, lack of awareness; and priority of trade and industry over the environment. Overall, 30% of respondents believe that the combined effect

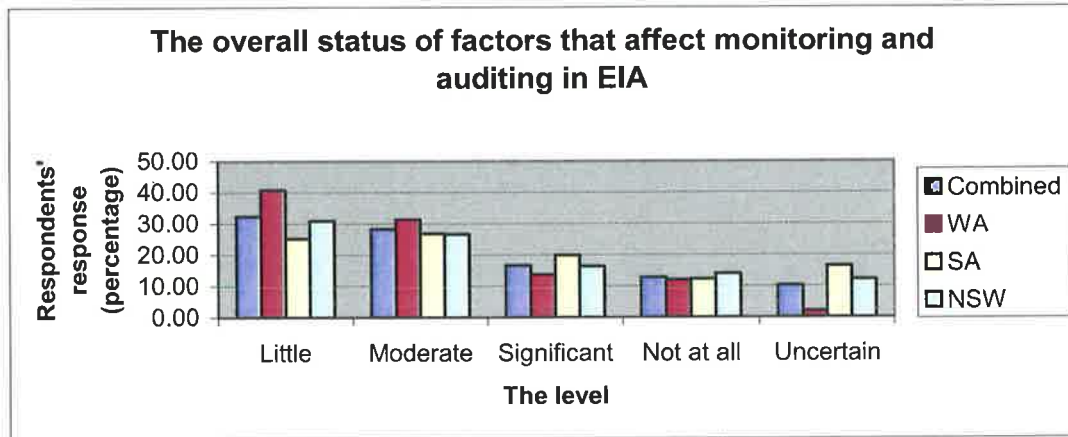
of factors (see Figure 8.16) in the implementation of monitoring and auditing in EIA is little or moderate.

Figure 8.16: Opinions on Different Factors that may Affect Monitoring and Auditing in EIA.



A=Lack of mandatory legal provision; B=Unwillingness of the proponent to bear the cost; C=Unwillingness of bureaucrats and EIA professionals; D=Poor or inadequate baseline study; E=Inadequate or unavailable monitoring data; F=Lack of adequate professional knowledge in relevant organizations; G=Lack of awareness in the bureaucratic set up; H=Lack of technology; I=Lack of established baseline data; J=Trade and industries get priority over the environment; K=Overlapping of monitoring and auditing activities in EIA with general environmental management practices.

Figure 8.17: Opinions on the Overall Status of Different Factors that Affect Monitoring and Auditing in EIA.



8.17 Public Accountability and Transparency

As mentioned at the beginning of this chapter, findings regarding public accountability are based on interviews only, and many opinions are emerged. The following comments highlight the benefits and/or disadvantages of public accountability in monitoring and auditing in EIA, and furthermore provide strategies to ensure that it happens:

- “In WA, if you do anything under Part IV formal assessment, anything you do in response to the commitments you made and conditions imposed upon you is public information in theory. The public does not always know how to access that information and sometimes do not know if that exists. Sometime you have to put requests under FOI but as a member of the public it is very hard to get access to it” (WIP3, 2005).
- “In WA, we report on a public website about projects that are non-compliant and through freedom of information the public can access the audit records of any project. We believe it is accountable to the public but is not legally accountable and it should not be. If the public is given the legal power under the Act to go around and do some sort of monitoring and then report projects that have been compliant or non-compliant, it could be a way for mischief to occur” (WIG17, 2005).
- “There is an element of public accountability. It is difficult because the public wants 30 second grabs and it is often difficult to explain the issue in a very short time span. In WA, the result of audits that we do put in our library so they are publicly available. Sometimes we require proponents to make their monitoring results available to the public and that tends to become more common. In a sense the government is the public; we are the servants of the public. So, to the extent the projects are accountable to the public service they are accountable to the public” (WIG18, 2005).
- “In South Australia, even as an environment group it is quite difficult for us to get documentation to enter monitoring information out of the government. We have to go through the lengthy and complicated Freedom of Information Act process and we may not get the document we wish to see” (SIN2, 2005).

- “Something tricky one and this is a failure of our system in South Australia. In most cases monitoring results are not made public unless a freedom of information request is made. A lot of international companies are seen to publish annual reports including monitoring results. The conservation groups and NGOs usually criticize them. They do not actually provide useful data” (SIG14, 2005).
- “The public has a right to know the requirements of developments that have received approval from the Minister who is acting for the public interest. I think monitoring and auditing should be made available to the public unless there is some sort of commercial in confidence issue” (NIG2, 2005).
- “I think there is a danger in this case. Everything we do tends to be based on consultation that is good. You never get people who actually support the project. So the consultation tends to have very negative skew into it. If you throw monitoring and auditing up to the public you are exposing it to that sort of negative task. Who from the public is going to do that? Do they have the necessary expertise?” (NIG6, 2005).
- “The EIA process is a very open and publicly accountable process. So to me it is the part of the same philosophy that is full disclosure of implementation of monitoring as well.” (WIG14, 2005).
- “I think that information should be made public. Full disclosure of information depends on the nature of the information as long as it is not a grey area between information that is indicating the impact of information, which might be commercially sensitive, and of revealing information to the competitors” (SIP10, 2005).
- “I don’t think things should be hidden from the public. The public should get information that they could perceive. I think there need to be some filtering of information. The public needs to be aware of what is going on; they should not be aware of something that government needs to grapple with” (SIP18, 2005).
- “Some industries do not want their practices to be known by the competitors and that is fair. They make huge investment, they deserve some level of protection but I think the public has still reserved their right to know what is happening to their environment because it is their as much as it is the industry’s environment” (SIP21, 2005).
- “Ideally, I believe the post-EIS process should require any negative results from monitoring and auditing to be published in the media. This would ensure that the proponent would take such activities seriously” (SIG23, 2005).
- “The company has got to be accountable to the public provided there is recognition by the government that an exceedance does not automatically mean an infringement notice. If you have got a result that is exceeded a particular assessment criteria, it does not necessarily mean that there is a huge impact on the environment. Often there are circumstances beyond the control of the company or the proponent” (NIP8, 2005).
- “In a perfect world it would be great if there is transparency and public are actually seeing what companies are doing. It does not come down to in reality. If you don’t get out and provide all of information required for them to be out of understanding properly – it is not useful at all” (NIG10, 2005).
- “Monitoring and auditing is a scientific exercise that should be in the domain of the technical experts” (NIP12, 2005).

- “The regulatory authorities are there to look after the interest of the community and also the government. I would not think another layer of scrutiny by having the public go out with you simply adds to cost of an already expensive process. They have the right to know but that does not necessarily mean that they should have a right to dictate what is done” (NIP13, 2005).

8.18 Public Consultation and Involvement

Public involvement in monitoring and auditing in EIA generated a variety of opinions. The following comments about the public involvement practices in monitoring and auditing in EIA in Western Australia, South Australia and New South Wales also highlight the benefits and demerits of public involvement in monitoring and auditing in EIA. They also provide strategies to ensure that it occurs.

- “In WA, some companies are proactive to get the public involved in reviewing of monitoring results. They have public groups to get involved. They have meetings with community groups every month or every three months. They may look at things like general activities, their plans as well as monitoring results” (WIP2, 2005).
- “It depends. A lot of projects which have been assessed and implemented in WA are remote. So there is no public in or there is very limited local people. I don’t have a problem with the public being involved in monitoring. Only a limited public could actually understand what is happening. In terms of auditing I think there is a very limited role for the public” (WIG16, 2005).
- “The community liaison groups are the best way that we have here in WA. We often set conditions where proponents have to make their environmental management plans publicly available. Sometimes, even they have to put their plans in a draft form for public review then they finalise them and make them publicly available. Then we have the community liaison groups. So that is how we involve them” (WIG17, 2005).
- “What is the benefit of involving the public, who is the public and does the public really want to be involved? In terms of actually involving them in audit scrutiny, that happens occasionally and I am aware that a number of projects that have representatives of special interest groups. I would not call them public; they are really special interest groups” (WIG18, 2005).
- “If you make the wrong decision through the wrong process and whatever you may say to the public thereafter in reinforcing that decision is invalid” (SIN2, 2005).
- “In South Australia, many companies are actually engaging the public in more informal ways. Some have education and involvement with the local communities. It is not formal. I don’t know if it can be formally ensured that the public have the right to be involved” (SIP8, 2005).
- “In South Australia, projects requiring the Commonwealth approval involve an environmental consultative forum. The members on that forum need to be local stakeholders and also the conservation council. The conservation council is not willing

to be engaged in that forum. So those meetings are not actually occurring” (SIG16, 2005).

- “It is difficult how much involvement the public should have in monitoring and auditing. Certainly, there is a public involvement process but for monitoring and auditing purposes not so much. I am not sure that is really necessary. The public can be consulted in designing the monitoring programme. In NSW, we have community consultative committee for major projects. Again, there is a problem here; it makes the process delayed if everything is consulted with the public” (NIG2, 2005).
- “Public involvement can be through consultative committees. The problem is to find the true representation of the public. Too often in this State [NSW] involving the public consultation is useless and an excuse not to do anything; it is used as a way to procrastinate” (NIG6, 2005).
- “Community consultative committees are effective in managing community expectations and resolving issues. I think those formal channels would benefit but may not be applicable for all projects. I think it is important to select the right people and good representation of community people” (WIP4, 2005).
- “I think that there is little to be gained having open public involvement in the design of monitoring programmes. I do have a concern – when too little detail contained in the original EIS and therefore a lot is left until the environmental management plan is prepared” (WIR12, 2005).
- “I think it is the best thing to involve the public. How you involve them is the question. If you do a half-hearted job you will raise the suspicion of the public and you will end up by negating the whole public involvement process” (SIP1, 2005).
- “I don’t really think that you need to actively involve the community in the assessment of monitoring and auditing data. However, I do think the results of monitoring and auditing should be provided to the community to demonstrate that the appropriate steps have been taken to deal with a problem” (SIG5, 2005).
- “If monitoring results and summary of audit are made public, the public could of course comment on that. I am not sure whether there should be at all any public involvement because this is a very complex one. In a lot of cases, people are pushing their own barrels and often don’t have the full environmental appreciation knowledge they think they have got” (SIP9, 2005).
- “My personal view is – the more the public are encouraged to be involved, eventually the public gain confidence in what the industry is trying to achieve. It is not only for the public but also for the industry themselves. Sometimes you may have unqualified people collecting information; this is quite a problem” (SIP10, 2005).
- “You can make the system available but you can’t actually make people do it. We can’t ensure it if people have no direct interest in it” (SIG17, 2005).
- “Sometimes proponents will do more than they intended to do because of public pressure. There are some demerits: multiple opinions and wishes. If you take ten people with ten different opinions and you try get any project through, everything becomes standby or stay still” (SIP19, 2005).

- “Again, the cost-effectiveness issue. Not involving the public too much but providing information to the public” (NIG7, 2005).
- “Public involvement in our process – I don’t see it as desirable. Public information and having access to information is another matter. If you suggest persons that the public would be involved in some auditing process or something like that, I think it would be a recipe for creating another bureaucracy” (NIG11, 2005).
- “The public can be involved as a watchdog but I don’t think it should be left out to the public. If you have an independent panel where the public raise issues they have – is the best way to involve the public” (NIN14, 2005).
- “Public should be involved and the outcomes of that inquiry should be made publicly available where questions about post-decision monitoring deal with more value judgement” (NIR16, 2005).

8.19 Compliance and Enforcement

As with the preceding sections, this one does not present any quantitative data, but qualitative findings based on interviews. Almost all interviewees in South Australia, Western Australia and New South Wales think that the compliance and enforcement mechanisms in EIA are either weak or are not implemented in practice. The following comments also identify some problems and possible solutions:

- “I think it could be strengthened by having more resources in WA” (WIG8, 2005).
- “The legislation is not too bad in WA. The problem with enforcement comes down to the ability of the government to effectively check the compliance” (WIN10, 2005).
- “In WA, we are working on this at the moment. Perhaps by imposing more enforceable conditions and by educating proponents to do the right thing it can be strengthened” (WIG17, 2005).
- “So what they are doing in practice in WA is – they try and have a cooperative approach where they talk to proponents about breaches of conditions and so on to the try to get proponents to do something about it. They wipe the stick but they don’t hit the body. If they go to the court they can lose their entire operating budget if they lose the case” (WIR13, 2005).
- “There are general enforcement provisions for implementing proposal as proposed that is fairly comprehensive, but their use has been limited in WA. Enforcement might be an adjustment. I don’t know if there is any enforcement of follow-up” (WIR12, 2005).
- “I think it is there but it is used rarely in South Australia. I think the biggest problem is liaison between the government agencies and proponents. I think 99% of compliance problems are due to the lack of understanding and lack of communication” (SIP1, 2005).
- “Well, clearly in SA it could be strengthened by having an EIA process within a single agency and it could be the EPA. At the present time that is disconnected. There are

various departments responsible for various aspects of monitoring – DEH, DWLBC, PIRSA, etc. but they are not properly coordinated” (SIP9, 2005).

- “The State Government (SA) has the responsibility for compliance and enforcement, whereas in reality many of the issues are of local nature, which could be better enforced through the local authority” (SIP10, 2005).
- “No one really enforces in SA. At the moment the review of follow-up is under resourced; resources for enforcement are probably also insufficient. At the other end of enforcement mechanism is the accountability. You need to improve the access of the community to the information making sure that they have the opportunity to review the performance” (SIG11, 2005).
- “Now, compliance is much more complicated and as a result we are now institutionally changed in NSW. Now we have a compliance unit. Now compliance would be pollution control –where you got to see how it is operating? Are they under control? Are they still talking to the people? Are they giving them reports? All these things are happening now” (NIG1, 2005).
- “I think it is necessary to have legislation which provides enforcement provisions identifying offences; which actions become offences? Whether they can be addressed through civil or criminal proceedings or both? What are the penalties? I think that is the base line; that is fundamental to legislation to include enforcement. One of the problems with enforcement is – it is very resource intensive” (NIG2, 2005).
- “It needs to be strengthened by greater community engagement and by resourcing the community conservation sector so that the community conservation groups can be fully involved. In this way we would have somebody who is truly impartial” (WIN11, 2005).
- “Communities can work a very good watchdog. We don’t use them enough. I recommend may be the government should reduce inspectors and then come to the communities. If we can empower the community to participate in the enforcement, I think things will be much better” (WIG15, 2005).
- “By having verifiable conditions of implementation it could be strengthened” (WIG18, 2005).
- “I suppose there are a number of ways that one can do that but I think it can be strengthened. One way is motivational initiatives; the other way is punishment. It should be on a scale from incentives to punishment. It should not be fully free of punishment” (SIG12, 2005).
- “If we can get projects well designed at start is the best way to do it. Trying to do something after the effect is occurred is a difficult part. Again, political force has to be applied to make the major project down. So it should be the pre-approval rather than the post-approval” (SIG14, 2005).
- “We need dedicated enforcement people in the Planning Authority in SA who are expert in investigation and have actually a willingness to do it” (SIG17, 2005).
- “Accountability is going to strengthen the system. At the end having the proponent being held accountable for the effect of what they have done is what the system needs

to have. It is also important to have a system that makes consultants accountable” (SIP19, 2005).

- “Abolish s48E of the Development Act that precludes legal challenges to major projects in South Australia” (SIN22, 2005).
- “It should be strengthened. Well, government needs to place further regulations. I am not thinking about any incentives other than this” (NIR9, 2005).
- “I think the main weakness is it only focuses on compliance and enforcement which is reactive. You are only going to get reactive response to environmental management; you are never actually going to see upfront organizations working together for the best outcomes in the planning phase thereby reducing the need for compliance and enforcement. If it comes down to DEC or DIPNR, they don’t have the resources, they don’t have money” (NIP10, 2005).
- “Unless you have actually got funding and resources to undertake the compliance and enforcement, it is not going to happen” (NIP17, 2005).

8.20 Self-regulation

The research findings presented in this section are also based on interviews. Many interviewees believe that the implementation of monitoring and auditing in EIA in Western Australia, South Australia and New South Wales relies heavily on a self-regulatory approach. They believe it is not working but some people differ. The following comments focus on both the advantages and disadvantages merits of self-regulation.

- “Self-regulation is particularly a fraud and we are in a situation at the moment in WA where not only we have a high degree of self-regulation but also have the situation where proponents are able to choose which environmental consultants work for them and they are able to put pressure on the consultants to give them answers they want. There is no accreditation system in place; there is no check on them” (WIN11, 2005).
- “I tend to think they need a better stick. If you are too reliant on self-regulation you are taking the risk. Maybe here [in WA] in practice we have a self-regulatory approach due to resource constraints but the Act is not based on the concept of self-regulation” (WIR12, 2005).
- “I think depending on the company it is acceptable. I would not say every company should be allowed to do that. I think from the public perspective it is rarely acceptable. There is still a need for regulators. It could be a risk management approach that is based on the risk of the industry to the environment and to the community. The higher the risk, the more likely government gets involved” (WIP2, 2005).
- “Companies do things in two ways. Some do whatever is required to get boxes tick while others embrace environmental outcomes and actually have that as component of working business. A lot of cases I still believe that companies would make their requirements and will do what is required to actually comply in a legal sense. They are

not offering any solution at the end of the day; they will only do the minimum” (WIG7, 2005).

- “It is a very good idea. I think it is an attempt to minimise cost. It should be carefully monitored. In many ways the government is not big enough to regulate large multinational companies” (WIG8, 2005).
- “Self-regulation is a good idea but it is a kind of unreliable in practice” (WIN10, 2005).
- “In an ideal world I do believe in self-regulation but in practice the company’s survival is more important than the environmental issues. So I do believe in very strong regulatory framework but I support self-assessment. Self-assessment is not self-regulation. We should have a regulation to set minimum standards and we should encourage industries to go above those minimum standards” (WIG15, 2005).
- “We have got the feedback from the community which is one of our three stakeholders that would not support industry self-regulation because they just don’t trust the industry. We just need a sort of quality assurance to make sure that they are doing the right thing” (WIG17, 2005).
- “My view is that it is at stake and the public in general don’t like it because they believe that industries deliberately falsify results or do the work badly. So in a sense the public is right – the self-regulation often does not work. I don’t think that is through criminal intent but more through incompetence and lack of guidance” (WIG18, 2005).
- “It is very unlikely that the company will do the right thing and will behave ethically. In certain circumstances self-regulation can do well. I think people need to have guidance, need to have rules. Unless there is some sort of compliance check, I do not believe they will do it. Some of the companies with ISO 14000 accredited EMS are amongst the worst polluters in South Australia” (SIG17, 2005).
- “I am not convinced that self-auditing is successful in South Australia. It is just a waste of time. I can see some significant problems with self-auditing. The issue there of course is the company is paying the third party auditor to give the company essentially the answer they want. There are no checks and balances in there. I think there is an inherent conflict of interest issue” (SIG5, 2005).
- “I am happy with proponents undertaking their own monitoring and auditing but there should be a separate audit by the government agencies which is far more strict. Self-regulation will bring success as long as you have got someone to coordinate” (SIP1, 2005).
- “Honestly, I don’t think it works particularly where projects may have significant environmental impacts (for example uranium mines). I don’t see any prospect for all these companies putting proper monitoring in place and putting proper reporting or transparency. Proponents should be bound by the stricter set of obligations, which are regularly audited and reports are made public” (SIN2, 2005).
- “I think it is important that business and industry have a strong focus on self-regulation because they are the people who can influence it most. However, only in

self-regulation people will not do anything, it is a bit of balance between two” (SIG6, 2005).

- “There needs to be accountability in self-regulation. I don’t think business itself is an incentive to self-regulation with the risk of exposure. It is about setting up mechanisms to make sure that businesses are held accountable to someone” (SIG11, 2005).
- “Self-regulation is a bit of a double episode. It saves government a lot of money and industries look after their own business. The trouble is we need to make sure that industries do the right thing. We need to put safeguards in minimum standards or benchmarks. Sometime, it is just seen as an exercise in getting the boxes ticked.” (SIG14, 2005).
- “Self-regulation can work where the system is understood enough and there is enough knowledge about it and you can employ somebody who understands it to keep you go through the process. I think self-regulation tends to become difficult because of conflict of interest” (SIP19, 2005).
- “I don’t think self-regulation is achievable. Co-regulation I suppose is a better concept where we work together with industries to achieve the best results” (NIG5, 2005).
- “I think in Australia we are very good at this because we generally have a responsible society here. I think self-regulation is the right way to go but it is not something that can happen on its own. You need self-regulation with periodic checks” (NIG6, 2005).
- “I think self-regulated standards actually do not work. I think a lot of companies have voluntary EMS. If companies have those things, they are more likely to have more business than companies don’t have it” (NIP15, 2005).
- “I think the business and industrial community need to be aware enough about the environmental issues. I don’t think just having an environmental responsibility is enough; they have to see how they are meeting their environmental obligations that affect their bottom line. So I guess self-regulation in one sense could be seen as quite difficult to achieve” (NIP17, 2005).

8.21 Concluding Remarks

The research findings presented in this chapter are based on limited sample size. Therefore, opinions expressed by respondents cannot be generalized to a wider context. There are also debates on some issues such as: legal requirement of monitoring and auditing; cost bearing, lead agency; supervising and coordinating role; disclosure of information; the role of the public, and regulatory approach. However, the chapter gives a clear picture how monitoring and auditing in EIA are being implemented in different Australian States. Most importantly, the survey and interview results are consistent with the findings of case studies discussed in the earlier chapters and they complement each other. The survey results will be discussed further in detail in the following chapter.

CHAPTER 9: DISCUSSIONS AND CONCLUSION

This chapter analyses in more detail the implementation of monitoring and auditing in Western Australia, South Australia and New South Wales. It interprets the findings of this study and makes a comparative analysis of procedures and practices in the three EIA jurisdictions. Based on the evaluation criteria discussed in Chapter 4 this chapter also evaluates the overall status of current procedures and practices mainly focusing on factors that are widely recognized as being relevant to monitoring and auditing in EIA. These include regulations and institutional arrangements, approaches and techniques, resources and capacity, parties and stakeholders, public accountability and transparency, public involvement and consultation and environmental management outcomes.

9.1 The Implementation of EIA as a Cyclical Process

As demonstrated in Chapter 1 it is widely accepted that in order to make EIA an effective environmental management tool it should continue beyond the initial development decision. In terms of procedures, the recognition of EIA as a cyclical process is evident in Western Australia, South Australia and New South Wales. However, in practice the cycle is not complete in most cases. Proponents are undertaking monitoring and auditing according to their commitments or conditions of consent but it does not provide any real feedback to the EIA process. Furthermore, they are not linked with future decision-making or EIA improvement strategies. Informally, EIA is being implemented in these three States as a two-step process: pre-decision impact analysis; and post-decision environmental management. In the first step a development proposal is approved subject to conditions that take EIA to the next phase, which is an area of environmental management. However, there is very little or no link between the assessment/ approval process (i.e. the first phase) and the environmental management phase. In Western Australia and New South Wales, EIA does go beyond decision-making but the focus is still on approval. In fact, monitoring and auditing in these two states do not effectively link the pre- and post-decision stages of EIA bridging the implementation gap as suggested in the literature (see Marshall et al., 2005; Morrison-Saunders & Arts, 2004). In South Australia, the post-decision area of EIA is much weaker than those two States and it is completely disconnected with the pre-decision stage of EIA.

9.2 Monitoring and Auditing as Formal Requirements

There are no mandatory legal requirements for EIA monitoring and auditing in South Australia, Western Australia or New South Wales. About 80% of the survey respondents (EIA practitioners) of this research believe that monitoring and auditing in EIA should be legislated for in Australia. This finding is consistent with the literature wanting EIA monitoring and auditing to be a formal legal requirement (see Canter, 1996; Sheate, 1996; Dipper et al., 1998; Glasson et al., 1999, 2005; Wood, 2003; Morrison-Saunders & Arts, 2004; Arts & Nooteboom, 1999; Barker, 2004). However, some believe that even monitoring and auditing legislation is enacted, they may not happen (see Arts & Nooteboom, 1999; Morrison-Saunders & Arts, 2004; Arts & Meijer, 2004). According to them, monitoring and auditing in EIA are more related to resourcing rather than legislative requirements. Monitoring and auditing are costly exercises which often prevent them being carried out. On the other hand, if EIA monitoring and auditing are not formally required by law, it is very likely that proponents will be reluctant to undertake them because of the cost involved. In addition, if monitoring and auditing are formally required without an enforcement mechanism in place then they are unlikely to be conducted. Glasson (1994a) observed that the industry resistance was an obstacle to the extensive application of EIA monitoring and auditing. Marshall (2004, 2005), however, found EIA monitoring and auditing to be cost-effective for industries.

Currently, the global political and economic situation tends to make the enforcement of environmental regulations very difficult because the regulatory 'stick' of the government has no effect on large multi-national companies. In a growth-based economy the government actually does not want to lose investment due to tough environmental regulations. Ultimately, the State government needs development for economic growth, employment and revenue. However, based on the 'polluters pay' principle, proponents should be legally bound to do monitoring and auditing. Moreover, the government may be reluctant to put adequate resources into the relevant organizations responsible for the implementation of monitoring and auditing in EIA if it is not a mandatory legal obligation.

For example, the government resources placed in WA, SA and NSW for the post-decision environmental management and monitoring purposes are very insignificant (less than 10%) compared to pre-decision environmental assessment of development proposals. Planning SA (PLNSA), the responsible agency for EIA in South Australia, does not have a separate compliance audit section. Although in WA and NSW the relevant agency has a separate audit

section it is under-resourced. In theory, monitoring and auditing are considered essential elements of the EIA process in WA, SA, and NSW. There is no single development approved under the EIA process without conditions requiring ongoing environmental management, monitoring, reporting and compliance. However, in practice the follow-up in these areas is much weaker in WA and NSW or lacking particularly in SA with the absence of a formal legal requirement.

9.3 Importance of Monitoring and Auditing in EIA

The current procedures and practices of EIA monitoring and auditing in WA and NSW primarily focus on compliance verification. In terms of procedural approach there is also an emphasis on environmental management of ongoing operations. However, the environmental performance of an ongoing operation is assessed through compliance only. In the South Australian EIA process very little importance is attached to monitoring and auditing, which depends entirely on other regulatory tools outside the EIA process. Planning SA has not even developed necessary guidance on EIA monitoring and auditing. More interestingly, in all three Australian States studied, the importance of monitoring and auditing is recognized in obtaining an approval for a development proposal. EISs very often attempt to avoid the analysis of an uncertain and complex environmental situation, and only attempt environmental management and monitoring commitments, which themselves are not usually detailed. These are often left as matters of post-decision negotiation between the proponent and regulators.

About 90% of the survey respondents (EIA practitioners) attach significant importance to EIA monitoring and auditing. They recognize the importance of monitoring and auditing in many ways as mentioned in the literature. However, politically, the State government puts very little emphasis on them. For example, the organizational set-up and under-resourced state of the relevant government agency betray the State government's commitment to EIA monitoring and auditing. This situation is at its worst in South Australia. Although Western Australia is internationally recognized as having a good EIA system (see Wood, 1995, Glasson, 2005) the focus is still on pre-decision environmental assessment and the approval process. During the last five years two independent commissions were formed by the Western Australian government to review the issues of the development approval system and licensing system (see WEC, 2003; Independent Review Committee, 2002). It clearly indicates that issues of EIA monitoring and auditing are not the government's priority. The Welker Report (WEC,

2003) clearly indicated the under-resourced condition of the relevant government agency in WA.

9.4 Monitoring and Auditing Outside the EIA Process

Monitoring and auditing take place in a number of countries such as Australia, the Netherlands, Canada, and United Kingdom under different regulatory or voluntary tools outside the EIA process (see CEPA, 1994; Arts & Meijer, 2004; Wood, 2003; Glasson et al., 2005; Marshall, 2005). Case studies in this research (Chapters 5, 6 and 7) show that environmental monitoring and auditing are happening in all three states under voluntary environmental management systems (e.g. ISO 14001 EMS) in addition to the requirement of development consents. Moreover, in New South Wales it is very often a requirement of the development consent that proponents should undertake third party audits consistent with ISO 14001 principles. The case studies also reveal that most of the ongoing operations in WA, SA and NSW that have been approved through an EIA, require licences or approvals from one or more regulatory agencies. The environment protection licence and mining lease are two prominent regulatory instruments that require monitoring, auditing and reporting. The environment protection licence issued by the environmental agency in these three States is mainly concerned with pollution and emission issues. Sometimes, there may be an overlap of monitoring requirements between the development consent and the environment protection licence. However, the monitoring requirements under the license are more specific and they do not cover all significant issues/impacts of the ongoing operation of the approved development. In fact, there is no active and formal link between these two instruments in any of the three States studied and the environmental issues identified in the EIA process are not fully incorporated into the operation license. The Keating Report (Independent Review Committee, 2002) identified it as a shortcoming of the regulatory licensing system in WA.

In WA, the environmental agency is responsible for environmental assessment but in SA and NSW this responsibility lies with the planning agency. In these two States there exists a formal relationship between the environmental and planning agency only in the pre-decision environmental assessment of the EIA process. Once a proposal gets an approval this relationship with EIA is terminated. However, they maintain a relationship informally during the operation stage, which is not often very effective. For example, the environment protection licence (DEC licence) in NSW is revised and renewed on a regular basis but the development consent is not. As a result a development consent, which may have been issued 10-15 years previously, is often found to be inconsistent with the current environment

protection license. Unlike WA and NSW, most of the South Australian major development proposals do not require an operating license from the EPA. However, the assessing agency relies heavily on the EPA in relation to ongoing environmental management, monitoring and reporting, although there is no formal relationship between these two agencies during the project operation. As with NSW, the EPA license in SA does not necessarily cover all the significant issues of the ongoing operation. In WA, environmental assessment and licensing are dealt with under two separate parts of the relevant legislation (i.e. *Environment Protection Act 1986*) and EIA is not part of the environmental licensing system. Moreover, the environmental protection licence (DoE operating licence) in WA covers only specific pollution or emission issues.

The mining lease conditions often require ongoing environmental monitoring, management and reporting. Under a mining lease, proponents are required to prepare an operation plan with environmental management and monitoring components and obtain approval before going into operation in all three States. This provides an opportunity to establish a link between the mining department and the assessing agency at the post-approval stage. However, this opportunity does not appear to be utilized properly. The mining department approves the mining operation plan. There is no formal relationship between the mining department and assessing agency at the post-decision stage. Although the mining operation plan takes into account some operational environmental issues, it is primarily concerned with the rehabilitation of disturbed land.

In South Australia, the Minister for Mines makes decisions on EIAs of all mining projects under the provision of the mining legislation. Therefore, the link between the pre-approval environmental assessment and ongoing environmental management and monitoring of mining operation is much stronger in South Australia than WA and NSW. PIRSA supervises the ongoing environmental management and monitoring during mining operations in addition to its regulatory role under the mining legislation. Therefore, in South Australia environmental monitoring and auditing of mining operations take place only outside the EIA process under the mining approval. The positive outcome of this system is that it assists in avoiding the duplication of monitoring, auditing and reporting requirements by the assessing agency and the regulatory agency. However, there is a potential problem that relates to conflict of interest. PIRSA is responsible for promoting mining operations and at the same time this agency oversees the environmental performance of mining operations. In WA and NSW, unlike South Australia, EISs of all major mining developments are approved under the

environmental and planning legislation respectively. In these two States there is environmental monitoring and auditing under the EIA process and the mining lease outside the EIA process. Both regulatory tools in these two states complement each other in terms of environmental monitoring and auditing but they do not substitute each other under the current legislative and institutional arrangements.

Case studies in this research show that, in all three States, proponents often make a commitment in the EIS to implement voluntary environmental management systems during the construction and operation of proposed developments. Most proponents, particularly bigger companies, have their internal environmental policies/ plans and ISO 14001 accredited operational environmental systems. Usually, the voluntary management systems involve systems audits in order to ensure that all necessary management plans and programmes reflect the internal environmental policy of a company. The audit does not verify how effective these plans/ programmes or specify the actual environmental management outcomes. Moreover, the commitment to continuously improve conditions under an EMS is often vague, while requirements set through an EIA are very specific to the latter. Again, the scope of an EIA is much broader than an EMS. Therefore, monitoring and auditing under an EMS cannot replace the requirement of an EIA. However, voluntary EMSs are complementary to EIA since latter incorporates environmental management components, particularly during the project operation.

State of the Environment reporting and area-wide monitoring exist in WA, SA and NSW. A number of other government agencies undertake environmental monitoring at regional level as part of their responsibility. The requirement for monitoring and auditing under EIA is based on a particular project. Therefore it is difficult to link a particular project to regional level impacts. However, monitoring and auditing by other government agencies outside the EIA process complement the EIA monitoring and auditing, and the assessing agency usually liaises with them informally during the operation of a project, particularly in WA and NSW. This liaison between government departments is usually stronger if they have the same Minister. For example, there exists a good relationship between the DoE and CALM in WA. In South Australia, the link between the assessing agency (i.e. Planning SA) and other environmental agencies (e.g. EPA, DEH, DWLBC) vanishes once a project gets development approval. Currently in South Australia, the mining and planning departments have the same Minister. This arrangement provides an opportunity for establishing a better liaison between these two agencies.

9.5 Lead Role

As demonstrated in the survey results (Chapter 8), there are varied opinions on the lead role of monitoring and auditing. Although Glasson (1994b) strongly criticises the sincerity of proponents taking the lead role of monitoring, according to Wood (2003) monitoring is becoming their responsibility more and more. While about half the survey respondents support an environmental agency as the lead agency, case studies (see Chapters 5, 6 and 7) show that proponents essentially take the lead role in monitoring the environmental impacts of a development that has passed through an EIA process. They report monitoring results to the relevant agencies on a regular basis in all these States. These are required under the environmental authorisation (e.g. in WA) or development consent (e.g. SA and NSW).

In WA, the auditing responsibility primarily lies with the environmental agency (DoE) while in NSW the assessing agency (planning agency) has this responsibility. In South Australia, no auditing mechanism exists within its EIA process, which is different to WA and NSW. It totally depends on other regulatory tools such as an EPA licence or mining lease. In WA and NSW, proponents also engage third parties (usually consultants) to undertake audits and submit audit reports to the relevant agencies. There is a clear emphasis in all of these three States to put the auditing responsibility more on proponents rather than government agencies. A lack of adequate resources in the relevant government agency is a valid reason behind this practice. In fact, the relevant laws in these three States do not state that the DoE (in WA), the DoP (in NSW) or the PLNSA (in SA) must conduct audits. Therefore, auditing is not their obligatory role. The relevant government agencies in these three states do not conduct any occasional parallel monitoring to verify the monitoring results submitted by proponents. [A total dependence on proponents for monitoring and auditing in EIA is more likely to affect the environmental management outcomes of an ongoing operation due to potential conflict of interest.] It also diminishes the credibility of the ongoing environmental management and monitoring practices. In terms of procedures, the role of the government agency is well recognized particularly in WA and NSW in ensuring compliance with development approval. In practice, however, it mostly depends on proponents because regulators rely heavily on information provided by project developers.

