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**MANAGEMENT REPORT AND RECOMMENDATION
IN RESPONSE TO THE
INSPECTION PANEL INVESTIGATION REPORT**

**SOUTH AFRICA
ESKOM INVESTMENT SUPPORT PROJECT
(IBRD LOAN NO. 78620-ZA)**

March 2, 2012

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OF THE
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Pursuant to paragraph 23 of the Resolution Establishing the Inspection Panel (IBRD Resolution 93-10 and IDA Resolution 93-6), attached for consideration by Executive Directors is Management's Report and Recommendation in response to the findings set out in the Investigation Report No. 64977-ZA dated November 21, 2011, of the Inspection Panel on the captioned Project (Eskom Investment Support Project, IBRD Loan No. 78620-ZA).

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ABBREVIATIONS AND ACRONYMS

BP	Bank Procedures
COP	Conference of the Parties (to the UNFCCC)
DEA	Department of Environmental Affairs
DSM	Demand-side Management
DWA	Department of Water Affairs
EC	European Commission
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EISP	Eskom Investment Support Project
EMF	Environmental Management Framework
EMC	Environmental Monitoring Committee
EMI	Environmental Monitoring Inspectorate
EMPR	Environmental Management Programme Report
FGD	Flue gas desulfurization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gas
GoSA	Government of South Africa
Ha	Hectare
IBRD	International Bank for Reconstruction and Development
IPN	Inspection Panel
LTMS	Long-Term Mitigation Scenarios
MCWAP	Mokolo and Crocodile Water Augmentation Project
MW	Megawatt
µg	Micrograms
NEMA	National Environmental Management Act
Nm ³	Normal cubic meter
NO ₂	Nitrogen dioxide
NWA	National Water Act
OMS	Operational Manual Statement
OP	Operational Policy
PAD	Project Appraisal Document
PM ₁₀	Particulate matter measuring 10 micrometers or less
RESA	Regional Environmental and Social Assessment
ROD	Record of Decision
SDR	Safeguard Diagnostic Review
SEA	Strategic Environmental Assessment
SO ₂	Sulfur dioxide
UCS	Use of Country Systems
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

Currency Unit

Exchange rate as of March 2, 2012

1 USD = 7.47 ZAR

1 ZAR = 0.13 USD

EXECUTIVE SUMMARY

The Project

i. On April 8, 2010 the World Bank approved an IBRD loan of US\$3.75 billion for the Republic of South Africa – Eskom Investment Support Project (EISP), which aims at extending South Africa’s power generation capacity and supporting its long-term carbon mitigation strategy. The EISP specifically supports Eskom’s “New Build” program to enhance energy security in an efficient and sustainable manner. The Project comprises the 4,800 MW Medupi coal-fired power plant, a 100 MW wind power project, a 100 MW concentrating solar power project, a road to rail component, sector investments and technical assistance to support carbon reduction.

ii. *After several years of sustained economic growth in South Africa, the country’s electricity system had been suffering from considerable capacity strain, which seriously affected the overall economy.* The energy crisis, which peaked in late 2007/early-2008, led to a downward trend of GDP growth (1.7 percent in early 2008). Mining fell 26 percent, its sharpest decline on record, and manufacturing also declined. The impact on growth was aggravated by the global financial and economic downturn, and also had serious consequences for the Southern African region as a whole which relies on South Africa for electricity supply, trade, and investment.

iii. *The Government responded with a major “New Build” program that would deliver an additional 12,000 megawatts (MW) over a 10-year period.* The program involved efficiency improvements, bringing back to service earlier retired power plants and building new generation capacity. This required some US\$50 billion, which Eskom planned to raise from a combination of internal cash generation and local and foreign debt. However, with the global financial and economic crisis, Eskom was unable to raise the required long-term debt.

iv. *To avoid delaying or curtailing the program and thus prolonging the impact of electricity supply constraints on economic growth, employment and social stability, South Africa approached the Bank at the end of 2008 for support for the EISP.* By this time Eskom and the Government had already decided on the design of the Medupi plant, and construction had already commenced.

v. *The EISP was processed under OP 4.00, Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-supported Projects (or Use of Country Systems), and is being implemented under South Africa’s environmental and social safeguard-related laws and regulations to avoid, mitigate, or minimize adverse environmental and social impacts of the project.* The decision to apply this policy was preceded by an extensive review of the country’s legal framework and implementation track record, which were found acceptable to the Bank. The nature of this review and its findings are documented in the Safeguards Diagnostic Review (SDR), which under OP 4.00 is the key safeguards document prepared for the project by Bank staff.

The Request for Inspection

vi. The Request for Inspection was submitted by *groundWork* and *Earthlife Africa*, two non-governmental organizations based in South Africa, acting as representatives of community members living in the Lephalale area (the “Requesters”). The Request was received before the loan for the EISP was presented for Board consideration and approval, and therefore no disbursement had been made at the time. The Request mainly pertains to Component A of the EISP, which is the construction of the Medupi coal-fired power plant (“the Project”).

vii. The Requesters allege a wide range of potential adverse impacts that they say could stem from the Project, but also raise issues unrelated to the Project. Regarding issues related to the Project some are of local nature and include health impacts from air pollution; impacts on water resources, livelihoods, cultural heritage and practices; influx of laborers; involuntary resettlement; and impacts from what the Requesters see as associated coal mining. Other issues are much broader, such as impacts on energy access for the poor; impacts on the national economy; climate change impacts and South Africa’s obligations; inadequate consideration of alternatives to coal; and adverse impacts from relying on the South African legal system for project implementation, which they believe is insufficient to provide protection from adverse impacts.

The Panel’s Findings

viii. The Board approved an inspection of the EISP on July 29, 2010, and the Inspection Panel’s Report was submitted to the Board on November 30, 2011. The Panel found “*that in most respects Management’s analysis of equivalence complies with OP/BP 4.00.*”¹ It did not find that the Bank had not complied with its policies regarding impacts on cultural heritage and practices, impacts on energy access for the poor, or impacts on the national economy. The Panel found specific instances of non-compliance or inconsistency with Bank policies (OP 4.00; OP 10.00; OMS 2.20; or OP 10.04), as follows:

- *Assessment of Equivalence and Acceptability:* The Panel found that the SDR did not adequately recognize the gap between Bank policy requirements and national legislation regarding cumulative impacts and environmental management planning in the Environmental Impact Assessment (EIA) process, and that the analysis of acceptability did not adequately address the capacity and implementation track record of key regulatory institutions, particularly at the provincial and local levels, for compliance monitoring and enforcement.
- *Emission of Particulates, Air Quality and Health Impacts:* The Panel found shortcomings in the assessment of air quality issues for the Project and in development of responsive mitigation measures. The Panel felt that due consideration should also have been given to *future* projects in the area (e.g., additional coal mines and coal-fired power stations).

¹ Panel Report, paragraph 180.

- *Water Availability and Quality:* The Panel found that there was inadequate consideration of the Project's direct, indirect and cumulative impacts on availability and quality of surface and ground water resources and that consideration of water resources impacts was not based on a risk-averse approach.
- *Influx of Laborers, Land Development and Local Impacts:* The Panel found that the Environmental Impact Report (EIR) for the Project did not adequately identify mitigatory measures for public infrastructure and services in the Medupi area.
- *Impacts on Local Livelihoods and Poverty:* The Panel found that the assessment in the EIR of possible impacts of the Project on tourism and commercial agriculture was not comprehensive, but acknowledged that Medupi's effect on ecotourism and commercial agriculture was difficult to predict.
- *Local Poverty Reduction:* The Panel found that links between the Medupi power plant and issues of poverty in the impact area of the plant were only addressed in some Project-related documents.
- *Consideration and Economic Analysis of Alternatives:* The Panel found that the economic analysis of the Project contained an inadequate consideration of risks, particularly with regard to water and air externalities, and that no systematic comparative analyses of emission abatement options and associated impacts were undertaken to inform the choice of flue gas desulfurization (FGD).

Management's Response and Recommendations

ix. Management welcomes the Panel's finding of broad concurrence with Bank policies and procedures applicable to the Project. Management further notes that no actual direct harm resulting from the Project was found by the Panel. Management notes the Panel's observations on instances of *potential future harm*, including its observation that, "*It is difficult to predict with certainty the implications of instances of non-compliance by Management*"² at the system level. ***Management strongly believes that the necessary capacity and systems are in place in South Africa to address issues that may arise during construction of the Project, as demonstrated so far, and during operation of the Project.***

x. ***Management also notes that many aspects of the Request do not relate to the EISP or Bank policy, as was discussed by the Board when considering the eligibility of the Request.*** In Management's view the Request for Inspection of the EISP has become a vehicle for raising broader issues of energy and climate policy in South Africa and internationally, which are outside Bank policy and the Panel's mandate. As an example, the Panel Report extensively discusses greenhouse gas (GHG) emissions without drawing any connection to issues of compliance with Bank policy.

xi. With respect to the specific issues where the Panel found the Bank to be non-compliant, Management's response is summarized below:

² Panel Report, paragraph 232.

On assessment of equivalence and acceptability:

xii. *South Africa has a widely recognized, established and robust legal and regulatory system for environmental and social safeguards and a track record of effective implementation of its systems relevant to EISP implementation.* As the Panel notes in its Report, "...South Africa arguably has one of the most advanced legal environmental regimes in the world."³ Its environmental and social safeguard systems have been a best practice model for many developing countries, particularly regarding EIA, and their implementation was demonstrated under a previously approved Use of Country Systems (UCS) project in South Africa. The EISP was selected as a scaled up UCS operation because Eskom had shown substantial corporate commitment to fulfilling the relevant environmental and social legal and regulatory requirements, publicly embracing a sustainability policy on both a corporate and project level.

xiii. *Management carefully reviewed the administrative capacity for environmental compliance monitoring in South Africa relevant to the Project and is confident of its quality.* The Medupi component of the EISP is of national importance and the authorities for the Project are national level agencies. The Panel's Report asserts that there are capacity constraints to implement environmental legislation and that government at all levels suffers from lack of staff and budget resources. Management, as well as the GoSA, acknowledges that environmental regulatory capacity is at best uneven at provincial and municipal levels in South Africa, as is the case in many if not most countries. However, such capacity is much more robust at the national level, in particular with respect to compliance monitoring and enforcement in the energy sector, including the Project.

xiv. *Overall, Management's view is that much of the critique in the Panel's Report refers to procedural issues and to a lesser extent regarding the outcome of such procedures.* The UCS approach requires the Bank to assess and verify if the country's environmental and social safeguard policies are sufficiently robust, have adequate coverage, and the outcomes of their application are equivalent to those resulting from use of the Bank's environmental and social safeguards. Management is of the view that this is the case in South Africa, even if its procedural steps and policies may differ from the Bank's approach.

xv. *Management maintains that the South African legal and regulatory system and specifically the environmental and social safeguards under which the EISP is governed are such that the South African authorities and Eskom are well equipped to address the Panel's concerns regarding potential future adverse impacts, should they materialize.*

On air quality issues:

xvi. *Management is confident that the potential risks of the Project to human health remain low, based on its review of the modeling and historic and ongoing monitoring data.* This review considered both the higher impact area that is downwind of the Medupi

³ Panel Report, paragraph 155.

plant under the prevailing wind conditions, and the nearest town of Marapong, a more densely populated area upwind of the plant.

On cumulative impacts including water and coal mining-related issues:

xvii. *Management reviewed the various analyses, assessments and strategic planning studies by the Department of Water Affairs and found them to be sufficient to address cumulative impacts that might result from the Project's demands on water resources.* The South African regulatory framework and technical capacity for assessing cumulative impacts is particularly robust, because the Department of Environmental Affairs (DEA), which is the responsible environmental authority for issuing Environmental Authorizations,⁴ employs a two-pronged approach to integrated environmental management. In addition to project-specific EIRs, the DEA also has environmental management tools available that allow it to engage in environmental management planning and address cumulative impacts at a strategic level beyond the project-specific EIR.

xviii. *The Equivalence analysis contained in the SDR included a comprehensive and detailed inventory of South African laws and regulations relating to the environmental and social safeguard aspects.* The SDR verified the robustness of the EIA process and its outputs under the requirements of OP 4.00, as well as that of the EIA processes for the two additional lines at Exxaro's Grootegeeluk coal mine and the implementation of the Mokolo and Crocodile Water Augmentation Project (MCWAP). The water supply for the Medupi plant has been the subject of long and thorough discussions with Eskom and Government counterparts, including the Department of Water Affairs (DWA). It is Management's opinion based on its review and assessment that this issue was addressed by DWA in compliance with, and with due respect to the safeguards applicable to water conservation, management, and allocation in South Africa.

xix. *Concerning the issue of coal supply from the Exxaro mine, including its water-related issues, neither the Bank nor the relevant authorities considered coal supply to be an "associated project" that should be considered in the EIR for the Medupi plant, because no new mine will be developed and the expansion occurred within the existing mining authorization area.* The increase in production was determined to have minimal or no environmental and social impacts beyond those already assessed and permitted. In fact, an Amendment to the mine's Environmental Management Programme Report (EMPR) was approved in 2007, based on a 2006 EIA that examined both direct and indirect impacts of the lines. Although the expansion was not considered an associated project impact, nevertheless, as part of its due diligence, the Bank reviewed the environmental documents for the addition of the two beneficiation lines and determined that they were of good quality, with analyses consistent with the expected level of direct, indirect, and cumulative impacts, including those on air quality and groundwater quality.

⁴ These were formerly called the "Record of Decision" (ROD).

On local impacts and poverty reduction:

xx. *The Panel's Report recognizes Eskom's efforts to support the local economy including employment, infrastructure development and social services.* Eskom has responded to the key issue of concern by making a significant commitment to optimize local employment. In addition, as reflected in Annex 1, Eskom has followed up on its commitment to help address infrastructure constraints that existed and might be aggravated by the Project.

xxi. *As the Panel observed in its Report, the urbanization impacts that development of Medupi may have on commercial agriculture and ecotourism are "difficult to predict."*⁵ The Environmental Management Framework (EMF) that is part of the country system approach to addressing cumulative impacts in a strategic manner should help ensure that water resources, biodiversity, and ecosystem services are strategically managed in the expectation of prospective future increases in mining, industrial development, agricultural and tourism activities, and population growth.

On consideration and economic analysis of alternatives:

xxii. Management notes that the economic analysis in the PAD goes beyond the identification of the "least cost" option for meeting electricity needs, thereby satisfying requirements for analysis of alternatives in projects of this type. A range of alternative coal-fired technology options were considered in deciding on the most appropriate technology to adopt.

xxiii. Regarding project externalities, the Bank team considered all the factors, based on the information available when the economic analysis was conducted in 2009/2010, and the outcome of this analysis was consistent with the requirements of OP 10.04. The provisions of OP 10.04 concerning global externality analysis are not applicable to this project as it is not under any international agreement, nor is it financed by GEF.

xxiv. On water supply, although the economic analysis did not explicitly consider the water use at the Grootegeluk mine, because it was not necessary to separately do so, it evaluated the sensitivity of economic returns to the economic value of coal.

xxv. Wet FGD was selected as the preferred sulfur dioxide abatement technology based on an assessment of life cycle costs as well as limited global experience in using "dry-type" FGD for large coal-fired generation units. Semi-dry SO₂ controls also have not been demonstrated in large units in the 800 MW range; in addition, semi-dry processes do not eliminate the need for water and are less efficient in SO₂ removal.