9.6 Overseeing and Coordinating Role

Interagency coordination is considered very important in EIA monitoring and auditing (see Canter, 1996; Wood, 2003). The survey results show many opinions on this issue. However, a large proportion of the survey respondents (41%) believes that an environmental agency

should coordinate and oversee monitoring and auditing in EIA. Case studies conducted in this research show that post-approval environmental management and monitoring involves different stakeholders in WA, SA and NSW: different government and local government agencies, proponents, private consultants and often the local community.

In WA, the environmental agency (DoE) acts as a central agency liaising with other relevant agencies. It approves various environmental management plans required under the Ministerial conditions. The DoE approves an audit table in consultation with the proponent once a development proposal receives its environmental authorisation. This audit table forms the basis for overseeing the implementation of monitoring and auditing in EIA. The audit table also specifies the role of different agencies but there is no inter-agency coordination committee in place. [The coordination mechanism that exists in practice is usually informal, where proponents liaise with different agencies and the public directly, not through the DoE.] In the absence of adequate resources the DoE is satisfied with this arrangement because dealing with the public seems to be a difficult matter for regulators. There is no clear relationship between officials of the EPA Service Unit (responsible for conducting environmental assessment) and the DoE Audit Branch (responsible for conducting compliance audits). Without a clear and formal link between these two sections of the DoE it seems to be very difficult to confirm whether the EPA objectives have been achieved.

In NSW, unlike WA, the assessing agency (the planning agency) is responsible for overseeing the implementation of monitoring and auditing in EIA. It acts as a central agency liaising with other relevant agencies, by approving various environmental management plans required under the Ministerial conditions. However, DoP in NSW does not have a formal instrument in place such as an audit table in WA for the implementation of monitoring and auditing. Although proponents deal with other government and local government agencies and the public directly, the community consultative committees often provide a common and formal platform for coordination. The community consultative committees also have an overseeing role in environmental management and monitoring. Sometimes (e.g. Ridgeway Gold mine in NSW), there are AEMR review committees in place comprising regulators from relevant government agencies. It provides a formal mechanism for inter-agency coordination in terms of ongoing environmental management and monitoring of those projects with significant environmental risks. Although proponents deal with the public directly they are required to report to the DoP and the community consultative committee on how they manage various

community issues. A close relationship exists between the officials of the Compliance Unit and the Assessment Unit since they work under the same director's supervision.

In South Australia, other than mining projects there is no central agency responsible for overseeing and coordinating the post-EIA environmental monitoring and auditing. This responsibility usually lies with the proponent where it is a government agency (such as Transport SA, SA Water, etc.). If the proponent is not a government agency there is no central agency to take that role formally other than the EPA. The EPA only gets involved with an operation if it is licensed with the EPA under the *Environment Protection Act 1993* or if there is a public issue concerning pollution or emissions of that particular operation. The role of the assessing agency is usually only limited to approving the EMP and occasional site inspections. For mining projects, the mining department (PIRSA) acts as a central agency to oversee and coordinate the post-EIA environmental management and monitoring. However, there is no formal mechanism in place for inter-agency coordination except projects requiring Commonwealth approval.

9.7 Reporting and Review Mechanism

The case studies show that monitoring results are usually reported to regulators through annual reports. Sometimes, there are requirements for half-yearly or quarterly reporting depending on the type of projects. Unlike WA and NSW, there is no formal mechanism in South Australia for reporting on post-EIA environmental management and monitoring of projects. Although a development approval is always conditional in SA, there is no formal reporting requirement on compliance and environmental performance. However, reporting of monitoring results happens in SA under other regulatory tools such as a mining lease or an EPA licence. No one actually knows about the operation of projects that are outside the scope of these regulatory tools. The EPA or PIRSA usually liaise with other relevant government agencies to get their responses on monitoring results. Sometimes proponents directly report to the relevant agencies and obtain responses from them. In SA, monitoring results of very high profile mining projects (e.g. uranium mines) are reviewed by committees comprising regulators of relevant State and Commonwealth governments agencies.

In WA and NSW, unlike SA, a formal reporting mechanism exists on compliance and environmental performance. The DoE Audit Branch in WA and the DoP Compliance Unit in NSW are the primary reporting and review authorities. These agencies liaise with other specialized agencies for their responses on monitoring results. However, no formal

mechanism exists in WA. In NSW, the community consultative committees (comprising representatives from the government and local government agencies and the local community) or the AEMR review committees (comprising government regulators) provide formal mechanisms for coordinated review of monitoring results. There are also reporting and review processes in place under other regulatory tools such as DoE operating license, mining approval, etc. Case studies conducted in this research show that regulators are usually slow in responding to monitoring results. Sometimes regulators do not have the appropriate expertise in some specific areas. In these cases proponents engage private consultants to conduct further investigations and provide additional information to regulators. Private consultants are occasionally engaged to conduct an independent review of a specific issue if there is a disagreement between proponents and regulators. Both the proponent and regulators agree to consider it as an independent review although consultants are engaged and paid by proponents. Other than this arrangement, there is no independent review mechanism in place such as that operating in Canada.

As demonstrated by the survey results, there is a clear debate among the EIA professionals in all three States on the independence of the review process. Some of the recent literature suggests that the involvement of an independent review body is significantly important in order to make monitoring and auditing more credible, accountable and transparent (Arts & Morrison-Saunders, 2004; Barker, 2004). Specifically, the role of an independent review is critical in circumstances where the development is highly controversial or there is a clear conflict of interest among regulators or one government department regulates another government department, which is in effect a proponent. Again, resourcing is the main issue here. If it is a publicly funded agency, it should be adequately resourced even if it adds costs to the public. In WA and SA, the EPA already exists as an independent body. It can be formally involved in the post-approval EIA monitoring and auditing like the pre-approval environmental assessment. Another option is to use independent third party consultants. Here the issue is who pays for it and who do they report to? If proponents pay these consultants, there is a clear conflict of interest again. Therefore, there should be some sort of accountability for consultants. This can be achieved through the application of a professional accreditation system such as in the UK. Moreover, they should be engaged by government regulators to whom they report.

9.8 The Role of Audits

As demonstrated in Chapter 4 and the case studies, the EIA process in SA, unlike WA and NSW, does not have a mechanism to conduct audits in order to verify compliance with conditions of development authorisation. However, it does happen under other regulatory tools such as mining approvals or EPA licenses. In addition to occasional regulatory audits, proponents undertake both internal and external audits. They mainly focus on the conformance with the environmental management plan in place. Although the South Australian EIA legislation (*Development Act, 1993*) empowers the planning Minister to conduct audits, no such audit has been conducted yet (as of 2006).

In WA, the DoE (Audit Branch) undertakes compliance audits of Ministerial conditions according to the audit table's schedule. Normally, auditing is a desk-based activity which involves the scrutiny of documentation and evidence, but can also involve site visits to look at specific issues. The DoE audit primarily focuses on compliance in order to assess environmental performance. However, it does not necessarily cover everything and aspects of environmental performance are usually picked up by other regulatory instruments such as DoE operating licences, mining approvals, etc. The audit team sometimes includes officials from a specialized agency looking into a specific environmental issue in addition to officials of the DoE Audit Branch. After each audit the DoE provides feedback to the proponent through the audit reports. The audit reports prepared by the DoE are made public and they are retained in the DoE library for public viewing. The DoE Audit Branch is not adequately resourced to do its job properly and therefore the DoE takes a risk-based approach in selecting projects for audits. With the existing organizational set-up the DoE usually undertakes 20 audits every year. The DoE encourages proponents to undertake third party (external) audits and submit the audit reports to the DoE. However, due to lack of adequate resources the DoE is often slow in responding to audit reports prepared by proponents with the help of consultants. These audit reports are not made public.

The procedural approach to audits within the EIA framework in NSW and their scope are more or less similar to that of WA. The only difference is that in NSW the DoP Compliance Unit does not maintain an audit table for an approved project like the DoE Audit Branch in WA. The Compliance Unit in NSW is a new set up within the DoP. Therefore, in terms of capacity, resources and experience it lacks the experience of the DoE Audit Branch in WA. Currently, the Compliance Unit of the DoP in NSW conducts 12 audits every year, and while they are made public they are not easily accessible. Like WA, NSW audits are mainly

concerned with compliance and there is a clear emphasis on third party audits done by consultants.

The scope of audits under the EIA framework precludes: firstly, the effectiveness of the mitigation measures; and secondly, impact identification or prediction verification. Therefore, they do not actually provide any feedback to the EIA process in terms of its predictive and environmental management capability. Under the voluntary EMS proponents also undertake internal or external audits, which are often system audits ensuring all relevant plans and programmes are in place. These audits do not necessarily verify the environmental performance of an ongoing operation.

9.9 The Role of Private Consultants

The role of private consultants in post-EIA environmental management and monitoring is expanding because there is a shortage of resources in the relevant government agencies. Proponents prefer consultants rather than regulators to get their desired solutions because consultants will give them answers that will satisfy the proponents who are paying for their services. Therefore, there is a scope for bias. The EIS often leaves much to do in the post-decision stage. In WA, SA and NSW very little about the operational environmental management and monitoring is included in the EIS. Usually, detailed environmental management plans and monitoring programmes are prepared after a decision on a development proposal is made. Like the pre-approval environmental assessment, proponents have to depend on consultants to prepare and get approval for management plans and programmes. Again, most often proponents (particularly smaller and medium-sized companies) do not have the necessary skills or capabilities to investigate environmental issues and monitor and produce reports on such activities. Therefore, they need to engage consultants to act on their behalf. A problem arises when no one questions the competence and ability of those consultants and the credibility of their reports. Regulators are satisfied to see a report within the specific time frame.

In all three states, the development consents or environmental authorisations usually require proponents to undertake independent third party environmental audits in a specific interval. Sometimes, proponents' internal environmental policies or voluntary EMS require regular external audits. Consultants engaged and paid by the proponent conduct these third party audits. Consultants are encouraged to follow the guidelines and procedures prepared by the relevant government agencies. However, regulators such as the DoP, DEC and DPI in NSW,

DoE and DOIR in WA, EPA and PIRSA in SA are not often very strict on this requirement. The scope of audits is determined through negotiations between consultants and proponents, not regulators. There is no formal accreditation system in the relevant State government agencies for consultants. However, in NSW proponents are usually required to obtain a clearance from the DoP about the consultant engaged by the proponent. As demonstrated in the survey results, the current role of consultants in EIA monitoring and auditing in all three states is facing huge criticism by EIA professionals, conservation groups and academicians. Criticisms refer to conflict of interest, lack of accountability and absence of quality assurance.

9.10 Public Accountability and Transparency

Although some of the recent literature puts emphasis on transparency and public accountability in EIA follow-up (see Marshall et al., 2005; Arts & Morrison-Saunders, 2004b; Baker, 2004; Au & Hui, 2004; Wood, 2003) EIA professionals in WA, SA and NSW debate whether public accountability and transparency is desirable in post-approval EIA monitoring and auditing. In principle, the EIA process is a transparent and publicly accountable process and, theoretically, the same principle applies to EIA monitoring and auditing since these are widely accepted as integral parts of the whole process. It automatically establishes the public's right of the public to know what is occurring during the post-decision stages of an approved project. Are commitments fulfilled? Are conditions met? Obviously, regulators must look after the interests of the community as well as the government. However, it depends on how effectively the regulators monitor industry activities. Again, regulators work in a political system where investment, economic growth and employment are desired in a capitalist and profit-oriented society like Australia. [The public voice is often stronger than the regulatory stick. So, the role of the public in ensuring the accountability of proponents/regulators in EIA monitoring and auditing is quite significant. There are some good examples globally where public pressure has compelled proponents or regulators to do the right thing in terms of caring for the environment.]

Although disclosure of information or transparency is the most widely accepted option to ensure public accountability the EIA professionals in all three states debate the issue of full disclosure of information. EIA monitoring and auditing is a technical area requiring expertise to interpret data. There is a risk of misinterpretation or different interpretation of data, and there may be commercial-in-confidence issues. Some survey respondents believe that the public should receive information that they understand and there needs to be some filtering of information; they should not be informed of something very technical which only regulators

could understand. Moreover, having another level of scrutiny by the public may add to the cost of an already expensive process, thus making it more complicated. However, a fully transparent system is very likely to help build public rapport because the public suspicion will grow in an atmosphere of corporate collusion. Another way of ensuring public accountability in EIA monitoring and auditing is to include the monitoring and auditing framework in the EIA document into the public arena. While it is not easy to address operational issues at this very early stage of the EIA process, it should be tackled to improve public confidence in the whole EIA system.

EIA monitoring and auditing in WA, SA and NSW is not a completely transparent process. Environmental management plans, monitoring programmes, monitoring results and third party audit reports are not usually public documents. [In most cases the public cannot access these documents unless a request is made under the State *Freedom of Information Act*, which is often a lengthy and complicated process.] Even the conservation groups often have difficulty in accessing information about environmental management and monitoring. The current practices in NSW in terms of disclosure of information seem to be better than those of WA and SA. [In NSW, proponents are required to make environmental management plans and annual reports publicly available, for example in local libraries.] However, these documents cannot be borrowed or photocopied even for academic research purposes; sometimes, documents are not preserved properly in the local libraries. There is no formal tribunal process in all three States preventing the public from take proponents to court for their actions or inactions.

9. 11 Public Involvement and Community Consultation

The benefits of public involvement in EIA follow-up have been highlighted by some authors (see Morrison-Saunders & Arts, 2004; Arts & Morrison Saunders, 2004b; Barker, 2004; Marshall, et al., 2005). However, there is much debate on public involvement in EIA monitoring and auditing in Western Australia, South Australia and New South Wales. Here the key questions are: what is the benefit of involving the public?; who is the public?; does the public really want to be involved?; and how much involvement should the public have? It is widely accepted that public should have a role in EIA monitoring and auditing, the whole process more transparent and accountable. Public involvement provides an opportunity to change people's attitudes since with their involvement they become the part of the process. The public can become involved in the scrutiny of reports produced by proponents, and can contribute to the preparation of various operational plans and programmes. They can be

involved in monitoring some issues that do not require any technical expertise. Public involvement can also be a community consultation or information sharing process. Controversies regarding projects and their likely impacts on the environment should determine what type of community involvement is actually needed.

It is very difficult to change the attitudes of people who take positions against a particular development due to self-interest. Therefore, it is important to have objective representation of the public in order to involve them in EIA follow-up. It is also important to get them involved early and as much as possible. Otherwise, it will raise only public suspicion and will end up negating the whole public involvement process. For example, community consultation in two uranium-mining operations in South Australia did not work effectively due to lack of transparency in the process. It is difficult to get an effective public involvement in the post-approval EIA monitoring and auditing if the credibility of the pre-approval EIA process is under suspicion. Some projects are located in sparsely populated remote places. Community involvement in these projects is often quite difficult.

Community consultation is a very common form of public involvement in EIA monitoring and auditing in WA, SA and NSW. This process is more robust and formal in NSW, where community consultative committees were found to work reasonably well in most of the case study projects. Proponents are required to make environmental management and monitoring information available to the community consultative committees. Proponents are also required to provide assistance to the committee in preparing minutes and conducting meetings. In WA, a good example of community consultation was found in the Esperance Port project where it successfully resolved a number of community issues, changing the attitude of the community in favour of the operation. Community consultation in post-decision EIA monitoring and auditing is very weak or absent in South Australia. However, in one case study project (Port Vincent Marina) the local community became directly involved in monitoring activities. Proponents in all three States usually undertake community consultation informally in a number ways, including educating communities, funding local conservation efforts, information sharing and welfare activities.

In WA and SA, only high profile and controversial projects involve a community consultative committee, while in NSW this committee is required for all major projects. The Community Consultative Committee does not have an advisory role; it can only request proponents to undertake certain actions. Proponents are not obliged to take into account all requests made

by the committee. Therefore, the primary role of this committee is largely information sharing with the local community and the proponent. In NSW, development consents usually specify the scope and functions of a community consultative committee placing a number of obligations on proponents. In SA and WA, community consultative committees are left to the discretion of proponents.

9.12 Regulatory Approach

As demonstrated in Chapters 5 and 8, the regulatory approach to EIA monitoring and auditing is more or less similar in SA, WA and NSW. As it is mentioned earlier the implementation of EIA monitoring and auditing in all three states is based on discretionary legal provisions. The implementation of monitoring and auditing in EIA is based on the 'polluters pay' principle but it does not involve a strict command and control approach. Although it allows flexibility to some extent, regulators are at the mercy of proponents. There is strong criticism of the current regulatory practice, which allows a high degree of self-regulation in EIA monitoring and auditing in all three States. In fact, EIA monitoring and auditing is dependent on the 'spin' of proponents and environmental consultancy.

Some survey respondents believe that self-regulation is a good due to the absence of capacity and resources in governments. More importantly, in many ways the regulatory sticks of the government are not big enough for large multinational companies. Others believe that environmental self-regulation can be allowed up to a certain level. Some raise concerns about the ability and sincerity of industries to self-regulate themselves. The global or local experience shows that self-regulation is successful only to some extent particularly in very large industries with influence, resources and political connections. However, too much reliance on self-regulation will lead to industries only doing the minimum. They are too concerned with maximizing profit. Currently, businesses and industries have a strong focus on environmental self-regulation because they want such flexibility, and this exists in the form of voluntary codes of standards (e.g. ISO 14001 certified EMS), which will generate more business and environmental legitimacy than companies that do not have them.

The government process often involves too much bureaucracy that is usually complicated and time consuming. Therefore, self-regulation is the preferred option for business and industries. In the absence of public accountability and transparency in self-regulation the community usually has very little trust in industries. In fact, self-regulation is a good idea in theory but

this is not completely reliable in practice. Therefore, 'co-regulation' could be a good option where industries will have considerable flexibility under the strict regulatory supervision.

9.13 Implementation and Effectiveness

The case studies show that environmental monitoring and auditing takes place both within and outside the EIA framework in SA, WA and NSW. They are not formally linked but complement and overlap each other to some extent. In SA, they mostly exist outside the EIA framework. The design of monitoring and auditing programmes occurs quite late particularly during the post-decision stage in all three states. They are included as part ongoing environmental management of project operations. Monitoring results are usually gathered in annual reports, which usually include an internal or external audit report showing the compliance status. Regulators provide their feedback on reports both formally and informally. In most cases reports are not made public and is not easily accessible.

In all three states proponents undertake monitoring and auditing because they are required to. Monitoring and auditing do not often make any real change in environmental performance or project operations. Environmental performance is largely assessed through compliance verification, but enforcement actions for non-compliance rarely occur. Critically, conditions are not written in ways that are legally enforceable. Clearly, there is an emphasis on industry self-regulation. There is also a clear political emphasis on economic growth and natural resource exploitation in all three states.

Information often does not get transferred between different agencies due to the lack of proper coordination in all three states. Different parts of the same department or agency are not always strongly linked (e.g. EPA Service Unit and DoE Audit Branch in WA). Huge amounts of data are being produced through monitoring but these are rarely fed back into the EIA process. Information gathered or made available for one process is not often disseminated or shared with another process (e.g. environmental permit, mining lease, development approval, etc.) in all three states. Currently, the auditing responsibility in WA and NSW lies with regulators but in practice it is largely the proponent's responsibility. In SA, no government agency is responsible for auditing in EIA. Here the EPA conducts environmental audits of operations that are licensed with the EPA under the South Australian *Environment Protection Act 1993*.

Although some of the literature claims that EIA in WA focuses on the management of impacts and it often results in environmental management outcomes (see Morrison-Saunders, 1996; Bailey, 1997; Morrison-Saunders & Bailey, 1999) the relevant officer in the DoE (WA) admits that they are not very effective in practice and impacts are usually greater than was imagined at the time of assessment by the EPA. Even if all management plans and monitoring programmes are in place there are still impacts on the environment. Ideally, the DoE should provide feedback to the EPA on the environmental performance of an operation. On the basis of this feedback the EPA either should change the conditions on the project or stop projects going ahead or at least recognize that damage will be done. That feedback is not happening in WA. WA, NSW and SA all emphasize management of impacts in theory but in reality it does not happen. According to Wood (2003), EIA monitoring and auditing should provide relevant information about implementation and impacts and they should be linked to the earlier stages of the EIA process so they are effective. Wood (2003) also suggests that in order to implement EIA monitoring and auditing more efficiently needless monitoring should be avoided. The following evaluation demonstrates that the effectiveness and efficiency of EIA monitoring and auditing in WA and NSW is debatable. In South Australia, the situation emerges as being worst of all three States.

9.14 Evaluation of Procedures and Practices

This section presents an overall evaluation of procedures and practices of EIA monitoring and auditing in WA, SA and NSW. This evaluation mainly focuses on four broad areas: institutional arrangements; public accountability, transparency and community involvement; approaches and techniques; and resources and capacity.

9.14.1 Institutional arrangements

South Australia

Table 9.1 illustrates the situation regarding evaluation in South Australia, Western Australia and New South Wales. The implementation of monitoring and auditing in EIA in South Australia is not based on mandatory legal provisions. Although the *Development Act 1993* makes provisions for the Minister for Planning to require proponents to monitor and audit, they remain at the discretion of the Minister. These provisions have not yet been applied to any development project subject to EIA as of 2006. The consent decisions usually provide for monitoring and auditing requirements. The assessing agency (i.e. planning agency) has not yet published any guidelines on monitoring and audit procedures. There are no defined roles

and responsibilities of different stakeholders. However, proponents are responsible for the implementation of EIA monitoring and auditing.

Table 9.1: The Status of 'Institutional Arrangements' in EIA Monitoring and Auditing in SA, WA and NSW.

Evaluation Criteria	Criteria Met		
	SA	WA	NSW
1. Are monitoring and auditing considered an integral part of the EIA process?	N	Y	Y
2. Are there mandatory legal provisions for monitoring and auditing in EIA?	N	N	N
3. Are there detailed published guidelines in place for the implementation of monitoring and auditing in EIA?	N	P	P
4. Are the procedural steps of EIA monitoring and auditing clearly defined?	N	P	P
5. Are the objectives of EIA monitoring and auditing clearly defined?	P	P	Y
6. Are there screening criteria in place for EIA monitoring and auditing?	N	N	N
7. Are there scoping criteria in place for EIA monitoring and auditing?	N	N	N
8. Are the roles and responsibilities of different stakeholders in EIA monitoring and auditing clearly defined?	P	Y	Y
9. Is there a central government agency to oversee and coordinate the implementation of EIA monitoring and auditing?	N	Y	Y
10. Is there a formal reporting system in place in relation to compliance?	N	Y	Y
11. Is there any formal mechanism for reviewing the monitoring results?	N	N	P
12. Are there mandatory legal provisions for taking ameliorative actions on the basis of monitoring or audit results?	P	P	P
13. Is there any independent agency to review or respond to monitoring results?	N	N	N
14. Is there any formal mechanism for coordination between different government agencies in place in the implementation of EIA monitoring and auditing?	N	N	N
15. Is there any enforcement mechanism in place in the implementation of EIA monitoring and auditing?	N	P	P

Y, Yes; N, No; P, Partially met

Although the planning agency is responsible for administering the EIA legislation (*Development Act 1993*), it only oversees and coordinates the EIA process until the decision is made. The supervision and coordination of post-decision monitoring and auditing become the responsibility of either the Environment Protection Authority (EPA) or relevant departments (e.g., Department of Primary Industries and Resources, South Australia is responsible for mining projects). At this stage, the assessing agency's role is limited to site

inspections. The Act does not provide for ameliorative actions to be taken by proponents on the basis of monitoring results. Except for large mining projects there is no formal mechanism to review the monitoring programmes and results. Neither the environmental agency nor the assessing agency conduct parallel monitoring or audit to verify the compliance status. The conditions of a development authorisation are legally binding on proponents. It is an offence under Section 48 (13) of the *Development Act 1993* not to comply with any condition of a development authorisation. A minimum \$1000 penalty applies for such non-compliance. Section 85 of the *Development Act 1993* makes provisions for the public to go to court for an order to remedy or restrain a breach of the Act. The implementation of monitoring and auditing in EIA in South Australia is not linked to the EPA licensing system. The EPA must issue a license to a development project/ proposal if it is given the development authorisation. However, the EPA licensing conditions are not linked to EIA recommendation/ decisions. They are concerned mainly with pollution issues. Therefore, monitoring and auditing requirements under the EPA licensing system do not necessarily serve the purpose of EIA monitoring and auditing. No mechanism has been established to encourage the voluntary initiatives of proponents.

Western Australia

The Western Australian EIA legislation (*Environmental Protection Act 1986*) does not specifically include any mandatory provision in relation to EIA monitoring and auditing. However, the Act empowers the Chief Executive Officer of the environmental agency to monitor the implementation of proposals subject to conditions and procedures, and to require reports from proponents on the implementation of approved proposals. The Ministerial Statements (consent decisions) which are legally binding upon proponents usually provide for monitoring and auditing requirements. There is published guidance in place on audit procedures. The audit table, which is often a requirement of the Ministerial Statement, forms the basis of monitoring and auditing in EIA in Western Australia. The administrative procedures clearly define the roles and responsibilities of different stakeholders in relation to monitoring and auditing. The Department of Environment (formerly Department of Environmental Protection) has the prime responsibility of overseeing and coordinating the implementation of such monitoring and auditing. However, all planning projects (e.g. land use changes, town planning, etc.) requiring a formal assessment are outside the scope of the DoE audit. Western Australian Planning Commission is responsible for ensuring the compliance with planning/environmental approval of those projects. However, the Planning Commission

does not have a formal mechanism for monitoring and auditing. According to the provisions of Section 48 (4) of the *Environmental Protection Act 1986* the Minister for the Environment is empowered to require proponents to take ameliorative actions on the basis of monitoring results.

The requirement for an annual compliance report in the Ministerial Statement establishes a formal mechanism for reviewing monitoring results. Proponents are usually required to review their environmental management plans, monitoring programmes and results externally under administrative arrangements. The DoE officials do not conduct any parallel monitoring to verify the monitoring results submitted by proponents; however, they are required to conduct site inspections and compliance audits. The Ministerial conditions are legally binding on proponents and failure to comply with any of them is an offence. The Minister can take any necessary step to prevent, control or abate any pollution caused by any non-compliance with relevant conditions or procedures. The Act also makes provisions for penalties for non-compliance. The Act also establishes the right for the public to take companies to court for their non-compliance with EIA decisions. However, the Act does not provide for any formal channel in relation to the public appeal if monitoring and auditing results show any undesired/harmful trend. The EIA process in Western Australia encourages proponents to take environmental management seriously.

Part V of the *Environmental Protection Act 1986* makes provisions for licensing requirements to implement development proposals. The DoE issues an operating license after the Minister for the Environment approves a development proposal. The DoE licence deals with various pollution issues associated with the proposal but it does not have any link with the Ministerial Statement. Similarly, other licences required by different regulatory agencies do not take into account the EIA report or the Ministerial Statement. No license or permit can be issued in favour of a proposal prior to the approval of the Minister for the Environment. However, EIA monitoring and auditing in Western Australia is not linked with the licensing or permitting system. The DoE coordinates with different regulatory agencies in relation to various environmental issues associated with the implementation, operation and decommissioning of a development project. The EPA, which depends on the DoE for its manpower and expertise, is only responsible for assessing proposals but not for the implementation of EIA monitoring and auditing. The relationship between the EPA and the DoE during the post-EIA environmental management and monitoring is very weak. The EPA usually does not receive

feedback from the DoE on environmental management outcomes. Therefore, the EPA actually does not know if its objectives set during the assessment have been met or not.

New South Wales

The *Environmental Planning and Assessment Act 1979* clearly outlines the purposes of monitoring and auditing and makes the Minister for Planning responsible for monitoring progress and performance in environmental planning and assessment. The Act also makes discretionary provisions for the Minister to require monitoring and auditing under the development approval conditions that are legally binding on proponents. Like Western Australia, Ministerial Determination (approval) in NSW usually provides for monitoring and auditing requirements. There are published guidelines in place on audit procedures. The Act and guidelines specify the roles and responsibilities of different stakeholders. The Department of Planning (formerly Department of Infrastructure, Planning and Natural Resources) is primarily responsible for overseeing and coordinating the implementation of EIA monitoring and auditing. While the Act establishes enforcement mechanisms for ensuring compliance with approval conditions, proponents can also be required to take remedial actions. The annual reporting requirement establishes a formal mechanism for reporting and reviewing monitoring results. The Ministerial Determination (approval) usually provides for external (independent) audits. The assessing agency (Department of Planning) is also responsible for conducting regular compliance audits but it does not conduct any parallel monitoring to verify the monitoring results submitted by proponents. The Act makes provisions for criminal proceedings along with penalties for non-compliance. The public has the right to appeal in court for any remedy, restrain or breach of the Act.

The Ministerial Determination (authorisation) usually provides for community consultative committees and complaint protocols that establish mechanisms to take into account public concerns at the post-decision stage in relation to various environmental issues. Monitoring and auditing in EIA in New South Wales are not linked with any licensing system. The environmental protection or other license/permits usually include environmental management and monitoring requirements but they are not linked to the requirements of Ministerial Determination (authorisation). Like Western Australia, proponents are required to make a statement of commitments in the EIS concerning environmental management and mitigation. Furthermore, they are encouraged to take initiatives for continuous improvement in environmental performance.

9.14.2 Public accountability, transparency and community involvement

South Australia

Table 9.2 indicates the evaluation status of South Australia, Western Australia and New South Wales in terms of public accountability, transparency and community involvement in EIA monitoring and auditing. Its implementation in South Australia is not transparent and accountable to the public. Unlike Western Australia and New South Wales, the assessing agency in South Australia does not formally require regular reports from proponents on compliance or environmental performance. There are no requirements for public consultation in the formulation and design of various management plans and monitoring programmes. The local community rarely gets involved in the monitoring programme. Projects with both State and Commonwealth approval require only consultative committees.

Western Australia

The implementation of monitoring and auditing in Western Australia is not based on a transparent process and is not accountable to the public. Although proponents are required to submit reports regularly on compliance and environmental performance, they are not made public. There is no public consultation about formulation and design of various management plans and monitoring programmes. These are rarely made public. The Ministerial Statements sometimes provide for community consultation in the ongoing management of various environmental issues. The local community rarely becomes involved in the monitoring programme.

Table 9.2: The Status of 'Public Accountability, Transparency and Community Involvement' in EIA Monitoring and Auditing in SA, WA and NSW.

Evaluation Criteria	Criteria Met		
	SA	WA	NSW
1. Is EIA monitoring and auditing a fully transparent process?	N	N	N
2. Is EIA monitoring and auditing a publicly accountable process?	P	P	P
3. Does the public have the right to get engaged in EIA monitoring and auditing?	N	N	P
4. Does the public have an easy access to relevant information?	N	N	P
5. Is there any formal tribunal process in place for the public to appeal if monitoring and auditing results show any harmful trend?	N	N	N
6. Is there any formal mechanism in place for public consultation in EIA monitoring and auditing?	N	P	Y
7. Is there any formal mechanism in place for handling complaints/concerns of the local community during implementation, operation and decommissioning of projects?	N	N	Y

Y, Yes; N, No; P, Partially met

New South Wales

The implementation of monitoring and auditing in EIA in New South Wales is more or less transparent and accountable to the public compared to other two States. Proponents are required to submit regular reports on compliance and environmental performance, which are usually made public. The EPA Annual Return establishes an additional mechanism that ensures transparency of the compliance status. There are no requirements for public consultation for the formulation and design of various management plans and monitoring programmes. However, these are made publicly available in the local councils. The Ministerial Determination (authorisation) usually provides for community consultation in the ongoing management of various environmental issues. The requirements for a community consultative committee and complaints handling protocols establish formal forums for members of the public to raise their concerns on various environmental issues and to become involved in the ongoing environmental management of a development project in the post-decision stage. Proponents are usually required to bear the expenditure of community consultative committees. Members of local community sometimes become involved in the monitoring programme.

9.14.3 Approaches and techniques

South Australia

Table 9.3 shows the evaluation status of South Australia, Western Australia and New South Wales concerning approaches and techniques in EIA monitoring and auditing. South Australian major development projects subject to EIA do not necessarily require impact monitoring and auditing. There are no published administrative guidelines to determine the need and scope of monitoring and auditing in EIA. Monitoring programmes are not required to be linked to the early stage of the EIA process. Proponents are not required to include a detailed monitoring programme in the EIS. Monitoring requirements do not necessarily include both compliance and impact monitoring. The scope of an audit does not necessarily include impact identification and performance of environmental management initiatives. Monitoring results are not usually useful and they are not often linked to the ongoing environmental management or improvement of future EIAs. Monitoring programmes are not reviewed or revised on the basis of monitoring results. It depends on the requirements of development authorisation. In 1990, the then Department of Environment and Planning conducted a survey of environmentally oriented monitoring activities conducted by State government departments and agencies (DEP, 1990). Since then no such initiatives have

occurred. There are no useful baseline data sources established by relevant government agencies.

Western Australia

Western Australian major development projects subject to EIA require compliance monitoring and auditing conducted by the environmental agency (Department of Environment). There are no published administrative guidelines to determine the need and scope of monitoring and auditing in EIA. Monitoring programmes are not linked to the early stage of the EIA process. Proponents are not required to include a detailed monitoring programme in the EIA report (ERMP or PER). However, proponents are required to include a summary of environmental management and monitoring commitments in the EIA report. Monitoring requirements include both compliance and impact monitoring. The scope of the audit includes the compliance status, which does not necessarily include impact identification and performance of environmental management initiatives. Monitoring results are usually used for the ongoing environmental management of the project. Monitoring programmes are not reviewed or revised on the basis of monitoring results. They depend on the requirements of the Ministerial Statement. There are no useful baseline data sources established by relevant government agencies. The information collected through monitoring and auditing is usually not passed between relevant government agencies or even different sections of the same department.

New South Wales

All major development projects subject to EIA in New South Wales require compliance monitoring and auditing to be conducted by the assessing agency (the Department of Planning). There are published administrative guidelines to determine the need and scope of monitoring and auditing in EIA. Monitoring programmes are not linked to the early stage of the EIA process. However, proponents are sometimes required to include a detailed monitoring programme in the EIA report (EIS). Proponents are also required to include environmental management and monitoring commitments in the EIA report. Monitoring requirements include both compliance and impact monitoring. The scope of the audit includes compliance status, which does not necessarily include impact identification and environmental management performance. Monitoring results are usually used for the ongoing environmental management of a project. Monitoring programmes are not reviewed or revised on the basis of monitoring results. It depends on the requirements of the Ministerial Determination (authorisation). There are no useful baseline data sources established by

relevant government agencies. The information collected through monitoring and auditing is not fed back into the EIA process.

Table 9.3: The Status of 'Approaches and Techniques' in EIA Monitoring and Auditing in SA, WA and NSW.

Evaluation Criteria	Criteria Met		
	SA	WA	NSW
1. Is EIA monitoring and auditing considered in the early stages of the EIA process?	N	N	N
2. Is baseline monitoring is a mandatory requirement of an impact study?	N	N	N
3. Is the EIA report (commonly known as EIS) is required to include a detailed monitoring programme with baseline monitoring data?	N	N	N
4. Is EIA monitoring and auditing linked with other regulatory tools (e.g. licences/permits etc.)?	N	N	N
5. Is EIA monitoring and auditing linked with ongoing management of project operations?	P	Y	Y
6. Is EIA monitoring and auditing linked with decision-making?	N	N	N
7. Is the implementation of EIA monitoring and auditing flexible in terms of methods and techniques?	P	P	P
8. Is there a proactive and pragmatic regulatory approach to EIA monitoring and auditing in place?	N	N	N
9. Does the scope of monitoring include identification of both anticipated and unanticipated impacts?	P	P	P
10. Does the scope of monitoring include cumulative effects?	N	N	N
11. Does the scope of audits include verification of predictions and compliance and identification of environmental performance?	P	P	P
12. Is there any mechanism in place to feedback the information collected through monitoring and auditing into the EIA process?	N	N	N
13. Are monitoring programmes and management plans required to be revised on the basis of monitoring or audit results?	N	N	N
14. Is the development consent / environmental authorisation required to be revised on the basis of monitoring or audit results?	N	N	N
15. Does the responsible government agency have a mandatory role in EIA monitoring and auditing?	N	N	N
16. Are monitoring results (submitted by proponents) verified through occasional parallel monitoring by the responsible agency?	N	N	N
17. Is there any mechanism for external (third party) audits and independent review of monitoring programmes and monitoring results?	P	P	P
18. Is there any formal government accreditation system in place for private consultants who get engaged in EIA monitoring and auditing?	N	N	N
19. Are the voluntary initiatives of proponents in EIA monitoring and auditing encouraged in addition to regulatory obligations?	P	Y	P
20. Is the good performance of proponents rewarded?	N	P	N

Y, Yes; N, No; P, Partially met

9.14.4 Resources and capacity

South Australia

Table 9.4 shows the evaluation status of South Australia, Western Australia and New South Wales in terms of resources and capacity required for EIA monitoring and auditing. The EIA Unit of Planning SA, the agency responsible for conducting environmental assessments of major development projects in South Australia, comprises seven officers including a Manager, Principal Environmental Officer, Chief Environmental Officer, three Senior Environmental Officers and an Environmental Officer. This Unit does not have technical personnel for monitoring or auditing purposes, and it is not equipped with various physical or technical facilities required for EIA monitoring and auditing. Critically, it does not have a separate audit section to conduct compliance audits. A major organisational restructuring took place in 1993 when the Department of Environment and Planning was separated into two departments assigning the EIA responsibility to the planning agency. Since then organisational reshuffling has occurred several times within the planning agency without bringing any benefit the EIA Unit. The monitoring provisions of the *Development Act 1993* clearly force proponents to bear the cost of monitoring. In the absence of formal reporting requirements there is no timeframe for reviewing and responding to monitoring results. Similarly, no timeframes apply to the responsible agency for conducting compliance audits.

Western Australia

The Department of Environment in Western Australia has an Audit Branch to ensure compliance with Ministerial conditions. The audit officers employed in this Branch are simply not enough to cope with 600 proposals that are subject to compliance audit in Western Australia (Chandler, pers. comm., 2005). Approximately 25 proposals are audited every year (DEP, 2002). Therefore, the DoE encourages proponents to conduct external (third party) audits with the help of consultants. The Audit Table of an approved project specifies the timeframe for audits. However, there is no time frame for reviewing and responding to monitoring results and for submitting audit reports. In the absence of adequate resources in the Audit Branch the DoE is often slow in responding to annual reports, audit reports and management plans submitted by proponents. Proponents are legally bound to conduct monitoring with their own costs since failure to comply with the Ministerial conditions is an offence. There is no requirement for proponents to employ environmental personnel on their projects. The former Department of Environmental Protection (DEP) was restructured as the Department of Environment in 2003 without creating any benefit for the Environmental Audit

Branch. The Act does provide for enforcement provisions for non-compliance but enforcement is rare due to DoE's lack of capacity. There is a clear emphasis on industry self-regulation and regulators rely heavily on proponents for information. Regulators generally rely on private consultants for conducting any special investigation.

New South Wales

The Office of Sustainable Development Assessments and Approvals within the Department of Planning has a Compliance Unit that conducts compliance audits. The Compliance Unit was formed in the former Department of Infrastructure, Planning and Natural Resources (DIPNR) in 2003. The number of officers currently working in this unit is three (Sparkes, pers. comm., 2005.). During the year 2001-02 to 2004-05 218 major infrastructure and industrial projects were approved (DIPNR, 2005). However, during this period only 21 audits were conducted. The highest number of audits conducted in 2004-05 was 12. Proponents are required to undertake external (third party) audits due to the relevant agency's inability to do all the work. Interagency coordination is usually poor or lacking due to the lack of adequate resources in government agencies.

Table 9.4: The Status of 'Resources and Capacity' in EIA Monitoring and Auditing in SA, WA and NSW.

Evaluation Criteria	Criteria Met		
	SA	WA	NSW
1. Is the responsible agency adequately equipped with physical, financial and human resources?	N	N	N
2. Are there established data sources readily available to use in EIA monitoring and auditing?	N	N	N
3. Are proponents legally bound to bear the cost of monitoring?	Y	Y	Y
4. Are proponents required to employ appropriate environmental personnel through out the life of the project?	N	N	Y
5. Is an environmental agency responsible for EIA monitoring and auditing?	N	Y	N
6. Do proponents and the responsible agency maintain continuity of staff responsible for EIA monitoring and auditing?	P	P	P
7. Is there any specific time frame for the responsible agency to review and respond to monitoring and audit reports?	N	N	N
8. Is there any specific time frame for the responsible agency to conduct audits and submit audit reports?	N	P	N
9. Is there any economic tool in place to ensure the implementation of monitoring and auditing in EIA?	N	P	P

Y, Yes; N, No; P, Partially met

There is no specific timeframe as such within which the Compliance Unit must audit a project. There is no timeframe for reviewing and responding to monitoring results and for submitting audit reports. Proponents are legally bound to conduct monitoring and bear the cost since failure to comply with the Ministerial conditions is an offence. The Ministerial Determination (authorisation) often requires proponents to employ environmental personnel throughout the life cycle of their projects. The DIPNR was restructured as the Department of Planning in 2005 without bringing any modification to the Compliance Unit. The Act does provide for enforcement provisions for non-compliance but enforcement is rare because the Compliance Unit does not have the 'teeth' to do it. Like WA, there is a clear emphasis on industry self-regulation and regulators rely heavily on proponents for information. Regulators employ private consultants to conduct any special investigation.

9.14.5 Evaluation summary

It can be concluded that there are still weaknesses in various procedural aspects of EIA monitoring and auditing, even in Western Australia, which is one of the well-reputed EIA jurisdictions of the world. The effectiveness and efficiency of EIA monitoring and auditing in all three States are still under considerable doubt. None of the three Australian EIA jurisdictions studied was found to fully meet the evaluation criteria. Out of a total of 51 evaluation criteria set under four broad categories, South Australia, Western Australia and New South Wales do not meet 39, 28 and 26 of these criteria, respectively. New South Wales fares a lot better than Western Australia and South Australia in terms of public accountability, community involvement and transparency in EIA monitoring and auditing. The following table summarises the status of procedural appropriateness, effectiveness and efficiency of EIA monitoring and auditing in these three States.

Table 9.5: Summary of the Evaluation Status

Criteria	South Australia			Western Australia			New South Wales		
	Y	N	P	Y	N	P	Y	N	P
Institutional Arrangements (15)	0	12	3	4	6	5	5	5	5
Public Accountability, Transparency and Community Involvement (7)	0	6	1	0	5	2	2	2	3
Approaches and Techniques (20)	0	14	6	2	13	5	1	14	5
Resources and Capacity (9)	1	7	1	2	4	3	2	5	2
Total (51)	1	39	11	8	28	15	10	26	15

Y, Yes; N, No; P, Partially met

10.15 Conclusion and Recommendations

10.15.1 Conclusion

The international literature on EIA identify monitoring and auditing as one of the main weaknesses in EIA. There are only a few countries (e.g. Canada and Hong Kong), which have good systems for monitoring and auditing. Monitoring and auditing have been identified as weak areas in the Australian EIA process but to date there have been no detailed studies. This thesis contributes significantly to the international literature on EIA with a thorough analysis of the role of monitoring and auditing within the EIA process in Australia. The three Australian EIA jurisdictions studied have different types of EIA regulations and institutional arrangements and their procedures and practices in EIA monitoring and auditing vary considerably. However, the problems and issues associated with EIA monitoring and auditing are more or less similar in nature.

Monitoring and auditing in EIA occur in Western Australia and New South Wales are integral parts of the EIA process but it is clear that problems exist. The way they have been implemented is not effective or efficient and they do not provide any meaningful feedback to the EIA process. Proponents are conducting monitoring for monitoring's sake and regulators are concerned with 'ticking the boxes' on the compliance sheet. There is no real enforcement in practice. In South Australia, a procedural framework for EIA monitoring and auditing is still lacking and there is no real improvement despite the *Development Act, 1993* which replaced the *Planning Act, 1982* or the Commonwealth *Environmental Protection and Biodiversity Act, 1999*. This study reinforces the conclusions on South Australian EIA monitoring and auditing by Ahammed and Nixon (2006). This study also reveals that some of the procedural aspects of EIA monitoring and auditing in NSW are better than those of Western Australia, although Western Australia is widely recognized as one of the better EIA jurisdictions in the world.

The main issues concerning EIA monitoring and auditing in all three Australian States are institutional in nature. A lack of mandatory legal provisions of EIA monitoring and auditing is mainly responsible for the absence of an appropriate organizational set-up and a lack of resources in the relevant government departments. This lack of resources in the relevant government agencies reflects the extent of political commitment for proper and thorough EIA monitoring and auditing. Public accountability and transparency have been compromised by the implementation of EIA monitoring and auditing as it is being carried out. Monitoring and auditing come very late in the EIA process after the decision is made on a development

proposal. Very little information on environmental management and monitoring is included in the EIA report. It limits the public's opportunity to get involved in designing monitoring programmes or to comment on the adequacy and appropriateness of environmental management and monitoring components of a development proposal. Although monitoring and auditing exist under different regulatory tools outside the EIA framework in all three Australian States there is very little or no link between EIA and these regulatory tools. Therefore, they cannot actually replace the requirement for monitoring and auditing in EIA. A lack of formal interagency coordination in the post-EIA project operation is a real obstacle in maximizing the benefits of monitoring and auditing under different regulatory tools that exist outside the EIA framework.

The evaluation criteria developed in this thesis are very detailed related to the practice of EIA monitoring and auditing. On the basis of these evaluation criteria further research could be conducted to compare other Australian or international EIA jurisdictions. It would be also possible to investigate how meaningfully aspects of the EIA process such as social impact are specifically addressed in monitoring and auditing practices in Australia. While there is scope for further research, it is possible to make recommendations and develop models based on research findings from this thesis in order to improve the existing situation of EIA monitoring and auditing Australia.

10.15.2 Recommendations

EIA monitoring and auditing in all three States require much attention even though Western Australia is held up as a good example of the EIA process. According to Marshall et al. (2005), monitoring and auditing in EIA should be appropriate social context of a particular jurisdiction without inventing completely new procedures. Therefore, recommendations have been made taking into account the particular legislative, administrative, socio-economic and cultural circumstances of South Australia, Western Australia and New South Wales. Some recommendations are applicable to all three States equally (Table 9.6). Two separate models for implementing monitoring and auditing both within and outside the EIA framework are presented below (Figures 9.1 and 9.2).

Monitoring and auditing within the EIA framework

Under the current Australian EIA procedures, monitoring and auditing are not integrated into the early stages of the EIA process. In order to implement them effectively it is necessary to integrate them at the early stages of the EIA process. There should be a set of specific criteria

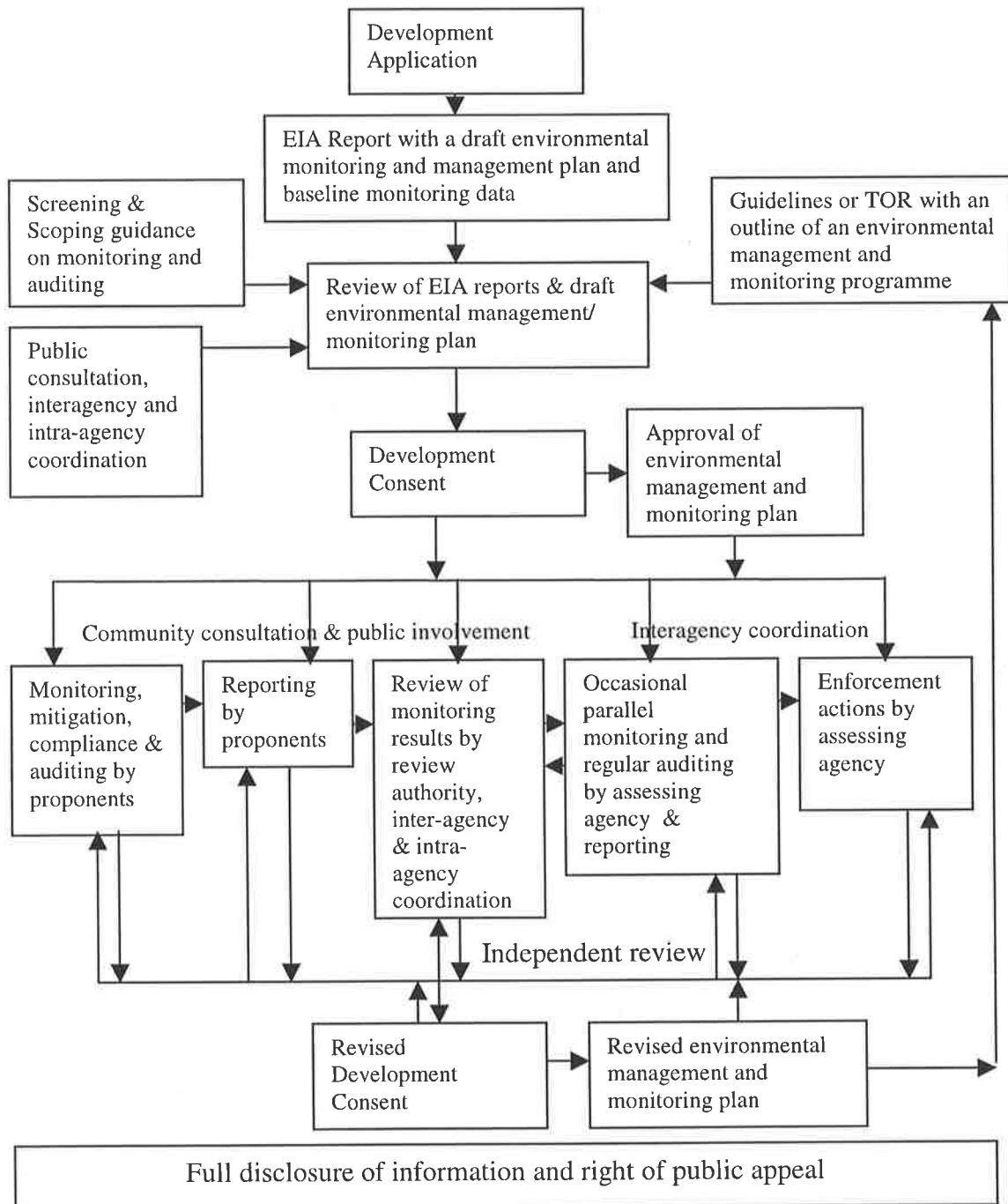
in place to determine the need and scope of EIA monitoring and auditing. In addition to that the scoping guidelines or the terms of reference of an environmental assessment should also determine the need and scope of a monitoring/ management plan for a project or development proposal. Incorporating such a detailed plan with necessary baseline data into the EIS (EIA report) should be a mandatory requirement. There should be a formal and practical inter-agency coordination mechanism in place when a monitoring/ management plan is being formulated. A consent decision on a development proposal should take into account the opinions of the specialized agencies and the public. A monitoring programme can be approved at the same time as the proposal or it can be approved separately after the approval of a proposal. This will allow the proponent to make necessary changes in the proposed monitoring/management plan. All stakeholders involved in the environmental assessment of a development proposal should have an access to the approved plans/programmes.

Proponents should be responsible for monitoring, mitigation, reporting and compliance. However, regulators should conduct occasional parallel monitoring and regular audits in order to verify compliance and environmental performance and to identify the actual impacts of an operation. The audit should provide feedback to the assessing authority whether or not the control measures in place are working effectively. There should be a formal inter-agency coordination when monitoring and auditing results are being reviewed.

There should be a formal community consultation process in place that addresses the operational environmental issues. The reporting and review process should be fully transparent and the public should have an access to all reports and monitoring results. The public should be involved in the review process in the form of a consultative committee comprising representatives of the relevant regulatory agencies, local government agencies, proponent and local community. This committee should have an objective representation of the public and have an advisory or supervisory role. The public should also be encouraged to be involved directly in the monitoring activities that are non-technical. There should be a mechanism for independent review of monitoring results when required. This could be done by an agency independent of the government and the proponent. If private consultants become involved in the audit or review process, the government should engage them and proponents should bear the cost. The government should maintain an accreditation system for private consultants and periodic revisions of development consent and the management/monitoring plans be planned for. The revision of a development consent or a management/monitoring plan should take into account the monitoring results and findings of audit reports. The

relevant agency should maintain a database to record monitoring and auditing findings, which will assist in future assessments and preparation of guidelines.

Figure 9.1: Model for Monitoring and Auditing within the EIA Framework

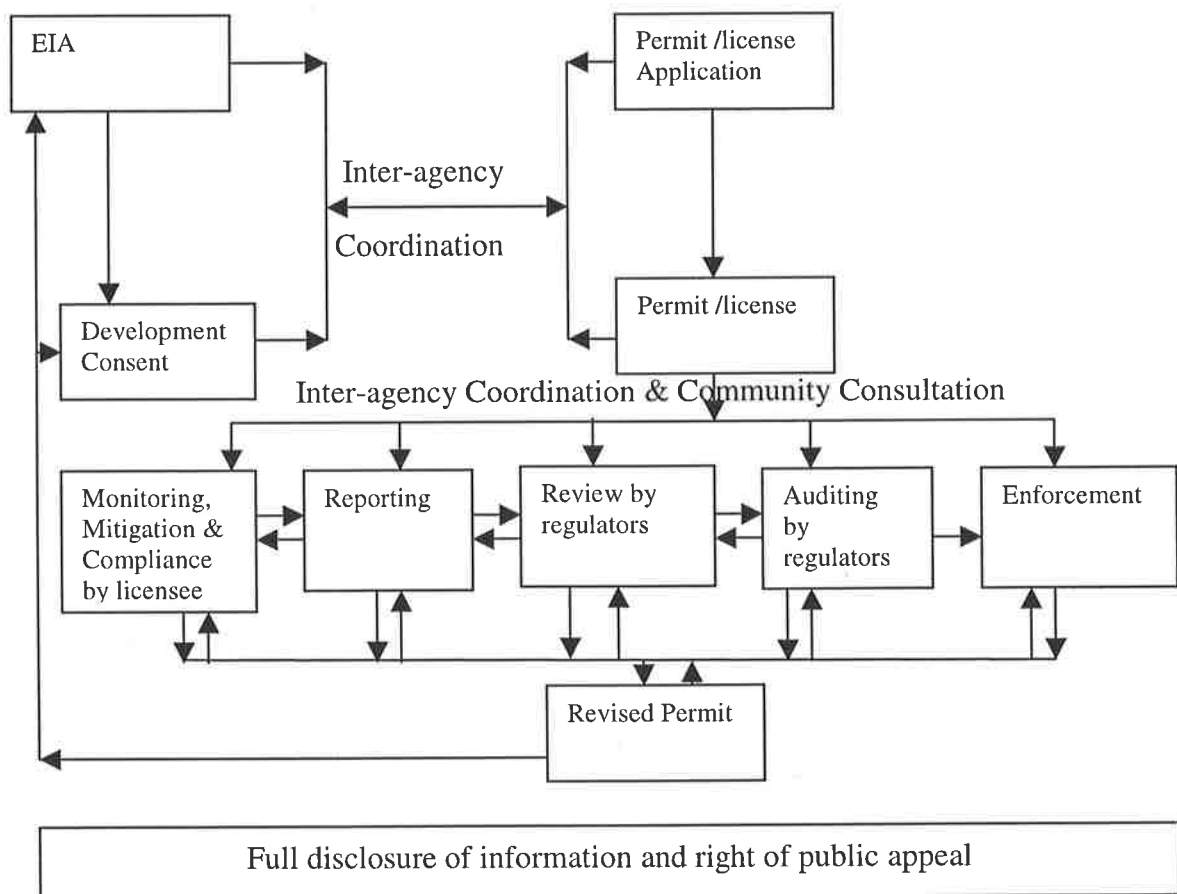


Monitoring and auditing outside the EIA framework

To implement monitoring and auditing outside the EIA framework there should be a formal link between the EIA process and the licensing and permit system. An inter-agency coordination mechanism between the assessing agency and the licensing authority should be

established during the assessment process, and for it to continue throughout the life of a project. In Australia the licensing process starts once an environmental assessment of a development proposal is completed, but there is very weak link between these two regulatory instruments. In order to establish a strong link between them they should continue simultaneously in a co-ordinated way. The development consent conditions and the permit/license conditions should be established in a way that they complement each other without any duplication. The need for monitoring and auditing under the EIA framework should be determined only for those issues that are not included in the licensing/permit system. The development consent conditions should be revised or updated when a license/permit is revised.

Figure 9.2: Model for Monitoring and auditing under the Legal Permit/ Licensing System.



Environmental monitoring and auditing under the environmental permit/licensing system in Australia do not provide any feedback to the assessing agency regarding environmental impacts of an operation. In order to establish a feedback loop between EIA and legal permit/licensing system it is necessary to involve both the assessing agency and licensing

authority in a review of monitoring results and the audit process. Environmental monitoring and auditing should be a completely transparent and publicly accountable process. In addition, there needs to be a mechanism for community consultation in the environmental management activities of an operation.

General recommendations

In order to improve the situation in Western Australia, South Australia and New South Wales it is necessary to:

- Make mandatory provisions for monitoring, auditing and reporting in the EIA legislation.
- Provide screening and scoping guidelines for EIA monitoring and auditing by the relevant agency.
- Determine the legislative roles and responsibilities of different stakeholders in EIA monitoring and auditing.
- Make mandatory provisions for incorporating draft environmental management and monitoring plans with sufficient technical details and baseline data in the EIA reports that are publicly available.
- Establish a formal mechanism for coordination during operation and decommissioning of projects between different government agencies, which require monitoring, auditing and reporting under various regulatory tools.
- Provide adequate resources in the relevant government agency/ agencies responsible for implementing, overseeing and coordinating EIA monitoring and auditing.
- Introduce an accreditation system for environmental consultants by the government.
- Engage environmental consultants for conducting third party audits by the government and making proponents responsible for costs.
- Undertake occasional parallel monitoring by the relevant government agency in order to verify monitoring results submitted by proponents.
- Regulators to maintain strict timeframes for audits and reviews of reports submitted by proponents.
- Review and revise 'Development Consent' / 'Ministerial Determination' / 'Ministerial Statement' regularly on the basis of monitoring and auditing results making it consistent with other regulatory tools.
- Review and revise various environmental management plans and monitoring programmes regularly on the basis of monitoring results.
- Make EIA monitoring and auditing a completely transparent public process.

- ❑ Establish a tribunal process for the public to appeal if monitoring and auditing results are unsatisfactory.
- ❑ Encourage public involvement in the ongoing environmental management and monitoring of projects.
- ❑ Support and encourage various voluntary conservation group's participation in the monitoring programme and review process.
- ❑ Provide guidance on the monitoring programme to be included in the EIA report specifying environmental parameters that are likely to be monitored in the terms of reference (TOR) or guidelines issued by the relevant agency.
- ❑ Determine the scope of audits for compliance check, impact identification and verification of predictions and the performance of environmental management or mitigation measures.
- ❑ Establish a formal link between the assessment officers and audit officers in the relevant agency.
- ❑ Enforce sanctions for non-compliance with EIA monitoring and auditing requirements.
- ❑ Educate and motivate proponents to undertake monitoring and auditing seriously in order to minimise damage to the environment. Proponents should be rewarded for doing this and not just monitoring for monitoring's sake. Bad proponents should be blacklisted and publicly criticized.
- ❑ Use various economic tools (bonds, securities, etc) to ensure that monitoring and auditing in EIA happen. Bonds and securities should be at a level that rectifies the damage.

Specific recommendations

South Australia, Western Australia and New South Wales need to take the following specific actions in addition to those mentioned above.

For South Australia

It is necessary to

- ❑ Establish a Compliance/Audit Section in the assessing agency with adequate resources to oversee and coordinate EIA monitoring and auditing.
- ❑ Establish a formal link between the EPA and the PLNSA during the operation and decommissioning phases of projects and involving the EPA for independent review purposes. Or, shift the EIA responsibility from the PLNSA to the EPA (which is an independent body in SA) with necessary amendments to the *Development Act 1993* and the *Environment Protection Act 1993*.

- Establish a formal mechanism for public consultation during the construction, operation and decommissioning of projects.
- Establish a formal mechanism for handling public complaints regarding environmental and social issues during the construction, operation and decommissioning of projects.

For Western Australia

It is necessary to

- Establish a formal link between the EPA (which is an independent body in WA) and the DoE during the operation and decommissioning phases of projects and involving the EPA for independent review purposes with necessary amendments to the *Environmental Protection Act 1986*.
- Link the EIA process with the DoE operating license making EIA a two-phase process.
- Establish a formal mechanism for public consultation during the construction, operation and decommissioning of projects.
- Establish a formal mechanism for handling public complaints regarding environmental and social issues during the construction, operation and decommissioning of projects.

For New South Wales

It is necessary to

- To establish a formal link between the DEC and the DoP during the operation and decommissioning phases of projects and involve the DEC in the independent review.
- To give the community consultative committee an advisory and supervisory role.

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Appendix 1

List of Survey Participants

South Australia

Name	Designation	Organization
Alex Kurralta	Independent Environmental Consultant	Adelaide, SA.
Anne Welsh	Principal Environmental Officer, Transport SA	Department for Transport, Urban Planning and the Arts, Adelaide, SA.
Anthony Rowe	Manager, Development Cooperation	Department of Water, Land and Biodiversity Conservation, Adelaide, SA.
Bronte Merrick Nixon	Senior Environmental Planner	Parsons Brinckerhoff Australia Pty Ltd., Adelaide, SA.
Darryl Harvey	Manager, Integrated Resource Management	Department of Water, Land and Biodiversity Conservation, Adelaide, SA.
Dave Cockshell	Chief Petroleum Geophysicist	Primary Industries and Resources SA, Adelaide.
Dr. David Cruickshanks-Boyd	State Manager SA	Parsons Brinckerhoff Australia Pty Ltd., Adelaide, SA.
David Noonan	Campaign Officer	Australian Conservation Foundation, Adelaide, SA.
Erick Lock	Environmental Officer	Primary Industries and Resources SA, Adelaide.
Dr. Jan Carey	Lecturer, Environmental Studies	University of Adelaide
Jayne Randall	Environmental Officer	Primary Industries and Resources SA, Adelaide.
Joe Pedicini	Environmental Team Leader	Connel Wagner, Adelaide, SA.
John Cugley	Director, Monitoring and Evaluation	Environment Protection Authority, Adelaide, SA.
Lee Webb	Senior Environmental Officer (EIA Unit)	Planning SA, Adelaide, SA.
Max Harvey	Director Operations Division	Environment Protection Authority, Adelaide, SA.
Maria Furulis	Lead Environmental Auditor	RABQSA, Adelaide.
Peter Dolan	Director, Pollution Avoidance	Environment Protection Authority, Adelaide, SA.
Peter Torr	Manager, Planning & Local Government Support.	Environment Protection Authority, Adelaide, SA.
Peter Woods	Principal Environmental Scientist	Parsons Brinckerhoff Australia Pty Ltd., Adelaide, SA.

South Australia (continued)

Name	Designation	Organization
Rob Tucker	Manager, Coastal Protection Branch	Department for Environment and Heritage, Adelaide, SA.
Simon Wheaton	Senior Environmental Officer (EIA Unit)	Planning SA, Adelaide, SA.
Tara Hage	Principal Environmental Impact Assessment Advisor	SA Water (South Australian Water Corporation), Adelaide.
Tim Harrington	Principal-Environmental Sciences	KBR, Adelaide, SA.
Tobias Hills	Senior Policy Planner	Department for Environment and Heritage, Adelaide, SA.
Tony Huppatz	Senior Planner, Coastal Protection Branch.	Department for Environment and Heritage, Adelaide, SA.
Vic Farrington	Senior Principal Environmental Engineer	URS, Adelaide, SA.

Western Australia

Name	Designation	Organization
Andrew Nigel	Senior Environmental Scientist	GHD, Perth, WA.
Dr. Angus Morrison-Saunders	Senior Lecturer in Environmental Assessment	Murdoch University, Perth WA.
Charles Newlind	Regional Team Leader (Senior Environmental Inspector).	Department of Industry and Resources, Perth, WA.
Collin Murray	Assistant Director, Environmental Impact Assessment	Department of Environment, Perth, WA.
David Ryan	Project Manager	Department of Industry and Resources, Perth, WA.
Ian Baxter	Principal Environmental Scientist	URS, Perth WA.
James Treloar	Manager, Statement Management Section, EPA Service Unit.	Department of Environment, Perth, WA.
Jamie Reilly	Senior Environmental Scientist	KBR, Perth, WA.
Jenny Yan	Environmental Scientist	SKM, Perth, WA.
Kathy Macklin	Senior Environmental Planner, Environment and Natural Resource Planning.	Department for Planning and Infrastructure, Perth, WA.
Lisa Chandler	Manager, Audit Section, Environmental Management Division	Department of Environment, Perth, WA.
Mark Ward	Programme Manager, EIA Division	Department of Environment, Perth, WA.
Norm Caporn	EIA Coordinator	Department of Conservation and Land Management, Perth WA.
Paul Holmes	Manager Environment	Maunsell Australia Pty Ltd, Perth, WA.

Western Australia (continued)

Name	Designation	Organization
Peter Skitmore	Manager Special Projects (formerly Manager Audit Section)	Department of Environment, Perth, WA.
Rob Tregonning	Senior Policy Officer, Environmental Assessment.	Department of Fisheries, Perth, WA.
Rob Sippe	Director, Policy and Coordination and Coordinator of EPA Services	Department of Environment, Perth, WA.
Ross George	Manager, Strategic Analysis.	Department of Agriculture.
Sonia Finucane	Principal Environmental Scientist	URS, Perth WA.
Steve Wilke	Senior Environmental Scientist	Water Corporation of Western Australia (currently DoE), Perth, WA.
Tim Mitchell	Principal Environmental Scientist	URS, Perth, WA.
Xuan Nguyen	General Manager, Environment Division.	Department of Industry and Resources, Perth, WA.

New South Wales

Name	Designation	Organization
Anita Mitchell	General Manager, Sustainability and Assurance.	WSN Environmental Solutions, Sydney, NSW.
Bruce McNamara	Manager, Environmental Planning and Assessment	NSW Roads and Traffic Authority, Sydney.
Dr. Greg Unwin	Manager, Regional Operations Mineral Resource Division	Department of Primary Industry, NSW.
John Sparkes	Manager, Approvals, Tracking and Monitoring.	Department of Planning (formerly DIPNR), Sydney, NSW.
Ken Hollands	Manager, Environmental Operation	Department of Primary Industry, NSW.
Monique Roser	Senior Environmental Planner	GHD Pty Ltd, Sydney, NSW.
Rob Corkery	Principal	RWC & Co (Geological and Environmental Consultants), NSW.
Salli Felton	Environmental Programme Manager	Sydney Water, NSW.
Dr Warwick Gullet	Lecturer in Law	University of Wollongong, NSW.
Anonymous	Director, Institute of Environmental Studies.	University of New South Wales, Sydney.
Anonymous	Senior Compliance Audit Officer	Department of Environment and Conservation, Sydney, NSW.

New South Wales (continued)

Name	Designation	Organization
Anonymous	Senior Compliance Audit Officer	Department of Environment and Conservation, Sydney, NSW.
Anonymous	Manager Compliance Audit Unit	Department of Environment and Conservation, Sydney, NSW.
Anonymous	Senior Compliance Audit Officer	Department of Environment and Conservation, Sydney, NSW.
Anonymous	Scientific Officer, Environmental Assessment Group	Department of Primary Industry, NSW.

Appendix 2

List of Interviewees

South Australia

Name	Designation	Organization
Alex Kurralta	Independent Environmental Consultant	Adelaide, South Australia.
Anne Welsh	Principal Environmental Officer, Transport SA	Department for Transport, Urban Planning and the Arts, Adelaide, SA.
Anthony Rowe	Manager, Development Cooperation	Department of Water, Land and Biodiversity Conservation, Adelaide, SA
Darryl Harvey	Manager, Integrated Resource Management	Department of Water, Land and Biodiversity Conservation, Adelaide, SA.
Dr. David Cruickshanks-Boyd	State Manager SA	Parsons Brinckerhoff Australia Pty Ltd., Adelaide, SA.
David Noonan	Campaign Officer	Australian Conservation Foundation, Adelaide, SA.
Greg Marshall	Manager	Primary Industries and Resources SA, Adelaide.
Joe Pedicini	Environmental Team Leader	Connel Wagner, Adelaide, SA.
John Cugley	Director, Monitoring and Evaluation	Environment Protection Authority, Adelaide, SA.
Lee Webb	Senior Environmental Officer (EIA Unit)	Planning SA, Adelaide, SA.
Lloyd Sampson	Environmental Officer	Department of Water, Land and Biodiversity Conservation, Adelaide, SA.
Max Harvey	Director Operations Division	Environment Protection Authority, Adelaide, SA.
Maria Furulis	Lead Environmental Auditor	RABQSA, Adelaide, SA.
Peter Body	Director (Former Manger, Department of Environment and Planning, SA)	Environmental Services
Peter Dolan	Director, Pollution Avoidance	Environment Protection Authority, Adelaide, South Australia.
Peter Torr	Manager, Planning & Local Government Support.	Environment Protection Authority, Adelaide, SA.
Simon Wheaton	Senior Environmental Officer (EIA Unit)	Planning SA, Adelaide, SA.

South Australia (continued)

Name	Designation	Organization
Tara Hage	Principal Environmental Impact Assessment Advisor	SA Water (South Australian Water Corporation), Adelaide.
Tim Harrington Tobias Hills	Principal-Environmental Sciences Senior Policy Planner	KBR, Adelaide, SA. Department for Environment and Heritage, Adelaide, SA.
Tony Huppatz	Senior Planner, Coastal Protection Branch.	Department for Environment and Heritage, Adelaide, SA.
Vic Farrington	Senior Principal Environmental Engineer	URS, Adelaide, SA.
Wisson Craig	Director	Native Vegetation Council, Adelaide, SA.