Transparency and Accountability

xxvi. *According to the South African EIA system, the requirement for transparency and access to information covers both, the planning and implementation phase.* For the Medupi Project, Eskom has established an independent Environmental Management

⁵ Panel Report, page xxi.

Committee (EMC) that includes representatives of local communities and the relevant authorities to oversee implementation of the Project in compliance with the requirements of the environmental legislation and the specific mitigation measures stipulated in the approved Environmental Management Plans. These meetings are advertised in local newspapers and open to the public.

xxvii. In addition to the regular meetings of the EMC, Eskom maintains a Public Communications Center in Lephalale town which is open to the public and serves both as an information source about the Project and its environmental performance and a location where local citizens can bring concerns and grievances regarding the environmental impacts of Medupi Project operations.

Management Plan for Project Supervision to Address Concerns

xxviii. ***Management has seriously considered the issues raised by the Requesters and continues to be of the view that any impacts – should they materialize – can be and are being effectively addressed by the responsible South African authorities through the country’s legal and regulatory system.*** Hence, an Action Plan to address such issues would replicate the mitigation measures that the appropriate authorities have already put in place pursuant to South Africa’s regulatory requirements.

xxix. Nevertheless, because the alleged impacts pertaining to water supply and air quality would only be verifiable once Medupi begins operations, (expected to begin in 2013, with the last unit coming on line in 2016), Management proposes to closely monitor: (i) air quality impacts before FGD installation; (ii) progress with MCWAP as it pertains to water supply for FGD and, as relevant, to the adequacy of water supply to Lephalale; and (iii) installation of FGD and the corresponding air quality results. The Bank would thus continue to monitor the above issues until 12 months after commissioning of FGD for the sixth unit, expected to be end 2022. This monitoring will enable Management to follow up with the appropriate authorities on any issues that might arise.

xxx. Management and Eskom have reached agreement to disclose environmental and social aspects of the Bank supervision mission findings for the EISP.

xxxi. Management met with the Requesters on February 15, 2012, in the Bank’s Office in Pretoria to consult on the above actions proposed by Management in response to the Panel Report.

Systemic Issues

xxxii. ***Management takes note of chapter 6 of the Panel’s Report on systemic issues, which relate neither to compliance, nor to harm or potential harm in connection with the EISP.*** This chapter, as well as other sections of the Report, takes an evaluative rather than compliance approach in reviewing issues at the policy level and discusses unrelated Bank projects. Management respectfully notes that the 1999 Clarification of the Resolution requires that “*the Panel will discuss in its written report only those material adverse effects, alleged in the request, that have totally or partially resulted from serious*

Bank failure of compliance with its policies and procedures.” Hence, Management offers no comment on issues raised in this chapter.

I. INTRODUCTION

1. On April 7, 2010 the Inspection Panel registered a Request for Inspection, IPN Request RQ 10/03 (hereafter referred to as “the Request”), concerning the South Africa Eskom Investment Support Project (“EISP”) financed by the International Bank for Reconstruction and Development (IBRD). The Request mainly pertains to Component A of the EISP, which is the construction of the Medupi coal-fired power plant (“the Project”). The Request for Inspection was submitted by groundWork and Earthlife Africa, two nongovernmental organizations from South Africa, on behalf of the representatives of community members located near Lephalale in South Africa’s Limpopo Province (hereafter referred to as the “Requesters”).
2. The Executive Directors and the President of IBRD were notified by the Panel of receipt of the Request. Management responded to the claims in the Request on May 27, 2010. In its report to the Board, the Panel found the Request eligible and recommended that the Executive Directors authorize an investigation. The investigation was authorized by the Executive Directors on July 29, 2010.
3. On November 21, 2011, the Panel issued its Report outlining the findings of the investigation. Management appreciates the Panel’s clear and thorough presentation of its findings. This report, responding to the findings of the Panel, is organized in six sections. Section I comprises this introduction. Section II discusses the Project. Section III summarizes the findings and recommendations of the Panel. Section IV provides Management’s response to the Panel’s findings. Section V outlines Management’s extended supervision plans, and Section VI contains the conclusion. The Panel’s findings, along with the Management’s responses, are described in detail in Annex 1.

II. THE PROJECT

4. *Eskom Holdings SOC, a government-owned enterprise, is implementing the EISP as part of its “New Build” program, which aims to enhance South Africa’s energy security in an efficient and sustainable manner.* The EISP will support South Africa’s economic growth objectives, through expansion of generation capacity, as well as its long-term carbon mitigation strategy, through enhanced energy efficiency and the development of renewable energy sources. The EISP comprises the following components: (a) the 4,800 MW Medupi coal-fired power plant; (b) the 100 MW Sere Wind Power Project and 100 MW Upington Concentrating Solar Power Project; (c) the Majuba Rail Project; and (d) sector investments and technical assistance to support reduction of Eskom’s carbon intensity.
5. *Following several years of sustained economic growth in South Africa, the country’s electricity system is suffering from considerable capacity strain.* Capacity constraints peaked in late-2007/early-2008, seriously affecting the performance of the country’s overall economy and adversely affecting employment. The impact was immediate, increasing unemployment with its associated poverty impacts, forcing businesses to close, and leading to shutdown of the largest mine operations, thus putting

thousands of additional jobs at risk. The energy crisis led to a downward trend of GDP growth which was aggravated by the global financial and economic downturn that began in 2008. The energy crisis also had serious consequences for the Southern African region as a whole, as South Africa's neighboring nations have long relied on it for electricity supply, trade, and investment.

6. Furthermore, the global financial crisis had tightened the international and domestic credit markets, which compromised South Africa's ability to respond to the funding challenges facing the power sector. Decreased availability of low cost capital was compromising Eskom's financial position and its ability to add capacity to the electricity system. Without additional generation capacity, electricity supply would become a "binding constraint" to growth and job creation.

7. Bank support, therefore, was necessitated by the scarcity of suitable long-term financing for the large infrastructure developments Eskom had already launched. The need to act rapidly to address the crisis helps explain why, by the time South Africa approached the Bank for support for the EISP at the end of 2008, Eskom and the Government had already decided on the design of the Medupi plant, and construction had already commenced. The ongoing construction of the Project did not otherwise limit the Bank's extensive due diligence, which was conducted in accordance with the relevant policies and procedures. The relevant policy in this case is OP 4.00, Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects, which uses national environmental and social safeguard-related laws and regulations to avoid, mitigate, or minimize adverse environmental and social impacts of the project supported by the Bank. The Bank's process and decision to apply this policy to the EISP is discussed in detail below.

8. It should be noted that prior to the Bank's support for the EISP, Eskom had made no commitment to renewable energy investments (i.e., the 100 MW Sere Wind Power Project and 100 MW Upington Concentrating Solar Power Project), apart from preliminary design work, technical studies, and carrying out the Environmental Impact Assessment (EIA) process.

III. FINDINGS AND RECOMMENDATIONS OF THE PANEL

9. ***Relevant Bank Policies.*** The Panel assessed the Bank's compliance with the following operational policies and procedures:

- OP 1.00 Poverty Reduction
- OP 4.00 Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects
- OP 10.00 Investment Lending
- OP 10.04 Economic Evaluation of Investment Operations

- OP 13.05 Project Supervision
- OMS 2.20 Project Appraisal

10. As the Medupi power plant is not yet operational, the investigation focused on the appraisal phase of the EISP, and concentrated most specifically on the Bank's assessment of equivalence and acceptability of the South African legal and regulatory framework, since the EISP is implemented under OP 4.00.

11. The Panel did not find specific instances of non-compliance with Bank policies with respect to the following topics:

- The Panel found that, in most respects, Management's analysis of equivalence complies with OP/BP 4.00.
- *Impacts on Cultural Heritage and Practices:* The Panel noted that grave sites at the Medupi site had been identified as part of the heritage study, that Eskom had identified the sites that may be affected by the construction, and that the Bank was assured that if any oversight had been made Eskom would respond in accordance with the relevant Act.
- *Impacts on Energy Access for the Poor:* The Panel noted that although the Project does not have a direct objective to increase access for the poor, it may enhance access by adding more electricity to the national grid.
- *Impacts on the National Economy:* The Panel found that the size and terms of the Loan are “.. unlikely to have any sustained impact on the exchange rate.”¹

12. The Panel found some specific instances of non-compliance or inconsistency with Bank policies. Specifically:

- *Assessment of Equivalence:* The Panel found that the Safeguard Diagnostic Review (SDR) did not adequately recognize the gap between Bank policy requirements and prevailing national legislation with respect to the following two specific aspects of the Medupi EIA process: assessing cumulative impacts and environmental management planning.
- *Assessment of Acceptability:* The Panel found that the analysis of acceptability in the SDR did not adequately address the institutional capacity and implementation track record of key regulatory institutions involved in environmental monitoring and management, asserting that the South African government at national, provincial, and municipal levels lacks sufficient resources for effective compliance monitoring and enforcement with respect to the Project.

¹ Panel Report, paragraph 573

- *Water Availability and Quality:* The Panel found that there was inadequate consideration of the Project's direct, indirect and cumulative impacts on availability and quality of surface and ground water resources and that the Project's consideration of the impacts of Medupi on water resources was not based on a risk-averse approach.
- *Emission, Air Quality and Health Impacts:* The Panel found shortcomings in the assessment of air quality issues for the Project and in the development of responsive mitigation measures to address associated risks. The Panel is of the view that due consideration should also have been given to *future* projects in the Medupi area (e.g., additional coal mines and coal-fired power stations).
- *Analysis of Project Externalities:* (i) Air Quality: the Panel considered that the economic analysis should have included calculations of potential harm from air quality degradation in the area of the Medupi power plant; and (ii) Water Resources: the Panel found that the economic analysis should have included costing for the water required for expansion of the Grooteegeluk mine.
- *Influx of Laborers, Land Development and Local Impacts:* The Panel found that the Environmental Impact Report (EIR) for the Project did not adequately identify mitigatory measures commensurate with its conclusion of impacts of "high significance" on public infrastructure and services.
- *Impacts on Local Livelihoods and Poverty:* The Panel found that the assessment of possible impacts on tourism in the EIR for the Project was not comprehensive and certain conclusions were not backed by empirical analysis. The Panel noted, however, that Medupi's net effect on ecotourism and commercial agriculture was difficult to predict.
- *Local Poverty Reduction:* The Panel found that links between the Medupi power plant and issues of poverty in the impact area of the plant were not addressed in the Project Appraisal Document (PAD) or SDR, and featured only indirectly in the EIR.
- *Economic Analysis of Alternatives:* The Panel found that the economic analysis contained an inadequate consideration of risks, particularly with regard to water and air externalities, associated with the choice of alternatives for the Project.
- *Inadequate Consideration of Emission Control Alternatives for SO₂:* The Panel noted that no systematic comparative analyses of emission abatement options and associated impacts were undertaken to inform the choice of wet flue gas desulfurization (FGD) for the Project.

Section IV and Annex 1 are presented following the above sequence, but with some related sections combined.

IV. MANAGEMENT RESPONSE TO THE FINDINGS

13. Management appreciates the Panel's finding of broad concurrence with Bank policies and procedures applicable to the Project, which includes the Panel's finding that *"in most respects, Management's analysis of equivalence complies with OP/BP 4.00."* and *"that Bank Management generally did good quality work in developing the SDR for the Project as required by OP 4.00."*²

14. ***Management notes the Panel's conclusion that issues of greenhouse gas (GHG) emissions, the impacts of the Project on energy access and of the loan on the national economy were not found to be an issue of compliance with Bank policy.***

15. ***Management observes that many aspects of the harm alleged by the Requesters do not relate to the EISP or Bank policy, as was discussed by the Board when considering the eligibility of the Request.***³ As the Panel's Report points out, the Request raises a number of issues that are outside the Panel's mandate, including the review of the Bank's Strategic Framework on Development and Climate Change. In Management's view, the Request for Inspection of the EISP has also become a vehicle for raising certain broader issues of energy and climate policy in South Africa and internationally that go beyond the question of compliance with Bank operational policies and the Panel's mandate.

16. ***Management further notes that the Panel found no actual direct harm resulting from the Project, and that in its consideration of equivalence and acceptability, the Panel's Report notes that at the system level, "It is difficult to predict with certainty the implications of instances of non-compliance by Management."***⁴ Management also believes that the limited implementation of the EISP to date makes it difficult to identify material adverse effects arising in connection with the Project, as required by the 1999 Clarification of the Inspection Panel Resolution. Management strongly believes, based on extensive due diligence and experience to date, that the necessary capacity and systems are in place in South Africa to deal with any issues that may arise during construction of the Project as demonstrated so far, and during operations.

17. Since the EISP was processed under the Bank's Use of Country Systems (UCS) approach and is being implemented under South African laws, a key issue raised by the Panel's Report, in the context of the EISP investigation, is the application of OP 4.00. This will be addressed in greater detail in the following sections of this Report.

18. ***Overall, Management's view is that much of the critique in the Panel's Report refers to procedural issues and to a lesser extent to the outcome of such procedures.*** The UCS policy requires the Bank to assess and verify if the country's environmental and social safeguard policies are sufficiently robust, have adequate coverage, and the ***outcomes*** of their application are equivalent to those resulting from use of the Bank's environmental and social safeguards. Management is of the view that this is the case in

² Panel Report, paragraphs 180 and 229.

³ Panel Report, paragraphs 18–32.

⁴ Panel Report, paragraph 232.

South Africa, even if the SA approach or *procedures* may differ from the Bank's approach.

19. *Management continues to believe that the South African legal and regulatory system and specifically the environmental and social safeguards under which the EISP is governed are such that the South African authorities and Eskom are well equipped to address the Panel's concerns regarding potential future adverse impacts of the Project, should they materialize.*

20. Management notes the Panel's observations on specific instances of non-compliance during Project design, and offers the following comments and responses to these findings in the section below. *A complete and more detailed response to all findings of the Panel's Report can be found in Annex 1 of this report.*

The Bank's Use of Country Systems

21. *The Bank applied OP 4.00 to EISP, which means project implementation is governed by South Africa's laws and regulations for environmental and social safeguards.*⁵ Under OP 4.00, as approved by the Board in March 2005, the Bank uses Borrowers' environmental and social safeguard-related laws and regulations (the "Borrower's system") to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by the Bank, provided that these laws and regulations have been found to be equivalent to the Bank's own safeguards, i.e., the Bank needs to establish that the Borrower's system is designed to achieve the objectives and adhere to the applicable operational principles set out in the policy. In addition, and equally important, under OP 4.00, "before deciding on the use of Borrower systems, the Bank also assesses the acceptability of the Borrower's implementation practices, track record, and capacity."