Western Australia

Name	Designation	Organization
Andrew Nigel	Senior Environmental Scientist	GHD, Perth, WA.
Dr. Angus Morrison-Saunders	Senior Lecturer in Environmental Assessment	Murdoch University, Perth WA.
Chris Tallentire	President	Conservation Council of WA.
Collin Murray	Assistant Director Environmental Impact Assessment	Department of Environment, Perth, WA.
Ian Baxter	Principal Environmental Scientist	URS, Perth WA.
James Treloar	Manager, Statement management Section, EPA Service Unit.	Department of Environment, Perth, WA.
Jamie Reilly	Senior Environmental Scientist	KBR, Perth, WA.
Jenny Yan	Environmental Scientist	SKM, Perth, WA.
Dr John Bailey	Associate Professor, Environmental Science.	Murdoch University, Perth WA.
Kathy Macklin	Senior Environmental Planner, Environment and Natural Resource Planning.	Department for Planning and Infrastructure, Perth, WA.
Lisa Chandler	Manager, Audit Section, Environmental Management Division	Department of Environment, Perth, WA.
Norm Caporn	EIA Coordinator	Department of Conservation and Land Management, Perth WA.
Rick Fletcher	President	EDO, Perth, WA.
Rob Tregonning	Senior Policy Officer, Environmental Assessment.	Department of Fisheries, Perth, WA.
Rob Sippe	Director, Policy and Coordination and Coordinator of EPA Services	Department of Environment, Perth, WA.
Ross George	Manager, Strategic Analysis.	Department of Agriculture.
Sonia Finucane	Principal Environmental Scientist	URS, Perth WA.
Tim Mitchell	Principal Environmental Scientist	URS, Perth, WA.
Xuan Nguyen	General Manager, Environment Division.	Department of Industry and Resources, Perth, WA.

New South Wales

Name	Designation	Organization
Anita Mitchell	General Manager, Sustainability and Assurance.	WSN Environmental Solutions, Sydney, NSW.
Bruce McNamara	Manager Environmental Planning and Assessment	NSW Roads and Traffic Authority, Sydney.
Colin Rudd	General Manager Projects	Sydney Ports Corporation, NSW.
Dr. Greg Unwin	Manager, Regional Operations Mineral Resource Division	Department of Primary Industry, NSW.
Ian McCardle	Manager, Environment	Maunsell Australia Pty Ltd, Sydney, NSW
John Sparkes	Manager, Approvals, Tracking and Monitoring.	Department of Planning (formerly DIPNR), Sydney, NSW.
Ken Hollands	Manager, Environmental Operation	Department of Primary Industry, NSW.
Mark Geoff	Principal Advisor, Mineral Resources	Department of Primary Industry, NSW.
Mark Gefford	Director, Reform and Compliance Branch	Department of Environment and Conservation, Sydney, NSW.
Monique Roser	Senior Environmental Planner	GHD Pty Ltd, Sydney, NSW.
Paul Greenhalgh	Senior Environmental Scientist	KBR, Sydney, NSW
Rob Corkery	Principal	RWC & Co Ltd (Geological and Environmental Consultants), NSW.
Salli Felton	Environmental Programme Manager	Sydney Water, NSW.
Sally	Principal Environmental Scientist	URS, Sydney, NSW
Tom Holden	Law Officer	EDO, Sydney, NSW.
Sharon Beder	Associated Professor, Environmental Management	University of Sydney, Sydney, NSW
Yalonde Stone	Director, Sustainable Development Assessment & Approvals	Department of Planning (formerly DIPNR), Sydney, NSW.



Survey Procedures and Practices of Monitoring and Auditing in Australian EIA Systems

Environmental impact assessment (EIA) is being used globally either as a planning or management tool in order to minimise the potential impact of development. Monitoring and auditing are two important components of the EIA process and without their proper implementation EIA loses its credibility. However, the implementation of monitoring and auditing programs in the EIA process is being neglected globally. In the Australian EIA systems, monitoring and auditing are the weakest areas and they need proper attention of the policy makers and EIA practitioners.

This survey is expected to take a maximum 20 minutes of your time. It is designed to investigate the procedures and practices of monitoring and auditing in Australian EIA systems. Your expertise, experience and opinions are very important for this survey. While the confidentiality of your responses is assured, I am happy to provide a summary of results of this survey if you wish. This survey forms a component of my PhD research project at the University of Adelaide. Any input received from you through this survey will contribute significantly in completing my Doctoral Dissertation. If you wish, you can withdraw your participation from this research at any time. For further information, please contact **Rafique Ahammed on** . Thank you for your help and cooperation.

Please return the completed questionnaire to:

Rafique Ahammed
Geography and Environmental Studies
School of Social Sciences
University of Adelaide, SA 5005.

Fax: _____

Email: _____

Questionnaire
(For Policy Makers and EIA Practitioners)

Instructions

For closed questions, please check or tick only one box against each criterion. A space has also been provided with some questions for your answers/comments. Please add separate sheets mentioning question numbers with your answers/comments if you need more space.

Your background

1. Your Name (Optional):-----
2. In which organization/institute are you currently employed?

Private Industry	Private Consultant	Environmental NGO	Research Institute	Local Government	Government Department	Other
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Please list your official job title and name of the organization.

4. How long have you been working at your present organization?

<5Yrs 6-10Yrs 11-15 Yrs 16-20Yrs 21+
5. Do you have any previous work experience relating to the EIA process?

No <5Yrs 6-10 Yrs 11-15 Yrs 16+
6. What is your background discipline (area of specialization)?

Planning Engineering Management Other -----
7. What is your highest educational qualification?

High School TAFE Undergrad. Postgrad. Other-----
8. What are the major responsibilities you perform in your current position?

Your attitude and opinions on procedural framework

9. To what extent do you consider the EIA process after making a decision?

Not at all Little Moderately Strongly Uncertain

Your comments (if any):-----

10. To what extent do you consider monitoring and auditing as a formal part of the EIA process?

Not at all Little Moderately Strongly Uncertain

Your comments (if any):-----

11. How important is the role of monitoring and auditing in the EIA process?

Not at all Little Moderately Significantly Uncertain

Your comments (if any):-----

12. How far do you support the implementation of monitoring and auditing as part of general environmental management activities outside the EIA process?

Not at all Little Moderately Strongly Uncertain

Your comments (if any):-----

13. How important are the legal provisions for economic incentives to encourage the implementation of monitoring and auditing in EIA?

Not at all Little Moderately Significantly Uncertain

Your comments (if any):-----

14. How important are the legal provisions of penalty or sanction for the enforcement of approval conditions and the implementation of monitoring commitments?

Not at all Little Moderately Significantly Uncertain

Your comments (if any):-----

15. To what extent has monitoring and auditing been implemented in your EIA jurisdiction?

Not at all Limited Moderate Significant Uncertain

16. How do you rank the following procedural aspects of monitoring and auditing in your EIA jurisdiction?

	Absent	Inadequate	Good	Excellent	Uncertain
Legal provisions for monitoring and auditing in EIA.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detailed procedural guidelines for monitoring and auditing in EIA.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A central agency to oversee and coordinate the implementation process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legally defined role of different government agencies and the proponent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordination between the government agencies assigned with different responsibilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provisions for taking ameliorative actions by the proponent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provisions for publishing monitoring and auditing results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provisions for reviewing and responding to monitoring results by an independent authority.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provisions for the right of the public to access and respond to the monitoring and auditing results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formal mechanism for enforcement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formal channels for the public to participate in the compliance and enforcement mechanism.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legally defined penalties /sanctions against non-compliance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Which of the following is the lead agency for the implementation of monitoring and auditing in your EIA jurisdiction?

Proponent	Assessing Agency	Environmental Agency	Planning Agency	Other (Please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Which of the following should be the lead agency for the implementation of monitoring and auditing in EIA?

Proponent	Assessing Agency	Environmental Agency	Planning Agency	Other (Please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your comments (if any):-----

19. Which of the following does bear the expenses of monitoring and auditing in your EIA jurisdiction?

Proponent	Public	Both Public and Proponent	Other (Please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. To what extent should the following bear the expenses of monitoring and auditing?

	Not at all	Little	Moderately	Substantially	Uncertain
Proponent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your comments (if any):-----

21. Which of the following is responsible for coordinating and supervising the implementation of monitoring and auditing in your EIA jurisdiction?

Business/Industrial Community	EIA Approving Agency	Environmental Agency	Planning Agency	Other (Please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Which of the following should coordinate and supervise the implementation of monitoring and auditing in EIA?

Business/Industrial Community	Assessing Agency	Environmental Agency	Planning Agency	Other (Please specify)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your comments (if any):-----

23. Which of the following is responsible for the enforcement of EIA decisions in your EIA jurisdiction?

- | | | | | |
|----------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|
| Business/Industrial
Community | Assessing
Agency | Environmental
Agency | Planning
Agency | Other (Please specify)
----- |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

24. Which of the following should be responsible for the enforcement of EIA decisions?

- | | | | | |
|----------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|
| Business/Industrial
Community | Assessing
Agency | Environmental
Agency | Planning
Agency | Other (Please specify)
----- |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

25. Which of the following reviews and responds to the monitoring results?

- | | | | | |
|---------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|
| Independent
Review Authority | Assessing
Agency | Environmental
Agency | Planning
Agency | Other (Please specify)
----- |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

26. How important is an independent agency for reviewing and responding to monitoring results?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Not at all | Little | Moderately | Significantly | Uncertain |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Your comments (if any):-----

Your experiences and opinions on EIA practices

27. How much consistency is there between procedures and practices of monitoring and auditing in your EIA jurisdiction?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Not at all | Little | Moderate | Significant | Uncertain |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

If there is any inconsistency, please give details.

28. How do you rank the following practices in your EIA jurisdiction?

	Absent	Poor	Good	Excellent	Uncertain
EIA reports specify a detailed monitoring programme in a separate chapter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The monitoring programme specified in the EIA report includes all potential impacts/issues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Full implementation of commitments in the monitoring programme takes place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring and auditing results are published regularly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring and auditing results are reviewed regularly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The review authority responds to the monitoring results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The proponent takes ameliorative actions (or appropriate measures) early.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring results are produced without any manipulation and bias.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The enforcement of monitoring conditions as specified in the EIA documents takes place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. To what extent are the following practices being implemented in your EIA jurisdiction?

	Not at all	Limited	Moderately	Significantly	Uncertain
Specifying detailed monitoring arrangements (with timeframe, responsibilities and variables) for each impact category.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Making all predictions auditable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carrying out routine auditing of impacts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Considering and designing the monitoring programme at the early stage of the EIA process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring unanticipated impacts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring the impacts of actions at the implementation stage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring the impacts of action at the operation stage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring the impacts of action at the decommission stage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensuring easy public access to the monitoring and auditing results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Involving the public in review, implementation and enforcement process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. To what extent do the following factors affect the implementation of monitoring and auditing in your EIA jurisdiction?

	Not at all	Little	Moderately	Significantly	Uncertain
Lack of mandatory legal provision.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unwillingness of the proponent to bear the cost.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unwillingness of bureaucrats and EIA professionals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor or inadequate baseline study.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inadequate or unavailable monitoring data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of adequate professional knowledge in relevant organizations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of awareness in the bureaucratic set up.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of technology.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of established baseline data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trade and industries get priority over the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overlapping of monitoring and auditing activities in EIA with general environmental management practices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. Have you noticed any other problems associated with the implementation of monitoring and auditing in your EIA jurisdiction?

Yes No

If yes, please specify.

Thank you for your time.



Interview

Procedures and Practices of Monitoring and Auditing in Australian EIA Systems

Environmental impact assessment (EIA) is being used globally either as a planning or management tool in order to minimise the potential impact of development. Monitoring and auditing are two important components of the EIA process and without their proper implementation EIA loses its credibility. However, globally the implementation of monitoring and auditing programs in the EIA process is being neglected. In the Australian EIA systems, monitoring and auditing are the weakest areas and they need proper attention of the policy makers and EIA practitioners.

This interview is expected to take a maximum 30 minutes of your time. It is designed to collect information in order to investigate and interpret the procedures and practices of monitoring and auditing in Australian EIA systems. Your expertise, experience and opinions are very important and relevant for my research. While the confidentiality of your responses is assured, I am happy to provide a copy of notes of our conversation before I use them in my dissertation if you wish. This interview forms a component of my PhD research project at the University of Adelaide. Any input received from you through this interview will contribute significantly in completing my Doctoral Dissertation. If you wish, you can withdraw your participation from this research at any time. For further information, please contact **Rafique Ahammed on** . Thank you most kindly for your help and cooperation.

Please return the completed questionnaire to:

Rafique Ahammed

Geography and Environmental Studies

School of Social Sciences

University of Adelaide, SA 5005.

Fax: _____

Email: _____

Please tick the box if you would like a copy of notes

Please tick the box if you do not wish to be identified in the dissertation

Questions for interviewing EIA practitioners/professionals

1. The EIA process ends with decision-making ignoring its post-decision components in most cases. What is your comment on this practice?
2. How do you recognise the importance of monitoring and auditing in the EIA process?
3. What is your view on the implementation of monitoring and auditing as a formal part of EIA?
4. What is your view on the implementation of monitoring and auditing as part of general environmental management activities outside the EIA process?
5. What is your view on the principle of self-regulation that advocates empowering the business/ industrial community as the regulatory authority?
6. How could monitoring and auditing fit better in the EIA process?
7. How can an independent authority be involved in the implementation of monitoring and auditing in EIA?
8. How does the implementation of monitoring and auditing in your EIA jurisdiction take place?
9. How effectively and efficiently are they being implemented in your EIA jurisdiction?
10. Should the implementation of monitoring and auditing in EIA be made accountable to the public? Please give reasons with your answer. If your answer is negative, please go to Question 12.
11. How can the involvement of the public be ensured in the implementation of monitoring and auditing in EIA?
12. In what way could the compliance and enforcement mechanism be strengthened?
13. Have you noticed any shortcoming or weakness in the legal, procedural or institutional arrangements that pose problems in the implementation of monitoring and auditing in your EIA jurisdiction?
14. Do you have any other suggestions or comments on the implementation of monitoring and auditing in your EIA jurisdiction?

Appendix 5

EIA Monitoring and Auditing in The Netherlands*The Dutch EIA process*

In The Netherlands, EIA regulations came into effect in 1987 (Arts, 1998). The Netherlands is well recognized for having advanced EIA regulations and practice (Glasson et al., 1994; Sadler, 1996; Wood, 2003). The specific features of the Dutch EIA system include:

- “Integration of EIA into the existing decision-making process;
- Assessment of projects as well as plan;
- The advisory role of the independent EIA Commission;
- Public consultation at an early stage about the scope of the EIS that will be prepared;
- The requirement to consider the ‘alternative most favourable to the environment’
- The requirement to do EIA follow-up” (Arts & Meijer, 2004, p.64).

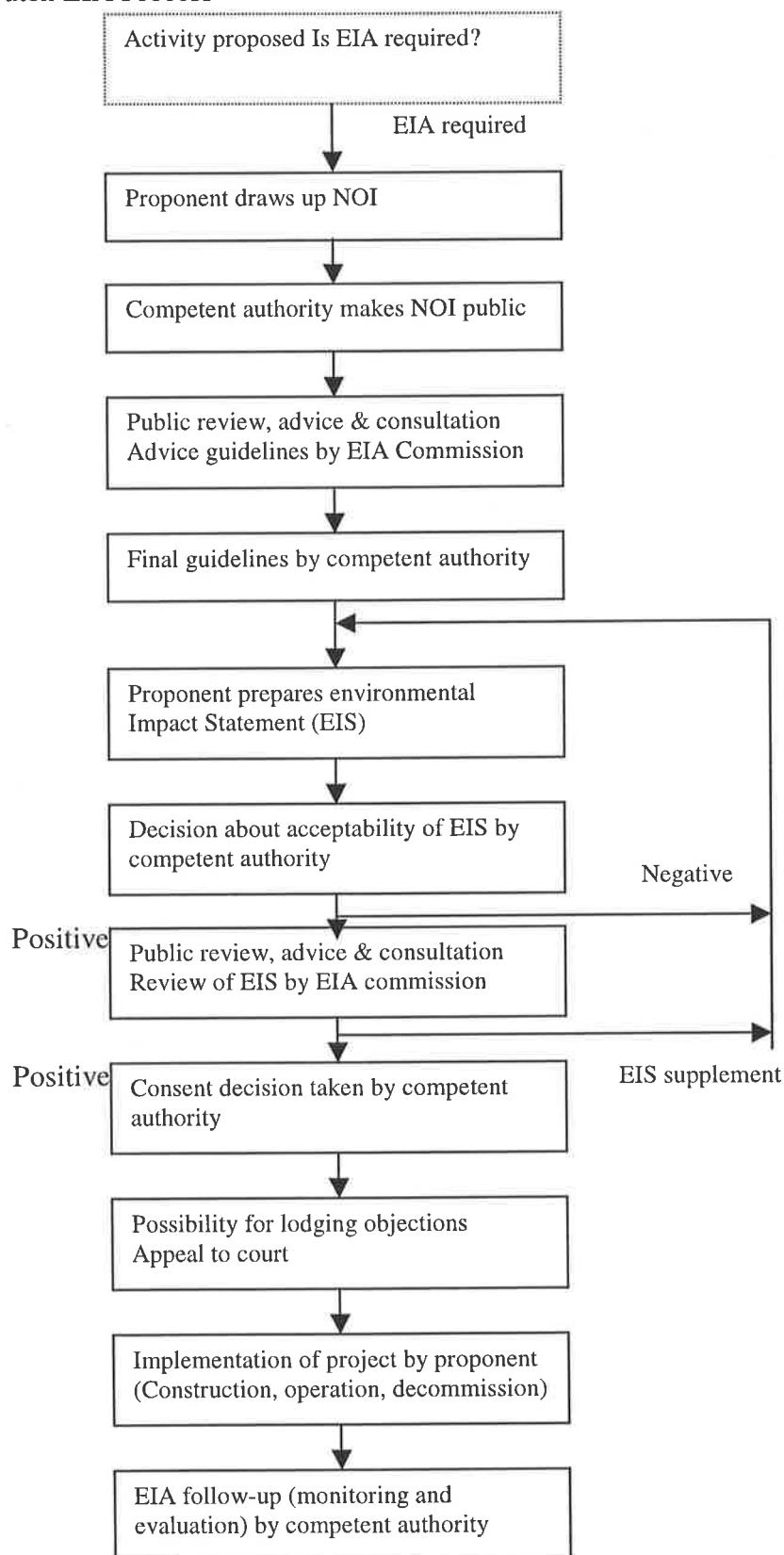
The current Dutch EIA procedures are set out in the Environmental Management Act 1994 (EMA) and the EIA Decree established by the Act (VROM, 1994a, 1996). Box 5.1 and Figure 5.1 summarise the EIA process in the Netherlands.

Box 5.1: Basic Elements of the Dutch EIA Procedures

- The EIA process starts with a Notification of Intent (prepared by the proponent), which provides a broad outline of the proposed project.
- The notification is made public and a first round of consultation, advice and public review starts in order to determine the scope of the EIS.
- The EIA Commission (a group of independent experts) issues an advice with guidelines on the basis of which the competent authority prepares the final guidelines for the EIS. The competent authority is usually a municipal or provincial government or a national Ministry (depending on the relevant consent decision).
- The proponent prepares the EIS, in which the project proposal and its alternatives are assessed for their impacts, and potential mitigation measures are proposed. There are no legal requirements for the proponent to devote attention to EIA follow-up in their EIS; however, the guidelines issued by the competent authority usually request this.
- The competent authority checks the completed EIS prior to its release for public review along with an application for the consent decision or a draft decision. The EIA Commission evaluates the quality of the EIS and submits a review advice document to the competent authority.
- The competent authority is responsible for the consent decision- to grant the environmental permit or to approve the plan. Both the proponent and the third parties may appeal the decision in court. The competent authority must also provide a programme for the ex-post evaluation indicating terms and manner in which the competent authority will perform the evaluation once the project commences.

(Based on Arts, 1998; Arts & Meijer, 2004).

Figure 5.1: The Dutch EIA Process



(Source: Arts & Meijer, 2004, p.64)

Legal provisions for EIA follow-up in The Netherlands

The Dutch EIA follow-up procedures and practices have been discussed by Arts (1998), Arts and Nootboon (1999), Arts and Meijer (2004), and Wood (2003). The formal procedures of EIA follow-up in The Netherlands are set out in the *Environmental Management Act 1994* (Sections 7.37, 7.39-7.43). The Dutch *Environmental Management Act 1994* (EMA) requires the competent authority to evaluate every plan and project subject to an EIS during or after implementation. The Act (Section 7.34 (2)) also requires the competent authority to specify how the post-decision evaluation should be carried out. Box 4.3 summarises of EIA follow-up provisions of the Dutch EMA. The objectives for EIA follow-up is reflected in Section 7.42(1) of the Act that states “ *if it appears for the investigation referred to in s7.39 that the effects of the activity are considerably more damaging to the environment than was anticipated when the decision was taken, the competent authority shall take such measures at its disposal as it sees fit in order to limit the said effects as much as possible or to remedy them*” (Arts & Meijer, 2004, p.69).

Box 5.2: Summary of EIA Follow-up Provisions of the Dutch EMA

- ❑ The competent authority must monitor and evaluate the consequences of the implemented action (section 7.39).
- ❑ The proponent must provide the competent authority with monitoring information (section 7.40).
- ❑ The competent authority must prepare an evaluation report, publish it and send it to EIA Commission and to the statutory consultees (section 7.41).
- ❑ The competent authority must take such remedial actions as sees it fit (for example, tightening license conditions) if impacts are much more severe than anticipated when the decision was taken (section 7.42).
- ❑ Detailed regulations relating to monitoring can be made (section 7.43).

(Adapted from Wood, 2003, pp. 248-49)

EIA follow-up procedures in The Netherlands continue parallel to the EIA procedures. They begin with the issue of the consent decision when the competent authority provides for an EIA follow-up programme that states in which way (what, when and how) the project will be evaluated. The competent authority is mainly responsible for implementing the follow-up programme. However, the proponent is legally obliged to cooperate with the investigation (e.g. by providing necessary information). In practice, the proponent carries out most of the follow-up work under the monitoring and reporting requirements of environmental permit (Arts, 1998, Arts & Meijer, 2004). The Act does not require any information on monitoring and mitigation to be included in the EIS. However, according to the advice of the EIA

Commission most guidelines issued by the competent authorities require proponents to include a section in the EIS on how monitoring will be undertaken (Wood, 2003).

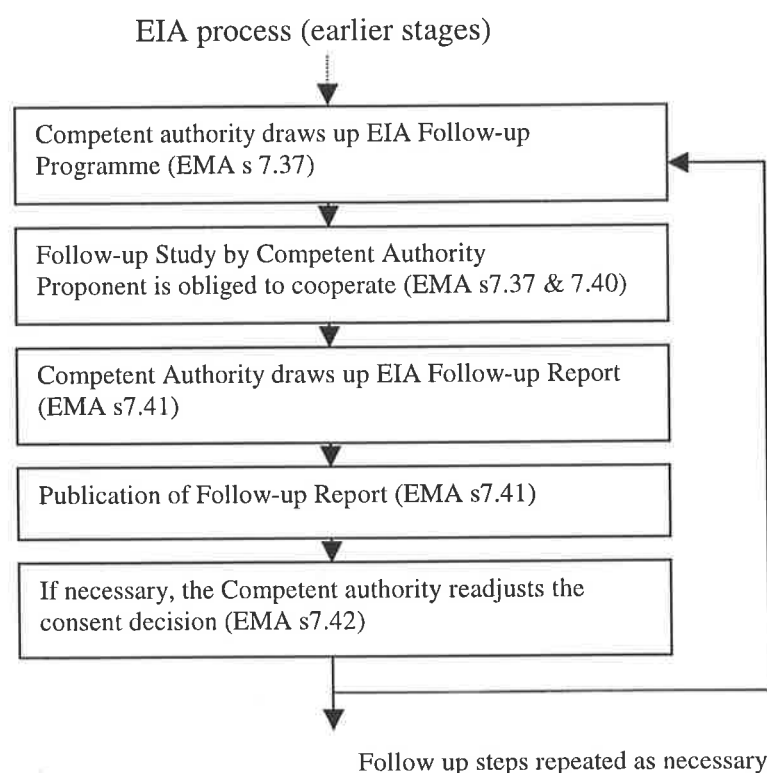
After the evaluation research is completed, the authority has to draw up a report of the research results called the 'evaluation report'. This report is sent to the proponent, the EIA Commission and legal advisors. Section 7.41 (EMA) requires the competent authority to publish the report and to make it public. There is no requirement for public consultation and participation in the preparation of the evaluation report. In accordance with Section 7.42 (EMA), the competent authority has to consider whether the actual consequences for the environment are within the bounds of the decision and it must take measures to reduce or undo the actual impacts as far as possible when it is necessary (Arts & Meijer, 2004). The competent authority takes measures which range from doing nothing, adjusting a license or its provisions, to rescinding the decision or even shutting down the activity (Arts, 1998). The sequence of investigation, reporting and taking measures is undertaken for as long as considered necessary in a specific case (Arts, 1998; VROM, 1995). EIA evaluation in The Netherlands is conducted to compare the effects expected when issuing the consent decision with the real effects of the implemented activity, and it focuses only on the issues relevant to the consent decision (Arts & Meijer, 2004). Unlike the EIA procedure, there are no provisions for lodging objections or appeal against the EIA evaluation or against the conclusions the competent authority draws from the evaluation (Arts, 1998). The Dutch regulations for EIA evaluation are briefly stipulated and are quite vague; much remains unclear. Moreover, the Dutch legislature seems not to have had a completely clear picture of what it should entail and how ex-post evaluation should be conducted (Arts, 1998). However, Wood (2003) notes that there exists more than adequate guidance on monitoring and auditing in the Dutch EIA system but they are not effectively implemented.

Although there is a clear legal mandate EIA follow-up in The Netherlands is not carried out for all projects subject to an EIA in practice (Arts & Meijer, 2004; Wood, 2003). The study by Arts (1998) reveals that by 1998 EIA follow-up occurred in only 61 projects (16%) out of 376 and follow-up reports were published for only 22 projects (6%). The annual report of EIA Commission (EIAC, 2001) shows almost similar findings. The evaluation studies conducted were mainly concerned mainly with implementation monitoring and with comparisons with conditions and standards rather than with impact auditing (Wood, 2003). However, EIA follow-up has been increasing since 1995 (Arts, 1998). The main reasons for the limited

extent of follow-up include: low policy priority; lack of external pressure; lack of surveillance and sanctions; lack of insight of the benefits of EIA follow-up regarding the effort needed; deficiencies in EISs; inadequate techniques for follow-up; and personnel and time constraints (Arts, 1998). In order to address these issues attention has been devoted to screening and scoping of EIA follow-up (Arts & Meijer, 2004).

Arts and Meijer (2004) note there are many other control and feedback mechanisms in The Netherlands outside the EIA framework doing monitoring and auditing. Wood (2003) notes that monitoring takes place under pollution control and other legislation in the Netherlands. Almost every environmental permit (the common consent decision to which an EIA is linked) specifies monitoring and reporting, and the competent authorities frequently audit such requirements. Additional monitoring and reporting often arises from the proponent's voluntary environmental management system (EMS) or from government area-wide monitoring schemes (e.g. state of the environment reporting) even in the case where a project is not subject to an EIA. Linking up with these other evaluative instruments is an important consideration in screening and scoping for EIA follow-up in The Netherlands (Arts & Meijer, 2004).

Figure 5.2: Procedure for EIA Follow-up in The Netherlands



(Source: Arts & Meijer, 1998, p. 67)

Screening and Scoping of EIA follow-up in The Netherlands

The Dutch EIA regulations set objectives for controlling the project and these require follow-up for all projects and plans subject an EIA, and do not call for screening if follow-up is needed. Hence, it is assumed that if a proposal warrants EIA, then it will be useful to carry out an ex-post evaluation of the actual environmental impacts. However, results of an evaluative study suggest that EIA follow-up will not always be useful (Arts, 1998). In some cases other (legal) instruments already provide for EIA follow-up of actual environmental impacts. Therefore, in practice for many EIA projects in The Netherlands no EIA follow-up has been initiated, despite the legal requirements to do so (Arts, 1998). As noted by Arts and Meijer (2004), this may be a form of implicit screening but whether this is always justified remains unclear. Proposals for introducing a formal screening step and moving to a discretionary requirement for EIA follow-up have been advocated (VROM, 1998, 2003) but not yet implemented.

In The Netherlands, the EMA (s7.37) requires the competent authority to determine the scope of the follow-up at the consent decision stage but it does not require the proponent to include a proposal for follow-up in the EIS. However, in practice most advice guidelines contain some general statements to this effect (Arts & Meijer, 2004). Arts (1998) notes that the quality of the sections on EIA follow-up in both EISs and consent decisions are often found to be of poor quality. The scope of the EIA follow-up programme includes both construction and operational phases. There are guidelines issued by the competent authorities that generalize issues for some specific categories of projects. For example, the Dutch Ministry of Transport distinguishes two categories of issues for the scoping of EIA follow-up in relation to road projects (Van Lamoen & Arts, 2002).

Table 4.1: Scoping Categories for EIA Follow-up of Road Projects

'Yes', unless	'No', unless
Noise	Nature conservation (flora and fauna)
Air pollution	Landscape
External safety	Social impacts (e.g. barrier effects, liveability)
Mitigation measures	Archaeology and cultural heritage
Compensation measures (traffic)	Water (including surface and groundwater)

(Source: V&W, 2003 cited in Arts & Meijer, 2004, p.79)

The items in the first category ('yes', unless) have a strong legal basis, either national or European. All of the items in this category should be included in the follow-up programme, unless they are clearly irrelevant to the project and/or the consent decision. The second

category ('no', unless) contains all other environmental issues normally found in EISs for road development projects. Effects of the items in the second category are mostly diminished by mitigation or compensation measures and may not always warrant follow-up. Sometimes, the initial monitoring and evaluation may be followed by an in-depth study on triggered aspects (Arts & Meijer, 2004).

Organizational Aspects

The competent authority is responsible for EIA evaluation (EIA follow-up) in The Netherlands. However, the main parties that usually get involved in the EIA evaluation are: the specialist for various sectors (e.g. water, soil, air, etc); the departments responsible for permits and enforcement; and the EIA coordinator (Arts, 1998). All provinces have EIA coordinator, civil servants specifically appointed for handling EIA affairs, generally responsible for managing and coordinating the ex-post evaluation. They have an important task in streamlining the way EIA is applied in practice. They also inform and help the provincial departments involved in EIA projects. Externally, the consultation with the developer/proponent and the other competent authorities is crucial in this evaluation. The proponent usually plays a vital role in providing the information needed. Besides these, other actors such as legal advisors, municipalities or the people in the neighbourhood and interest groups are drawn into the EIA evaluation (Arts, 1998).

Most Dutch provinces have made divisions in their organizational set-up separating the activities of preparing and granting permits from the activities of surveillance and enforcement of permits; there are separate departments for both activities (BiZa, 1996; VVM, 1995). In most provinces, therefore, the responsibility for a project is handed over after the decision is taken, i.e., when the environmental permit is granted and the EIS is finished. As EIA evaluation relates to both the original decision and the implementation of the project, both the departments responsible for granting permit and enforcing them are relevant during EIA evaluation (Arts, 1998). Box 5.4 shows some other organizational aspects of EIA follow-up in The Netherlands.

The Dutch Environmental Management Act (EMA) stipulates only briefly the post-EIA evaluation of projects subject to EIA. The EMA only succinctly gives the main points regarding aspects such as who is responsible, what the procedure is, what the formal scope and aim of EIA evaluation is, etc. The Dutch Environmental Management Act (EMA) clearly

stipulates that the competent authority is responsible for the EIA evaluation and that the proponent has to cooperate. However, in practice the relationship between these parties is rather complex. Their relationship is surrounded by several judicial ambiguities relating to their distinct interest (Arts, 1998). The EMA does not provide for an effective enforcement mechanism. In fact no penalty applies for failures to carry out post-EIA audits. There is neither regulatory surveillance nor sanctions (Arts & Nooteboom, 1999). Although the competent authority is responsible for the EIA evaluation, it can avoid carrying out the investigation for the EIA evaluation.

Box 5.3: Organizational Aspects of EIA Follow-up in The Netherlands.

- ❑ The work related to the EIA evaluation can be contracted out to consultancy firms. In such case, the main task of the competent authority is limited to reviewing and judging the EIA evaluation study.
- ❑ Sometimes, the competent authority involves third parties to conduct an evaluation depending on the controversy associated with a project or policy.
- ❑ The formal requirements for involving the public in EIA evaluations are limited- only the evaluation report has to be made public. However, in Dutch practice, there appears to be room for making EIA evaluation more democratic and open to the public.
- ❑ The competent authority is primarily responsible for bearing the cost involved in carrying out an EIA evaluation. However, it can avoid many of potential costs related to EIA evaluation by linking up with other evaluative activities, whether these are undertaken by the competent authority itself, the proponent or others.
- ❑ In practice, much of the work load and the expense of evaluating an EIA project is borne by the proponent.
- ❑ No separate finances are usually provided by the national government for the EIA evaluation. Therefore, the costs are charged to the regular budgets of the competent authorities-in most cases the provincial organization.

(Based on Arts, 1998)

Appendix 6

EIA Monitoring and Auditing in Canada*The EIA Process in Canada*

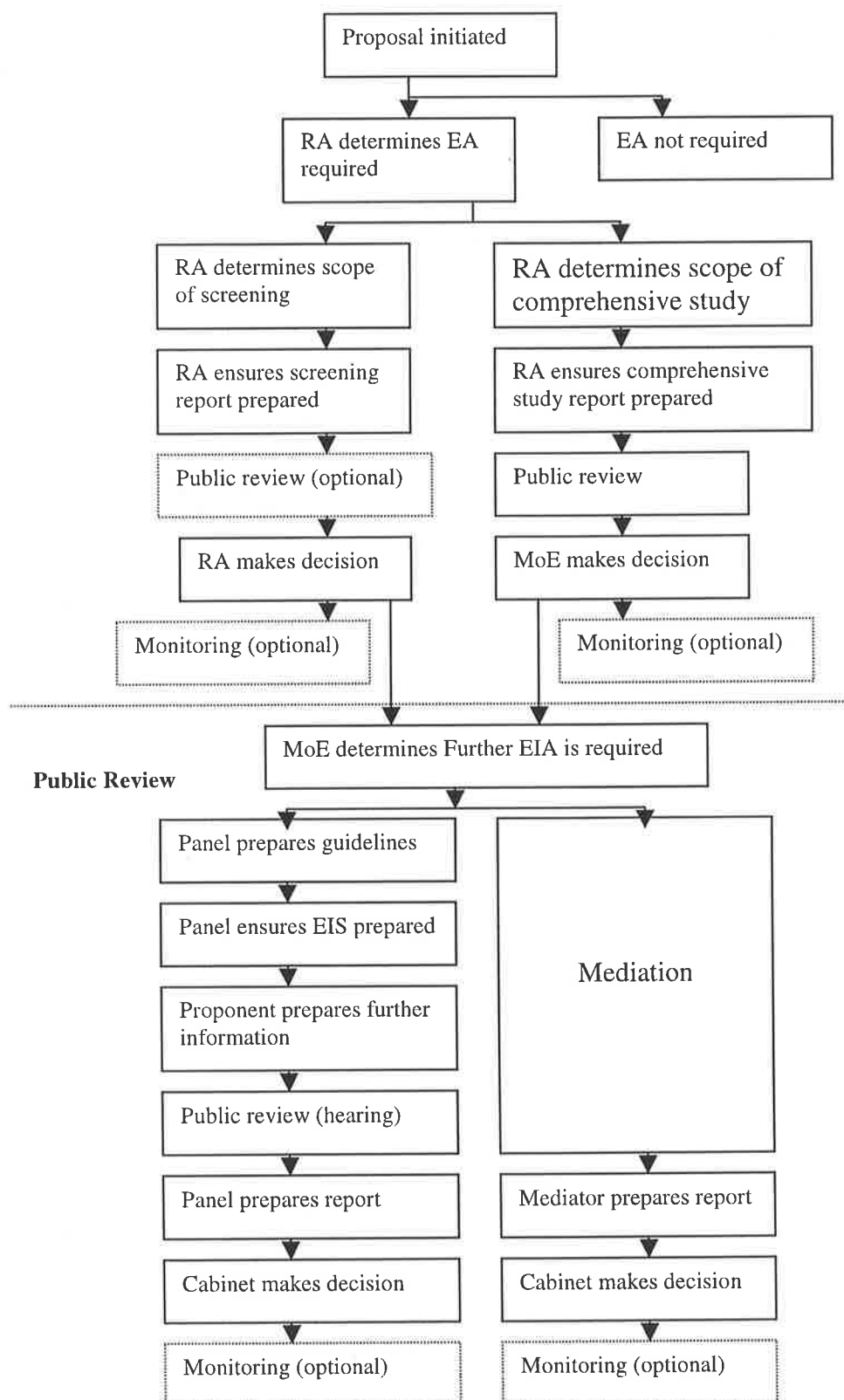
In Canada, environmental assessment is legislated and most jurisdictions provide for specific EIA approvals. In some jurisdictions other approvals are prohibited until the EA approval has been obtained (e.g. Canada and Ontario) (Doyle & Sadler, 1996). The responsibility for EIA in Canada is shared between the federal and the provincial governments (Glasson et al., 1999). The federal EIA procedures are set out in the *Canadian Environmental Assessment Act, 1992*, which came into effect in 1995. Prior to this and since 1984 the federal environmental process was guided by a Cabinet order. The provinces have separate, and widely differing EIA processes for projects under their own jurisdictions (Smith, 1991). Environmental assessment is formally legislated in ten provinces and one territory. Box 6.1, Figure 6.1 and Table 6.1 show the EIA process in Canada.

Box 6.1: The Federal Canadian EIA Procedures

- The federal Canadian EIA system consists of two separate, sometimes successive procedures: the self directed assessment and the public review. Each of these procedures contains two assessment tracks, each with its own steps.
- An initial self-assessment by the responsible agency proposing the action determines whether the action is likely to have a significant environmental impact. At this stage, agencies consider technical information, expert opinion, initial public reactions and any other surveys and studies carried out in the time available.
- Once it is determined that an EIA is needed, the next step is to decide which EIA track to follow. Most projects are handled as a screening EIA involving a brief review of available information and a short report.
- A comprehensive EIA study is done for a small number of projects. This study involves a consideration of a wider number range of factors, a public review and a follow-up programme.
- Where projects subject to 'screening' have potentially significant adverse environmental impacts, or if the project is the subject of public concern because of its potential environmental effects, the minister of the responsible authority is supposed to refer the proposal to the Minister of the Environment to initiate the second stage (i.e, the public review).
- Following the mediation or panel review, the responsible authority must decide whether to proceed with the project and with what mitigation measures and follow-up programme. The follow-up actions are undertaken to verify the accuracy of the EIA of a project and to determine the effectiveness of mitigation measures.

(Based on Wood, 2003; Glasson et al., 1999; Northey, 1994; Hazell, 1999).

Figure 6.1: Main Steps in the Canadian EIA Process

Self-directed Assessment

RA, Responsible Authority; MoE, Minister of the Environment

(Source: Wood, 2003, p.7)

Table 4.2: EIA Procedures in Canada

Jurisdiction	Project Screening	Scoping of Key Decision Topics	Project Terms of Reference	Specific Mitigation	EA or EIA Document Field	Review of EA by Governments and Public	Terms and conditions of Approval	Surveillance of construction or implementation	Monitoring of Effects or post-construction Evaluation	Periodic EA Audits of Approvals	Periodic Evaluation of EA Process
British Columbia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Alberta	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Saskatchewan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partially/Optionally	Partially/Optionally	Partially/Optionally	Yes
Manitoba	Yes	No	Partially/Optionally	Yes	Yes	Yes	Yes	Partially/Optionally	Yes	No	Partially/Optionally
Ontario	Yes	No	No	Yes	Yes	Yes	Yes	No	Partially/Optionally	No	Yes
Quebec	No	No	Yes	Yes	Yes	Yes	Yes	Partially/Optionally	Partially/Optionally	No	Partially/Optionally
New Brunswick	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Partially/Optionally	Partially/Optionally	No	Partially/Optionally
Nova Scotia	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Partially/Optionally	No	Yes
Prince Edward Island	Partially/Optionally	Partially/Optionally	Partially/Optionally	Yes	Yes	Yes	Yes	Partially/Optionally	Partially/Optionally	Yes	Yes
Newfoundland	Yes	Yes	Yes	Yes	Yes	Yes	Partially/Optionally	Yes	Partially/Optionally	No	Partially/Optionally
Northwest Territories	Partially/Optionally	Partially/Optionally	Yes	Yes	Yes	Partially/Optionally	Yes	Partially/Optionally	No	No	Partially/Optionally
Yukon	Yes	Yes	No	Yes	Partially/Optionally	No	Partially/Optionally	Partially/Optionally	No	No	No
Canada (CEAA)	Yes	Yes	Yes	Yes	Yes	Yes	Partially/Optionally	No	Partially/Optionally	No	Yes

(Adapted from Doyle & Sadler, 1996, p.15)

In Canada, most of the federal departments or agencies with decision-making authority for projects (the 'responsible authorities') have developed their own environmental assessment procedures. Federal EA coordination regulations have been promulgated to clarify the nature of necessary cooperation between responsible authorities. Notable positive features of the Canadian Environmental Assessment Act include provisions for cumulative impact effects, mediation, follow-up, public participation, the inclusion of socio-economic and cultural effects, considering of transboundary effects, participant funding and consideration of environmental effects in decision-making (Wood, 2003; Glasson et al., 1999). However, the lack of an effective mechanism for ensuring compliance with mitigation and monitoring requirements is considered a major weakness in the Canadian Environmental Assessment Act (Wood, 1999).

Legal Provisions for EIA Follow-up in Canada

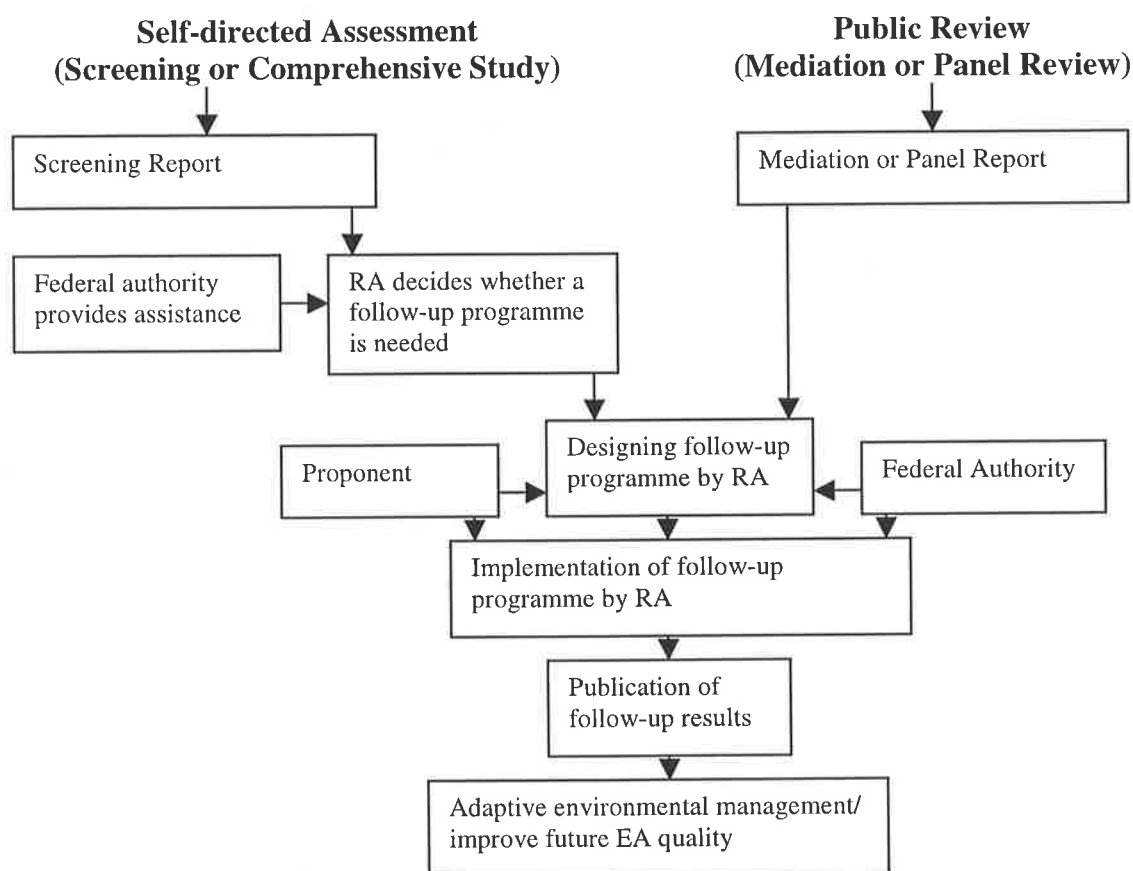
Follow-up is strongly emphasized in the *Canadian Environmental Assessment Act 1992* (Wood, 2003). Section 2 of the Act defines follow-up as "a program for verifying the accuracy of the environmental assessment of a project, and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project". Section 14(c) of the Act states that the EA process includes, where applicable, 'the design and implementation of a 'follow-up program'. Sections 16 and 38 specifically address follow-up programmes. According to the provision of Section 16(2)(c), the need for and the requirements of a follow-up programme must be considered during a comprehensive study, mediation or panel review. Section 38 of the Act provides the following guidance for the Responsible Authority in determining such a need:

- Where a Responsible Authority (RA) takes a course of action to permit a project to be carried out after the completion of comprehensive study, mediation or panel review the RA must design and arrange for the implementation of any follow-up programme that was deemed necessary during the EA.
- Where an RA takes a course of action to permit a project to be carried out after the completion of a screening the RA shall, where circumstances warrant a follow-up programme, design and arrange for the implementation of a follow-up programme that it considers appropriate for the project (CEAA, 2002).

The Act specifies the extensive requirements for public information about follow up. Section 38 of the Act requires the Responsible Authority to advise the public any follow-up programme and the results of any follow-up programme. In addition, Section 55 of the Act establishes the requirements for a public registry for the purpose of facilitating public access to records relating to EAs. Specific requirements for the follow-up programmes are:

- “For screening or comprehensive studies, the RA must maintain the public registry for the duration of a project (until any follow-up programme is completed). Any records pertaining to the follow-up programme and its implementation must be available on the public registry.
- For mediations and panel reviews, the Agency is required to maintain the public registry as described above from the appointment of a mediator or panel to the submission of the respective report. After the submission of the reports the responsibility for maintaining the public registry (including any follow-up documents), reverts to the RA” (CEAA, 2002, p.2).

Figure 6.2: Procedures for EIA follow-up under the CEAA



(Based on CEAA, 2002)

It is the responsibility of the RA to design a follow-up programme and to ensure its implementation. An RA may require the proponent to devise a follow-up programme early in the planning stages of a project and to ensure its implementation (CEAA, 2002). With regard to involvement of federal authorities, Section 38(4) of the Act states that “a federal authority shall provide any assistance requested by a responsible authority in ensuring the implementation of a follow-up programme on which the federal authority and the responsible authority have agreed”. Concerning the taking of action as a result of follow-up programme Section 38(5) of the Act clearly mentions that “the results of follow-up programmes may be

used for implementing adaptive management measures or for improving the quality of future environmental assessments". The Act does not clearly state who is responsible for taking action and it contains no absolute means of ensuring either compliance or monitoring by RAs (Wood, 2003). However, the CEAA guidance notes that it is the responsibility of the responsible authority to take actions based on follow-up results (CEAA, 2002).

Box 6.2: The Role and Responsibilities of Different Parties Involved in Follow-up

- ❑ An RA is primarily responsible for EIA follow-up in Canada. However, an RA may require the proponent to plan for a follow-up programme and to ensure its implementation.
- ❑ An RA may also request assistance from the federal authority or from other jurisdictions to ensure the implementation of a follow-up programme, especially for areas outside an RA's expertise.
- ❑ In cases of projects with multiple RAs, RAs should agree between themselves on the design and implementation of a follow-up programme with respect to issues of mutual interest should one be required or appropriate.
- ❑ An RA can include conditions in authorizations, permits, contracts, leases or other binding documents which may include specific mitigation and follow-up measures, environmental thresholds, or reporting and compliance monitoring schedules. Conditions from other federal authorities may also be included in binding documents. It is however, the responsibility of the RAs to enforce those conditions.
- ❑ An FA that is in possession of specialist or expert information or knowledge, with respect to a project, can make available that information or knowledge to the RA, mediator or review panel. Where requested, an FA can assist in the design of a follow-up programme and the analysis of a follow-up programme.
- ❑ Aboriginal Groups and other levels of government including territories, provinces, municipalities and other agencies may have a role to play in the design and implementation of a follow-up programme.
- ❑ Cooperative agreements between the federal government and provincial governments may include the design and implementation of any follow-up programme.

(Based on CEAA, 2002)

Screening and Scoping of EIA follow-up in Canada

Under the Act, the main objective of a follow-up programme is to verify the accuracy of the environmental assessment and to determine the effectiveness of any mitigation measures that have been implemented (Wood, 2003; CEAA, 1997, 2002). The other objectives include better project management, detection of unanticipated impacts, verification of compliance with approval conditions, and improvement of the quality of future environmental assessment (CEAA, 2002). Canadian Environmental Assessment Agency (CEAA) provides guidelines for determining whether a follow-up programme is necessary (CEAA, 1994, 2002). A critical question in determining the need for a follow-up programme is one of uncertainty or

unfamiliarity. The CEAA guidance on follow-up recognizes the importance following factors in determining the need for follow-up:

- Environmentally sensitive area/ valued ecosystem components
- Accuracy of predictions
- Effectiveness of mitigation measures
- New or unfamiliar environmental settings
- New or Unproven Techniques and Technology
- Cumulative environmental effects
- Nature of projects
- Limited scientific knowledge and uncertainty about conclusions (CEAA, 1994, 2002).

Box 6.3: Criteria for Designing a Follow-up Programme in Canada.

- In developing a follow-up programme, the following questions should be asked:
- What is the primary purpose of the programme? Is it to verify the accuracy of the predictions on the type and extent, and sensitivity of environmental effects that may occur? Is it to verify that mitigation measures are effective and adequate?
 - Based on the purpose of the programme, what should be measured? How? When? Where? How often?
 - Will the proposed measurement techniques be able to distinguished between changes resulting from other factors?
 - Will the proposed measurement techniques provide answers that are within accuracy required for the primary purpose for which the information is being collected?
 - How long should the programme continue?
 - Is the information being collected in the most efficient manner possible?
 - Are the relative roles of the proponent, RA, expert, FAs, and other agencies clear in relation to the programme?
 - How will the results be disseminated?

(CEAA, 2002, p.5)

The CEAA guidance on follow-up (CEAA, 2002) emphasizes designing a follow-up programme during the EA phase of the project and establishing pre-project scientific baselines. The key consideration in designing the elements of a follow-up programme includes scope of a follow-up programme, baseline conditions, and public involvement. The scope of a follow-up programme can be simple or quite complex based depending on the size of the project and the sensitivity and complexity of any associated issues. EIA follow-up in Canada includes compliance monitoring and a follow-up programme. Compliance monitoring is concerned with the implementation of mitigation measures while a follow-up programme determines the accuracy of EA conclusions and the efficacy of required mitigation measures. Compliance monitoring does not satisfy the requirements of a follow-up programme (CEAA, 2002). The monitoring programme is clearly linked to the earlier stages of EA process in Canada, but the Act provides no mechanism for ameliorative actions to be taken where

monitoring reveals the need for them: this is left to such means as the enforcement of permit conditions under other legislation (Wood, 2003). In Canada, environmental assessment is being used as a basis for environmental management plans related to the ongoing operations of a project (CEAA, 1996). These plans provide for an adaptive environmental management approach ensuring that mitigation measures, monitoring and follow-up programmes are carried out (CEAA, 1996).

Box 6.4: Canadian Guidance on Follow-up

- ❑ For projects subject to screening, the RA must make a decision about whether a follow-up programme is appropriate. If so, it must ensure that one is designed and implemented.
- ❑ The need for and requirements of a follow-up programme need not be considered during the preparation of a screening report.
- ❑ A comprehensive study must explicitly consider the need for and requirements of a follow-up programme during preparation of the report and the RA must decide whether to implement the follow-up programme.
- ❑ The report of the mediator or review panel may recommend that the RA develop and implement a follow-up programme.
- ❑ The RA is not obliged to follow the recommendations for a follow-up programme, but if it does not, it must justify the decision publicly. RAs should keep in mind that the report from a mediator or panel is the product of an open, fair, and rigorous review involving all key interests, and that the report's recommendations cannot be treated lightly.
- ❑ The focus of the monitoring and follow-up programme should be on those potential environmental effects associated with the greatest risk and uncertainty. It should also include statements on the future development of follow-up programmes and periodic re-evaluations of the plans.
- ❑ The report should specify who is responsible for financing and carrying out the follow-up programme. The report should also clearly identify a responsible body to review the results of the programme to ensure that feedback occurs and that any remedial actions are taken when appropriate.

(Based on CEAA, 1994, 1997)

Responsible authorities generally include mitigation measures in the terms and conditions of their approval, or binding them into related contract documents but they seldom verify whether mitigation measures are implemented by the project proponents (CESD, 1998). It has been reported that of 48 screening projects for which follow-up of environmental effects were appropriate, RAs planned to follow-up about three-quarters and one-quarter of required follow-ups were not requested as a condition of approval (CESD, 1998). David Redmond and Associates (1999) reported that follow-up requirements were included in about half of the 191 screening reports they examined.

Organizational Aspects

According to the provisions of the *Canadian Environmental Assessment Act 1992* the responsibility of follow-up and monitoring mainly lies with the responsible authorities. However, this can in practice be avoided. The role of the Canadian Environmental Assessment Agency is to provide data and advice to the responsible agency and often, if requested, to review the results of assessment work. It does not have the authority to interfere in decisions made by the responsible authorities (RAs). McCallum (1987) notes that the Canadian Environmental Assessment Agency does little to ensure that the responsible agency will conduct an assessment in any particular way. The responsibility for EIA in Canada is shared between the federal and the provincial governments.

The federal government has ratified harmonization agreements with a number of provinces recognizing that both federal and provincial governments have interests and obligations concerning environmental assessment of projects, and that cooperative approaches are the best way to ensure effective and efficient process (CEAA, 1996). Canadian environmental assessments often involve more than one jurisdiction and many interested stakeholders. Multi-stakeholders advisory committees are being used for coordination. Public involvement has changed over time from strictly information dissemination to broader consultative approaches (CEAA, 1996). Involvement of the community in the follow-up study and use of independent environmental monitoring agency as a watchdog for environmental management have been successful in some Canadian jurisdictions under the environmental agreement between proponents and responsible authorities (Ross, 2004).

In Canada, environmental effects monitoring (EEM) programmes are required under the provisions of two regulations: the Pulp and Paper Effluent Regulations 1992 and the Metal Mining Effluent Regulations 2002 (Walker et al., 2003). As a regulatory tool, EEM provides science-based nationally consistent monitoring approach to determine if effluents are causing effects in receiving environments (ecosystems). Munkittrick et al. (2002) note that the Canadian EEM programmes are unprecedented for their magnitude and mandatory environmental monitoring requirements. However, the *Canadian Environmental Assessment Act 1992* does not involve a strict command and control approach to EIA follow-up. The Act does not contain any means of ensuring that follow-up and monitoring is implemented. There is a lack of clarity in the Act in relation to follow-up procedures, enforcement, mitigation measures and the role of other parties involved in follow-up.

Appendix 7

EIA Monitoring and Auditing in Hong Kong*The EIA Process*

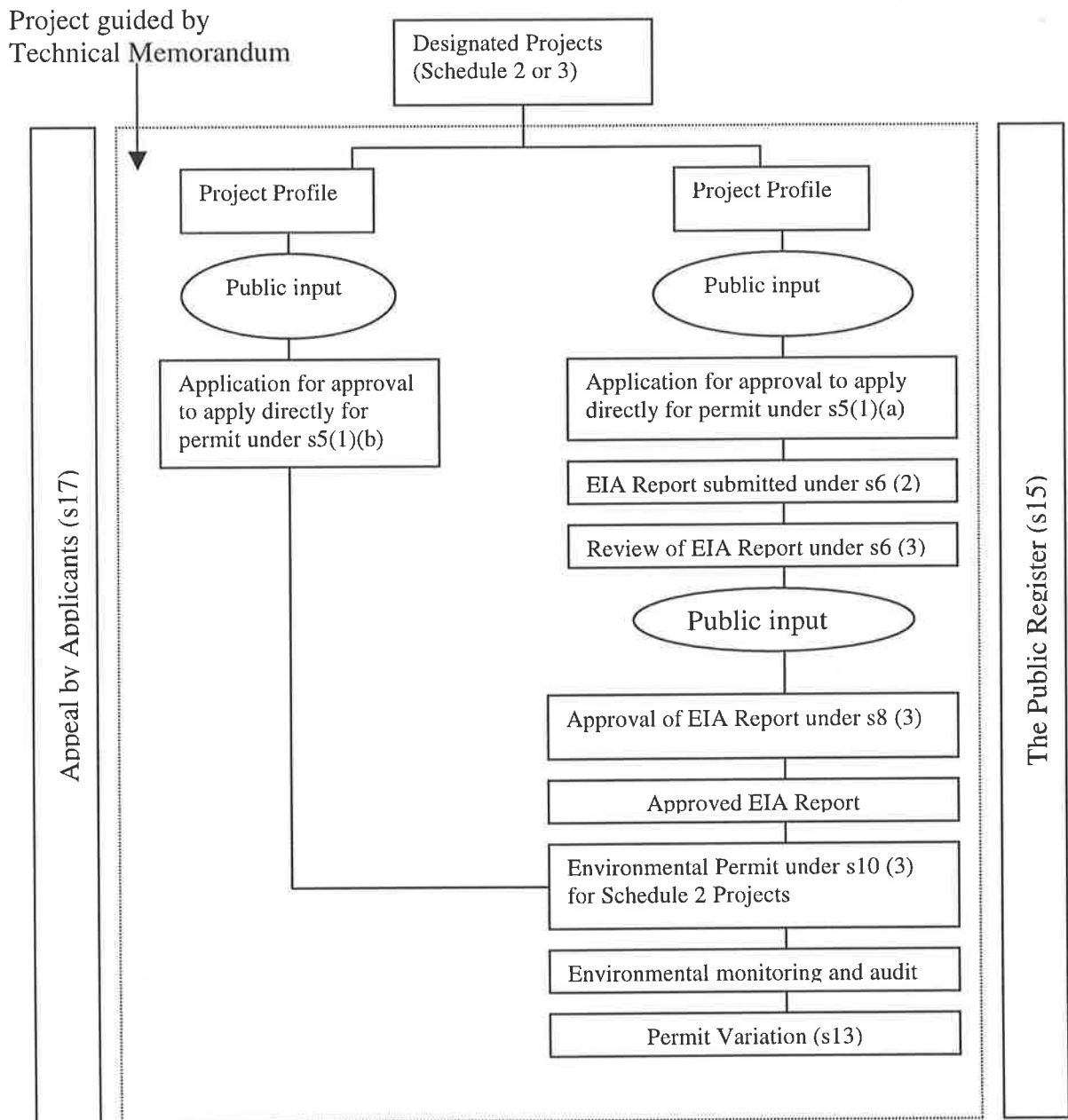
The EIA system in Hong Kong started in 1986 under an administrative arrangement, and it was formalized through the enactment of EIA Ordinance 1997, which came into effect in 1998 (Au & Hui, 2004). Pursuant to EIA Ordinance, the Technical Memorandum on Environmental Impact Assessment was published by the government in 1997. The Memorandum, which is a legal document, gives clear guidance on the EIA procedures. Box 7.1 and Figure 7.1 show the EIA process in Hong Kong.

Box 7.1: An Outline of the Hong Kong EIA Process

- The EIA Ordinance requires the proponents of 'designated projects' listed in Schedule 2 and Schedule 3 of the Ordinance to comply with the statutory EIA process. In addition, projects of Schedule 2 must obtain environmental permits before the implementation starts.
- Proponents of designated projects prepare a Project Profile which is subject to review by the public and the Advisory Council on the Environment (ACE).
- The Environmental Protection Department (EPD) prepares an EIA study brief.
- The proponent prepares an EIA Report, including among other things an Environmental Monitoring and Audit (EM&A) programme.
- The EPD reviews the EIA Report to decide whether it complies with the EIA Study Brief and the Technical Memorandum on the EIA process.
- The EIA Report is subject to review by the public and ACE.
- The EPD determines whether the EIA Report should be approved and any conditions which should apply. The proponent can apply against EPD's decision to an independent board chaired by a person qualified as a District Judge.
- For Schedule 2 projects, the proponent or their contractor applies for an Environmental Permit.
- The Environmental Permit is issued by the EPD. It usually includes a requirement on the submission and implementation of an EM&A Manual outlining the follow-up measures that the Permit Holder is required to implement. It may also include a requirement for the permit holder to establish a project website for communication of follow-up studies.
- The Permit Holder (i.e. the proponent or the contractor) establishes an Environmental Team (ET) and an Independent Environmental Checker (IEC) for the project.
- During project implementation, the ET is responsible for ensuring that the permit holder complies with follow-up requirements and IEC is responsible for verifying this. Follow-up results are posted on the project website, which is linked to the EIA Ordinance website hosted by EPD.

(Based on Au & Hui, 2004)

Figure 7.1: The EIA process in Hong Kong



(Source: EPD, 2002)

A generic environmental monitoring and audit manual was also published in 1996 to assist proponents (EPD, 1996). Wood and Coppell (1999) evaluated the EIA system of Hong Kong and concluded that the EIA Ordinance provided a firm, detailed and comprehensive legal basis for EIA system. Au (1998) recognizes the enactment of the EIA Ordinance as a significant step towards strengthening the EIA system in Hong Kong. The EIA Ordinance requires that environmental impact assessments be conducted for major feasibility studies and projects with potential for causing adverse impacts. It makes the implementation of EIA recommendations legally binding through an environmental permit system. There is also a

legal provision for requiring implementation of environmental monitoring and audit programme. The EIA process in Hong Kong provides for early public input and an effective system to enforce EIA recommendations, environmental monitoring and audit requirements (Figure 4.5). In addition, it involves an innovative approach to disclosure of follow-up information using the cyber technology (Au & Hui, 2004). The development of an EIA system in Hong Kong has been described by Au and Baldwin (1994), Au (1998, 2000), Au and Hui, (2004) and Wood and Coppell (1999). The Operation of Environmental Impact Assessment Ordinance (EPD, 2002) describes the current EIA procedures in Hong Kong (as shown in Box 7.2).

Legal Provisions for EIA Follow-up in Hong Kong

Hong Kong has more than 15 years of EIA experience with environmental monitoring and audit practices (Au, 1998). Environmental monitoring and audit requirements have been formulated and implemented on large development projects since 1990. Environmental monitoring has been required as a condition of approval for some time. These requirements were formalized and extended to all major developments in both the public and private sectors in 1992 through a revised government EIA directive (Au, 1998). Section 16 of the Ordinance enables the EPD to impose environmental monitoring and audit requirements for designated projects as conditions in environmental permits. The Technical Memorandum (Annex 11) requires the EIA Report to contain an environmental monitoring and audit programme, its scope and justification. Section 8 of the Technical Memorandum clearly mentions the purpose of environmental monitoring and audit and circumstances under which a full environmental monitoring and auditing programme is required. The main purpose of monitoring is to verify predictions or the effectiveness of mitigation measures while an audit is to be conducted in order to review the environmental monitoring data, assess compliance with regulatory requirements, policies and standards, and identify any remedial works required to redress unacceptable or unanticipated environmental impacts (EPD, 1997).

The Technical Memorandum requires at least three types of environmental monitoring to be conducted. They include baseline monitoring, impact monitoring and compliance. Annex 21 of the Technical Memorandum describes the major components of a full monitoring and auditing programme. These include the preparation of an Environmental Monitoring and Audit Manual. Schedule 4 of the EIA Ordinance addresses matters relevant to follow-up that may be specified in the Environmental Permit.

Box 7.2: Key Requirements under Schedule 4 of the EIA Ordinance for EIA Follow-up

- Programmes or exercises for monitoring the environmental impact of a designated project or the effectiveness of measures to mitigate its environmental impact, whether such impact may occur within or outside its physical boundary or site, and the review and audit of data and information derived from such programmes or exercises, including specification of:
 - The release to the public of reports on monitoring or auditing work or other reports or information in relation to the assessment or carrying out of a designated project.
 - The requirement for carrying out of environmental monitoring by accredited laboratories, or environmental audit by qualified personnel.
 - The requirement for certification by qualified personnel on the status of the implementation of mitigation measures.

(Based on Government of Hong Kong, 1997)

Box 7.3: Requirements in Relation to Environmental Monitoring and Audit Programme

- Parameters or impact to be monitored.
- The frequency of monitoring, or the procedures, practices, methods or equipment to be used for monitoring, including the maintenance and calibration of such equipment.
- The standards or criteria to be used for evaluating and auditing monitoring data.
- Quality assurance and laboratory accreditation procedures.
- Plans and procedures for action in response to the results of such monitoring programmes or exercises, including action to intensify or increase monitoring, inspect or investigate revealed or indicated problems, or take remedial measures to address such problems.
- The nature, format or frequency of the reporting of the results and findings of monitoring or action plans and procedures.
- Organization and interpretation of the environmental monitoring data to determine the change due to the implementation or operation of a project.
- Verification of compliance with regulatory requirements, internal policies and standards, and established environmental quality performance limits.
- Comparison of project impact predictions with actual impacts for the purpose of assessing the accuracy of predictions.
- Assessment of the effectiveness of the environmental management systems, practices and procedures;
- Event and action plans shall be included and linked to the environmental quality performance.
- Determination of the degree and scope of any necessary remedial measures in case of exceedance of compliance, for which environmental monitoring forms the basis.
- Recommendation of environmental controls and operations in the event that the organisation's environmental objectives are not achieved.
- For projects which are assessed to have potential impacts on nearby fish culture zones, the part of EM&A programme to address such impacts shall be approved by Director of Agriculture & Fisheries (DAF).
- Qualified personnel shall carry out the environmental monitoring and audit work.
- Establishment of Environmental Quality Performance Limit.
- Regular reporting on baseline monitoring.
- Documentation of results and findings of each audit and regular reporting on EM&A.

(Based on EPD, 1997)

Screening and Scoping of EIA follow-up in Hong Kong

The screening and scoping of the environmental monitoring and audit requirements are undertaken as an integral part of the EIA process in Hong Kong, and decisions about follow-up requirements are usually made at the EIA Report approval stage (Au & Hui, 2004). The follow-up requirements are identified in the course of the EIA study in the form of an EM&A programme. According to Section 8 of the Technical Memorandum the EPD is responsible for determining the need for and the scope of the environmental monitoring and audit programme (EPD, 1997). Circumstances under which a monitoring and auditing programme is necessary include the following:

- Potential risk to the health or well being of people, the flora, fauna or ecosystem if the recommended mitigation measures are not properly implemented;
- High conservation value of the project area;
- Uncertainty about the effectiveness of mitigation measures;
- New or unproven technology;
- Unproven mitigation measures;
- New or unfamiliar environmental setting;
- Uncertainty about design, assumptions and/or the conclusions; or
- Change of project schedule with a risk of significant environmental impacts (EPD, 1997).

The focus of the follow-up process in Hong Kong is on those issues of importance or valued resources identified during the EIA study (Au & Hui, 2004). Usually, comprehensive environmental monitoring and audit is only required for projects whose scale, complexity and severity of potential environmental damage warrant close attention and tracking during the project's implementation and operation (Sanvicens & Baldwin, 1996). Once the need is determined, the permit holder (i.e. the proponent or contractor) is required to prepare a draft Environmental Monitoring and Audit Manual outlining the follow-up programme in their EIA report. The EM&A Manual determines the scope of the follow-up programme. The scope of environmental monitoring in Hong Kong includes baseline monitoring during EIA study and impact and compliance monitoring during the construction and operation phases.

All 'designated projects' listed in Schedule 2 of the EIA Ordinance require an environmental permit from the EPD prior to their construction and operation. The permit conditions are legally bindings upon the permit holders. Once the EIA report containing the draft EM&A Manual is approved by the EPD, the proponent is issued with an environmental permit that usually requires the proponent to submit a finalized EM&A Manual and to implement the programme included in the Manual. Most Environmental Permits under the EIA ordinance

require the permit holders to engage an Environmental Team (ET) and an Independent Environmental Checker (IEC). The IEC can be replaced if they fail to show performance as required by the EPD.

Box 7.4: Components of EM&A Manual

- ❑ Project background including organisation and programme;
- ❑ Purpose of the manual;
- ❑ An implementation schedule, summarizing all recommended environmental mitigation measures with reference to the programme for their implementation. The measures shall include those identified at detailed design, contract preparation, construction, and operation stages of the project;
- ❑ Drawings showing all environmentally sensitive receivers;
- ❑ An EM&A programme for the construction of the project including: responsibility for EM&A work; EM&A organization and management structure; EM&A methodology; equipment to be used and calibration required; locations, parameters, frequency and duration for baseline, impact and compliance monitoring; environmental quality performance limits (Action and Limit levels); Event-Action plans and decision audit flow charts; procedures for reviewing the monitoring results; compliance audit procedures and follow-up; Implementation programme and impact prediction review procedures;
- ❑ Site inspection, deficiency and action reporting procedures;
- ❑ Complaint/consultation procedures; and
- ❑ Reporting format and procedures.