22. On January 31, 2008, the Board approved Management's proposal for the continuation and "scaling up" of the UCS pilot program.⁶ The main features of the proposal included the scaling up of the analytical work, the SDR, to the country or sub-national level rather than focusing the analysis on individual projects. In large countries with diverse environmental and social safeguard systems and varying levels of regional and institutional capacity, scaling up could take place on a sub-national level (e.g., state agencies or parastatal organizations) rather than central governmental institutions, with gap-filling and capacity building measures tailored to the strengths and weaknesses of the

⁵ As per OP 4.00, systems refer to the "country's legal and institutional framework, consisting of its national, subnational, or sectoral implementing institutions and applicable laws, regulations, rules, and procedures."

⁶ *Evaluation of the Initial Phase of the Pilot Program for Use of Country Systems for Environmental and Social Safeguards: Lessons Learned and Management Proposal for an Incremental Scale Up of the Program*, R2008-0005, January 9, 2008. See also: *First Year Review of Implementation of Incremental Scaled-Up Program to Pilot Use of Country Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects*, SecM2009-0367, July 14, 2009; *Strengthening Country System and Expanding Their use in Bank-Supported Operations: Updated Report*, SecM2010-0690, December 28, 2010; *Extension of Authority for OP 4.00 – Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects*, R2011-0014, January 18, 2011.

domestic implementing agencies responsible for each project. OP/BP 4.00, including its three key concepts – (1) equivalence between the Borrower system and the safeguard objectives and operational principles outlined in OP 4.00; (2) acceptability of the Borrower system’s implementation; and (3) gap-filling/capacity building measures, designed to attain and sustain full equivalence and acceptability for the project—have remained the basis of the Bank’s approach to UCS for environmental and social safeguards.

23. Since the launch of the *Pilot Program on Use of Borrower Systems to Address Environmental and Social Safeguard Issues* and the issuance of the governing Operational Policy 4.00 in 2005, the Bank has conducted several management and independent (e.g., by the Independent Evaluation Group) reviews of its implementation practice and lessons learned from the application of OP 4.00 to a diverse range of countries, sectors and safeguards. The evolution of Bank practice in the conduct of SDRs (both equivalence and acceptability assessments) has required continual refinement to take into account these diverse circumstances. Against this background, the EISP presented its own challenges given the fact that the Borrower is a parastatal corporation with its own dedicated policy of corporate social responsibility that incorporates both South African legal requirements as well as international corporate social responsibility practices. The “cooperative governance” structure of the South African legal and regulatory system presented additional complexities. Last, but not least, the evolution and economics of supply and demand for both energy and water in South Africa have provided a dynamic background to the development of the EISP from the design stage in 2004 through to present and future developments. The preparation of the EISP has highlighted many of these challenges, and experience from implementation in the EISP will contribute to Bank practice in mainstreaming the selective use of Borrower systems in Bank supported projects.

Management’s View on Equivalence and Acceptability for EISP

24. *South Africa was selected as a pilot country for UCS because of its widely recognized, established and robust legal and regulatory system, and its track record of effective performance and implementation of its systems governing a range of key elements addressed in OP 4.00. These include environmental assessment and protection of natural habitats, protected areas and physical cultural resources, as well as involuntary resettlement.*

25. As noted by the Panel’s Report “..South Africa arguably has one of the most advanced legal environmental regimes in the world.”⁷ South Africa’s environmental and social safeguard-related systems have been a best practice model for many developing countries, particularly regarding environmental impact assessment, and implementation of its systems had been demonstrated under the previously approved UCS pilot project for the Development and Conservation of iSimangaliso Wetlands Area in South Africa. At project identification, the EISP was selected as a scaled up UCS operation because Eskom had demonstrated substantial corporate commitment to fulfilling the relevant

⁷ Panel Report, paragraph 155.

environmental and social legal and regulatory requirements, at times even going beyond them and publicly embracing a sustainability policy on both a corporate and project level.

26. As required under OP 4.00, a SDR was conducted. For this, the EIA processes and the EIRs for the Bank financed Medupi Power Plant and for the independently financed Kusile Power Plant (the latter of similar size to Medupi, but not financed by the Bank) were selected by the Bank's Project team and safeguard reviewers as case studies for more detailed analysis of acceptability.⁸ Selection of these two separate projects allowed the SDR to assess the integrity and robustness of the environmental review and approval process of the Department of Environmental Affairs (DEA) for two major projects of national importance. It also provided broader insights into Eskom's capacity, commitment and capability not only with respect to the EIA process, but also its systems set up for compliance monitoring during construction, as both of these projects were under construction at the time the Bank began work on the SDR and the EISP.

27. The Bank team also reviewed safeguards documents already disclosed by Eskom for additional investments expected to be financed out of the loan,⁹ and therefore did not base its analysis of acceptance solely on the Medupi Project. The review of other EISP components in addition to the more detailed analyses of the two case studies verified the robustness of the EIA process and its outputs under the requirements of OP 4.00, as did Bank review of the EIA processes for the addition of two processing (beneficiation) lines at Exxaro's coal mine and the implementation by the Department of Water Affairs (DWA) of the Mokolo and Crocodile Water Augmentation Project (MCWAP).

28. Initial discussions with government counterparts on the SDR indicated that permitting and compliance monitoring for the key issues of concern for the Project, i.e., air quality and water supply, were responsibilities coordinated at the national level within DEA and DWA, respectively, and not at the provincial or municipal level. DWA had already begun key activities in implementing catchment management strategies and water management planning for the Waterberg District. Given that the Borrower was Eskom and the key environmental authority for permitting and compliance monitoring of Eskom's project was DEA, the SDR review of capacity focused appropriately on Eskom and DEA.

29. Management notes that in making its decision on the equivalence and acceptability of the South African system, it also considered the system as it applies to water issues connected to the Project. The Bank team included in its equivalence analysis a full review of the legal framework applicable to water management and use. A portion of that analysis of water laws and regulations was included in the SDR (pages 85-86) and substantiated by a comprehensive legal review prepared by the team when it started the discussion on the water supply issue with DWA.

⁸ Under South African regulations, a distinction is made between the EIA process, and the EIR, which is a key document produced by the EIA process. Management employs these terms to reflect South African usage.

⁹ These additional investments comprise a wind farm, a concentrating solar power project, and a road to rail component.

30. At the Project level, the EIR for the Project addresses water impacts, but because it is prepared under South African regulations, it recognizes the separate authority of DWA in water management issues. After taking stock of water legislation, the SDR team considered the following: (a) DWA already had identified the Waterberg area as one of national priority for catchment management strategies in the 2004 National Water Resource Strategy, based on a 25-year planning horizon, and had already begun taking key steps to implement its responsibility for addressing water management in the Lephalale service area by launching the design of the MCWAP prior to the drafting of the EIR for the Project; and (b) the water issue was highlighted during the discussion of the EIR by DEA before the issuance of the Record of Decision (ROD), and was discussed in the EIR for Medupi.

31. Under the South African approach to integrated environmental management, cooperative governance, and strategic planning, the delivery of water supply by DWA to the Steenbokpan-Lephalale corridor was a different major investment by the South African government, of which the Project would be one of many, and a relatively minor, beneficiary, which the Bank team recognized at the time that the SDR was being prepared. This is because the MCWAP was identified as a multi-phased, priority project by DWA before the Medupi EIR process began and was expected to be developed to supply water to the Steenbokpan-Lephalale corridor in four phases, even if the Project were not built. At the time the EIR was prepared for the Project, it was expected that the Project would receive about 10 percent of the total additional water delivery by the MCWAP to the Steenbokpan-Lephalale corridor by the time Phases 1 and 2 of the MCWAP were completed.

32. Development of the MCWAP by DWA is subject to the South African EIA process, and although neither the Bank nor Eskom have leverage regarding the process, procedures, and outcomes of the EIA being carried out for DWA's MCWAP, Management instructed the team to closely monitor this process during Project supervision and assess whether it remained consistent with the findings of the SDR regarding the South African system for assessing and managing environmental and social impacts. Progress on the MCWAP and the EIA process for this DWA project has been a key subject for discussion with DWA during preparation of the EISP (June 2009, December 2009) and as part of the Bank team's supervision missions (November 2010, May 2011, August 2011).

33. The Equivalence analysis contained in the SDR included a comprehensive and detailed inventory of South African laws and regulations relating to the environmental and social safeguard aspects of the EISP. The analysis included an extensive literature review tracing the development and evolution of South African environmental law and drew careful distinctions between laws and regulations that are mandatory, as valid comparators to the Operational Principles of OP 4.00, Table A1, and other documents that informed the analysis focusing on the Project.

34. As explained in the SDR, with respect to EA and the legal system designed to manage the environmental and social impacts of the various components of the EISP (not just the Medupi component), to have relevance for the full scope of the EISP under OP

4.00, it was necessary to conduct analysis of equivalence on current legislation and regulations, as well as some laws and regulations that were in effect at the time the various components of the EISP design processes were undertaken (i.e., at different times over the period 2004-2008).

35. The older legislation regarding the EIA process, air quality regulations, and permitting needed to be reviewed because it was applicable to some components of the EISP at the time the EIA process for those components was undertaken. The more recent legislation was reviewed for two objectives: (i) some components of the EISP fell under the newer legislation; and (ii) the Bank needed to understand whether changes in the legislation allowed for continued application of the UCS.¹⁰ With respect to regulations on ambient air quality and emissions limitations from power plants in particular, the new and final regulations include reasonable time frames for upgrading existing or recently permitted facilities to eventually comply with newer regulations. These time frames were not envisaged in the existing and interim regulations in effect at the time that the EIR for Medupi was approved. In Management's view, therefore, the Panel's Report does not seem to have fully reflected why Management concentrated its review on laws in effect at the time construction began, in order to ensure that due diligence had been applied (even though the Bank was not yet involved), while also addressing the laws currently in effect that could have a bearing on future Eskom operations at Medupi, which is the EISP component that is the subject of the Panel investigation.

36. Management also notes that the EIA process and EIR content for the Project were strongly influenced by and were essentially consistent with the EIA Regulations that became effective beginning in July 2006, even though they were not legally applicable to the Project because it came under the pre-existing regulations. Thus, as stated in the SDR, although not required to do so, Eskom chose, and instructed its consultants, to ensure that the EIA process and the EIRs would conform to the proposed new regulations.

37. ***In assessing Equivalence, Management notes that under OP 4.00 the Borrower's legal framework and regulatory system do not need to be a mirror image of Bank safeguards; rather, the objective is to assess whether the relevant Operational Principles found in OP 4.00 Table A1 can be properly identified in the host country's legal and regulatory framework.*** In a similar manner, Management believes that a responsible approach to assessing Acceptability under OP 4.00 also must acknowledge flexibility in processes and procedures in achieving outcomes, rather than expecting mirror images of Bank procedures. In particular, key documents such as Environmental Assessments, Management Plans, or similar safeguards-like documents produced under host country regulations should be carried out in accordance with law (full, fair and bona

¹⁰ OP 4.00 paragraph 6: "If, during project implementation, there are changes in applicable legislation, regulations, rules or procedures, the Bank assesses the effect of those changes and discusses them with the borrower. If, in the judgment of the Bank, the changes reflect a further improvement in the country systems, and if the borrower so requests, the Bank may agree to revise the legal framework applicable to the operation to reflect these improvements, and to amend the legal agreement as necessary. Management documents, explains, and justifies any changes to such framework, and submits them for Board approval (normally on an absence of objection basis). If the country system is changed in a manner inconsistent with the legal framework agreed with the Bank, the Bank's contractual remedies apply."

fide compliance) and be sufficiently adequate and complete so that a decision-maker can make an informed decision. They need not be identical in all aspects to safeguards documents that might have been produced if OP 4.00 had not been applied.

38. This approach is similar in many ways to determining acceptability of national safeguards-related documents (such as environmental impact assessments) in judicial and administrative review processes, and is a foundation on which Bank review and acceptance of safeguards documents prepared by Borrowers should be based. Moreover, with reference to Paragraph 6 of OP 4.00, Management believes that subsequent changes in a Borrower's legal and regulatory framework that bring it further in alignment with the Operational Principles found in OP 4.00, Table A1, whether requested by the Bank or not, should be viewed as reaffirmation that the decision to use country systems was appropriate, in terms of both project appraisal (by the Bank) and in terms of project implementation. In Management's view, both of these factors in assessing Acceptability are relevant and appropriately applied in the EISP.

South Africa's Capacity for Environmental Compliance Monitoring

39. *The Medupi component of the EISP is a project of national importance and at the time the SDR was being drafted and subject to comment, it was clear to the Bank team that DEA at the national level was the relevant authority that approved the EIR and issued the Record of Decision (ROD) for Medupi.* Section 41 of the South African Constitution prescribes a set of principles for cooperative governance that establishes coordinating committees at both national and provincial levels. With respect to a project of national importance, as discussed in more detail below, the national government is *de facto* the effective operating authority for purposes of monitoring and compliance.

40. *Management has carefully reviewed the administrative capacity for environmental compliance monitoring in South Africa that is relevant for the Project.* While the Panel's Report asserts that there are capacity constraints in the South African Government to implement environmental legislation and that Government at all levels suffers from a lack of staff and budget resources, Management has not found evidence of ineffective compliance monitoring and enforcement in the context of the EISP, and the Medupi component in particular. In contrast, the SDR describes measures taken by DEA in recent years to improve the relevant regulatory framework and provide capacity building and training in an effort to provide more effective environmental management and environmental protection. Moreover, Management found that such constraints that might exist at lower tiers of Government have not been an issue in implementing large or complex projects, including projects in the power sector, which are usually closely controlled and supervised by central Government authorities.

41. *The ROD for the Project addresses compliance monitoring and enforcement by DEA and not by provincial or local government.* This includes, inter alia, the requirement for the appointment of an independent Environmental Control Officer (ECO) that regularly reports directly to DEA and to an Environmental Management Committee (EMC), and is responsible for compliance monitoring and auditing. The Environmental Monitoring Inspectorate (EMI) established by DEA is playing an increasingly important

and effective role in monitoring and enforcing compliance with South African environmental laws, regulations and authorization conditions.

42. According to the South African EIA system, the requirement for transparency and access to information does not end with project approval by the DEA, but continues through the implementation phase. In the case of the Medupi power plant, for example, the ROD requires Eskom to establish an independent EMC that includes representatives of local communities (Marapong and Lephalale), representatives from DEA and the provincial environment department, a senior site manager from the main contractor, and qualified professionals from the EIA preparation team. It is the task of the EMC to oversee project implementation in compliance with the requirements of the ROD, environmental legislation, and specific mitigation measures stipulated in the approved EMPs. Such an EMC has been established for Medupi and is actively engaged in monitoring project implementation and has recently increased its efforts to facilitate greater community interaction. It advertises its meetings two weeks in advance in local newspapers (see Annex 2). Results of environmental monitoring are presented in the first half of the meeting, which is open to the public, followed by a discussion of the information and concerns raised by meeting participants that are related to the environmental performance of the Medupi Project. Issues of concern to the EMC are placed on the agenda. After the public session adjourns, the EMC continues in closed session to discuss the issues that have been raised by the public or by the ECO during the open session, and to identify actions that must be taken. These decisions are then presented to the public in the next EMC meeting.

43. In addition to the regular meetings of the EMC that are locally advertised and open to the public, Eskom maintains a Communications Center on Pika Street in Lephalale town. The Communications Center is open to the public and serves both as an information source about the Project and a location where local citizens can bring concerns and grievances regarding the environmental impacts of Medupi Project operations.