(Based on EPD, 1997)

Box 7.5: Types of Environmental Monitoring in Hong Kong

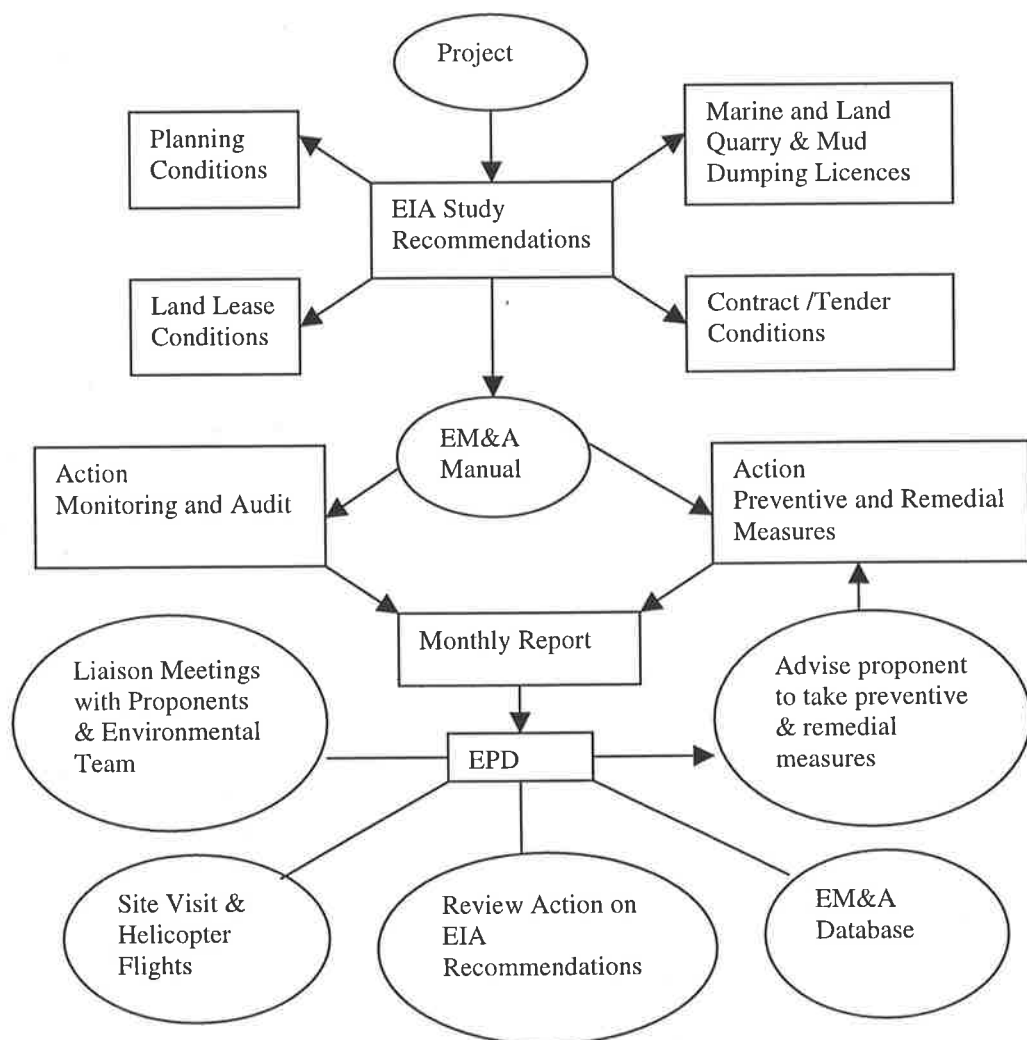
- ❑ **Environmental monitoring** is the systematic collection of environmental data through a series of repetitive measurements. A number of different monitoring activities are identified below:
- ❑ **Baseline Monitoring** refers to the measurement of environmental parameters during a representative pre-project period for the purpose of determining the nature and ranges of natural variation and to establish, where appropriate, the nature of change;
- ❑ **Impact Monitoring** involves the measurement of environmental parameters during project construction and implementation so as to detect changes in these parameters which can be attributed to the project; and
- ❑ **Compliance Monitoring** takes the form of periodic sampling and/or continuous measurement of environmental parameters, levels of waste discharge or process emissions to ensure that regulatory requirements are observed and standards met. (Surveillance and inspection may also form a part of this activity but need not necessarily involve measurement of a repetitive activity).

(Based on EPD, 1997)

In addition to environmental permits, other instruments that are being used to ensure the implementation of environmental monitoring and audit during project operation include planning conditions, land lease conditions, contract and tender conditions, and marine and land based quarrying and mud dumping licences (Sanvicens & Baldwin, 1996). Different management approaches to environmental monitoring and audit exist in Hong Kong (Au &

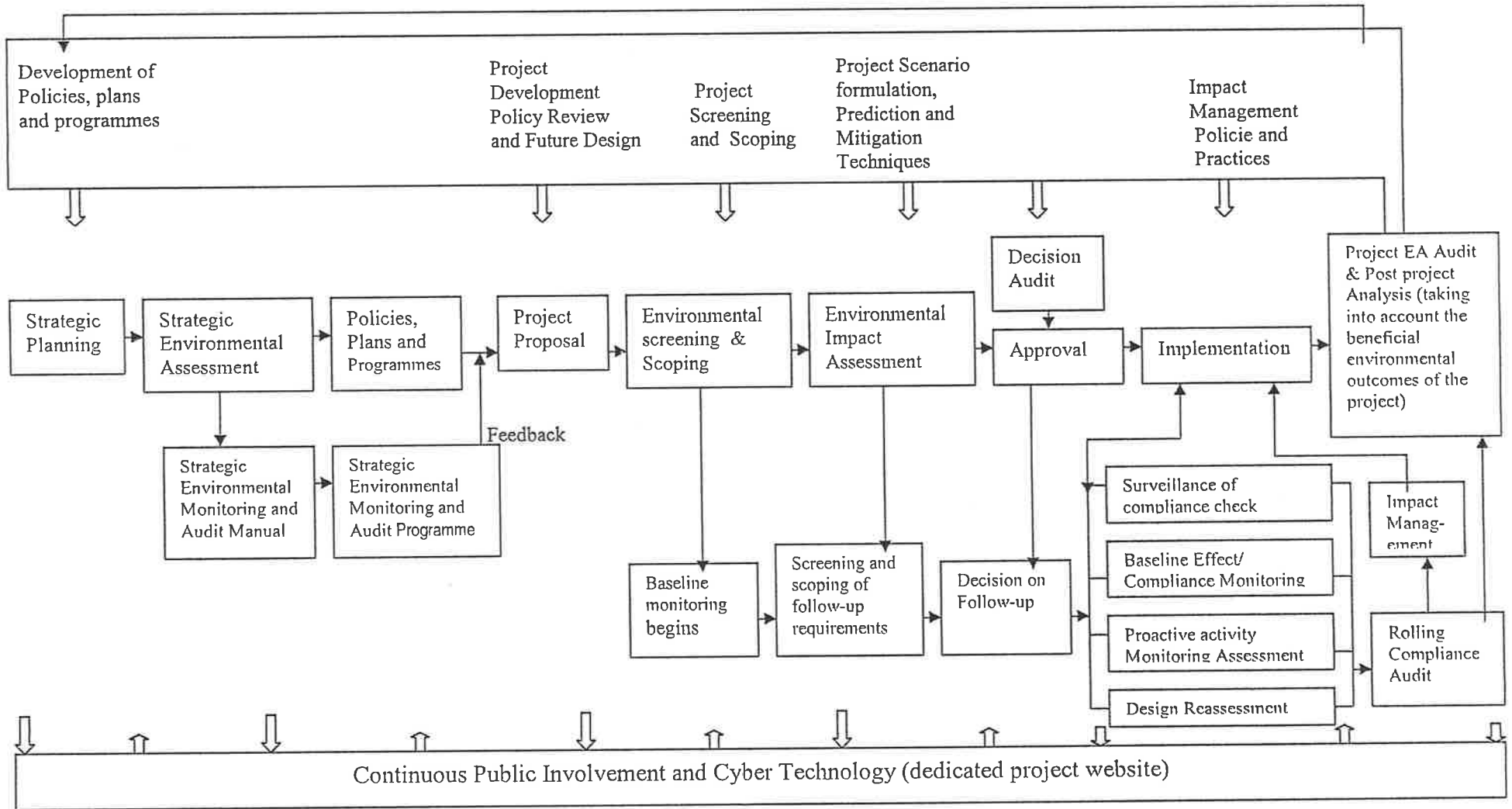
Hui, 2004). Continuous public involvement and use of the Internet in the follow-up process are recent innovations in the EIA process of Hong Kong (Au & Hui, 2004). Since 2002 all permits with EM&A requirements are required to set up a project website containing all project information and EM&A data. The effectiveness of web-based EIA follow-up in Hong Kong in terms of increasing public involvement with the process was reported in Au (2001) and Morrison-Saunders et al. (2001). A two-tiered criteria system of environmental performance limit is adopted in impact monitoring and impact management. If the monitoring results exceed the action level, necessary actions are to be taken before the upper limit (i.e. the limit level) is reached. The monitoring results should not exceed the limit level.

Figure 7.2: Different Instruments Used for Implementing EIA Follow-up in Hong Kong



(Source: Sanvicens & Baldwin, 1996, p. 437)

Figure 7.3: Schematic Model of Hong Kong Follow-up System



(Source: Au & Hui, 2004, p. 209)

Organisational Aspects

In Hong Kong, proponents are responsible for preparing and implementing the EM&A Manual. The EPD is the Key agency for reviewing and approving the EM&A manual, evaluating follow-up results, monitoring compliance, and ensuring enforcement. Sanvicens and Baldwin (1996) note that in Hong Kong the EPD plays proactive and anticipatory role in reviewing and evaluating follow-up functions and it encourages pre-emptive actions to halt and readdress adverse impacts. It actively advises the project proponent in taking preventative and remedial measures. Box 7.6 outlines the major functions of the EPD.

Box 7.6: The Major Functions of the EPD

- ❑ Review of the EM&A Manual
- ❑ Review of the baseline monitoring report for adequacy
- ❑ Review of compliance audit in the monthly report on monitoring
- ❑ Having liaison meetings with the project proponent, project engineer, resident site staff and environmental team
- ❑ Conducting surveillance and compliance checks via site visits and helicopter flights to provide first hand experience and an overview of work practices
- ❑ Review of action taken by the developer to implement the EIA study recommendations in a phased manner
- ❑ Storing in an environmental monitoring and audit data, works programme and method statements, EIA recommendation schedule and trend analyses
- ❑ Responding to complaints and enquiries from the public and officials appointed or elected to advisory, legislative or district bodies
- ❑ Reviewing design assessments during the detailed design stage of a development for compliance with the EIA study; and
- ❑ Preparing quarterly summary reports for consultative committees.

(Based on Sanvicens & Baldwin, 1996)

Different management structures exist in Hong Kong for EIA monitoring and auditing (see Box 7.7). Au and Hui (2004) note that projects undergoing EIA studies as required in the EIA Ordinance usually need an Independent Environment Checker to verify the follow-up results of Environmental Teams, and this approach is the common one in Hong Kong. EIA follow-up is based on formal clear regulations and detailed procedural guidelines, and it is considered as an integral part of the EIA process. Although the system is based on a command and control approach, it allows flexibility to some extent in the implementation process. There is a strong emphasis on transparency, accountability and public engagement. The public disclosure of follow-up results and the use of cyber technology in disseminating information have enhanced efficiency, transparency, accountability and public engagement in the follow-up process. The experience of Hong Kong in EIA follow-up is regarded as learning by doing. 'Continuous public involvement' approach is an example of recent development. Au and Hui (2004) note

that the EM&A process in Hong Kong mainly focuses on compliance issues and transparency and it needs to be strengthened further especially in evaluating the accuracy of EIA predictions and the success of various mitigation measures and EM&A programmes in the construction and operation phases.

Box 7.7: Management Approaches to Environmental Monitoring and Audit in Hong Kong

Project proponent to employ an Environmental Team (ET)

For small projects with minimal environmental effects and public concern, the project proponent can employ an ET. The ET may be from a consultancy or specifically recruited into the resident site staff. If resources of the proponent permit, an external consultancy can be employed to vindicate the work. The proponent reports to the review authority.

Contractor to employ an ET

The contractor undertaking work on behalf of the proponent can employ their own ET. The contractor reports to the Review authority through the proponent.

Project proponent to employ an ET and Independent Environment Checker (IEC)

For medium to large projects those are potentially environmentally sensitive, proponents are required to employ an IEC to verify the ET's work. The IEC may have a role early in the design stage to vet the design submission and design changes in order to ensure that EIA recommendations are properly implemented. The IEC may also have a role in managing public complaints and handling enquiries.

Environmental Project Office (ENPO)

The ENPO is established where multiple developments occur adjacent to each other or within the same area and cumulative impacts are of major concern. The ENPO acts as the IEC for individual projects reporting directly to the proponent of each project.

(Based on Au & Hui, 2004; Sanvicens & Baldwin, 1996).

Appendix 8**Background Information on South Australian Case Study Projects****1. Olympic Dam Expansion Project**

The Olympic Dam Mine is located 580 km by road north-north-west of Adelaide in northern South Australia. Production at Olympic Dam commenced in 1988. In 1996, WMC Limited (WMC) proposed to undertake a two-phase expansion of production at its Olympic Dam operations to increase production from current 85,000t/a copper and associated products (silver, gold and uranium) to 350,000t/a (WMC, 1997). The proposal was subject to a joint assessment by the Federal and State governments. An environmental impact statement (EIS) was required by the Commonwealth Minister for the Environment and South Australian Minister for mines under the provisions of the *Environment Protection (Impact of Proposals) Act 1974* (Cwlth) (EPIP) and the *Development Act 1993* (SA). Planning SA (part of the South Australian Department for Transport, Urban Planning and the Arts) took the lead role in the joint assessment, in full consultation with Environment Australia (part of the Commonwealth Department of the Environment). The proposal was approved by the South Australian Minister for Primary Industries, Natural Resources and Regional Development.

The mining operation of Western Mining Corporation Pty Ltd at Roxby Downs was approved according to an agreement, signed between the South Australian Government, the Minister of Mines and Energy, Roxby Mining Corporation Pty Ltd, BP Australia Limited, BP Petroleum Development Limited and Western Mining Corporation Limited, called the Olympic Dam and Stuart Shelf Indenture (the Indenture), which was ratified by the *Roxby Downs (Indenture Ratification) Act 1982*. The Act was amended by the *Roxby Downs (Indenture Ratification) (Amendment of Indenture) Amendment Act 1996* and *Roxby Downs (Indenture Ratification) (Aboriginal Heritage) Amendment Act 1997*. Section 6 of this Act describes supremacy of the Act over a number of South Australian laws such as the *Development Act 1993*, *Environment Protection Act 1993* and *Mining Act 1971*.

The Indenture includes 57 Clauses and 8 Schedules covering five categories of licence/ lease for the Olympic Dam operations at Roxby Downs including Special Water Licence, Special Mining Lease, Special Exploration Licence, Special Buffer Zone Lease, and Special Tenements. The indenture ensures confidentiality, State assistance and extension of mining period. The responsibilities of enforcement of compliance with the provisions of this indenture and the condition of any special Tenement lies with the State, the Minister and Joint Ventures.

In response to the draft EIS (WMC, 1997), a total of 55 submissions was received. 39 were from the general public and the rest from government agencies. Comments on the EIS relate to impacts of groundwater abstraction on the Great Artesian Basin and mound springs; tailing impacts; radiation exposure and socio-economic impacts particularly in relation to town management (DTUP, 1997). Several submissions express the view that the amendment of the *Roxby Downs (Indenture Ratification) Act 1982* in 1996 by the South Australian Government pre-empted the environmental approval for the project's expansion.

The *Roxby Downs (Indenture Ratification) Act 1982* (Clause 11 of the Indenture) requires the proponent to submit to the Minister a three-year programme with monitoring arrangements at three yearly intervals for the protection, management and rehabilitation of the environment and to ascertain the effectiveness of such programme. The Olympic Dam Operations at Roxby Downs requires an environmental authorisation (licence) under Part 6 of the *Environment Protection Act 1993* for activities of environmental significance described in Schedule 1 of the Act. The EPA licensing conditions relate to monitoring of effluents and emissions, reporting of incidents and formulation of an environmental improvement programme (EPA 1301, 2005). None of the other permits/licences applicable for the Olympic Dam Operations specifically include any monitoring conditions.

2. Beverley Uranium Mine

In 1996, Heathgate Resources Pty Ltd, an Australian affiliate of General Atomics of the USA, proposed to establish an uranium mine at Beverly located on the arid plains between the North Flinders Ranges and Lake Frome, approximately 600 km north of Adelaide and 300 km north-east of Port Augusta. The proposed mining was designed to use *in-situ* leaching (ISL) method and was expected to produce 1000 tonnes of yellowcake per annum for the exporting purpose over a minimum 15-year mine life (Heathgate Resources, 1998). The proposal was subject to a joint assessment by the South Australian and Commonwealth governments. The Commonwealth *Environment Protection (Impact of Proposals) Act 1974* (EPIP) and the South Australian *Development Act 1993* applied to the proposed development. The proponent was required to prepare an environmental impact statement (EIS) by the Commonwealth Minister for the Environment and the South Australian Minister for Mines. Planning SA (of the South Australian Department for Transport, Urban Planning and the Arts) took the lead role in the joint assessment, in consultation with Environment Australia (of the Commonwealth Department for the Environment and Heritage). The proposal was approved

by the South Australian Minister for Primary Industries, Natural Resources and Regional Development in April 1999 under the *Mining Act 1971*.

The adequacy of the assessment and approval procedures for the Beverley mine has been the subject of considerable disagreements amongst stakeholders, and these have generated a significant amount of distrust in the community (The Senate Committee, 2002). In response to the draft EIS (Heathgate Resources, 1998), a total of 1169 submissions was received. 10 submissions came from the Commonwealth and State government agencies. Major issues raised in the public submissions relate to hydrogeology and water use (use of ISL method); radiation effects; transport; fauna and flora; Aboriginal heritage and native title; and environmental monitoring and rehabilitation (Minister for Primary Industries, 1998). Some submissions referred to the general opposition to uranium mining and using nuclear material in the nuclear fuel cycle and in nuclear weapons, and the EIA process itself.

The EIS includes a chapter (Chapter 12) outlining the general environmental policy and principles of the proponent. It also gives an overview of environmental safeguards, monitoring and management plans but it does not include a detailed monitoring programme. The monitoring recommendations of the assessment report relate to flow and pressure at wellheads, process plants functions, leachate contamination of overlying aquifers, impact on biological community, success of rehabilitation, annual reporting and auditing, and disclosure of information (Minister for Primary Industries, 1998).

The major approval obligations of the Beverley Uranium Mine originate from the mining lease conditions under the *Mining Act 1971*, EPA licensing conditions under the *Radiation Protection Act 1982*, planning approval conditions set by the South Australian Government, approval by the Commonwealth Minister for the Environment and Heritage, and approval by the Commonwealth Minister for Industry, Science and Resources. Condition 6 of the First Schedule of Mining Lease (No. 6036) requires the lessee to prepare and submit an Environmental Monitoring and Management Plan (EMMP) to the Minister for his/her approval. The Second Schedule of mining lease further details the requirements for an EMMP. Some of them relate to leachate detection, contamination of overlying aquifers, monitoring impacts on native biological communities, reporting, GAB water usage, environmental monitoring radiation and management of wastes. The EPA (Radiation Protection Branch) license (No. LM4) to mine and mill does not specify any monitoring

conditions. However, it requires the licensee to comply with relevant codes of practice, standards and recommendations.

Box 8.1: Obligations of Heathgate Resources for Environmental Management and Monitoring

- ❑ A hydraulic connection must not exist between the Beverley aquifer and other surrounding groundwater. The proponent should modify the project so that the waste stream is not injected into the Beverley aquifer, or adopt an environmentally acceptable alternative option for managing and disposing of waste stream.
- ❑ The proponent should prepare and implement an EMMP to be approved by the South Australian Government that, with other components, includes an on-going survey programme for monitoring the impact of mining on native biological communities and for measurement of success of rehabilitation.
- ❑ The proponent should participate in, and provide information to, the environmental monitoring committee for the Beverley mine, including the EMMP and annual environment reports.
- ❑ The proponent should make the EMMP and annual environment reports public.

(Based on Minister for Primary Industries, 1998)

3. Glenelg Foreshore and Environs – Holdfast Quays Proposal

The Glenelg Foreshore and Environs – The Holdfast Quays Proposal is a unique and controversial project in South Australia in terms of its approval process and changes in project design. Quinn (2001) demonstrates its complex nature of development and its divergence from the EIA procedures outlined in the relevant legislation, i.e. the *Development Act 1993*. Glenelg is unique in South Australia due to its historic importance, attractiveness, proximity to the beach and urban location. Glenelg Foreshore and Environs has been the subject of development interest by the State government, local council and private developers for many years. The Jubilee Point marina proposal was the first major development proposal that included construction of a private marina, a residential village on reclaimed land from the sea, further housing on reclaimed land within Patawalonga, a tourist hotel across part of Glenelg beach and other facilities such as sailing club, a relocated boat ramp, car parking, a pier and associated commercial and tourist activities (Harvey, 1995). This proposal required an EIS under the *Planning Act 1982*. The government agencies and the public objected to the proposal and ultimately the State Government rejected it in 1984 (Harvey, 1995).

In 1990, a single EIS document was prepared for four proposals with separate sections for each proposal. South Australian Department of Environment and Planning assessed all proposals in 1991. The State government ultimately approved one proposal called Glenelg

Ferry Proposal. However, it did not go ahead since the proponent could not ensure funding sources and it was ultimately abandoned in 1993. In October 1994 the State Government again took an initiative to prepare a Master Plan for the commercial redevelopment of the Glenelg/West Beach areas on the basis of the previous Holdfast Quays Proposal. By this time the *Development Act 1993* came into effect repealing the *Planning Act 1982* with some changes in EIA provisions in South Australia. The EIA documentation under the *Planning Act 1982* was considered relevant but required a series of amendments. The proposal was approved in different stages with a series of amendments and separate assessments at different times between 1996 and 2000. Different agencies were involved with the proposal in different stages as proponents.

The Glenelg Foreshore Development and Environs proposal was ultimately implemented as the Holdfast Quays proposal (amended). It basically includes two components: Glenelg Marine Harbour and Sand Management; and Patawalonga Basin Sea Water Flushing and Stormwater Discharge works (Barcoo Outlet Proposal). This case study mainly focuses on the Barcoo Outlet Proposal. The main benefit of the Barcoo Outlet proposal is the expected return of the Patawalonga Lake to a condition suitable for the safe conduct of water-based recreation on a more predictable, reliable basis, especially during summer. In addition, redirecting the majority of stormwater flows away from the Lake would eliminate a source of pollutants. The main elements of the Barcoo Outlet Proposal are:

- ❑ Construction of a second weir.
- ❑ Construction of a watercourse linking the northern end of the lake and sea.
- ❑ Construction of an approximately 320 metres long buried duct (comprising twin pipes up to three metres in diameter) under the coastal dunes, under the beach and out to the sea.
- ❑ Construction of an offshore outlet (200 metres).
- ❑ Patawalonga lake sea water circulation using the existing flood gates and new ducts (Minister for Government Enterprises, 1999).

In response to the Third Amendment to the EIS (Minister for Government Enterprises, 1999) on the Development Proposal for the Glenelg Foreshore and Environs Barcoo Outlet Proposal, a total of 21 submissions was received, including 10 submissions from the Government agencies, 5 from Local Governments and 6 from the public. The key issues raised in submissions included ecological sustainability, cost-benefit analysis, water pollution, impact on the marine environment, biological impacts, social impacts etc (Minister for TUP, 2000). The Fourth Amendment to the Assessment Report (Minister for TUP, 2000) notes that

the final responsibility of long-term ownership and management of all components associated with the Barcoo Outlet proposal and the Patawalonga Lake, including the maintenance and monitoring matters lies with the Minister for Environment and Heritage according to a Cabinet decision. However, it does not nominate any agency. The EPA was expected to be nominated as the agency responsible for coordinating environmental monitoring matters. A complete revision of the catchment plans for the Patawalonga Catchment Water Management Board (PCWMB) and the Torrens Catchment Water Management Board (TCWMB) was suggested in the Assessment Report (fourth amendment) in order to determine the overall monitoring responsibility of the Gulf St Vincent. Long term responsibility for managing the Patawalonga Lake and the lock/barrage structure flood control gates was expected to be vested upon a private organisation.

4. Wallaroo Marina

Adelford Pty Ltd, a private development company, came up with the proposal to develop a marina at Wallaroo in 1990. An EIS was required to be prepared by the proponent in July 1990. The proponent submitted a draft EIS (Eco Management Consultants Pty Ltd, 1990) prepared by Eco Management Consultants Pty Ltd in the same year. The EIS was given an official recognition on 9 April 1991 and the development approval was given on 12 August 1991 (Minister for TUP, 1998a). However, the proposal did not go ahead at that time.

In July 1998, the proponent again submitted an application seeking new development approval for a modified proposal to construct a 150-berth marina with associated facilities and 275 water front residential allotments. An amended EIS was submitted with this application for consideration by the then Minister for Transport and Urban Planning. The Minister for transport and Urban Planning determined that the proposed changes require a further technical investigation but they do not significantly affect the overall outcomes of the original EIS. Therefore, the amended EIS was not made publicly available. However, liaison with relevant government agencies was undertaken and referred to relevant government agencies for their comments. Submissions from 9 agencies were received (2 after the due date). The key issues raised in submissions include the maintenance of suitable water quality in waterways, the control of pollution sources (esp. the management of stormwater) and management responsibilities (maintenance and monitoring) responsibilities, protection of the marine environment and adjoining Coastal Reserve, coastal erosion and flood protection (including

sea-level rise), the maintenance of local beach amenity and the provision of suitable infrastructure and public access (Minister for TUP, 1999a).

The amended EIS (Gupta Environment and Planning Consultants, 1998) does not include a separate chapter on environmental management and monitoring. However, it indicates that the proponent has established a programme approved by EPA for monitoring all discharges of water into the sea during the construction of breakwaters, entrance channel and waterways. The Second Amendment to the Assessment Report (Minister for TUP, 1999a) recognizes monitoring requirements under three main categories and outlines the ideal components. The Assessment Report (second amendment) indicated that some of the monitoring aspects would be covered by the EPA licensing and South Australian Health Commission requirements during the construction and operation phases. It also indicated that the local Council would be responsible for monitoring in the long term and would need to monitor the effects of land-based disposal for stormwater run-off, (i.e. on areas comprising Council land). An agreement between the proponent and Council would be required for the allocation of financial, management maintenance and monitoring responsibilities during the construction, transition (or hand-over) period and operational phases. Finally, the Second Amendment to the Assessment Report recommended that the proponent should establish suitable monitoring programmes in consultation with relevant agencies in order to maintain suitable water quality standards and navigability within the marina basin. This would ensure that the impacts on the adjacent coastal vegetation and marine environment are minimised (Minister for TUP, 1999a). According to the development authorisation given in March 1999 the proponent must prepare and implement a monitoring programme as recommended in the amended Assessment Report to the satisfaction of the EPA and the Development Assessment Commission.

5. Tumby Bay Marina

In 1987, the District Council of Tumby Bay proposed to construct a 40-berth marina facility and residential development immediately south of the township of Tumby Bay. An EIS was required by the Minister for Environment and Planning on 4 March 1987 under the *Planning Act 1982*. Lange, Dames and Campbell Pty Ltd prepared the draft EIS (Lange, 1990) on behalf of the proponent in 1990 according to the guidelines issued by the Department of Environment and Planning. The EIS was approved in September 1991 but the proponent did

not seek the development approval at that time being unable to find suitable investors (Minister for TUP, 1998b).

The District Council of Tumby Bay (the proponent) again submitted a draft review of the EIS with a modified proposal to build a 100-berth marina with associated facilities and 55 residential allotments to the Department of Housing and Urban Development (formerly Department of Environment and Planning) for consideration on 10 September 1997. As the *Development Act 1993* came into effect in South Australia in January 1994, this modified proposal required an amended EIS and a further assessment under the provisions of the Development Act 1993. The amended EIS (District Council of Tumby Bay, 1998) was placed on public exhibition again for three weeks (9 –17 March 1998) during that time it received 15 submissions (six public and nine from the government). The amendment to the Assessment Report (Minister for TUP, 1998b) prepared by the Department for Transport Urban Planning and Arts was released in August 1998. The Development Assessment Commission approved the proposal on behalf of the Governor in 25 May 2000 subject to conditions.

The public submissions on the amended proposal expressed concerns similar to those of the original proposal. However, the public submissions on the amended proposal showed a greater level of awareness and concern for the protection of environmental values, particularly the retention of mangrove swamps on-site and minimising impacts on the coastal estuary to the south. Two public submissions pointed out environmental monitoring requirements, specifically monitoring of impacts of the development on the shorebird communities, and implementation of monitoring commitments as specified in the original EIS. Over all, the public submissions to the amended EIS included the following main issues:

- Adequacy of channel/ basin water depths;
- Maintenance of suitable water quality;
- Preservation of mangrove communities;
- Management of impacts on the coastal dunes;
- Maintenance of natural tidal flows to the estuary to the south
- Control of pollutants and litter;
- Protection against sea-level rise;
- Impact on local residents from adjoining slip-way/boat repair yard activities;
- Minor loss of public access;
- Suitable provision of infrastructure to service the development;
- Financial cost to the community; and
- Management/maintenance arrangements (Minister for TUP, 1998b).

In the amended EIS (District Council of Tumby Bay, 1998), the proponent makes a commitment to prepare an independent monitoring programme with base line studies in consultation with relevant government agencies in order to manage impacts associated with the development. The amended Assessment Report outlines the monitoring requirements in three categories: construction stage; operational stage; and offsite impacts (Minister for TUP, 1998b). The amended Assessment Report recommends that the Council should establish suitable monitoring programmes for the proposal, in consultation with relevant agencies, in order to maintain suitable water quality standards and navigability within the marina basin and to ensure that the impacts on the adjacent coastal dune system, coastal estuary and marine environment are minimised (Minister for TUP, 1998b). The development authorisation requires the proponent to prepare monitoring programmes for the construction and operation stages to the satisfaction of EPA and to implement them. Tumby Bay Marina is not required to maintain an EPA license since it has less than 50 berthing facilities at present.

6. Port Vincent Marina

In 1990, Paradise Development Pty Ltd came up with a proposal to develop a 70-berth marina with associated facilities and residential complex at Port Vincent on the Yorke Peninsula. An EIS was required by the then Minister of Environment and Planning under the provisions of the *Planning Act 1982*. A draft EIS (Paradise Development Pty Ltd, 1991) was prepared by the proponent with the help of R M Heriot and Associates Pty Ltd and Eco Management Services in December 1991. The EIS was given formal recognition on 25 March 1993 (Paradise Development Pty Ltd, 1998). The proponent did not submit an application for planning approval at that time.

In 1998, the proponent again lodged an application to Planning SA (Department of Transport, Urban Planning and the Arts) seeking consent for the proposed development. As the EIS was more than 5 years old, it was required to be reviewed (or amended) under the provisions of Section 47(1)(d) of the *Development Act 1993*. The proponent submitted a Review of the EIS for Port Vincent Marina to Planning SA on 6 November 1998. The review document (Paradise Development Pty Ltd, 1998) was considered as an amendment to the EIS and it was not released for public comment. However, comments informally received from the State Government Agencies (Environment Protection Authority and Native Vegetation Council), District Council of Yorke Peninsula (Council), the Port Vincent Tidy Towns Committee and Port Vincent Progress Association and other relevant information were taken into account in

preparing the Assessment Report (Minister for TUP, 1999b). The Governor finally approved the proposal subject to conditions in December 1999.

The informal comments on the proposal from the government agencies included issues relating to stormwater erosion and drainage management, water quality, onshore effluent disposal, dredging of sand and dead seagrass accumulation, biological impacts, wastewater disposal system, clearance of native vegetation (Minister for TUP, 1999b). The requirement of water quality monitoring was specified in the EPA comments. The amended EIS notes that the responsibility of the ongoing management and maintenance of all public facilities (eg. boat ramp, public roads, reserve land, public toilets, public car park, recreation beach, breakwaters and channel) lies with the local Council. However, the proponent makes a commitment for the maintenance of the marina (specifically for breakwaters, sand siltation and the removal of seagrasses) for five years. The proponent makes specific monitoring commitments in the amended EIS relating to waste material and effluent disposal, Aboriginal heritage items, noise and air quality during the construction phase (Paradise Development Pty Ltd., 1998).

The amended Assessment Report outlines the monitoring requirements in three categories: construction stage; operational stage; and offsite impacts (Minister for TUP, 1999b). The Assessment Report indicates that some of the monitoring aspects would be covered by the EPA licensing and South Australian Health Commission requirements during the construction and operation phases. The Amended Assessment Report recommends that the proponent should establish suitable monitoring programmes in consultation with relevant agencies in order to maintain suitable water quality standards and navigability within the marina basin and to ensure that the impacts on the adjacent coastal vegetation and marine environment are minimised (Minister for TUP, 1999b). The development authorisation requires that a suitable monitoring programme be prepared and implemented as outlined in the amended Assessment Report.

Appendix 9**Background Information on Western Australian Case Study Projects****1. Lake Lefroy Gold Mine**

In 1998, WMC Resources Ltd. (St Ives Gold) proposed to develop a series of gold mining pits, associated waste rock dumps, access infrastructure and mining support facilities on Lake Lefroy, a naturally occurring salt lake approximately 7km southeast of Kambalda. Approximately 21 million tonnes (Mt) of ore and 414 Mt of overburden will be mined during the life of the project (10 years). A number of sites for open-cut gold mine developments have been identified in the project area. The proposed mining developments require dewatering operations, access to causeways and other infrastructure. The proponent has been mining at Lake Lefroy since 1981. The gold operations comprise:

- Exploration of lake-based deposits;
- Lake-based mining operations comprising two active mines and four inactive mines;
- Land-based mining operations comprising four active mines and six inactive mines;
- Gold treatment plant; and administration and other supporting infrastructure (Dames & Moore, 1999).

The EPA has decided to make a strategic assessment of the proposed development at the level of public environment review (PER). The PER document (Dames & Moore, 1999) was published on September 1999 and a total of 4 submissions was received. Submissions were made by the Department of Conservation and Land Management (CALM), Water and Rivers Commission (WRC), Aboriginal Affairs Department (ADD) and Conservation Council of Western Australia. The major environmental issues raised concern the conservation value of Lake Lefroy, rehabilitation of landform and lake hydrology, landform considerations, groundwater and surface water contamination, impact on aquatic flora, impact on terrestrial flora and fauna, and Aboriginal culture and heritage. The EPA assessed the impacts related to nature conservation value, vegetation communities, declared rare and priority flora, aquatic flora, terrestrial fauna, aquatic invertebrates, specially protected fauna, ecological and hydrological process of Lake Lefroy, land form, rehabilitation, particulates/dust, greenhouse gases, groundwater quality, surface water quality, public health and safety, road transportation, recreation, Aboriginal culture and heritage (EPA, 2000a). The Assessment Report (EPA Bulletin No. 976) was released in May 2000. The Minister approved the proposal in July 2000 and the Ministerial Conditions (548) were published on 13 July 2000. Other regulatory mechanisms apply to the proposal under the provisions of the *Mines Safety and Inspection Act 1974*, *Rights in Water and Irrigation Act 1914*, *Wildlife Conservation Act*

1945, the *Environmental Protection Act 1986* (Part V) and *Aboriginal Heritage Act 1972-1980*.

The PER document (Dames & Moore, 1999) notes that there is already an environmental management system put in place by the proponent and it is being reviewed and evaluated periodically. The Environmental Management System for the Gold Mine Developments on Lake Lefroy has been developed so that it complies with ISO 14001 EMS and the Australian Minerals Industry Code for Environmental Management (Dames & Moore, 1999). Furthermore, the proponent makes a commitment to implement an Annual Environmental Management Plan (AEMP) and to review the environmental performance of the project, and its compliance with the Ministerial conditions of approval and environmental management commitments made for this project on an annual basis. The proponent makes a number of specific commitments for environmental management and monitoring in the PER document. The PER document includes an appendix (J) that outlines detailed environmental procedures to be undertaken at St Ives Gold Mine. The proponent has presented its EMS and environmental procedures in the PER to provide the EPA and the public with detailed information. The environmental conditions recommended by the EPA include some environmental management and monitoring requirements. The Ministerial conditions impose the same conditions as recommended by the EPA.

Table 9.1: Proponent's Obligations for Environmental Management and Monitoring in Lake Lefroy Gold Mine

Proponent's commitments	Ministerial conditions
<ul style="list-style-type: none"> ❑ Conduct further hydrological investigations to determine the dewatering requirements of the proposed pits within the project area. ❑ Groundwater monitoring and reporting. ❑ Surface water monitoring and reporting. ❑ Photographic monitoring of discharge point. ❑ Vertebrate fauna monitoring. ❑ Rehabilitation monitoring 	<ul style="list-style-type: none"> ❑ The proponent should prepare an Environmental Management Plan prior to the commencement of mining activities in consultation with relevant agencies. ❑ The proponent should revise/update the EMP on an annual basis or as new pits are developed. ❑ The EMP, in addition to other components, should include a monitoring programme to determine progress in achieving the rehabilitation objective. ❑ The proponent should prepare an audit programme in consultation with DEP and submit periodic compliance reports.

(Based on EPA, 2000a).

2. Jangardup Mineral Sand Project

The Jangardup heavy minerals mine is located on the Scott Coastal Plain within the Shire of Nannup approximately 47 kilometres south of Nannup and 7km from the coast. The original project was approved to mine 2,1000,000 tonnes of orebody over 99 months and process a maximum of 410, 000 tonnes of orebody per year (EPA, 1999). The proposed mine extension was for one month to mine 20,000 tonnes of orebody. The proposal for a heavy mineral mines at Jangardup brought about by Cable Sands was previously assessed (No. 116) by the Environmental Protection Authority (EPA, 1990) at the level of Environmental Review and Management Programme (ERMP). The Minister for the Environment approved the project in July 1990 subject to conditions. In 1997, the proponent requested changes to the existing Ministerial Conditions for Jangardup. EPA assessed (No.1041) the proposed changes and published an Environmental Statement No. 455 in July 1997. In 1998, the proponent again came up with a proposal to extend their current mining operation into the adjacent class 'C' Reserve. The review document (Cable Sands, 1998) was placed on public review for four weeks in December 1998. A total of 6 submissions was received from the State/Local Government agencies (4), non-government organisation (1) and an individual (1). The major issues raised in the public submissions relate to clearance of native vegetation, impact on declared rare and priority flora, rehabilitation, and surface and ground water quality.

The environmental factors identified by EPA included vegetation communities, declared rare and priority flora, fauna, specially protected and priority fauna, surface water quality, landform, rehabilitation, particulates/dust, noise, greenhouse gases, groundwater quality, surface water quality, and Aboriginal culture and heritage, aesthetic values and recreation values. On completion of the assessment (No.1206) under Section 46 of the Environment Protection Act 1986 the Environmental Statement No. 932 (EPA, 1999) was published by the EPA in April 1999. The Minister approved the proposal subject to conditions in June 1999 and the Ministerial conditions (508) were published on 04 June 1999.

The major environmental issues identified in the Initial ERMP were: 1) rehabilitation of the land to restore the landscape, vegetation, flora and fauna, and to prevent the further spread of dieback fungus; 2) the impact on local communities of increased trucking; 3) the impact on local water regimes; 4) possible impacts on the adjacent D'Entrecasteaux National Park; and 5) the impact on local employment and services (W.G. Martinick & Associates, 1989). The review document notes that no environmental issues are significantly different from those

addressed in the initial assessment of Jangardup operation and incremental effects are minimal. Neither the ERMP nor the Review Document included a separate chapter on Environmental Management and Monitoring. However, the proponent makes commitments for environmental management and monitoring in the ERMP and review documents. The environmental conditions set by the Minister in relation to monitoring and environmental management are similar to those recommended by the EPA.

Table 9.2: Proponent's Obligations for Environmental Management and Monitoring in Jangardup Heavy Minerals Mine

Proponent's commitments	Ministerial conditions
<ul style="list-style-type: none"> ❑ Prepare and implement a groundwater management strategy and a programme to monitor vegetation, groundwater levels and groundwater quality. ❑ Take ameliorative actions in response to the monitoring data indicating any unacceptable/ harmful changes and reporting to the appropriate authority immediately. ❑ Implement a rehabilitation monitoring and maintenance programme and reporting annually to the relevant agencies. ❑ Monitoring surface water flow and taking appropriate actions in consultation with relevant agencies in response to the monitoring data indicating any unacceptable/ harmful changes. ❑ Prepare and implement a Mining Restoration Plan in relation to clearing restriction, dieback management, vegetation reestablishment, weed management, completion criteria and monitoring of rehabilitation success. ❑ Prepare and implement a 'potential acid sulphate soils (PASS) management plan. 	<ul style="list-style-type: none"> ❑ Prepare and implement a groundwater and vegetation management strategy. ❑ Report adverse effect on groundwater levels and quality and vegetation and proposed remedial action. ❑ Prepare and implement a dieback hygiene programme. ❑ Prepare and implement rehabilitation plans for State Forest and Private Lands. ❑ Review the rehabilitation plans annually. ❑ Perform annual audits on the rehabilitated areas. ❑ Prepare a decommissioning and rehabilitation plan. ❑ Prepare an Audit programme in consultation with DEP and report annually for performance and compliance. ❑ Implement the consolidated environmental management commitments.

(Based on EPA, 1999).

The proponent required a Work Approval License for the project under the provisions of Part V of the *Environmental Protection Act 1986*. Other regulatory instruments included a mining lease under the *Mining Act 1978* and Water Licence under the *Rights in Water and Irrigation Act 1914*. The Mining lease conditions do not specifically require any environmental

monitoring. However, they do require the proponent to take measures for protecting the environment and creating the minimum practicable disturbance to the existing vegetation and natural landform. The proponent is also required to submit an annual report to the Department of Industries and Resources (DOIR) outlining the project operations, minesite environmental management and rehabilitation work undertaken in the previous 12 months and the proposed operations, environmental management plans and rehab programmes for the next year. The WRC licensing (56054) conditions required monitoring of aquifer performance and submission of an annual report by a groundwater professional. The DEP licence (6662/6) issued in favour of Jangardup Mine required Cable Sands to monitor dust and water quality and to submit an Annual Environmental Report.

3. Ludlow Titanium Minerals Mine

In 1987, Cable Sands (WA) Pty Ltd (CSWA) submitted a proposal for mining within Mining Lease 70/80, which is outside the Tuart National Park but within the State Forest No. 2 near Ludlow. The EPA decided to formally assess the proposal at the level of Environmental Review and Management Programme (ERMP). It did not proceed, however, and eventually it was deactivated in 1989. In 2001, a new proposal was put forward by the CSWA to develop a titanium minerals mine on Mining Lease 70/80.

The key aspects of the proposal include: disturbance of 147 ha of State Forest No. 2 (including the loss of 1700 Tuart trees, approximately 55% of Tuart trees on the mining lease) and mining of 7 million tonnes of ores to produce 800,000 tonnes of heavy mineral concentrate (Cable Sands, 2002). The mining method involves dry mining (using conventional earth moving equipment) and progressive backfilling of mine pit. The proposed duration of mining was for four years and the proponent proposed to rehabilitate the entire mining lease (mined and unmined areas) into a Tuart Forest ecosystem so that the rehabilitated area can be included within the Tuart Forest National Park in future (Cable Sands, 2002). The EPA again set the level of assessment at an ERMP for three main reasons: firstly, the potential impact of mining on the Ludlow Tuart Forest; secondly, serious concern for the Tuart conservation; and thirdly, a high level of public interest in the proposal (EPA, 2003a).

The ERMP document (Cable Sands, 2002) was released in January 2002 for an eight weeks public review period. A total of 81 submissions was received from the government and local

government agencies (9), non-government organisations (14) and individuals (54). Issues that were raised in the public submissions specifically relate to the following:

- ❑ Clearing/destruction of large numbers of Tuart trees;
- ❑ Tuart Forest management;
- ❑ Conservation value of Tuart Forest;
- ❑ Tuart Forest National Park;
- ❑ Impact of fungal community, Vasse-Wonnerup wetlands and McCarleys Swamp;
- ❑ Impact on the endangered Carnaby's Black Cockatoo;
- ❑ Loss of habitat and impact on fauna;
- ❑ Impact of light and noise on nocturnal animals;
- ❑ Impact on subterranean fauna;
- ❑ Flocculant overflow from settling ponds and surface water quality;
- ❑ Pumping of large amount of groundwater and drop in the watertable within the surrounding forest area;
- ❑ Contamination of nearby wetland by radioactive monazite;
- ❑ Public health and safety;
- ❑ Aboriginal and cultural heritage;
- ❑ European heritage; and
- ❑ Visual amenity (EPA, 2003a).

The key environmental factors identified by the EPA include flora and vegetation, fauna, subterranean fauna, surface water, and groundwater, dust, radiation, solid waste, noise, social community consultation, Aboriginal culture and heritage, European heritage, public health and safety, visual amenity, Tuart conservation, Tuart Forest National Park, environmental offsets, decommissioning and rehabilitation (EPA, 2003a). The potential for long-term impacts on the conservation value of the area has been the most important consideration for the EPA in assessing this proposal (EPA, 2003a). The EPA completed its assessment (No. 1385) in 2003 and published the Assessment Report (Bulletin 1098) in May 2003. The Minister for the Environment approved the Cable Sands proposal in November 2003 (Ministerial Statement 639), after imposing some additional conditions over and above those recommended by the EPA.

Overall, issues discussed in the ERMP relate to biodiversity and conservation, vegetation and flora, fauna, rehabilitation, wetland, groundwater (level and quality), surface water (water courses and quality), Aboriginal and European heritage, greenhouse gases, recreational uses/public amenity, minesite noise, dust and other particulates, radiation, transport and visual amenity (Cable Sands 2002). The ERMP includes two separate chapters on 'environmental risk management' and 'management of potential impacts' but it does not include a detailed monitoring programme. The ERMP (Cable Sands, 2002) notes that there is already a

voluntary EMS (ISO 14001 accredited) in place. In addition, the proponent makes specific commitments in relation to environmental management and monitoring.

Table 9.3: Proponent's Obligations for Environmental Management and Monitoring in Ludlow Titanium Mine

Proponent's commitments	Ministerial conditions
<ul style="list-style-type: none"> ❑ Prepare and implement an environmental management and monitoring programme (EMMP) addressing the specific issues such as vegetation and flora, fauna, groundwater and surface water, greenhouse gas, noise, dust and particulates, and radiation. ❑ Prepare and implement a Fauna Management Plan (FMP) with a monitoring component. ❑ Prepare and implement a Mining and Rehabilitation Management Plan (MRMP) with a component of rehabilitation monitoring. ❑ Prepare and implement a Water Resources Management Plan (WRMP) with a monitoring component. ❑ Prepare and implement a Noise Management Plan (NMP) with a monitoring component. ❑ Financial support to CALM to develop a Management Plan for the Tuart Forest National Park. ❑ Sampling of site groundwater piezometers for the occurrence of subterranean fauna. ❑ Consultation with Ludlow Working Party during mining and rehabilitation stages and involve them in the preparation of management plans. ❑ Annual reporting on environmental performance. 	<ul style="list-style-type: none"> ❑ The proponent should prepare an audit programme in consultation with DEP and submit reports for the implementation of proposal, compliance with the conditions and commitments, and performance of the environmental management plans and programmes. ❑ The proponent should prepare and implement a Soil Profile Reconstruction Plan with a monitoring component and a review mechanism. ❑ The proponent should prepare and implement a Tuart Preservation Plan with a monitoring component and a review mechanism. ❑ The proponent should prepare and implement a Mining and Rehabilitation Management Plan with a monitoring component and a review mechanism.

(Based on EPA, 2003a).

The other regulatory instruments that apply to Ludlow Mine include: A Work Approval License for the project under the provisions of Part V of the *Environmental Protection Act 1986*; groundwater abstraction license under the *Rights in Water and Irrigation Act 1914*; and mining lease under the *Mining Act 1978*. The groundwater abstraction license does not include any condition relating to environmental monitoring and auditing except annual reporting of monitoring results. DoE license (Work Approval License) sets conditions for dust management, water quality monitoring, noise monitoring, and annual reporting of monitoring data along with other requirements. The Mining Lease does not include any condition specifically relating to environmental monitoring and auditing. However, it sets some

conditions that broadly cover the environmental management and environmental performance of the mine. Some other conditions relate to dust management, rehabilitation, waste management, water quality and landform.

4. Tutunup Titanium Minerals Mine

In 2000, Cable Sands (WA) Pty Ltd (CSWA) proposed to develop a titanium mine at Tutunup, approximately 20 km east of Busselton. The main components of the proposal include the following:

- Disturbance of 120 hectares of mainly cleared agricultural land.
- Construction of water and fines dams, and topsoil, tails and overburden stockpiles.
- Dewatering and mining, using dry mining techniques at up to two million tonnes per annum.
- Abstraction of groundwater from the Yarragadee aquifer for process use.
- Haulage of Heavy Minerals Concentrate (HMC) in road-trains to the proponent's North Shore facility and widening a road to be used for transportation (EPA, 2003b).

The Commonwealth Minister for the Environment and Heritage considered the proposal a 'controlled action' under section 75 of the *Environment Protection and Biodiversity Act 1999* due to the proposal's potential to impact on threatened species and communities. Environment Australia accredited the Western Australian assessment of proposal under Section 87(1)(1) of the EPBC Act. The proposal was referred to the Western Australian Environmental Protection Authority (EPA) in November 2000. The EPA decided to assess the proposal at the level of public environment review (PER). The PER document (Cable Sands, 2001) was released for an eight week public review period, ending on 11 February 2002. 13 submissions were received during the public review period and these were made by government agencies (7), other organisations (3) and individuals (3). Issues raised in submissions mainly relate to the following.

- Risk to the adjacent Busselton Wet Ironstone Threatened Ecological Community and Declared rare Flora through draw down of groundwater.
- Other risks to restricted flora.
- Operation of the Artificial Recharge System.
- Management of transport of heavy mineral concentrate (HMC) from the site.
- Management of surface water flows and discharge water.
- Landform restoration and rehabilitation objectives.
- Management of dust and noise.
- Heritage and consultation (EPA, 2003b).

Overall, the relevant environmental factors, as identified by the EPA, include vegetation community, Declared Rare Fauna, priority flora and other flora of particular conservation significance, native terrestrial fauna, specially protected fauna, water courses, groundwater

quality, mine planning, decommissioning, rehabilitation and landform, particulates/ dust, noise from mine site and road transport, groundwater quality, surface water quality, solid waste, and Aboriginal culture and heritage, Register of the National Estate, public health and safety in relation to radiation and transport, and visual amenity (EPA, 2003b). 'Vegetation (threatened ecological community)' and 'Declared Rare and Priority Flora' were considered most significant factors associated with the proposed development. EPA completed its assessment (No. 1384) in 2002 and published the Assessment Report (Bulletin 1095) in December 2003. The Minister approved the proposal in March 2003. Ministerial Statements (621) was published on 17 March 2003 and site development commenced in April 2003.

The PER (Cable Sands, 2001) document notes that Cable Sands has satisfactorily managed similar issues in the past in relation to another similar mine site. The PER document also notes that Cable Sands has an Environmental Management System (EMS) certified to ISO 14001 standards. Continued implementation of Cable Sand's EMS would ensure its mining operation in an environmentally responsible manner. The PER document includes a draft groundwater management plan and operating strategy and a draft noise management plan. However, it does not outline any monitoring programme. The proponent makes a number of commitments in the PER in relation to environmental management and monitoring. The proponent's commitments relate to: preparation and implementation of an EMMP and a number of management plans with monitoring protocols. The environmental conditions established by the Minister in relation to monitoring and environmental management are similar to those recommended by the EPA.

The other regulatory instruments relevant to the proposal are:

- Environmental approval from the Commonwealth agency (Environment Australia) under the provisions of the EPBC Act;
- Clearance from CALM under the provisions of the *Wildlife Conservation Act 1950* for taking one of DRF plant;
- Work Approvals and Licensing of the project from the DEP under Part V of the *Environmental Protection Act 1986*;
- Approvals from DOIR under the provisions of the *Mining Act 1978*; and
- Licensing from the WRC under the *Rights in Water and Irrigation Act 1914*.

In addition to the Ministerial Conditions, Tutunup Mine must comply with the requirements of the above-mentioned regulatory instruments and the local council. The local Council imposes a number of conditions with respect to haulage. Some of the conditions relate to the speed limit of the road, noise limit, dust generation, surface water management, stormwater

management, rehabilitation of mine site, mine safety and protection of water quality. A number of the conditions set by the DoE license relate to dust monitoring, discharge limit, noise monitoring, solid waste management, stormwater management, water quality monitoring, and chemical waste management. The Commonwealth approval under the EPBC Act sets a number of conditions relating to GWMP, VMMP, the audit programme, and the compliance report. The license for groundwater abstraction sets a number of conditions relating to implementation of GWMP and groundwater monitoring, and annual water abstraction limit. The Mining Lease does not include any conditions specifically relating to environmental monitoring. However, it sets a number of conditions that broadly cover the environmental management and pollution control aspects. A number of conditions specifically concern dust management, rehabilitation, solid waste management, fines management, stormwater management, annual reporting, water quality and decommissioning. Most of the conditions of these legal instruments are broad and are of generic types, wherein non-compliance is difficult to prove.

Table 9.4: Proponent's Obligations for Environmental Management and Monitoring in Tutunup Titanium Mine

Proponent's commitment	Ministerial conditions
<ul style="list-style-type: none"> ❑ Develop an Environmental Management and Monitoring Plan (EMMP) addressing groundwater, vegetation, rehabilitation, dust, noise, and radiation. ❑ Development of a Groundwater Management Plan and Operating Strategy. ❑ Yarragadee abstraction and monitoring. ❑ Monitoring of superficial groundwater in the vicinity of the Busselton Wet Ironstone Threatened Ecological Community (TEC). ❑ Monitoring of groundwater levels in other areas surrounding the mining areas. ❑ Continued monitoring of superficial groundwater levels in the area around the Busselton Wet Ironstone TEC. ❑ Development and implementation of a Vegetation Monitoring and Management Programme. ❑ Monitoring and assessing the health of the TEC and associated rare flora. ❑ Develop and implement a noise management plan with monitoring and reporting protocols. ❑ Develop and implement a radiation management plan. 	<ul style="list-style-type: none"> ❑ The proponent should prepare an audit programme in consultation with DEP and submit reports for the implementation of proposal, compliance with the conditions and commitments, and performance of the environmental management plans and programmes. ❑ The proponent should submit a performance review report every five years. ❑ The proponent should prepare a Final Decommissioning and Closure Plan prior to the closure of its operation, in consultation with the EPA.

(Based on EPA, 2003b)

5. Industrial Infrastructure and Harbour Development, Jervoise Bay

In February 1997, the Department of Commerce and Trade (DCT) referred a proposal to the EPA to develop an industrial estate and a harbour immediately south of the existing marine shiplift facility at Jervoise Bay. The proposal involved:

- Reclamation of waterfront land for construction of berths, wharves and onshore fabrication areas including associated servicing;
- Construction of two major breakwaters to provide wave and swell protection;
- Dredging of an approach channel and harbour basin;
- Clearing and excavation of land either side of Cockburn Road to provide for development of support industry inclusive of associated services; and
- Realignment of Cockburn Road (Halpern Glick Maunsell, 1997).

The level of assessment was determined at Public Environment Review (PER). The PER document (Halpern Glick Maunsell, 1997) was released in December 1997 for public review for a period of eight weeks. A total of 81 submissions was received from the government/local government and non-government agencies (32) and individuals (49). In addition, 43 form letters were received. The significant environmental issues raised in submissions relate to: marine waters (changes to water circulation, quality and sediments); marine flora and fauna (loss of seagrass and habitat); coastal processes (changes to nearshore processes and sediment regime); System Six area M91 and M92 (loss of 10.5 ha of northern portion of M91, and impact on terrestrial flora and fauna); realignment of Cockburn Road (impact on wetlands, drainage); impact of noise and dust, impact on sites of cultural significance; and recreation, public health and safety (EPA, 1998). The key environmental factors relevant to the proposal, as identified by EPA, include marine flora, marine fauna, shore line, sea bed, landform, vegetation communities, terrestrial fauna, wetlands, marine water quality, noise and vibration, particulates/dust, light overspill, soil contamination, and heritage – indigenous and non-indigenous cultures, public health and safety, recreation, realignment of Cockburn Road and traffic (Halpern Glick Maunsell, 1997).

In response to submissions received on the project and considerations by the EPA, some additional studies were conducted. The EPA sought independent appraisals from two experts on the adequacy of the PER in relation to key marine related issues and technical advice from the then Department of Environmental Protection (DEP). The proponent redesigned two aspects of the proposal to include an island breakwater and an alternative Cockburn Road realignment. On completion of the assessment (No. 1091) the EPA published the Report No. 908 (EPA, 1998) in October 1998. The Minister approved the project subject to conditions in December 1998 and the Ministerial Statement (490) was published on 24 December 1998.

In 2000, modifications were made to the design and layout of the harbour, which were assessed and cleared by the Minister and the EPA as being non-substantial. Subsequently, the construction of the harbour and infrastructure commenced in January 2001 and initial developmental stage contracts were completed over two and a half years later in June 2003. The PER document does not outline a monitoring programme concerning impact management. However, the proponent does commit to environmental management and monitoring in the PER. The environmental conditions set by the Minister in relation environmental management and monitoring are similar to those recommended by the EPA.

Table 9.5: Proponent's Obligations for Environmental Management and Monitoring in Jervoise Bay Infrastructure Project

Proponent's commitment	Ministerial conditions
<ul style="list-style-type: none"> ❑ Prepare and implement an EMP for the construction phase. ❑ Prepare an EMP for the ongoing operations of the harbour and the shorefront industrial estate. It will include the monitoring requirements along with other specific components. ❑ Monitor marine water quality in the Jervoise Bay region under a water quality monitoring programme. The programme will include sampling for, or measurement of light penetration, phytoplankton, total nitrogen, dissolved inorganic nitrogen, chlorophyll a; dissolved oxygen concentrations; and temperature and salinity profiles. ❑ Implement a sediment quality monitoring programme which includes annual measurements of heavy metals, tributyltin (TBT) compounds; and organic contents. ❑ Lake Coogee water quality monitoring. 	<ul style="list-style-type: none"> ❑ The proponent should implement an environmental management system (EMS) including environmental policy and commitments, planning of environmental requirements, implementation and operation of environmental requirements, measurement and evaluation of environmental performance, and review and improvement of environmental outcomes. ❑ The proponent should prepare and implement a seagrass management plan. ❑ The proponent should prepare and implement a water quality contingency plan to monitor water quality both within and outside the harbour. ❑ The proponent should prepare and implement a dredging and spoil management plan. ❑ The proponent should prepare and implement a noise management plan prior to construction of the Cockburn Road realignment. ❑ Following the commencement of construction, the proponent should submit a performance review every six years to the DEP. ❑ The proponent should prepare an audit programme in consultation with DEP and submit periodic performance and compliance reports.

(Based on EPA, 1998)

6. Geraldton Port Upgrade Project

In 2000, Geraldton Port Authority (GPA) proposed to upgrade the Port of Geraldton (otherwise known as the Port Enhancement Project and preparatory works for the Town Beach Foreshore Redevelopment Project). The objective of this proposal is to enable vessels to sail from the port fully laden. This proposal involved deepening of harbour basin by dredging, widening of the existing channel and extension out to the sea, disposal of dredge spoil, reconfiguration and construction of breakwaters, relocation of existing northern breakwater, reclamation of land adjacent to the existing northern breakwater, sand nourishment of Town Beach, and construction and operation of a railway line on the eastern breakwater (EPA, 2002).

The EPA decided to assess the port upgrade proposal at the level of public environment review (PER). The proposal was referred to Environment Australia (of the Commonwealth Department for the Environment and Heritage) regarding its impacts on the Humpback Whale, a threatened migratory species. The Commonwealth Minister for the Environment and Heritage subsequently decided that the proposed project was a 'controlled action' (a matter of national environmental significance) under the *Environment Protection and Biodiversity Act 1999* specifically relating to any harm that might occur to the Humpback Whale. In accordance with the Commonwealth Environment Protection (Sea Dumping) Act 1981, the proposal required an assessment of the environmental implications of sea dumping and a Sea Dumping Permit.

The PER document (URS, 2001) was released for public review from 07 November 2001 to 28 January 2002 resulting in 42 submissions being received from different government, local government and community organisations (7) and individuals (35). The major issues relate to dredging impacts (benthic primary producer habitat, water quality, and marine mammals), Eastern Breakwater impacts (marine mammals, water quality, noise impacts, and visual impacts) and issues of coastal processes (coastal stability; and management responsibility for Town Beach). The key environmental factors, as identified by the EPA, include marine biota and associated habitat, marine migratory species, coastal process and littoral drift, introduction of exotic organisms, marine water and sediment quality, contamination, particulates/dust emissions, noise, commercial activity, recreational activity, visual amenity, heritage, risk and management (EPA, 2002). On completion of the assessment (No.1379) the EPA published the Assessment Report (Bulletin No. 1050) in 2002. The Minister approved

the project subject to conditions in July 2002 and the Ministerial Statement (600) was published on 31 July 2002.

Table 9.6: Proponent's Obligations for Environmental Management and Monitoring in Geraldton Port Upgrade Project

Proponent's commitments	Ministerial conditions
<ul style="list-style-type: none"> ❑ Prepare and implement an EMP. ❑ Prepare and implement a water quality management and monitoring programme (WQMMP). ❑ Prepare and implement a seagrass management and monitoring programme (SMMP) with monitoring protocols. ❑ Prepare and implement an artificial reef management programme (ARMP) with monitoring protocols. ❑ Prepare and implement a marine mammal management and monitoring programme (MMMP). ❑ Prepare and implement a breakwater construction and Town Beach reclamation management plan (BCRMP). ❑ Prepare and implement a northern beaches stabilisation programme (NBSP) with monitoring protocols. ❑ Prepare and implement a dredging management plan (DMP). 	<ul style="list-style-type: none"> ❑ The proponent should prepare an audit programme in consultation with DEP and submit reports for compliance and performance. ❑ The proponent should submit a performance review report one year after the completion of construction and every five years thereafter. ❑ The proponent should make the environmental management programmes and/or plans publicly available. ❑ The proponent should manage and monitor water quality of the inner harbour basin and Town Beach. ❑ The proponent should monitor the stability of town beach.

(Based on EPA, 2002)

The EPA guidelines required a monitoring programme to be outlined in the PER document in relation to marine water and sediment quality. The PER document does not outline a detailed monitoring programme but it sets out several monitoring commitments. It recognises monitoring requirements in three phases: pre-construction, construction and post-construction monitoring. The PER document details the environmental management commitments of the proponent noting that there is already an EMS in place for Geraldton Port operations, and the proponent would continue and update the EMS to include the monitoring commitments set out in the PER.

The Ministerial conditions establish the main regulatory instrument to control the project operation. In addition to that, the Port Authority currently holds a DoE license (4275/8) in accordance with Part V of the *Environment Protection Act 1986* to operate the bulk mineral

loading system at the port. License conditions relate principally to the control of dust emissions and ore spillages during ship-loading operations. Water quality and sediment monitoring are obligations under the Part V license.

7. Esperance Port Upgrade Project

Esperance Port Authority proposed to upgrade the existing facilities at Esperance Port in two stages to increase iron-ore handling from two million tonnes per annum to four million tonnes per annum. In Stage 1, the proposal includes a long-term development strategy for Esperance port. Stage 2 comprises the construction of sulphur storage and handling infrastructure. The upgrade of marine facilities consists of deepening berths 1 and 2, dredging of the harbour basin and shipping channel, construction of a new deepwater berth, reclamation of approximately 15 hectares of land, construction of a new iron ore shed and installation of associated ship loading and conveyor infrastructure (ERS, 2000).

The EPA decided to assess the proposal at the level of public environmental review (PER). The PER document (ERS, 2000) was released for an eight week public review period, ending on 27 March 2000. A total of 34 submissions was received from different community and local government organisations (10) and individuals (24). The major issues raised relate to beach erosion problems, marine water pollution, operational noise impacts on adjacent land users, particulates /dust and visual amenity (EPA, 2000b). The relevant environmental factors, as identified by EPA, include marine flora and fauna, coastal processes and littoral drift, introduction of exotic organisms, marine water and sediment quality (dredging and reclamation, port operations), contamination (dredge spoil and oil spill), noise (construction and operation), particulates and dust (construction and port operation), light, traffic noise, visual amenity, recreation, public health, safety (traffic management and risk and hazard), and review and updating of existing EMP (ERS, 2000).

In addition to the direct impacts of the proposal, environmental management of increased shipping and rail operations and associated port operations were considered in the EPA assessment. The Stage 2 components were subject to a separate environmental assessment. However, the cumulative impacts of noise in relation to future expansion were considered in the current assessment. On completion of the assessment (No. 1277) the EPA published the Assessment Report (No. 989) in August 2000. The Minister approved the project subject to

conditions in October 2000 and the Ministerial Statement (555) was published on 31 October 2001.

Table 9.7: Proponent's Obligation for Environmental Management and Monitoring in Esperance Port Upgrade Project

Proponent's commitments	Ministerial conditions
<ul style="list-style-type: none"> ❑ Prepare and implement an EMP with a monitoring component for the construction stage. ❑ Develop and implement a Dredging and Reclamation Management Plan (DRMP) with monitoring plans and water quality criteria. ❑ Sediment analysis (Tri-butyl tin and Nickel) in all materials proposed for beach nourishment. ❑ Prepare and implement a construction noise management plan (CNMP). ❑ Develop and implement a dust management plan for construction activities. ❑ Review and update existing port operations EMP incorporating monitoring plans and programmes, and implement the EMP through an environmental management system. ❑ Prepare and implement an ongoing biological monitoring programme including monitoring of Tri-butyl Tin and Nickel leachate. ❑ Review and update coastal process monitoring programme and implement the revised programme. ❑ Prepare and implement a noise monitoring and management plan for port operations. ❑ Review and update dust monitoring and management plan for port operations and implement the revised plan. 	<ul style="list-style-type: none"> ❑ The proponent should prepare an audit programme in consultation with DEP and submit periodic compliance report. ❑ The proponent should implement an environmental management system with elements such as an environmental policy and corporate commitment to it, planning to meet environmental requirements, implementation and operation of actions to meet environmental requirements, measurement and evaluation of environmental performance, and review and improvement of environmental outcomes. ❑ The proponent should undertake seagrass monitoring at six monthly intervals, initially for a period of two years. ❑ The proponent should prepare and implement a sediment quality management plan including monitoring protocols, sediment quality criteria and other relevant components. ❑ The proponent should submit a performance review report in relation to dust and noise every three years following the commissioning of the new port facilities.

(EPA, 2000b).

The PER document does not outline a detailed monitoring programme but it does recognise monitoring requirements concerning harbour sediment quality, noise, air quality and traffic. The PER notes that there is already an EMP in place for the operation of the port facility. The existing EMP would be updated to reflect the environmental factors and management controls

associated with the proposal. In addition, the Esperance Port Authority would develop an integrated risk management system (IRMS) to address water quality and safety issues. The proponent makes a number of specific commitments in relation to environmental management and monitoring. The environmental conditions set by the Minister include a number of environmental management and monitoring requirements. These are similar to those recommended by the EPA.

The Ministerial conditions establish the main regulatory instrument to control the project operation. In addition to that, Esperance Port Authority currently holds a DoE license (5099/9) in accordance with Part V of the *Environment Protection Act 1986* for storage and shiploading of iron ore, nickel concentrate and unloading of fertilizer products at the Port of Esperance. License conditions relate principally to the control of dust emissions, marine pollution and noise control. Dust monitoring is an obligation under the Part V license.

Appendix 10**Background Information on the Case Study Projects in New South Wales****1. Ridgeway Gold Mine**

In 2000, Cadia Holdings Pty Ltd (CHPL) proposed to develop an underground gold mine and associated infrastructure in Cadia Hills (approximately 2.5 km north-west of the existing Cadia Hill open cut mine). An ore production rate of some 4 million tonnes per annum was estimated for the project to produce approximately 240,000 ounces of gold and 24,000 tonnes of copper per annum (Resource Strategies, 2000). The proposed operational life of the mine is 12 years and it was scheduled to commence full production in 2002. Under the *Environmental Planning and Assessment Act 1979* (EP&AA) the proposal was classified as State Significant, Designated and Integrated development. The Minister for Infrastructure and Planning was the consent authority for the proposal. The proposal required an environmental impact statement (EIS) to be prepared by the proponent, and also required additional approval from a number of State agencies under the *Rivers and Foreshores Improvement Act 1948*, *Protection of the Environment Operations Act 1997*, the *Roads Act, 1993*, *Fisheries Management Act, 1994*, and *Water Act, 1912*.