44. ***The EMC and the Eskom Communications Center in Lephalale town are mandated to focus specifically on the Medupi Project and its environmental performance.*** There are other fora, however, available to the public to raise issues and concerns on broader topics of local interest. For example, on broader issues regarding local development, Management views the Lephalale Development Forum, chaired by the Municipality, as an important ongoing mechanism for the public to register themselves as Interested and Affected Parties or as a Stakeholder and actively participate in these meetings. The periodic updating of the Integrated Development Plan for the municipality is another forum that provides an ongoing opportunity for local citizens to engage on broader issues regarding local development.

45. ***DEA is of the view that while there are sectors with large numbers of transgressions there are others that are largely compliant.*** Typically small scale mining, property development and agriculture fall in the former category, while the energy sector falls in the latter. DEA, like any governmental agency in any country responsible for monitoring and enforcement of regulations, acknowledges that there is room for

improvement, especially if provided with greater budget and staff resources, but is also of the view that good strides have been made in this regard and disagrees with the manner in which some have portrayed the enforcement regime.

46. DEA considers that the steep legal penalties, the strong line taken by the Courts regarding environmental transgressions and the high visibility and success of the EMI (along with its enforcement arm known as the “Green Scorpions”) are supporting increased compliance with the legislation and conditions of authorization.¹¹

47. ***In addition, the South African Judiciary, in many highly visible cases, has issued decisions that supported the rights of citizens to participate in EIA-related decision making processes.*** Such cases include the internationally known *Earthlife Africa (Cape Town) vs. Director-General DEAT*, where the Court found that the applicant (Earthlife), was entitled to a fair hearing before the decision was made to build a nuclear reactor at the Koeberg Nuclear Power Station¹² or *Bato Star Fishing (Pty) Ltd vs. Minister of Environmental Affairs and Tourism* where the Court examined inter alia whether the Minister failed to give due consideration to the Marine Resource Living Act.¹³ The above consideration for the wide variety of processes through which South African authorities are addressing environmental law implementation and enforcement issues¹⁴ were all reviewed by the Bank in the due diligence process and provided added means for confidence in the future monitoring of the EIA undertaken, reviewed, cleared and supervised by DEA for the purpose of the EISP.

48. ***Management is confident that South Africa has sufficient capacity to monitor and enforce environmental compliance for the purpose of the EISP. This has been demonstrated by the implementation of the Project thus far.*** For example, DEA’s Environmental Management Inspectorate (the “Green Scorpions”) carried out a spot inspection in December 2010, which produced positive news in the local press regarding EMI’s findings on Project compliance. One legal contravention was identified at the Medupi site during Eskom’s fiscal year 2010/2011, after a DWA site inspection in early December 2010. This was the absence of a Water Use License to use wastewater (mostly wash water) from the batching plant for on-site dust suppression; the absence of a license for this specific water use was quickly corrected.

¹¹ According to DEA, the “Green Scorpions” are a component of the Environmental Management Inspectorate (EMI) and are recruited from among members of the EMI. However, unlike the EMI which investigates allegations of both administrative and criminal offenses, the Green Scorpions focus exclusively on criminal offenses under environmental law and have a dedicated prosecution authority independent of the EMI.

¹² 2005 (3) SA 156 (c), 2006 (10) BCLR 1179 (C).

¹³ (2004 (4) SA 490 (CC) BCLR 687 (CC).

¹⁴ Kidd, Michael. “Environmental Audits and Self-Incrimination,” *The Comparative and International Law Journal of Southern Africa* 37:1, 84-95 (2004); and same author, “Environmental Crime – Time to Rethink in South Africa?” *SAJELP* 5:181 (1998).

South African Approach to Cumulative Impacts

49. Both OP 4.00¹⁵ and the South African EA system refer to assessment of cumulative impacts as appropriate in the project context. The National Environmental Management Act (NEMA) requires that cumulative impacts be considered both in the EIA process and by decision-makers. Because EIA in South Africa is primarily used as a permitting instrument, (which is a common feature of the EIA process in most countries), and because the EIA process results in a permit with conditions for which the applicant is responsible, it is difficult to include a detailed assessment of impacts that are not under the control of the applicant. At the same time, the permitting authority needs to be in a position to decide on the acceptability of impacts not only as a result of the applicant's proposed project but for all of the activities in the project area.

50. *In order to address this issue, South Africa has adopted a two-pronged approach, whereby cumulative impacts or effects are dealt with at both a strategic and an activity level.* On the strategic level, the Government uses the Strategic Environmental Assessment (SEA) approach to develop Environmental Management Frameworks (EMFs) for defined areas as described below. An EMF takes into consideration all existing and planned (or anticipated) activities, and then models impacts on air, water, land use, and the socio-cultural landscape. This forms the baseline against which decisions on specific development applications can be based. It also informs land use planning and management for the area, using a participatory planning process. At a project-specific level, the applicant assesses the incremental contribution of the proposed activity with respect to the baseline to assess cumulative impacts of the project. This forms part of the EIA process, even though it focuses on what is under the control of the applicant and on that for which the applicant can reasonably and lawfully be made responsible through permit conditions. At the same time, NEMA requires the permitting authority to consider cumulative impacts at a more strategic level when determining the conditions to be included in the ROD, now referred to as the Environmental Authorization.

51. The SDR found that the DEA uses this two-pronged approach in carrying out its responsibility for integrated environmental management. In preparing the ROD for the Project, the DEA took into consideration the cumulative impacts of the proposed Project on the environment, especially on the affected airshed. The DEA explicitly considered the emission sources already present, and, recognizing that further proposed developments in the Project area could have adverse cumulative impacts beyond those of the Project, made three important decisions. First, the ROD imposed a requirement on Eskom to monitor air quality impacts and take remedial measures if needed to ensure ambient air quality was not degraded in the Project area, including the possibility of remedial actions involving the nearby (Eskom-owned and operated) Matimba power plant. Second, DEA launched in parallel the development of an EMF for the Project area to guide future planning, development, and permitting decisions. Third, DEA proposed designating the airshed as a National Priority Area for air quality management and as a proactive measure, i.e., before the airshed degraded.

¹⁵ Operational Principle 1 in Table A1 of OP 4.00.

Addressing Climate Change and Externalities

52. *With respect to the Inspection Panel's finding on GHG emissions and exacerbation of climate change, Management notes that this is not a matter of Bank policy compliance.* Nevertheless, Management considers that the Government not only carefully considered the particular case of the Project, including domestic, cross-border and global externalities, but also the country's longer-term goals towards developing alternative sources of energy, including a serious effort to include renewable energy as part of its domestic policy and international commitments. In this manner, Management is satisfied that the Government's system is consistent with the operational principle under OP 4.00 that assessment includes transboundary and global concerns. Management also notes that the Panel's Report finds that Management acted consistently with Bank policy in preparing an extensive analysis on the issue of GHG externalities.¹⁶

53. *The Government of South Africa (GoSA) is strongly committed to addressing climate change.* It has ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol on July 31, 2002. Indeed, the GoSA hosted the 17th meeting of the UNFCCC on November 29–December 10, 2011. Although it has no obligations to reduce emissions under the UNFCCC regime, it was also one of the first developing nations to formalize its political commitment to reducing emissions over the long term, again reflecting that the South African system is fully cognizant of global concerns. This commitment was formally conveyed to the UNFCCC Secretariat following the 15th meeting of the Conference of the Parties, as part of the “Copenhagen Accord.” It has also adopted a National Climate Change Response Strategy; issued Electricity Regulations for Energy Efficiency; and as part of its Copenhagen Accord commitment, agreed to implement economy-wide emission reduction targets for 2020.

54. *South Africa is putting in place a new development paradigm that addresses its energy security while also following a long-term strategy to protect against the effects of climate change.* The strategy to lower its carbon intensity has been examined by the GoSA and peer reviewed, with Bank support, under the Long-Term Mitigation Scenarios (LTMS) Study. Subsequent to the LTMS, the GoSA has recently approved the Integrated Resource Plan, which envisages a large reduction in the share of fossil-fueled power generation and a corresponding increase in renewable energy sources, like concentrating solar power and wind. The EISP and the Clean Technology Fund (CTF)-financed Eskom Renewables Support Project (ERSP) are helping the GoSA implement the strategy by financing the first two utility-scale renewable energy power projects and a large power plant that had already begun construction to meet the urgent power demand. In parallel, the GoSA recently invited Expressions of Interest from the private sector for renewable energy development and has received responses for a cumulative 1,416 MW.

55. *In this context, Management notes that while the Panel's Report acknowledges that GHG emissions are not an issue of compliance with Bank policy, Chapter 4.E of the Panel Report goes on to discuss the question of GHG emissions by the EISP, without making any relevant policy citation.*

¹⁶ Panel Report, page xvii.

56. *The Panel's Report also cites the global externality analysis under OP 10.04, which, unlike OP 4.00 provisions on Environmental Assessment, is not applicable in this context to this Project as the EISP is not under any international agreement, nor is it financed by the Global Environment Facility (GEF).*¹⁷ The Panel's Report further points to "several Bank policies,"¹⁸ which would contain the requirement for the Project to address its own externalities, but does not cite said policies. Indeed, OP 4.00 includes the required Operational Principle that the "government does not finance project activities that would contravene such international [environmental] obligations." Clearly, as noted above in paragraph 53, the Bank team had an appropriate basis to conclude from the available record that South Africa is operating in compliance with the UNFCCC. Management recognizes that where OP 10.04 is not applicable, other tools may be used to assess global externalities, where they exist. To that extent, it is *per se* not feasible within a very large thermal power generation project (which provides nearly 10 percent of the total system generation) to address such externalities in the context of one Bank financed project, and this has also not been policy or practice in Bank financing. Moreover, as noted above, such issues must also be considered within the realm of, and with reference to, the UNFCCC.

Alleged Health Issues

57. *Management is confident that the potential risks of the Project to human health remain low, based on its review of the modeling and historic and ongoing monitoring data. This review considered both the higher impact area that is downwind of the Medupi plant under the prevailing wind conditions, and the nearest town of Marapong, a more densely populated area upwind of the plant.*

58. In defining and assessing human health risk, the EIR, the DEA and the Bank team follow the widely accepted and long used definition that risk is a product of hazard and exposure. In the case of human health risk from air emissions, the measure of hazard is the concentration of pollutants in ambient air, and exposure is the likelihood that people will be present, especially people with significant respiratory problems that make them more sensitive and vulnerable. It is important to note that threshold concentrations for people at risk are usually incorporated into ambient air quality guidelines established by the World Health Organization (WHO) and national legislation for ambient air quality.

59. At the time the EIR was being prepared for the Project (2005-2006), Schedule 2 of South Africa's Air Quality Act issued in 2004 was applicable, which set interim ambient air quality standards that were closely aligned with WHO guidelines¹⁹ for the

¹⁷ OP 10.04, states, "A project's global externalities—normally identified in the Bank's sector work or in the environmental assessment process—are considered in the economic analysis when (a) payments related to the project are made under an international agreement, or (b) projects or project components are financed by the Global Environment Facility. Otherwise, global externalities are fully assessed (to the extent tools are available) as part of the environmental assessment process and taken into account in project design and selection."

¹⁸ Panel Report, paragraph 432.

¹⁹ Regulations issued pursuant to South Africa's 2004 Air Quality Act are consistent with the "interim targets" recommended by the WHO for application to developing countries and/or circumstances involving

protection of human health and with European Union Directives. In addition to using South African ambient air quality thresholds that were in effect at the time, the EIR chose to include as part of the modeling and analytical work the European Commission (EC) 1-hour criteria that are recognized as particularly stringent with respect to human health, especially for SO₂. The GoSA interim ambient standards did not include a 1-hour limit for SO₂, but in the EIR analysis the EC's 1-hour limit of 350 µg/Nm³ was applied. To put this EC criterion in perspective, California (USA) has defined a 1-hour threshold risk level of 660 µg/Nm³ for at-risk individuals; thus, the threshold used in the EIR analysis for 1-hour exposure is strongly precautionary for predicting impacts on human health.

60. As required by the DEA ROD that authorized Eskom to proceed with the Medupi Project, Eskom carried out continuous monitoring of air quality in Marapong. The Air Monitoring Report, based on three years of continuous monitoring for PM₁₀, SO₂, NO₂, and ozone, concluded that air quality in Marapong will not be affected by Medupi. The data show that coarse particulates (PM₁₀)²⁰ are the major pollutant of concern in the area and that the main sources are: vehicle traffic, especially moving at high speeds on unsealed roads; blasting and drilling at nearby mine sites; earthmoving at nearby construction sites; and wind erosion from bare soil. Similar sources account for relatively high particulate levels that have been observed in other regions of South Africa. This conclusion is strongly supported by the most current United States Environmental Protection Agency (USEPA) research demonstrating that power plant emissions are not significant sources of coarse particulates, for which the major sources are dusts generated from roads, dry river beds, agricultural activities, mining and construction. In addition, in 2006 USEPA rescinded its annual ambient regulatory standard for PM₁₀ due to "*insufficient evidence linking health problems to long-term exposure to inhalable coarse particulate pollution.*"²¹ Finally, Matimba is equipped with electrostatic precipitators with 99.77 percent design efficiency for removal of particulates and Continuous Emissions Monitors (CEM) on both of its stacks, and therefore is unlikely to be a major source of particulate emissions.

61. With respect to the construction of Medupi, the ROD requires Eskom to control particulate emissions (including dust) consistent with national ambient and emission regulatory standards. These requirements were included and expanded upon in the construction stage Environmental Management Plan for the Medupi Project,²² implementation of which is the responsibility of Eskom, with monitoring and compliance by the ECO and the EMC. During the operational phase of the Medupi plant each of the six units will be equipped with ultra-high efficiency particulate control technology, as well as CEM. On this basis, the Marapong Air Monitoring Report concluded at the end of the three years of continuous monitoring that no further actions are required at Medupi or

previously degraded airsheds. See WHO Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Oxide and Sulfur Dioxide. Summary of Risk Assessment, World Health Organization, 2005.

²⁰ PM₁₀ = Particulate matter up to 10 micrometers in diameter.

²¹ USEPA. Fact Sheet, Final Revisions to the National Ambient Air Quality Standards for Particulate Pollution, 2006.

²² Eskom, Environmental Management Plan for the Medupi Coal Fired Power Station in the Lephalale Area, Limpopo Province, The Construction Phase, 16 April 2007, Section 4.15.2. Environmental Specifications, Dust Control.

the nearby Matimba Power Station for air pollution control in Marapong, so long as emission and ambient regulatory requirements are met. Monitoring of construction impacts, including ambient air quality, is ongoing, and the Bank team continues to review these data as part of or in preparation for supervision missions.

62. On December 24, 2009, the Minister of Water and Environmental Affairs issued final ambient air quality standards for South Africa, to take effect immediately. Unlike the interim standards, the final standards are expressed as a combination of limit values and frequencies of exceedance. For SO₂, a 1-hour limit value of 350 µg/Nm³ has been introduced, which was also used in the Medupi EIR, as well as a 10-minute standard (500 µg/Nm³); the other threshold values are unchanged from what was used in the EIR for the Project. The frequencies of allowed exceedance (which were not considered in the EIR analysis) represent the maximum number of times a threshold value can be exceeded at a given sampling location in a calendar year without resulting in non-compliance with the standard (which means the EIR findings are biased towards a presumption of non-compliance, because they did not take into account any allowance for a specified yearly exceedance frequency).