The DA and the supporting EIS were publicly exhibited for 30 days (from 4 May to 2 June 2000). Government agencies and local councils supported the development proposal, subject to conditions. However, the local communities opposed the proposal on the basis of their experiences of the existing Cadia Hill Mine. They were also concerned that there might be further mining in future. On 3 May 2000, the Minister for Urban Affairs and Planning directed an inquiry be held in accordance with Section 119 of the *Environmental Planning and Assessment Act 1997* into the environmental aspects of the proposed development. The Inquiry Commission recommended the proposal be approved subject to conditions. Subsequently, the then Minister for Urban Affairs and Planning granted the approval of the Ridgeway Project in October 2000. The consent conditions have been set on the basis of the recommendations of the Commission of Inquiry.

The key issues of the proposal relate to the local and regional groundwater and surface water resources, noise levels particularly at night, social and community impacts including uncertainty and property values in Panuara District, visual amenity, increases in regional traffic, rehabilitation and land management, dust levels, impacts on flora and fauna, waste and tailings disposal, and potential dam hazard (COI, 2000). The guidelines issued by the Director

General of DUAP specified monitoring requirements only for water quality (Resource Strategies, 2000). The EIS (Resource Strategies, 2000) includes a chapter on environmental management and monitoring that gives an overview of the commitments of the proponent for the environmental management and monitoring in relation to the Ridgeway Project. The EIS notes that in addition to an Environmental Management System (EMS) and a number of environmental management plans, manuals, procedures in place, there is an extensive ongoing monitoring programme in place. The existing monitoring programme relates to Cadia Hill Mine, Blayney Concentrate dewatering Facility and the Ridgeway Trial. The proponent makes a further commitment to:

- Continue the Existing EMS.
- Implement a number environmental management plans.
- Implement monitoring programmes for surface water quality, surface water flow, erosion and sediment, groundwater level and quality, groundwater inflows and mine dewatering, Geochemistry, air quality, noise, blasting, social and economic factors, meteorology, ecological process of Cadiangullong Creek, native fauna, weed and animal pest control, rehabilitation performance, subsidence zone, tailings storages, and post-operation monitoring (Resource Strategies, 2000).

The consent conditions specify requirements for environmental management and monitoring, an independent environmental audit, annual environmental compliance report, community consultation, and complaint handling. The audit should assess compliance with the requirements of the development consent, licences, and approvals and review the effectiveness of the environmental management of the mine, including any mitigation works. The annual environmental management report (AEMR) should include results of all environmental monitoring required under the development consent or other approvals and review the effectiveness of the environmental management of the mine in terms of the requirements of different government agencies and the local Council and identify trends in monitoring over the life of the mine. The proponent should provide the Community Consultative Committee (CCC) with regular information on the progress of work and monitoring results and access for site inspection by the Committee. The proponent is required to take minutes of Committee meetings. These minutes shall be available for public inspection at the Council (COI, 2000).

2. Dunmore Quarry

In November 2003, Boral Resources (NSW) Pty Ltd (Boral) proposed to increase production at the existing Dunmore Quarry from 1.2 Mtpa to 2.5Mtpa, by extending operating hours, increasing plant throughput by minor plant modifications, and additional use of rail and road

transport (RWC, 2003). The existing Dunmore Quarry is located approximately 12 kilometres north-west of Kiama, within Shellharbour Local Government Area. The quarry produces hard rock which is crushed to produce coarse aggregates, which are mainly used in concrete and asphalt production. Boral intends to surrender the three existing development consents and existing use right to operate under a single consolidated consent (RWC, 2003).

Under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) the proposed development is a State Significant, Integrated and Designated development and it requires an EIS in support of the DA. Consequently the Minister for Infrastructure and Planning is the consent authority. As an integrated development the proposal requires environment protection licence from the Environment Protection Authority under the *Protection of the Environment Operations Act 1997*, an approval from the National Parks and Wildlife Services under the *National Parks and Wildlife Act 1974*, and an approval from the Sydney Ports Corporation under the *Rivers and Foreshore Improvement Act 1948*.

The DA and supporting EIS (RWC, 2003) were placed on public exhibition from 19 November 2003 to 22 December 2003 and 14 submissions were received during this time. The private submissions specifically objected to the proposal. The key issues relate to noise and blasting, air quality, water quality and water management, flora and fauna, landscape management, Aboriginal heritage, amenity and property values, and traffic (DIPNR, 2004). Department of Infrastructure, Planning and Natural Resources (DIPNR) published the Assessment Report (DIPNR, 2004) in May 2004 and the Minister approved the proposal subject to conditions.

The Director General's guidelines do not specify monitoring requirements for any specific environmental aspects. However, it requires the proponent to provide details about a monitoring programme in the EIS. The EIS does not include a separate chapter on environmental management and monitoring but it discusses the environmental management and monitoring issues in different sections. The EIS notes that Boral is undertaking a number of measures on the basis of the guidelines on best practice environmental management in mining issued by the Commonwealth environment agency. In addition to that Boral makes some specific commitments in the EIS to:

- undertake measures on the basis of the guidelines on best practice environmental management in mining issued by the Commonwealth environment agency.
- undertake monitoring of water quality, noise, blast, and dust.
- report monitoring results annually in the performance report (based on RWC, 2003).

The consent conditions have been set on the basis of the recommendations in the Assessment Report. They included a number of measures including the preparation and implementation of an environmental management strategy, monitoring, annual reporting and independent environmental auditing, while also providing a mechanism for communication and feedback from the local community via the proposed Community Consultative Committee. The proponent should conduct an independent environmental audit every five years and submit audit reports to Director General, relevant agencies, local Councils and CCC. The audit should: assess the environmental performance of the development, its effects on the surrounding environment and compliance status with relevant standards, performance measures and statutory requirements; and review the adequacy of the proponent's environmental management strategy and environmental monitoring programme.

3. Dunmore Lakes Sand Extraction Project (Stage 1)

Dunmore Sand and Soil Pty Ltd. has operated the Dunmore Sand Quarry since late 1980s. With the experience of sand dredging, processing and landscape construction, in 1999 the company came up with a development proposal for sand extraction near Dunmore, approximately 4km south-south-west of Shellharbour and 6 km north of Kiama in the Illawarra Region of New South Wales. The proponent proposed to extract the high quality sand from the nearby Dunmore Lakes site and to continue to undertake its blending activities at the Dunmore Sand Quarry Site. The proposed sand quarry was expected to continue for 15 years (RWC, 1999) and classified as a Designated State Significant Integrated Development. As such the proposal required approvals from a number of State agencies under the *Protection of the Environment Operations Act 1997*, *Rivers and Foreshores Improvement Act 1948* and *Water Act 1912*.

The proponent submitted an EIS (RWC, 1999) in January 1999 along with the Development Application. The DA and the EIS were placed on public exhibition from 4 February to 8 March 1999. The proposal was approved by the Minister on 27 November following a Commission of Inquiry (COI). Submissions to the Inquiry were received from 66 parties including the proponent, 2 Councils, 6 Government Agencies, 2 Estuary/Catchment Management Committees, 5 community groups, 9 businesses or business organisations and 41 residents. Truck traffic was a significant concern raised by the local Council and residents. Other major issues were potential soil contamination (by acid causing material), noise,

operating hours, project life, final land and lake use, surface water quality, groundwater draw down and quality, visual impact, flora and fauna, and rehabilitation (COI, 1999).

The Director General's guidelines do not specify any requirements for monitoring of environmental aspects. The EIS outlines the draft environmental management plan. The EIS does not include a separate chapter on environmental monitoring. However, some monitoring commitments have been made in Chapter 4 titled 'features of the existing environment and safeguards and impacts of the proposal'. This chapter does not include a detailed monitoring programme but it specifies monitoring commitments in relation to water quality, noise, air quality and revegetation. The EIS notes that the majority of the safeguards to be implemented with this proposal are currently being exercised or implemented by the proponent. The proponent makes further commitments to:

- Prepare and implement an Environmental Management Plan (EMP) and review it every five years.
- Implement environmental monitoring programmes for noise, water quality, air quality and revegetation
- Submit Environmental Management Report (AEMR) to a committee comprising representatives of the relevant government authorities and local community representatives throughout the life of the proposal (RWC, 1999).

A number of conditions have been attached to the development consent on the basis of the recommendations of the Inquiry Commission. The consent conditions specify some obligations for the proponent to minimise environmental impacts of the development. In addition, there are also requirements for environmental management and monitoring, annual environmental compliance report, community consultation, and complaint handling.

4. Bulga Open Cut Coal Mine

In 1999 Bulga Coal Management Pty Ltd proposed to continue mining at Bulga open cut coal mine near Broke in the Upper Hunter Valley in NSW. The proposed mining was expected to produce 140 million tonnes of raw coal over 21 years (ERM, 1999a). The proponent has been undertaking open cut mining operations at the Bulga Complex since 1981. The existing mining operations at Bulga include two open cut mines and one underground mine. They are Saxonvale Open Cut Mine (Dip Pit), Bulga Open Cut Mine and South Bulga Underground Coal Mine. Environmental impact statements were prepared in 1980, 1990 and 1993 respectively for these mines and consequently the Minister for Planning issued three development consents. The proposed mining was expected to use existing pits and

infrastructure such as the coal handling and preparation plant (CHPP), conveyors and rail loader.

The Bulga Coal proposal was classified as Designated State Significant Integrated Development and the consent authority for the development was the then Minister for Urban Affairs and Planning. The proponent was required to prepare an EIS in support of the DA.

As an Integrated Development the proposal required approvals from a number of State agencies under the *Protection of the Environment Operations Act 1997*, *Rivers and Foreshores Improvement Act 1948*, *Water Act 1912*, *Mine Subsidence Compensation Act 1961* and *National Parks and Wildlife Act 1974*.

The DA and the EIS (ERM, 1999a) were publicly exhibited from 03 March 1999 to 27 April 1999. 7 submissions were received. No State agency or the local Council objected to the proposed development. There was no request for a Commission of Inquiry. The key issues relate to water (surface and groundwater) quality and management, visual amenity, noise, blast and vibration, flora and fauna, dust, lighting, visual amenity, property values and compensation, rehabilitation and aboriginal heritage issues.

The Department (DUAP) recommended the approval of the proposal subject to conditions (DUAP, 1999). The Minister for Urban Affairs and Planning granted the development consent in December 1999. The consent conditions provide for: appropriate surface and groundwater management and monitoring; noise and vibration; Aboriginal artefacts management and monitoring; provisions for land acquisition if residents are demonstrated to be significantly impacted by noise and/or dust; management of lighting impacts; requirement for an Annual Environmental Management Plan Report; continuing use of a Community Consultative Committee; and independent audits of the operations each 3 years.

The guidelines issued by the then Department of Urban Affairs and Planning required the proponent to set out a framework of a monitoring programme of all key impacts on the environment. In other words, this framework should indicate what specific information will be monitored, the monitoring intervals, the procedures to be undertaken should the monitoring indicate an environmental problem, and the reporting procedures. The EIS (ERM, 1999a) includes a chapter on Management and Monitoring outlining waste management procedures, mitigation measures, monitoring and environmental management actions. The EIS notes that

the proponent has been using a computer based site management system called ISO *soft* 14001 which is designed to help organisations attain and maintain compliance with the relevant international standard. The existing management system focuses on: environmental incidents and complaints and subsequent follow-up; compliance with all lease, license and development consent conditions; onsite chemical management; and various regulatory tools (ERM, 1999a). The EIS also notes that the proponent is currently undertaking monitoring of surface and groundwater, dust deposition, noise and vibration, and greenhouse emissions. The proponent makes specific commitments in the EIS to:

- Continue the Existing EMS.
- Implement waste management procedures, undertake mitigation measures and environmental management actions.
- Continue monitoring of surface and groundwater, dust deposition, noise and vibration, and greenhouse emissions (ERM, 1999a).

5. Dartbrook Coal Mine

The Dartbrook Mine did operate under the consent granted to Dartbrook, by the then Minister for Planning on December 1991. Since this consent was granted, Dartbrook has been granted a number of modifications. In July 2000, Dartbrook Coal Mine Pty Ltd lodged a Development Application (DA) with the then Department of Urban Affairs and Planning to extend the existing Dartbrook underground mine. The proposed development also includes an expansion of the existing above ground rejects emplacement area and some new surface facilities (HLA, 2000).

The Dartbrook Extension was classified a Designated State Significant Integrated Development under the *Environmental Planning and Assessment Act 1979* and the consent authority for the development was the then Minister for Urban Affairs and Planning. An EIS was required in support of the DA. As an 'Integrated Development' the proposal required other approvals or licences from other government agencies under the *Protection of the Environment Operations Act, 1997, Water Act 1912, Mine Subsidence Compensation Act 1961, Roads Act 1993, and National Parks and Wildlife Act 1974*.

The DA and the EIS (HLA, 2000) were publicly exhibited from 25 August 2000 to 25 September 2000. Of the 51 submissions received, there were 22 requests for a Commission of Inquiry (COI) and 33 outright objections to the proposal. No government agency objected to the proposal. The key issues relate to: groundwater and surface water resources, noise and vibration, dust and gaseous odours, visual impact (poor existing performance of the mine

regarding mitigation of visual impacts, visual impact and safety of West Browns Mountain Rejects Emplacement Area (DUAP, 2001). The Minister directed that a COI be held in accordance with Section 119 of the EP & A Act. Following the COI, the Commissioners reported to the Minister. The COI findings were considered in preparing the Assessment Report (DUAP, 2001). The Minister granted the development approval in August 2001 subject to conditions.

On 25 July 2001, Dartbrook Pty Ltd again lodged an application accompanied by a Statement of Environmental Effects (SEE) to modify development consent issued by the then Minister for Planning on 2 December 1991. The local community submission strongly objected to the proposed modification. The key issues identified in the Assessment Report included noise, air quality, flora and fauna, hydrology and water management, heritage, visual impacts, subsidence impacts, socio-economic impacts and cumulative impacts. The DUAP completed its assessment in 2002. The Assessment Report (DUAP, 2001) notes that under the existing consent conditions some monitoring requirements will be fulfilled. However, it recognizes monitoring requirements for noise, air quality and groundwater. The Minister granted the approval on 27 February 2002.

The guidelines issued by the then Department of Urban Affairs and Planning outlines the framework of an environmental management plan (EMP) and a monitoring programme of all key impacts on the environment to be included in the EIS. According to this framework the monitoring programme should identify the impacts that would be monitored, their criteria (with monitoring locations, intervals and duration), the reasons for doing so and reporting procedures. The EIS (HLA, 2000) includes a chapter on proposed environmental management and mitigation measures relating to issues associated with subsidence, water management, land use, dust, noise, visual impacts, hazard management, heritage and community consultation. The EIS notes that under the existing monitoring programme monitoring results for noise, air quality, spontaneous combustion management, surface and ground water, and mine gas and ventilation rates are reported annually (HLA, 2000). The EIS recognises monitoring requirements for issues relating to noise and subsidence. However, the EIS does not include a detailed monitoring programme as specified in the Director General's guidelines. The proponent makes specific commitments to:

- Monitoring of noise, air quality, spontaneous combustion management, surface and ground water, subsidence, mine gas and ventilation rates.

- Maintain and update existing Health, Safety and Environmental Management System (HSEMS).
- Extension of the existing monitoring programme to ensure adequate coverage of new activities (Based on HLA, 2000).

The recommended conditions in the Assessment Report provide for management and monitoring of noise, vibration, dust and odours, visual impacts, surface and groundwater management, rejects emplacement area and waste management, flora and fauna, and archaeological issues. The recommended conditions of consent also include specific provisions for land acquisition regarding impact arising from noise, air quality or subsidence impacts, noise criteria, procedures for independent dispute resolution, compliance management, requirement for the preparation of a number of management plans (covering dam safety emergency, noise, dust, landscape, water, and flora and fauna), Annual Environmental Management Plan Reports and compliance reports, independent auditing and the continuation of the Community Consultative Committee. The mining lease (1497) specifies monitoring conditions in relation to groundwater (quality and levels), erosion and subsidence management. The water license (20AL201391) does not include any monitoring conditions.

6. Extension of Warkworth Coal Mine

Warkworth Mine is an open cut coal mine located in the Upper Hunter Valley of NSW. With an annual production rate of 10 million tonnes annum the mine has operated since 1981 (ERM, 2002). Its existing approval finished in 2003. In 2002, Warkworth Mining Limited proposed to continue the mining operation. The operational practices involve vegetation clearing and topsoil stripping, overburden and interburden removal, coal removal, and progressive rehabilitation (ERM, 2002).

The proposal was declared a 'controlled action' under the *Environmental Protection and Biodiversity Conservation Act 1999* for its likely impact on listed threatened species. Therefore, the proposal required approval from the Commonwealth Minister for the Environment under the provisions of the *Environmental Protection and Biodiversity Conservation Act 1999* in addition to the development consent from the NSW Minister for Planning. The EP&A Act and *Threatened Species Conservation Act 1995* (TSC Act) require the preparation of an EIS and a species impact assessment (SIS). The Commonwealth Minister accredited the NSW EIA process set out in the EP&A Act and the TSC Act. The Warkworth Extension was classified as a Designated State Significant Integrated Development

under the *Environmental Planning and Assessment Act 1979*. An EIS was required in support of the DA. As an Integrated Development the proposal required approvals from a number of State agencies under the *Protection of the Environment Operations Act, 1997, Water Act 1912, Roads Act 1993, National Parks and Wildlife Act 1974* and *Fisheries Management Act 1994*.

The proponent lodged a development application (DA) and EIS (ERM, 2002) with the DUAP on 17 September 2002. These were placed on public exhibition from 20 September 2002 to 30 October 2002. During this time a total of 23 submissions was received, 15 of them objecting to the proposal. The key issues relate to ecological values, flora and fauna, air quality, water quality, noise, vibration, traffic (road closure), rehabilitation, property values, visual, Archaeology, health, sports and recreation. Based on the recommendations of the Assessment Report, the Minister approved the development consent in May 2003 subject to conditions. The Assessment Report (DUAP, 2003) recommended consent conditions to: prevent, minimise and /or off set adverse environmental impacts; set standards and performance measures to monitor environmental performance; require regular monitoring and reporting; and provide for the ongoing environmental management of the development. The Assessment Report also recommended monitoring for flora and fauna, air quality (dust deposition, TSP, and PM 10), noise, blasting (overpressure and ground vibration), surface water, and groundwater level and quality.

The Director General's guidelines required the proponent to outline detailed monitoring programmes in the EIS for flora and fauna, noise, surface water, and groundwater (ERM, 2002). The EIS (ERM, 2002) notes that there is already an ISO 14001 accredited environmental management system (EMS) in place. Under the existing operation the proponent is undertaking meteorological monitoring, surface and groundwater monitoring, air quality monitoring, noise and blast monitoring. The proponent is also maintaining community relations through a community consultative committee (CCC) and producing reports regularly. The EIS has a chapter titled 'Environmental Management and Monitoring' detailing the environmental management procedures and mitigation measures. It does not include a detailed monitoring programme. However, it provides an outline of the monitoring programme to be prepared under the EMP. The proponent makes specific commitment in the EIS to:

- Expand the existing EMS to incorporate environmental management plans for both the infrastructure construction and mine operational phases.

- ❑ Prepare and implement an EMP with monitoring and reporting protocols.
- ❑ Continue monitoring of surface and groundwater, air quality, noise and blast.
- ❑ Implement a community consultation strategy.
- ❑ Regular reporting (ERM, 2002).

The obligations of the proponent under the development consent are more or less similar to those of other coal mines mentioned earlier. However, the scope of the audit is found different from those of other projects discussed before. According to the condition of the development consent the audit must:

- ❑ assess the environmental performance of the development, and its effects on the surrounding environment;
- ❑ assess whether the development is complying with the relevant standards, performance measures, and statutory requirements;
- ❑ review the adequacy of the proponent's environmental management strategy and environmental management programme; and
- ❑ recommend measures or actions to improve the environmental performance of the development, and /or the environmental management and monitoring systems (DUAP, 2003).

7. Ravensworth Open Cut Coal Mine

In 1999 Peabody Resources Limited (Peabody) proposed to develop an open cut coal mine at Ravensworth East, which is located between Singleton and Muswellbrook in the Hunter valley of New South Wales. The proposed mine was expected to produce approximately 65 million tonnes over 20 years for the domestic market. Existing infrastructure on the site includes a crusher, workshop, office complex and amenities building. Proposed new facilities include a new office, bath house, workshop extension and mine dam (ERM, 1999b). It was proposed to replace the existing crushing and conveying infrastructure during the Year 4 of mine development.

The proposed development was classified a State Significant Integrated and Designated Development under the *Environmental Planning and Assessment Act 1979*. As such, an environmental impact statement (EIS) must accompany a development application for the proposal. As a state significant development the proposal requires approval from the Minister for Urban Affairs and Planning. As an integrated development the proposal requires approvals/licences from a number of State agencies under the *Protection of the Environment (Operations) Act 1997*, *Rivers and Foreshores Improvement Act 1948*, *National Parks and Wildlife Act 1974*, *Mine Subsidence Compensation Act 1961*, *Heritage Act 1977*, *Roads Act 1993*, *Mining Act 1992*, *Native Vegetation Conservation Act 1997* and *Water Act 1912*.

The proponent lodged the DA accompanied by an EIS (ERM, 1999b) in March 1999. They were placed on public exhibition from 30 March 1999 to 03 May 1999. During this time a total of 17 submissions was received. None of the Government agencies and the local Council opposed the proposal provided that appropriate conditions are attached to the development consent. The private submitters either objected to the proposal or raised some concerns about it. The key issues relate to noise and blasting, dust, visual impacts, Aboriginal heritage issues, lighting, compensation and devaluation of property, and cumulative impacts (DUAP, 2000a). The Department (DUAP) did not consider that a COI was warranted. An independent review was done to verify the noise and dust impact predictions. Based on the recommendations of the Assessment Report (DUAP, 2000a) the Minister granted the development consent in March 2000 subject to conditions.

The Director General's guidelines required the proponent to set out a framework of the monitoring programme in the EIS. The Guidelines specified monitoring requirements for rehabilitation, air quality, water quality, noise and vibration, spontaneous combustion, and social impacts. Chapter 11 of the EIS outlines a monitoring programme for the proposed development. The EIS (ERM, 1999b) notes that the monitoring will be performed within a procedural framework provided by the Environmental Management Plan (EMP). The EMP would specify in detail the locations and number of monitoring stations, frequency of sampling and type of analysis. The EMP would also specify procedures to achieve rehabilitation requirements included as conditions of the mining lease. The EIS also notes that there is already an environmental monitoring programme (approved by the Department of Mineral Resources) in place for the proposed mine site to monitor surface water quality, ground water quality, air quality, noise, blasting and rainfall, and monitoring results are being submitted to the DUAP, EPA, DMR and the local Council through annual reports. The proponent makes specific commitments in the EIS to:

- Develop an ISO 14001 accredited Environmental Management System (EMS).
- Prepare and implement an Environmental Management Plan to the satisfaction of EPA
- Continue the current monitoring programme.
- Monitor climate, dust, noise, blasting, water quality and volume, and rehabilitation. (ERM, 1999b)

The consent conditions provide for monitoring of noise and blasting, dust, surface and groundwater management, flora and fauna, and archaeological issues. They also include specific provisions for land acquisition, appropriate noise criteria, preparation of Annual Environmental Management Reports and compliance reports, independent auditing, a number

of environmental management plans, and the establishment of a community consultative committee.

8. Whitehaven Coal Mine

In 2000, Whitehaven Coal Mining Pty Ltd (WCM) proposed to undertake the second stage of open cut coal mining at the 'Whitehaven' property, located approximately 16km east-south-east of Boggabri within the Narrabri Local Government Area. The first stage (known as a trial mine) was approved by Narrabri Shire Council in November 1999, under delegation from the Minister for Urban Affairs and Planning, which has now been completed. The proposed mining life is for 12 years and the mining activities involve a combination of both open cut and highwall (underground) mining methods to extract 0.75 million tonnes of coal product per annum (RWC, 2000). The proposal was defined as a Designated, Integrated and State Significant Development under the *Environmental Planning and Assessment Act 1979*. The proposal was subject to an EIS and the Minister for Urban Affairs and Planning was the consent authority. As an integrated development it required approvals from a number of State agencies under the *Protection of Environment Operations Act, 1999*; *Mining Act, Water Act 1912* (Water Licence), and *Roads Act 1993*.

On 13 March 2000, the proponent lodged the development application and EIS (RWC, 2000) with the Department of Urban Affairs and Planning (DUAP). The DA and EIS were publicly exhibited from 23 March 2000 to 28 April 2000. During this time a total of 10 submissions was received. None of the State agencies or the local Councils objected to the proposal. The private submitters either objected to, or raised some concerns with the proposal. The key issues principally relate to noise (from truck movements), noise (from the mine), dust, blasting impacts, visual impacts, quality of roads subject to truck transportation, road safety, threatened species, groundwater quality and quantity impacts, and devaluation of property (DUAP, 2000b). The Department was satisfied that the mine's impacts were thoroughly addressed negating the need for a COI. Based on the recommendations of the Assessment Report (DUAP, 2000b) the Minister approved the proposal on 10 August 2000 subject to conditions.

The guidelines issued by the Director-General of the Department of Urban Affairs and Planning (DUAP) specify the outline of a monitoring programme and an environmental management plan (EMP) to be included in the EIS. The guidelines required the proponent to

prepare monitoring programmes in relation to noise and blasting, air quality, water issues, and flora and fauna. The EIS does not include a separate chapter on environmental management and monitoring nor outline a monitoring programme as suggested by the Director-General's guidelines. However, it makes specific commitments to:

- Undertake operational safeguards.
- Adopt various procedures.
- Monitor air quality, groundwater and surface water, noise, and blast (RWC, 2000)

The consent conditions recommended in the Assessment Report provide for monitoring of noise and blasting, dust, surface and groundwater management, flora and fauna, and archaeological issues. They also include specific provisions for land acquisition, set appropriate noise criteria, require the preparation of Annual Environmental Management Plan Reports and Compliance Reports, independent environmental audit, a number of environmental management plans, and the establishment of a Community Consultative Committee. Two mining leases (Nos. 1464 and 1471) apply to Whitehaven Mine. One of the mining lease conditions specifically requires monitoring of noise and vibration.

9. Patrick Stevedores Container Terminal Upgrade

In December 2002, Patrick Stevedores Operations Pty Ltd proposed to upgrade the container terminal at Penrhyn Road, Port Botany in the Botany Bay local government area. The development application (DA) sought to increase the efficiency and capacity of the existing terminal (from 547,000 TEU (twenty-foot equivalent units/containers) to 1.3 million TEU by 2016 (Parsons Brinckerhoff, 2002). Under the *Environmental Planning and Assessment Act, 1979* the proposal is classified as State Significant, Designated and Integrated Development. The Minister for Infrastructure and Planning was the consent authority for the proposal. The proposal required additional approval from the Waterways Authority under the Rivers and Foreshores Improvement Act 1948, and Environment Protection Authority under the *Protection of the Environment Operations Act 1997*. An environmental impact statement (EIS) was required to assess the environmental impacts, and to accompany the Development Application (DA).

The DA and the supporting EIS (Parsons Brinckerhoff, 2002) were publicly exhibited for 30 days (from 15 January to 14 February 2003). 53 public submissions were received during this time. The relevant State agencies or the local Council did not object to the proposal. The public submissions raised concerns about road and rail traffic, air and noise pollution,

justification for proposal, changes to the boat ramp, and impacts on flora and fauna. Based on the recommendations of the Assessment Report (DIPNR, 2003) the Minister for Infrastructure and Planning granted the development consent in October 2003. The consent conditions relate to noise, traffic, water quality, management plans, and compliance. They specifically require the proponent to prepare and implement an operational environmental management plan (OEMP), a number of environmental management plans, submit compliance reports every six months, conduct an independent environmental audit every three years, and establish a Community Consultative Committee, revise and update monitoring programmes and make them publicly available at the Council (DIPNR, 2003).

No monitoring requirements were mentioned in the Director-General's guidelines. The EIS (PB, 2002) includes a chapter (Chapter 10) on environmental management and monitoring. However, it does not outline a detailed monitoring programme. The EIS (Parsons Brinckerhoff, 2002) also notes that the existing Operational Environmental Management Plan contains monitoring requirements for the existing terminal. In addition to that the proponent makes specific commitments to:

- ❑ Develop an EMS based on ISO 14001 principles
- ❑ Prepare and implement the environmental management plans during the construction and operation.
- ❑ Monitor noise, soil erosion, groundwater contamination, surface water quality, water use, flora and fauna, hazards and risks, energy use and waste generation.
- ❑ Conduct regular environmental audits to ensure adequate and effective implementation of environmental management mitigation measures.
- ❑ Report internally and externally (Parsons Brinckerhoff, 2002).

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Errata

Chapter One

Page	Section or Para/line	Correction
1	Para 2/Line 1	Replace "has been" with "have been"
8	Para 3/Line 2	Replace "has been" with "have been"

Chapter Two

Page	Section or Para/line	Correction
41	Para 1/Line 9	Replace "three principle" with "three principal"

Chapter Four

Page	Section or Para/line	Correction
98	Para 2/Line 3	Replace "Ferguson, 1994" with "Ferguson, 1994"
98	Para 2/Line 15	Replace "meets majority" with "meets the majority"
103	Para 1/Line 9	Replace "the pre and" with "the pre- and"

Chapter Six

Page	Para/line	Correction
132	Para 3/Line 7	Replace "site is compliance" with "site is in compliance"
133	Para 1/Line 2	Replace "have not conduct" with "have not conducted"
133	Para 3/Line 1	Replace "Department of industries" with "Department of Industries"
135	Para 2/Line 1	Replace "state Forest" with "State Forest"
135	Para 2/Line 7	Replace "on vegetation" with "on a vegetation"
135	Para 3/Line 7	Replace "Sands Ltd it has" with "Sands Ltd has"
136	Para 3/Line 4	Replace "(dust and smokes)" with "(dust and smoke)"
137	Para 1/Line 5	Replace "separately in" with "separately at"
137	Para 2/Line 6	Replace "decline in Possum" with "decline in the Possum"
145	Para 1/Line 8	Replace "are practiced" with "are practised"
145	Para 3/Line 2	Replace "permit system" with "permit systems"
145	Para 3/Lines 2,4,6	Replace "DoE license" with "DoE licence"
145	Para 3/Line 9	Replace "Of these four" with "Of these, four"

Chapter Seven

Page	Section or Para/line	Correction
148	Para 1/Line 3	Replace "(Cadia, 2003)" with "(Cadia Holdings Pty Ltd., 2003)"
148	Para 1/Line 9	Replace "(Cadia, 2004)" with "(Cadia Holdings Pty Ltd., 2004)"
148	Para 2/Line 11; Para 3/Lines 1,6	Replace "(Cadia, 2005)" with "(Cadia Holdings Pty Ltd., 2005)"
149	Para 1/Line 1	Replace "and logger-based" with "and a logger-based"
149	Para 1/Line 5	Replace "regarding Blayney" with "regarding the Blayney"
149	Para 3/Line 7	Replace "and Annual" with "and an Annual"
149	Para 3/Line 8	Replace "complaints have been reported" with "complaints were reported"
149	Para 3/Line 10	Replace "being leak in tailings" with "being a leak in the tailings"
153	Para 1/Line 11	Replace "to the exceeding" with "to the exceedence of"
153	Para 2/Line 6	Replace "supports the" with "support the"
153	Para 2/Line 6	Replace "does not" with "do not"
153	Para 3/Line 1	Replace "performance of as" with "performance as"
154	Para 1/Line 3	Replace "(MOP) in to the" with "(MOP) to the"
154	Para 2/Line 12	Replace "held in every" with "held every"
155	Para 3/Line 1	Replace "6 months and" with "6 months, and"
158	Para 2/Lines 3,5	Replace "EPA license" with "EPA licence"
159	Para 2/Line 3	Replace "and mine's" with "and the mine's"
159	Para 3/Line 7	Replace "Of them 8" with "Of these 8"
169	Para 3/Line 6	Replace "This license" with "This licence"

Chapter Eight

Page	Section or Para/line	Correction
178	Section 8.7/Line 6	Replace "respondents, views" with "respondent's views"
193	Section 8.17/Line 3	Replace "opinions are emerged" with "opinions emerged"
201	Section 8.21/Line 2	Replace "based on limited" with "based on a limited"

Chapter Nine

Page	Section or Para/line	Correction
202	Para 2/Line 16	Replace "two states" with "two States"
202	Para 2/Line 19	Replace "disconnected with" with "disconnected from"
203	Para 1/Line 8	Replace "even monitoring" with "even if monitoring"
204	Para 3/Line 11	Replace "It clearly indicates" with "They clearly indicate"
205	Para 2/Lines 12, 17,21	Replace "license" with "licence"
206	Para 1/Line 1	Replace "license" with "licence"
206	Para 3/Line 4	Replace "operation is" with "operations is"
207	Para 1/Line 3	Replace "two states" with "two States"
207	Para 2/Line 12	Replace "since latter" with "since the latter"
208	Para 2/Line 11	Replace "three states" with "three States"
208	Para 2/Line 17	Replace "recognized particularly in WA and NSW" with "recognized, particularly in WA and NSW,"
210	Para 2/Line 1	Replace "projects there" with "projects, there"
211	Para 1/Line 5	Replace "license" with "licence"
212	Para 1/Line 5	Replace "licenses" with "licences"
213	Para 4/Line 1	Replace "three states" with "three States"
214	Para 2/Line 8	Replace "establishes the publics" with "establishes the"
215	Para 3/Line 8	Replace "auditing, the" with "auditing, to make the"
217	Para 2/Line 3	Replace "As it is mentioned" with "As mentioned"
217	Para 2/Line 4	Replace "three states" with "three States"
217	Para 3/Line 1	Replace "is a good" with "is good"
217	Para 3/Line 5	Replace "self-regulate themselves." with "self-regulate."
218	Para 1/Line 1	Replace "this is not" with "is not"
218	Para 2/Line 6	Replace "three states" with "three States"
218	Para 2/Line 6	Replace "part ongoing" with " part of the ongoing"
218	Para 2/Line 10	Replace "and is not" with "and are not"
218	Para 3/Line 1	Replace "three states" with "three States"
218	Para 4/Line 2	Replace "three states" with "three States"
221	Para 1/Line 11	Replace "license" with "licence"
221	Para 2/Line 16	Replace "audit. Western" with "audit. The Western"
222	Para 3/Lines 2,6	Replace "license" with "licence"
223	Para 3/Line 5	Replace "license" with "licence"
225	Para 1/Line 3	Replace "to other" with "to the other"
225	Para 1/Line 15	Replace "of local" with "of the local"
231	Para 1/Line 6	Replace "week areas" with "weak areas"

References

Page	Section or Para/line	Correction
242	Line 4	Replace "The Hague." with "The Hague, pp. 405-425."
242	Line 18	Replace "Oxford." with "Oxford, pp. 223-248."
242	Line 30	Replace "Oxford." with "Oxford, pp. 143-167."
242	Line 33	Replace "Oxford." with "Oxford, pp. 183-202."