63. If these exceedance frequencies had been in effect at the time the EIR was written, its conclusions would have demonstrated that the baseline data showed virtually no instances of non-compliance with any of the standards, nor would SO₂ concentrations predicted by the dispersion model result in non-compliance in Marapong. Similarly, the five exceedances measured in Marapong over 2008-09 are well within the tolerance for the 1-hour standard, and the SO₂ concentrations predicted by the dispersion model would also not result in non-compliance at that site. The air quality model predicts that even with both Medupi and Matimba in operation without the FGD emission abatement technology, the annual average limit for SO₂ would not be exceeded in the maximum impact area downwind of Medupi. Management believes that the model predicts a worst-case condition but recognizes that incidents of technical non-compliance with daily and hourly ambient standards for SO₂ are likely.²³ Nevertheless, the risk of human health impacts, as a function of hazard and exposure, remains low because: (a) the 1-hour thresholds adopted by South Africa are stringent even for at-risk individuals as described above; and (b) the sparse population on the game farms in that area makes it highly unlikely that there would be any detectable increase in respiratory problems among the people living there. In its due diligence, Management took note of the ROD conditions calling for monitoring (Eskom is in the process of selecting the location for the downwind station), installation of SO₂ abatement equipment as necessary at Medupi and,

²³ It is predicted that operation of the six units of the Medupi plant without FGD would raise the number of times the daily concentration limit for SO₂ is exceeded in the affected area downwind to 33 times per year. The more stringent hourly limit could be exceeded 419 times in a year downwind (a frequency of less than 5 per cent). The validation exercise for the air quality modeling presented in the EIR suggests that the EIR likely over-predicts levels and impacts of future ambient concentrations because the predicted values (model results) for baseline (existing) conditions, using hourly levels of concentration as the most sensitive indicator, exceeded measured values (observations from recent air quality monitoring data) by a factor of at least six. Therefore, Management considers the air quality modeling work in the EIR to be an appropriate basis for a risk-averse approach to assessing the potential impacts of the project on human health.

should monitoring results indicate non-compliance with ambient standards, also at the existing Matimba power plant.

64. ***As noted in the Panel's Report, Management insisted on, and obtained a legal commitment by Eskom to install FGD at Medupi.*** It is worth noting, however, that although the Bank's conditions for engagement in the EISP may have helped to ensure Eskom's commitment to FGD, the new ambient air quality standards that the GoSA promulgated in December 2009 subsequent to the issuance of the Medupi ROD would, in any case, require installation of FGD within a time frame specified in the regulations.²⁴ This provides further evidence of the robustness of the South African system.

65. With respect to the reference in the Panel's Report to the need for consideration of probable future developments in the cumulative assessment, and in any determination by DEA of the appropriate level of mitigation, it is important to note that the South African country system provides a robust approach that goes beyond what can realistically be accomplished in a project-specific EIA. First, the Waterberg EMF, initiated by the DEA to facilitate decision-making under the 2006 EIA Regulations, is a vehicle for considering and managing a wide range of development possibilities in the region. Second, the process of designation of the greater Waterberg municipality as a National Priority Area for Air Pollution Control will lead to development of an air quality management plan and will give DEA the authority to impose limits more stringent than national standards on existing and future air emission sources if necessary to achieve compliance with ambient standards. It is now in the final comment stage prior to approval by the Minister of Water and Environmental Affairs. Third, as noted in the Panel's Report, Management has been supporting development of a regional environmental and social assessment (RESA) for power development in the region that involves Botswana as well as South Africa. Preparation of the RESA with the engagement of the respective environmental authorities and power producers on both sides of the border offers an opportunity to examine cumulative impacts as a transboundary issue at a more strategic level of cooperation.

Cumulative Impacts Regarding Water and Coal Mining-related Issues

66. ***Management reviewed the various analyses, assessments and strategic planning studies by the Department of Water Affairs and found them to be sufficient to address cumulative impacts that might result from the Project's demands on water resources. Moreover, Management wishes to clarify that OP 4.00 does not require a "risk averse approach," but provides a framework to identify, avoid, and manage project impacts.***

Water-related Issues

67. Well prior to the Medupi EIR process, the Government anticipated that the vast coal reserves of the Waterberg area would be further developed, mainly for power generation.²⁵ Nevertheless, as explained below, water resources planning in South Africa

²⁴ Refer to SDR, paragraph 179.

²⁵ However, as reflected in the Integrated Resource Plan, there has been a significant reduction in proposals for future coal-fired power plant construction in South Africa since the Medupi EIA process began and the MCWAP was being planned and designed by DWA.

ensures that all priority requirements, “Reserves” in particular, are taken into account. The concept of the water “Reserves” is central to water resource management in the country and establishes priority of use according to the National Water Act (No. 36 of 1998) (NWA). The Reserves relate to the quantity and quality of water required to satisfy the following two elements: the Basic Human Needs Reserve, which provides for essential needs of individuals; and the Ecological Reserve, which relates to the water required to protect the functional integrity of aquatic ecosystems. These needs take priority over any water use for agricultural or industrial purposes and were taken into consideration by DWA in the planning of the MCWAP.

68. Development of the MCWAP by DWA is subject to the South African EIA process. Management instructed the Bank team to closely monitor this process during Project supervision and assess whether it remained consistent with the findings of the SDR regarding the South African system for assessing and managing environmental and social impacts. Progress on the MCWAP and the EIA process has been a key subject for discussion in the Bank team’s supervision reports.

69. The intended users of MCWAP water will need to apply for a water use authorization in terms of Section 21 of the NWA. The water use authorization process will duly consider the determination and implementation of the Ecological Reserve. For the Mokolo catchment, the Intermediate Reserve Determination Study (DWAF, 2007) has now been signed by the Minister, and has full legal standing. As such, it can be used officially for planning purposes. This study determined the minimum flow regime downstream and therefore how much water can be abstracted and allocated among the various water use authorizations after taking into account the Reserve.

70. The Panel’s Report notes that the way impacts on water have been addressed in the Project “*may not be consistent with the operational principle .. in OP 4.00.*”²⁶ Management is unclear about this statement’s relevance for compliance with Bank policy and is not in a position to speculate about the statement’s intent.

Coal Mining-related Issues

71. ***The Grootegeeluk colliery has been operated since early 1981 by Exxaro, a private sector operator.*** Within its 6,528 hectare (ha) concession there are an estimated 5,600 million metric tons of coal, making it one of the most significant deposits in the region. The environmental impacts of operating within Exxaro’s concession have already been assessed as part of the Environmental Authorization to operate, and the mine’s Environmental Management Program is updated regularly.

72. ***Neither the Bank nor the relevant authorities considered the coal supply mine to be an associated project that should be considered in the EIR for the Medupi plant, because no new mine would be developed and operation and extension occurred within the existing mining authorization area.*** The impacts of the mine had already been considered and their management planned and committed to independently of the EISP.

²⁶ Panel Report, paragraph 348.

Management has determined that the only potential impact of the Project on the colliery is the relationship between the construction schedule for Medupi and the financing of Exxaro's colliery expansion, a tenuous relationship at best and having no material environmental impact. For this reason it was not considered an "associated impact" following recognized uses of the term. This is evident from the fact that the expansion of production levels by Exxaro within Grootegeeluk's existing area of authorized operation requires only an amendment to its Environmental Management Programme Report (EMPR), because the Environmental Authorization has already been granted for the mine to operate.

73. *The installation of the two additional beneficiation lines within the existing Exxaro operations footprint was subject to the EIA process in early 2006. The ensuing increase in production within the previously approved mining concession was considered by DEA to have minimal or no environmental and social impacts beyond those already assessed and permitted.* In accordance with South African environmental regulations, an Amendment to the EMPR was prepared and approved in 2007, based on the environmental and social assessment that examined both direct and indirect impacts of the installation and operation of the two additional beneficiation lines, as discussed in the PAD. Although the Bank team did not consider the Exxaro colliery expansion to be an associated impact, nevertheless, as part of its due diligence, it reviewed the Amended EMPR, along with its accompanying environmental and social assessment, and concluded that it was of good quality, consistent with the expected level of direct, indirect, and cumulative impacts, including those on air quality and groundwater quality, which in turn would include the low risk of acid mine drainage from this mine operation.

74. *Acid mine drainage was discussed in detail in the documentation prepared by Exxaro for adding the two beneficiation lines, and also in the Medupi EIR as part of the description of the current baseline.* Key factors in determining that there was low risk for off-site groundwater contamination include: generally low rainfall, generally poor quality of groundwater because of natural geological conditions, and low soil and rock permeability that produces very low rates of off-site groundwater movement. Local consultations on and disclosure of the Amended EMPR and its incorporated environmental and social assessments, as required by the South African environmental regulations, also were consistent with what would be expected in accordance with OP 4.00. Subsequent research has been carried out through funding by the Water Research Commission of South Africa on how water quality and quantity will be affected by mining methods and mining of the Waterberg coal reserves west of the Daarby fault.²⁷ This was done in anticipation of future expansion of mining in the coal fields. Although the study shows there is the potential for acid formation from a wide range of samples taken and tested, the low rainfall and water availability and low soil and rock permeability are significant factors in reducing the risk and aiding appropriate preventative measures. The study goes on to recommend that the methods of mining, beneficiation, remediation and water management currently being employed by Exxaro at its Grootegeeluk mine be employed by the new mines. The methods being used at the

²⁷ WRC Report No. 1830/10/1, January 2011.

Grootegeeluk mine have been proven to be the best possible solutions for the conditions found in the area.

Consideration of Alternatives

75. *Management is confident that all feasible alternatives were considered in the assessment provided in the PAD. The economic analysis in the PAD goes well beyond the identification of the “least cost” option for meeting electricity needs, traditionally used for analysis of alternatives in such projects. Management also notes that a range of alternative coal-fired technology options were considered in deciding on the most appropriate technology to adopt.* In addition to analysis of least economic cost (as required by OP 10.04), and of projected GHG emissions, the PAD and the economic analysis background report examined, among others, financial feasibility, and technological and geopolitical readiness as additional criteria.

76. With respect to renewable energy options, paragraph 113 of the PAD explains why regional hydropower was found not feasible—due to timing and size, and the recognition that there will be a permanent capacity shortage by 2012. Such capacity constraint would have an adverse impact on GDP (e.g., a capacity reduction of 10 percent would lead to a 6 percent reduction in GDP).²⁸ Furthermore, paragraph 159 explains why other renewables, like wind, were also found not feasible in the Medupi time frame—due to technological limitations and cost, even if externalities were taken into account. For example, the capacity of wind power that would have had to be installed to substitute for Medupi would be four times that of Medupi, and at a much higher cost. Even then, the supply from wind would remain intermittent and limited. Based on technological development, the only renewable option that could be compared with Medupi in terms of firm supply was therefore 4,800 MW of regional hydropower supply. However, as discussed in the PAD (paragraph 159), the construction of these projects in the Medupi time frame was not feasible.

77. With respect to options such as Demand-side Management (DSM) and smaller hydropower projects, the PAD noted that these were not mutually exclusive alternatives, because they would in any event be implemented in addition to Medupi. Regarding the choice of coal-fired technology, Eskom’s decision to adopt Supercritical technology in 2006 was based on a thorough assessment of alternative technologies such as Subcritical, Ultrasupercritical, Pulverized Coal, Fluidized Bed Combustion, and Integrated Gasification Combined Cycle. The assessment of alternative technologies and the rationale for selecting Supercritical technology are discussed in the PAD (paragraphs 116-117),

78. On Project externalities, the Bank team considered all the factors, based on the information available when the economic analysis was conducted in 2009/2010, and the outcome of this analysis was consistent with the requirements of OP 10.04. As noted above in paragraph 53, this Project is not one under any international agreement, nor is it

²⁸ PAD, paragraph 29.

financed by GEF and hence the global externality analysis under OP 10.04 is not applicable to this Project.

79. On water supply, although the analysis did not explicitly consider the water use at the Grootegeluk mine, the economic analysis evaluated the sensitivity of economic returns to the economic value of coal, which shows the switching value for the economic price of coal (USD155/ton) to be five times the assumed baseline value (USD155/ton v. USD32/ton). It should also be noted that the coal will be supplied by an independent mining company and the negotiated price includes all input costs of the Grootegeluk mine.

80. Wet FGD was selected as the preferred sulfur abatement technology based on an assessment of life cycle costs and limited global experience in utilization of “dry-type” FGD for large coal-fired generation units. It took into account the fact that dry and semi-dry SO₂ controls have not been demonstrated in large units in the 800 MW range. Moreover, semi-dry processes do not eliminate the need for water; they reduce water requirements by roughly 50 percent. They are also less efficient in SO₂ removal.

Local Poverty Reduction

81. *The Panel’s Report recognizes Eskom’s efforts to support the local economy including employment, infrastructure development, skills development, and social services.* A key issue of concern to local communities during the preparation of the EIR was employment opportunities and Eskom responded by making a significant commitment to optimize local employment both directly and through its contractors and subcontractors. The social assessment done under the EIA for Medupi mentioned employment as a key community concern and determined that: (a) “*the proposed power station would lead to the creation of a number of job opportunities, both during its construction and operation;*” and (b) social investment and infrastructural improvements would be developed by Eskom (Chapter 15, Page 413). Also, beyond employment creation, Eskom has been closely working with local communities to address infrastructure constraints that existed and might be aggravated by the Project.

82. *As the Panel observed in its Report, the urbanization impacts that development of Medupi may have on commercial agriculture and ecotourism are difficult to predict.* In this circumstance, the EMF that is part of the country system approach to addressing cumulative impacts in a strategic manner proves particularly valuable. The objective of the EMF is to ensure that water resources, biodiversity, and ecosystem services are comprehensive and well managed in the expectation of prospective future increases in mining, industrial development, agricultural and tourism activities, and population growth in the Waterberg area. Eskom reports that the EMF Report and the accompanying GIS data sets have been made available to local authorities and agencies at the provincial, district, and municipal levels, and that training in their use for planning and permitting purposes is being provided to “Interested and Affected Parties” by the consulting firm contracted by DEA to facilitate the preparation of the EMF.

Alleged Impacts on Cultural Heritage and Practices, Energy Access for the Poor and the National Economy

83. *Management concurs with the Panel's finding that there are no issues of compliance with Bank policy with respect to alleged impacts on cultural heritage and practices, energy access for the poor, or the national economy.*

84. *Cultural heritage and practices:* The conservation of cultural resources is a key issue treated in the ROD for the EISP and Management is satisfied that South Africa has the necessary regulations and Eskom the institutional capacity to implement the Project while conserving the natural habitat and physical cultural resources in the area. The plant communities on the Project site were found to be characteristic of the surrounding *bushveld*, and clearing of the site would not significantly reduce the availability of plants with medicinal uses associated with cultural practices in the area.

85. *Energy access for the poor:* South Africa and Eskom have increased overall access to electricity from 34 percent to over 81 percent since 1994 and the Government has made provision for connecting the remaining 19 percent of households, the majority of whom are poor, by 2014. This has not been achieved anywhere else in Africa, and is a rare achievement in the developing world. The GoSA was able to do so due to a substantial surplus of generation capacity, which no longer exists. Therefore, although the Project does not finance new connections, such connections need to be preceded by installation of adequate generation capacity to ensure their effectiveness.

86. *National Economy:* The Loan will not put undue stress on the country's foreign exchange situation because the payment on the principal amount will be no more than 0.1 percent of the country's total exports in any given year. Moreover, the IBRD loan is one of the cheapest loans available to Eskom, and with the longest maturity.

Systemic Issues

87. *Management takes note of chapter 6 of the Panel's Report on systemic issues, which appear to relate neither to non-compliance, nor to harm or potential harm in connection with the EISP.* This chapter, as well as other sections of the Report, takes an evaluative approach in reviewing issues at the policy level and discusses unrelated Bank projects. Management respectfully notes that the 1999 Clarification of the Resolution requires that "*the Panel will discuss in its written report only those material adverse effects, alleged in the request, that have totally or partially resulted from serious Bank failure of compliance with its policies and procedures.*" Hence, Management offers no comment on issues raised in this chapter.

V. MANAGEMENT PLAN FOR PROJECT SUPERVISION TO ADDRESS CONCERNS

88. *Management has seriously considered the issues raised by the Requesters and continues to be of the view that these issues – should they materialize – can be and are being effectively addressed by the responsible South African authorities through the country's legal and regulatory system. Hence, an Action Plan is not required.*

Management notes that the Panel's Report does not identify weaknesses that would result from relying on South Africa's country systems for project implementation *per se*. An Action Plan is also not required under the Panel Resolution because the measures in place are well positioned to achieve the requisite measure of compliance.

89. ***As explained in the SDR and the PAD,²⁹ and reaffirmed by the Panel's Report, it has been recognized by the Bank and South African authorities that air quality and water supply are key issues of concern for the Project.*** As a key example of how the Bank is addressing this concern, the Project's Legal Agreement includes a provision that requires Eskom to provide to the Bank a progress report in mid 2013 on Eskom's most recent plans and schedule regarding the installation of FGD, for which the timing of the completion of DWA's MCWAP Phase 1 also will be of significant interest.

90. Nevertheless, because the alleged impacts pertaining to water supply and air quality would only be verifiable once Medupi begins operations, (expected to begin in 2013, with the last unit coming on line in 2016), Management proposes to closely monitor the air quality impacts before FGD installation, progress with MCWAP as it pertains to water supply for FGD and, as relevant, to the adequacy of water supply to Lephalale; and installation of FGD and the corresponding air quality results. The Bank would thus continue monitoring implementation of the Medupi Project until 12 months after commissioning of FGD for the sixth unit, currently expected to be end 2022. The closing date for the EISP is October 31, 2015.

91. Management has already committed to the Board to engage in a supervision program for this very large and important Project that included biannual supervision missions that would continue until the Project closing date. In addition to monitoring implementation of the Project by Eskom, Management instructed the Bank team to also meet with DWA during implementation of the MCWAP, and to monitor the EIA process for DWA's project to ensure that it remains consistent with the key findings of the SDR regarding the acceptability of the South African system for managing environmental and social impacts of projects. The team has also been tracking during its supervision missions the progress of DEA in preparing and adopting the EMF for the Waterberg District, and the recommendation by DEA to the Minister to declare the Waterberg District as a National Priority Area for air quality management.

92. Finally, as noted briefly above, in the context of a Bank-financed project in Botswana, the Bank has been working with key stakeholders in Botswana and South Africa in developing a RESA that is intended to examine environmental and social impacts of major developments in the coal fields on both sides of the Botswana and South African border in the project area. The initial scoping of this study was completed with Bank financing. The scope of the RESA is currently being reassessed as a result of recently emerged major changes in thinking both in Botswana and South Africa as to the nature and especially the timing of coal field development on both sides of the border, but the relevant areas of focus will remain the same. Once the Botswana and South Africa

²⁹ See PAD, section E and annex 11.

environmental authorities have reached an agreement, the Bank plans to finance from trust funds the preparation of the RESA based on the revised scope.

93. DEA's ROD for the Project, as well as the proposed designation of the Waterberg District as a National Priority Area for air quality management, clearly demonstrates DEA's determination that ambient air quality in the airshed not be degraded by the Project. To help fulfill this objective will require additional air quality monitoring capacity by the time Medupi begins operations. In addition to upgrading the ability to monitor compliance with the new ambient air quality standards established by the GoSA since the Medupi ROD was issued, additional air quality monitoring will help validate the conclusions of the air quality modeling in the EIR, which Management believes takes the appropriate conservative approach to describing potential impacts on the airshed and therefore uses a risk averse approach to protecting human health. Management believes it is important for the Bank to monitor air quality impacts and DEA's use of these data during the period of time the Medupi plant is operating without FGD, and Management will commit the staff and resources necessary to ensure engagement with Eskom on an ongoing basis on this issue during that period of time.

94. Management and Eskom have reached agreement to disclose environmental and social aspects of the Bank supervision mission findings for the EISP.

95. Management met with the Requesters on February 15, 2012, in the Bank's Office in Pretoria to consult on the above actions proposed by Management in response to the Panel Report. Management first invited the Requesters to a meeting on December 22, 2011; the Requesters responded after some time and agreed to meet on February 15, 2012. In order to accommodate the Requesters, Management sought and obtained from the Board an extension to the submission date for the Management Response. After the meeting, the Requesters provided written input as a follow up to the discussions, to which Management has responded (see Annexes 3 and 4).

VI. CONCLUSION

96. Management believes that the Bank team has properly applied Bank policies and procedures and followed its mission statement in the context of the Project.

97. *Management believes that the South African legal system and specifically the environmental and social safeguard regulations under which the EISP is governed provide a fully appropriate mechanism to address the Panel's concerns regarding potential future adverse impacts, should they emerge. In line with this assessment, Management has agreed with the Borrower to monitor the implementation of selected mitigation measures well beyond the closing date of the EISP to include the period of operations at Medupi until FGD is installed.*

ANNEX 1
FINDINGS and COMMENTS

No.	Issue / Finding	Comment
Compliance Analysis at the System Level		
1.	<p>Assessment of Equivalence</p> <p>General Conclusions. The Panel notes that the preparation of an SDR is a challenging and complex task and recognizes the significant work by staff to carry out this assignment. The SDR contains a detailed review of the Guarantor's and the Borrower's legal and regulatory framework and practices. The Panel finds that, in most respects, Management's analysis of equivalence complies with OP/BP 4.00.</p>	<p>Comment: Management appreciates the recognition that preparation of an SDR is a challenging and complex task. Management also appreciates and acknowledges the critical review and comments of staff from DEA on the draft SDR, and is grateful to the DWA for taking the time to discuss at length its programs and projects on several occasions during Project preparation and supervision, which helped the Bank to better understand the South African natural resource management framework in a broad context.</p>
2.	<p>Shortcomings in the Analysis of Equivalence. Relevant Legal Framework. The Panel, however, found certain shortcomings in the SDR analysis, which raise issues of compliance as they relate to the claims in the Request. The Panel finds that the SDR did not adequately recognize the gap between Bank Policy requirements and prevailing national legislation with respect to assessing cumulative impacts and environmental management planning in the EIA process at the time that the Medupi EIA was prepared, as required by Table A1 of OP/BP 4.00.</p> <p>Assessment of Applicable Laws. The Panel finds that the SDR does not provide an adequate analysis of equivalence in respect to laws related to water use and mining activities which are of relevance to this Project and the claims of the Requesters. The Panel further finds that the SDR does not adequately assess the lack of provision in South African law to use an independent advisory panel during preparation and implementation of projects</p>	<p>Comment:</p> <p>a) Cumulative assessment issue was addressed in applicable legislation at the time of the Medupi EIR, and in the SDR</p> <p>The SDR was prepared in 2009. In keeping with OP 4.00, it described existing laws and regulations applicable to environmental protection for development activities, including Eskom projects. At the time the Medupi EIR was in preparation, the 1998 NEMA was in effect in South Africa. Chapter 5 of the 1998 NEMA, "Integrated Environmental Management", sets out general objectives for such management, and Section 24 provides for implementation. Section 24 of the 1998 NEMA states that: "(1) In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on: (a) the environment; (b) socio-economic conditions; and (c) the cultural heritage of activities that require authorization or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity...." The 1998 NEMA goes on to state that the Minister who makes: "(7) Procedures for the investigation, assessment and communication of the potential impact of activities must, as a minimum, ensure the following: (a) Investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto; (b) investigation of the potential impact, including cumulative effects, of the activity and its alternatives on the environment, socio-economic conditions and cultural heritage, and assessment of the significance of that potential impact."</p>

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	<p>that are “<i>highly risky or contentious or that involve serious and multi-dimensional environmental and/or social concerns</i>,” which is an operational principle set forth in Table A1 of OP 4.00 (para. A.8). In these respects, the SDR analysis falls short of the requirements of OP/BP 4.00.</p>	<p>It is a fact that the 1997 EIA Regulations under the 1989 Environment Conservation Act (ECA) were promulgated before the 1998 NEMA was enacted, but came into effect on January 1, 1999, not long after the 1998 NEMA was enacted. These 1997 EIA Regulations do not explicitly provide for cumulative impacts to be addressed in a project-specific EIA.¹ It is, however, recognized by South African legal doctrine and practice that between 1999 and 2006, the ECA regime operated in parallel with the NEMA provisions on Integrated Environmental Management (Chapter 5 of NEMA which includes Section 24) and the general principles set out in NEMA were, therefore, considered in many ways as relevant for development projects under consideration before the new regulations were issued. Although the EIR for Medupi was prepared after the 1998 NEMA was enacted, the repeal of the ECA by NEMA was not to take effect until a date to be published by the Minister of Environment, after regulations under Section 24 of NEMA had been enacted.</p> <p>It was only in 2006 that the EIA Regulations under Section 24 of NEMA were enacted. The 2006 EIA Regulations under NEMA further impose the obligation on any project proponent to consider “cumulative impacts” for:</p> <p>(a) projects subject to Basic Assessment (Section 23(h)), which mandates the EIR to provide a description and assessment of “the significance of any environmental impacts, including cumulative impacts that may occur as a result of undertaking of the activity or identified alternatives...;”</p> <p>(b) Scoping Report (Section 29(1)(f)); and</p> <p>(c) an EIR (Section 32 (2)(k)(i)).</p> <p>Since 1992, DEA has been working to develop a practical approach to SEA in response to the limitations of project-specific EIA, in particular for the purpose of addressing cumulative and large-scale effects and incorporating sustainability considerations into higher level decision-making, thereby strengthening the context for project-specific EIA. The SEA approach in South Africa was designed to meet the needs of EIA in South Africa, including bridging the gap between planning and Integrated Environmental Management, defined by DEA in 1992 as “a philosophy which prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development process in order to achieve a desirable balance between conservation and development.” The need for SEA was acknowledged as a matter of policy in the 1998 White Paper on Environmental Management Policy for South Africa. In addition, under the 1998 NEMA, South Africa equipped itself with an environmental management tool, the EMF, to facilitate decision-making under the 2006 EIA Regulations “and which is to be initiated by the Minister of Environment or a Provincial Government to help assess and identify the attributes of the environment in a given area, including sensitivity, extent, interrelationship and significance of those attributes and states the environmental management priorities of the area by</p>

No.	Issue / Finding	Comment
		<p>indicating the activities that would have a significant impact on those attributes and would be undesirable in the area or specific parts of it." In doing so, the Government would have the needed instrument to help address cumulative impact assessment in any given area.</p> <p>Therefore, as noted in the SDR, South African EIA regulations and practices in Integrated Environmental Management refer to assessment of cumulative impacts as appropriate in the project context, and most explicitly in terms of the environmental authority in making its decision regarding a project-specific EIR. The SDR states:</p> <p>"With respect to the EISP project and its components, the issue of cumulative impacts is germane at the level of each individual project component. As noted in the map attached to this draft SDR, the various project components are well removed from each other, and have been considered as stand-alone projects by Eskom and the regulatory authorities. There has been and remains no reasonable justification for examining their cumulative impacts as a package of investments being considered for Bank financing through the EISP. As individual projects, however, cumulative impacts have been examined as appropriate as part of the EIA process. In the case of the Medupi and Kusile projects [<i>which were the two case studies subject to most intense review during preparation of the SDR</i>], the most important cumulative impact relates to air emissions and ambient air quality. South African air quality regulations require assessment of cumulative impacts on the airshed of the new project. As noted later in this SDR, the cumulative impacts on the airshed resulting from the proposed project, existing sources, and likely future developments are taken into consideration in the Record of Decision."</p> <p>Thus, cumulative impacts of the EISP were addressed at three levels in the SDR: first, as a package of investments being considered for Bank financing; second, at the level of each project's specific contribution to the environment as presented in the project-specific EIR; and third, by the environmental authority (DEA) in issuing the ROD for each project.</p> <p>Cumulative impacts were considered "to the extent feasible" (as required by Section 2 of NEMA). On this issue, the South African regulatory framework is particularly robust, because in addition to project-specific EIRs, DEA also has environmental management tools available to it that allow it to engage in environmental management planning and address cumulative impacts at a strategic level beyond just the project-specific EIR. The evolution of the regulatory framework underpinning this approach is complex, but it also demonstrates the ability of South African authorities to pursue integrated environmental management in a changing regulatory environment. Given this strength, it is possible for the SDR to factually state that, "...given the concern noted above for possible deterioration of ambient air quality in the Waterberg airshed with respect to SO₂ due to cumulative</p>

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		<p>impacts, the ROD issued to Eskom for Medupi requires that Eskom take steps to mitigate its emissions from both Medupi and potentially also Matimba should air quality fail to meet ambient standards in the future. Given the likelihood of this occurrence, Eskom has developed and is constructing Medupi to be 'FGD-ready' by providing sufficient physical space and infrastructure to allow installation of FGD for all six units should this become necessary." In 2006, while the ROD for Medupi was being granted, DEA was concurrently taking steps to address at a more strategic level the cumulative impacts of what were then envisioned as likely future projects' contributions to cumulative impacts on the Waterberg airshed.</p> <p>Moreover, another strategic environmental management tool available to DEA to address cumulative impacts is the authority to recommend that a given area be designated as a National Priority for air quality management, and the Waterberg District in which Medupi is located is the first area proposed for such designation on a proactive basis, i.e., before significant degradation of air quality occurs in the designated area.</p> <p>b) Water law and water rights for the proposed Medupi Power Plant were reviewed and assessed in preparing the SDR:</p> <p>The SDR does discuss South African Water legislation and its application in terms of allocation of water rights to the proposed Project. The Bank team included in its Equivalence analysis a full review of the legal framework applicable to water management and use. Part of that analysis of water laws and regulations was included in the SDR (pages 85-86) and substantiated by a comprehensive note prepared by the team when it started the discussion on the water supply issue with DWA. Management notes that in making its decision on the equivalence and acceptability of the South African system, it also considered the system as it applies to water issues connected to the Project. After taking stock of the water legislation, the SDR team considered the following: (a) DWA already had identified the Waterberg area as one of national priority for catchment management strategies in the 2004 National Water Resource Strategy, based on a 25-year planning horizon, and had already begun taking key steps in implementing its responsibility for addressing water management in the Lephalale service area prior to the drafting of the EIR for the Project; and (b) the water issue was highlighted during the discussion of the EIA by DEA before the issuance of the ROD, and was discussed in a comprehensive manner in the EIA for Medupi. Under the South African approach to integrated environmental management, cooperative governance, and strategic planning, the delivery of water supply by DWA to the Steenbokpan-Lephalale corridor was a different major investment by the South African government, of which the Project would be one of many, and a relatively minor, beneficiary, which the Bank team recognized at the time the SDR was being prepared. See also the response to Item 5.</p> <p>Management notes that the SDR analyzed the environmental</p>

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		<p>legislation that applies to mining, including analysis of the full set of laws applicable to mining and electricity, including ECA (1989), NEMA (1998), NEMA-AQA (2005), NEMA Waste Act (2008) and several of their implementing regulations. The analysis of mining law, <i>stricto sensu</i>, was not done in the Equivalence analysis because coal supply was not an issue during the preparation and review of the EIR respectively by Eskom and DEA, as discussed further in Item 5 below. Nevertheless, the supply of coal was reviewed within the Acceptability analysis, as was the environmental regime applied to the supplier (see SDR Pages 69-70).</p>
3.	<p>Assessment of Acceptability</p> <p>Assessment of Institutional Capacity. The Panel finds that the analysis of acceptability in the SDR did not adequately address the institutional capacity of key regulatory institutions involved in environmental monitoring and management related to EISP, particularly at the provincial and local levels. The focus was mostly on Eskom and DEAT. This does not comply with OP/BP 4.00. The Panel finds that the SDR does not adequately reflect concerns relating to implementation practices and track record in regard to the EIA process, nor suggest feasible actions to address them, other than relying essentially on the capacity and practices of the Borrower. This is not consistent with OP/BP 4.00.</p>	<p>Comment: Initial discussions with government counterparts on the SDR indicated that permitting and compliance monitoring for the key issues of concern for the Project, i.e., air quality and water supply, were responsibilities at the national level within DEA and DWA, respectively, and not focused at the provincial or municipal level. DWA had already begun key activities in implementing catchment management strategies and water management planning for the Waterberg District. Given that the Borrower is Eskom and the key environmental authority for permitting and compliance monitoring of Eskom's Project was DEA, the focus of SDR attention on capacity was on Eskom and DEA.</p> <p>Management notes that DEA has taken significant steps over recent years to expand its role and capacity in monitoring and enforcement, as well as building regulatory capacity at the provincial level, as described in the SDR. In 2001, DEA initiated a process to develop appropriate authority structures to undertake pro-active environmental monitoring for purposes of assessing and enforcing compliance. This resulted in the 2003 issuance of legislative authority under NEMA to designate an Environmental Monitoring Inspectorate (EMI) tasked with enforcing NEMA and other designated Specific Environmental Management Laws, together with the establishment of a new Enforcement Directorate within DEA. The fact that the institution of a centralized national environmental compliance and enforcement regime in South Africa is a relatively recent development may account in large part for the perception among some members of South African civil society that environmental enforcement is not effective. In the course of consultations on the draft version of the SDR, stakeholders from civil society expressed concerns about DEA's compliance and enforcement capacity. In response, DEA acknowledged that compliance monitoring and enforcement is an area for overall improvement; however, DEA's own data indicate that significant instances of non-compliance tend to be concentrated in particular sectors and activities, especially at the small-scale and municipal level. In contrast, the energy generation sectors, and Eskom in particular, have been largely compliant, and therefore have not been frequent or highly visible targets of DEA's emerging enforcement activities.</p> <p>The ROD for the Project requires the appointment of an independent Environmental Control Officer (ECO), reporting</p>

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		<p>directly to both DEA and Eskom, with responsibility for: daily monitoring of Project compliance with the ROD, environmental legislation, and specific mitigation requirements stipulated in the EMPs; ensuring that periodic performance audits are undertaken; and written environmental compliance report are regularly submitted. At the Project level, Management believes that the establishment of an independent ECO, and an Environmental Management Committee (EMC) with local representatives and qualified professionals as members, are powerful tools in ensuring compliance and accountability in Eskom's management of environmental and social issues. The EMC and Eskom's Public Communications Center in Lephalale town serve both as platforms where local citizens can obtain information about the Project and its environmental performance and bring concerns and grievances regarding the environmental impacts of Medupi Project operations. Management wishes to make clear that the Project does not rely on self-monitoring by Eskom for compliance. During Project supervision, the Bank team has received briefings from the ECO on the outcomes of both ECO monitoring and independent audits of Medupi's compliance with the ROD during the current stage of construction. Monthly EMP and ROD compliance audits carried out by the ECO show a steady trend of greater than 95 percent compliance; the majority of reportable environmental incidents involved small hydrocarbon spills (fuel and lubricants). Biannual, external (independent) audits indicate 96 percent compliance with ROD and EMP requirements. DEA's Environmental Management Inspectorate (the "Green Scorpions") carried out a spot inspection on December 7-8, 2010, which produced positive news in the local press regarding EMI's findings on Project compliance. One legal contravention was identified at the Medupi site during Eskom's FY2010/2011 after a DWA site inspection in early December 2010. This was the absence of a Water Use License to use wastewater (mostly washwater) from the batching plant for on-site dust suppression; the absence of a license for this specific water use was quickly corrected.</p>
4.	<p>Gap Filling. Due to certain shortcomings in its analysis of institutional capacity and implementation practices, the Panel finds that Management did not have an adequate basis to properly identify gap-filling measures to help address issues of capacity within competent environmental authorities at certain tiers of government to, inter alia, review EIAs, draft robust authorizations, and monitor and enforce compliance. This is not consistent with OP 4.00.</p>	<p>Comment: See the response to alleged shortcomings in Item 3 above. For the EISP in general, and the Medupi component in particular, the competent environmental authority is DEA at the national level, and Management considers that the SDR appropriately assessed its capacity to, inter alia, review EIRs, prepare robust RODs (now Environmental Authorizations), and monitor and enforce compliance with the ROD, which by reference, included the Project's EMPs. The discovery of a missing Water Use License in a recent site inspection by DWA also validates Management's confidence in compliance monitoring and enforcement by the responsible South African authorities for water resource management.</p>

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Compliance Analysis at the Project Level		
5.	<p>Decreased Water Availability and Quality</p> <p>The Panel finds that there has been inadequate consideration of the Project's direct, indirect and cumulative impacts on availability and quality of surface and ground water resources. This is not consistent with OP/BP 4.00.</p> <p>This shortcoming is of particular concern due to the scarcity of water resources in the region, the associated risks and in light of competing demands for those resources. The construction and operation of the Medupi plant entails significant risks of adverse impacts on the availability and quality of surface and ground water resources in the area. The Panel finds that the instances of non-compliance noted above have likely weakened the ability of the Project to take effective steps to minimize or avoid these risks, and provide measures to compensate for harms that cannot be avoided.</p> <p>The Panel finds that the Project's consideration of the impacts of Medupi on water resources was not based on a risk-averse approach, as required under the terms of OP/BP 4.00 and the NEMA s2 principles. Such an approach is not evident in the PAD or the Medupi EIR, the SDR, or the MCWAP documentation accepted by Management.</p> <p>The Panel's view is that Management should have taken a broader look at expansion of coal mining to supply the Medupi Power Plant, given that it entails associated and cumulative impacts of relevance and that the expansion of the Grootegeluk Mine will increase water use and risks of water pollution, particularly with regard to Acid Mine Drainage</p>	<p>Comment: Management is of the view that the analyses were adequate to show that no harm would result from the Project's demands on water or coal resources. Moreover, Management wishes to clarify that OP 4.00 does not require a "risk averse approach," but provides a framework to identify, avoid and manage project impacts.</p> <p>Water Resource Management. In considering the impacts of Medupi on water resources, Bank staff preparing the SDR reviewed and assessed all legal and regulatory requirements applicable under South Africa's legislation, regulations, rules, and procedures that were identified as relevant to the operation; this was done through discussion with experts, field visits, or interviews, and review of technical and legal literature. The water issue has been the subject of long and thorough discussion with Eskom, DEA and DWA and it is a team opinion based on the above review and assessment that the water supply issue for the Medupi plant was treated with due care, in compliance with, and with due respect to the safeguards applicable to water conservation, management, and allocation in South Africa. The note on the applicable legal regime for water management and use in South Africa, prepared by the Bank team, has extensive discussion on this aspect.</p> <p>DWA has been responsible for implementing all government policies and regulations regarding water supply since 1956, when the Water Act came into effect. This authority was reiterated under the ECA of 1989, the Water Services Act of 1997, and the NWA of 1998 (Act 36 of 1998). The DWA prepared a National Water Resource Strategy in 2004, which among other findings determined that the Crocodile (West) River Basin was of paramount importance in developing a more specific management strategy (SDR, paragraph 86). This was because the GoSA anticipated that the vast and mostly unexploited coal reserves of the Waterberg area would be further developed, inducing industrial development, additional power development, increased population, and expansion of the agricultural sector (including ecotourism and hunting on game farms) in the Steenbokpan-Lephale corridor. This was before the Medupi EIR process began in early 2006. There have now been significant changes in thinking in both South Africa and Botswana, and Management recognizes that the scenario for future industrial development in the Waterberg District has changed dramatically, especially in terms of timing of future major investments, if any.</p> <p>Nevertheless, with regard to water resources planning, South Africa ensures that all priority requirements, "Reserves" in particular, are taken into account. Reserves are central to water resource management for priority use as established by the NWA (No. 36 of 1998). The Reserves relate to the quantity and quality of water required to satisfy the following two elements: the Basic</p>

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	<p>in the longer term. The Panel finds that this is a combined cumulative impact of the Project that was not properly assessed, as required by OP 4.00.</p>	<p>Human Needs Reserve, which provides for essential needs of individuals; and the Ecological Reserve, which relates to the water required to protect the functional integrity of aquatic ecosystems. These Reserves take priority over any water use for agricultural or industrial purposes.</p> <p>The MCWAP was identified as a multi-phased, priority project by DWA before the Medupi EIR process began and was expected to be developed to supply water to the Steenbokpan-Lephalale corridor even if the Project were not built. Under the South African approach to integrated environmental management, cooperative governance, and strategic planning, the delivery of water supply by DWA to the Steenbokpan-Lephalale corridor was a different major investment by the South African government, of which the Project would be one of many, and a relatively minor, beneficiary, which the Bank team recognized at the time the SDR was being prepared. At the time the EIR was prepared for the Project, it was expected that the Project would receive about 10 percent of the total additional water delivery by the MCWAP to the Steenbokpan-Lephalale corridor by the time Phases 1 and 2 of the MCWAP were completed.</p> <p>Development of the MCWAP by DWA is subject to the South African EIA process. Although neither the Bank nor Eskom have leverage regarding the process, procedures, and outcomes of the EIA process being carried out for DWA's MCWAP, Management instructed the team to closely monitor this process during Project supervision and assess whether it remained consistent with the findings of the SDR regarding the South African system for assessing and managing environmental and social impacts. Progress on the MCWAP and the EIA process for this DWA project has been a key subject for discussion in the Bank team's supervision reports.</p> <p>At the Project level, the EIR for the Project addresses water impacts, but because it is prepared under South African regulations, it recognizes the separate authority of DWA in water management issues.</p> <p>The intended users of the MCWAP water will need to apply for a water use authorization in terms of Section 21 of the NWA. The water use authorization process will duly consider the determination and implementation of the Reserve, according to Section 16-18 of the NWA. DWA hires qualified, experienced, independent consultants to determine the Reserve using established methodologies appropriate to the river basin's aquatic ecology and hydrology. Before the abstraction license can be issued to supply water to prospective users, the Ecological Reserve Determination must be done by DWA. For the Mokolo catchment, the Intermediate Reserve Determination Study (DWAF 2007) has now been signed by the Minister, and has full legal standing. As such, it can be used officially for planning purposes. This study determined the minimum flow regime downstream and therefore how much water can be abstracted and allocated among the various applicants for water use authorizations <u>after</u> taking into account the Reserve. During</p>

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		<p>a recent supervision mission, the Bank team was informed by DWA that there were no registered objections to the Environmental Authorization for MCWAP Phase 1 (issued December 2010). In terms of the allocation of the <u>additional</u> water that will be produced by MCWAP Phase 1, Exxaro will be allocated ~26 percent of the additional available water, Eskom will be allocated ~49.5 percent, and the Municipality of Lephalale will be allocated ~24.5 percent of the additional water produced by Phase 1.</p> <p>Intent to apply for a Water Use License must be publicly disclosed and subject to a public comment period. If there are objections to the application, DWA has a process that must be followed for reviewing objections before a decision can be made whether to issue the license.</p> <p>Water Supply for Exxaro. Currently, the water supply for Exxaro's operations at Grootegeluk, the municipality of Lephalale, and the nearby Matimba power plant (operated by Eskom) is provided by Exxaro under Water Use Licenses issued by DWA. One of the key objectives of Phase 1 of DWA's MCWAP is to turn over management of the existing water supply and treatment system to a third party. The Grootegeluk colliery has been operated since early 1981 by Exxaro, a private sector operator. Within its 6,528 hectare (ha) concession, there are an estimated 5,600 million metric tons (Mmt) of coal reserves. The environmental impacts of operating within Exxaro's concession have already been assessed as part of the Environmental Authorization to operate, and the mine's Environmental Management Programme is updated from time to time.</p> <p>Grootegeluk's production level at the time of Project preparation was 18.6 Mmt/yr and required the operation of six coal processing (beneficiation) lines. In order to meet the demand of the Medupi Project, once a sales agreement was signed with Eskom, two additional beneficiation lines would need to be installed. When Medupi is fully operational, Grootegeluk's production will increase by 44 percent to 33.2 Mmt/yr. At that rate of production, Exxaro conceivably could mine coal within its concession for about 168 years, approximately halving the mine's life at the current production level.</p> <p>Neither the Bank nor DEA considered coal supply to be an associated project that should be considered in the EIR for the Medupi plant, because no new mine will be developed. Management has determined that the only potential impact of the Project on the colliery is the relationship between the construction schedule for Medupi and the financing of Exxaro's colliery expansion, a tenuous "relationship" at best and having no material environmental impact, therefore not an "associated impact" following recognized uses of the term. This is evident from the fact that the expansion of production levels within Grootegeluk's existing area of authorized operation required only an amendment to its EMPR, because the Environmental Authorization has already been granted for the mine to operate and the installation of the two additional beneficiation lines and</p>

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		<p>the ensuing increase in production were expected to have minimal or no environmental and social impacts beyond those already assessed and permitted. In accordance with South African environmental regulations, the Amendment to the EMPR was prepared following an environmental and social assessment that examined both direct and indirect (off-site) impacts of the installation and operation of the two additional beneficiation lines, as discussed in the PAD. Although the Bank team did not consider the Exxaro colliery expansion to be an associated impact, nevertheless, as part of its due diligence, the Bank team reviewed the Amendment along with the environmental and social assessment, and came to the view that the documents are of good quality, consistent with the expected level of direct, indirect, and cumulative impacts, including those on air quality and groundwater quality, which in turn would include the low risk of acid mine drainage from this mine operation.</p> <p>Acid mine drainage was discussed in detail in the documentation prepared by Exxaro for adding the two beneficiation lines, and also discussed in the Medupi EIR as part of the description of the current baseline. Key factors in determining that there is low risk include: generally low rainfall, generally poor quality of groundwater because of natural geological conditions, and low permeability that produces very low rates of groundwater movement off-site. Local consultations on and disclosure of the Amended EMPR and its incorporated environmental and social assessments, as required by the South African environmental regulations, also is consistent with what would be expected in accordance with OP 4.00, Table A1. Subsequent research has been carried out through funding by the Water Research Commission of South Africa on how water quality and quantity will be affected by mining methods and mining of the Waterberg coal reserves west of the Daarby fault (January 2011; WRC Report No. 1830/10/1). This was done in anticipation of future expansion of mining in the coal fields. Although the study shows there is the potential for acid formation from a wide range of samples taken and tested, the low rainfall and water availability and low soil and rock permeability are significant factors in reducing the risk and aiding appropriate preventative measures. It is also recommended by the study that the methods of mining, beneficiation, remediation and water management currently being employed by Exxaro at its Grootegeeluk mine be employed by the new mines. The methods being used at the Grootegeeluk mine have been proven to be the best possible solutions for the conditions found in the area.</p>
6.	<p>Emission of particulates, air quality and health impacts</p> <p>The Panel finds significant shortcomings in Management's due diligence assessment of air quality issues and of the development of responsive mitigation measures to address</p>	<p>Comment:</p> <p>a) Management is of the opinion that hazards to human health remain low.</p> <p>In defining and assessing human health risk, the EIR, the DEA and the Bank team follow the widely accepted and long used definition that risk is a product of hazard and exposure. In the case of human health risk from air emissions, the measure of</p>

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	<p>risks of serious harm. This is not consistent with the provisions of OP/BP 4.00.</p> <p>The Panel further finds that an analysis of the cumulative effects of the Grootegeluk mine, Medupi and Matimba on air quality in the local airshed was carried out as part of the related EIA and EMPR for expansion of the Grootegeluk Mine. The Panel finds that this is largely consistent with OP/BP 4.00. However, the Panel is of the view that due consideration should have been given to probable future projects in the area (e.g. additional coal mines and coal-fired power stations), in determining the appropriate level of mitigation measures for the project.</p> <p>The Panel finds that it is likely that these shortcomings in meeting relevant policy requirements have reduced the ability of the Project to assess and respond to the significant potential negative air quality impacts of Medupi in an integrated and effective manner.</p> <p>The Panel notes that Management is supporting a study of cumulative impacts in the context of a broader Regional Environmental and Social Assessment which is ongoing. The Panel notes the importance of these initiatives and their potential to help manage cumulative impacts at a regional scale.</p>	<p>hazard is the concentration of pollutants in ambient air, and exposure is the likelihood that people will be present, especially people with significant respiratory problems that make them more sensitive and vulnerable. It is important to note that threshold concentrations for people at risk are usually incorporated into ambient air quality guidelines established by the World Health Organization (WHO) and national legislation for ambient air quality.</p> <p>At the time the EIR was being prepared for the Project (2005-2006), Schedule 2 of South Africa's Air Quality Act issued in 2004 was applicable, which set interim ambient air quality standards that were closely aligned with WHO guidelines for the protection of human health and with European Union Directives. In addition to using South African ambient air quality thresholds that were in effect at the time, the EIR chose to include as part of the modeling and analytical work the European Commission (EC) 1-hour criteria that are recognized as particularly stringent with respect to human health, especially for SO₂. The GoSA interim ambient standards did not include a 1-hour limit for SO₂, but in the EIR analysis the EC's 1-hour limit of 350 µg/Nm³ was applied. To put this EC criterion in perspective, California (USA) has defined a 1-hour threshold risk level of 660 µg/Nm³ for at-risk individuals. Thus, the threshold used in the EIR analysis for 1-hour exposure is strongly precautionary for predicting impacts on human health.</p> <p>As required by the DEA ROD that authorized Eskom to proceed with the Medupi Project, Eskom carried out continuous monitoring of air quality in Marapong. The Air Monitoring Report, based on three years of continuous monitoring for PM₁₀, SO₂, NO₂, and ozone, concluded that air quality in Marapong will not be affected by Medupi. The data show that coarse particulates (PM₁₀) are the major pollutant of concern in the area and that the main sources are: vehicle traffic, especially moving at high speeds on unsealed roads; blasting and drilling at nearby mine sites; earthmoving at nearby construction sites; and wind erosion from bare soil. Similar sources account for relatively high particulate levels that have been observed in other regions of South Africa. This conclusion is strongly supported by the most current USEPA research demonstrating that power plant emissions are not significant sources of coarse particulates, for which the major sources are dusts generated from roads, dry river beds, agricultural activities, mining and construction. In addition, in 2006 USEPA rescinded its annual ambient regulatory standard for PM₁₀ due to <i>"insufficient evidence linking health problems to long-term exposure to inhalable coarse particulate pollution."</i> Finally, Matimba is equipped with electrostatic precipitators with 99.77 percent design efficiency for removal of particulates and Continuous Emissions Monitors (CEM) on both of its stacks, and therefore is unlikely to be a major source of particulate emissions.</p> <p>With respect to the construction of Medupi, the ROD requires Eskom to control particulate emissions (including dust) consistent</p>

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		<p>with national ambient and emission regulatory standards. These requirements were included and expanded upon in the construction stage Environmental Management Plan for the Medupi Project, implementation of which is the responsibility of Eskom, with monitoring and compliance by the ECO and the EMC. During the operational phase of the Medupi plant each of the six units will be equipped with ultra-high efficiency particulate control technology, as well as CEM. On this basis, the Air Monitoring Report concluded at the end of the three years of continuous monitoring that no further actions are required at Medupi or the nearby Matimba Power Station for air pollution control in Marapong, so long as emission and ambient regulatory requirements are met. Monitoring of construction impacts, including ambient air quality, is ongoing, and the Bank team continues to review these data as part of or in preparation for supervision missions.</p> <p>On December 24, 2009, the Minister of Water and Environmental Affairs issued final ambient air quality standards for South Africa, to take effect immediately. Unlike the interim standards, the final standards are expressed as a combination of limit values and frequencies of exceedance. For SO₂, a 1-hour limit value of 350 µg/Nm³ has been introduced, which was also used in the Medupi EIR, as well as a 10-minute standard (500 µg/Nm³); the other threshold values are unchanged from what was used in the EIR for the Project. The frequencies of allowed exceedance (which were not considered in the EIR analysis) represent the maximum number of times a threshold value can be exceeded at a given sampling location in a calendar year without resulting in non-compliance with the standard (which means the EIR findings are biased towards a presumption of non-compliance, because they did not take into account any allowance for a specified yearly exceedance frequency).</p> <p>If these exceedance frequencies had been in effect at the time the EIR was written, its conclusions would have demonstrated that the baseline data showed virtually no instances of non-compliance with any of the standards, nor would SO₂ concentrations predicted by the dispersion model result in noncompliance in Marapong. Similarly, the five exceedances measured in Marapong over 2008-09 are well within the tolerance for the 1-hour standard, and the SO₂ concentrations predicted by the dispersion model would also not result in non-compliance at that site. The air quality model predicts that even with both Medupi and Matimba in operation without the FGD emission abatement technology, the annual average limit for SO₂ would not be exceeded in the maximum impact area downwind of Medupi. Management believes that the model predicts a worst-case condition but recognizes that incidents of technical non-compliance with daily and hourly ambient standards for SO₂ are likely. Nevertheless, the risk of human health impacts, as a function of hazard and exposure, remains low because: (a) the 1-hour thresholds adopted by South Africa are stringent even for at-risk individuals as described above; and (b) the sparse population on the game farms in that area makes it highly</p>

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		<p>unlikely that there would be any detectable increase in respiratory problems among the people living there. In its due diligence, Management took note of the ROD conditions calling for monitoring (Eskom is in the process of selecting the location for the downwind station), installation of SO₂ abatement equipment as necessary at Medupi and, should monitoring results indicate non-compliance with ambient standards, also at the existing Matimba power plant.</p> <p>With respect to air quality impacts in Marapong the CALPUFF model that Eskom selected for use in the EIR, based on recommendations from the USEPA and others, predicted exceedances of short-term health thresholds four times per year. Under new ambient air quality standards issued during SDR preparation, this frequency of exceedance would not constitute non-compliance. CALPUFF predicts that with Medupi and Matimba both in operation, the annual average limit for SO₂ will not be exceeded in the maximum impact area downwind of Medupi, but the daily and hourly limits will be on occasion. The operation of the six units of the Medupi plant without FGD is predicted by the modeling results to raise the number of times the daily concentration limit for SO₂ is exceeded in the maximum impact area downwind to 33 times per year. The hourly limit could be exceeded 419 times in a year downwind (a frequency of less than 5 per cent). Due to the use of a highly precautionary model to project ambient impacts as a worst case scenario, the predicted concentrations are potentially as much as six-fold higher than what is likely to be found by monitoring data once Medupi is fully operational, and the frequency of exceedances also is likely to be much less than predicted. Management believes that the model predicts a worst-case condition but recognizes that non-compliance with daily and hourly ambient standards is likely.</p> <p>As noted in the Panel's Report, Management insisted on, and obtained, a legal commitment by Eskom to install FGD at Medupi. It is worth noting, however, that although the Bank's conditions for engagement in the EISP may have helped to ensure Eskom's commitment to FGD, the new ambient air quality standards that the GoSA promulgated in December 2009 subsequent to the issuance of the Medupi ROD would, in any case, require installation of FGD within a time frame specified in the regulations. This provides further evidence of the robustness of the South African system.</p> <p>With respect to the reference in the Panel's Report to the need for consideration of probable future developments in the cumulative assessment, and in any determination by DEA of the appropriate level of mitigation, it is important to note that the South African country system provides a robust approach that goes beyond what can realistically be accomplished in a project-specific EIA. First, the Waterberg EMF, initiated by the DEA to facilitate decision-making under the 2006 EIA Regulations, is a vehicle for considering and managing a wide range of development possibilities in the region. Second, the process of</p>

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		<p>designation of the greater Waterberg municipality as a National Priority Area for Air Pollution Control will lead to development of an air quality management plan and will give DEA the authority to impose limits more stringent than national standards on existing and future air emission sources if necessary to achieve compliance with ambient standards. It is now in the final comment stage prior to approval by the Minister of Water and Environmental Affairs. Third, as noted in the Panel's Report, Management has been supporting development of a regional environmental and social assessment (RESA) for power development in the region that involves Botswana as well as South Africa. Preparation of the RESA with the engagement of the respective environmental authorities and power producers on both sides of the border offers an opportunity to examine cumulative impacts as a transboundary issue at a more strategic level of cooperation.</p> <p>b) The country system has provisions for consideration of potential future developments in cumulative impact assessment that have been and are being applied.</p> <p>With respect to consideration of probable future developments in the cumulative assessment, including additional power plants, coal mines, and unplanned development, and in the determination of the appropriate level of mitigation for Medupi, the country system provides a robust approach that goes beyond what can realistically be accomplished in a project-specific EIA. First, the Waterberg EMF initiated by DEA is a vehicle, built on a participatory planning process, for considering and managing a wide range of development possibilities in the region. This EMF has been completed and adopted by DEA, and training in its use for planning and permitting has been provided to local and provincial authorities. Second, the process of designation of the Waterberg area as a National Priority Area for Air Pollution Control that is now in the final comment stage prior to approval by the Minister of Water and Environmental Affairs was being initiated during SDR preparation. This designation will lead to development of an air quality management plan and will give DEA authority to impose limits more stringent than national standards on existing and future air emission sources if necessary. Third, as noted in the Panel's Report, Management has been supporting development of a RESA for power development in the region that involves Botswana as well as South Africa.</p>
7.	<p>Greenhouse gas emissions and Exacerbation of climate change</p> <p>Technology and policy measures to control and mitigate emissions. The Panel finds that steps have been taken to adhere to the Bank's policy framework, including selection by Eskom of super-critical</p>	<p>Comment: It is not clear what is meant in the Panel's Report by the conclusion that "the Project fails to demonstrate adequately that the Project is directly addressing its own externalities." Management interprets this as specifically referring to CO₂ emissions. It should be noted that it is neither feasible nor required under Bank policy to avoid "equivalent emissions."</p> <p>Like many developing countries, South Africa is in a precarious balancing act between the need for economic growth and the need to address climate change. South Africa is an active leader</p>

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	<p>technology, financing of the Majuba Rail Project, and financing of renewables as part of the Project. The Panel considers that these efforts constitute an important recognition of other options available to provide electricity and reduce negative externalities in the context of the critical need for power to support development in South Africa. Nevertheless, the magnitude of emissions from Medupi far outweighs emissions avoided in these measures. The Panel notes that the description of the net results of mitigation efforts under the Project fails to demonstrate adequately that the Project is directly addressing its own externalities.</p>	<p>on meeting the challenges that climate change presents – not only in Africa but also globally. It is a key player in striking the new climate change agreement and the Project should be seen in that light. South Africa is putting in place a new development paradigm that addresses its energy problems while following a long-term strategy to protect against the effects of climate change. The strategy proposed by South Africa to lower the carbon intensity of its power sector development path over the longer term has been exhaustively examined by the GoSA (and peer reviewed) in the Long-Term Mitigation Scenarios (LTMS) Study, which set out the proposed development plans for the next 20 years, balancing the available options against a range of evaluation criteria. Within this strategy and as discussed under the “comparison of alternatives,” South Africa has evaluated all technically and financially feasible options and concluded that the Project is the least cost option to meet its needs. The evaluation also concluded that the extent of mitigation efforts under the Project is limited by non-availability of feasible non-coal based options during the Project time frame; and the technology choices (Supercritical, dry cooling) are consistent with international best practice to minimize emissions from coal generation. This analysis takes in to account the impact of technically feasible options such as energy efficiency improvement, DSM, etc.</p> <p>South Africa is fully committed to moving toward a low-carbon energy future. The GoSA ratified the UNFCCC, signed the Kyoto Protocol, adopted a National Climate Change Response Strategy and endorsed a Long-Term Mitigation Scenario that has led to its low-carbon strategy. South Africa has also issued Electricity Regulations for Energy Efficiency, co-drafted and signed the Copenhagen Accord, and confirmed ambitious GHG emission reduction targets of 34 percent by 2020 and 42 percent by 2025 (under the assumption that technical assistance and financial support will be available). Since then South Africa has hosted COP 17 and taken the lead in moving the climate change agenda forward.</p>
8.	<p>Alternatives to the Project to reduce GHG emissions. The Panel finds that Management acted consistently with Bank policy in preparing an extensive analysis in the PAD on the issue of GHG externalities, and notes that this analysis is additional to the information provided in the Medupi EIR. The Panel notes, however, that this is not a complete analysis of alternatives, as it focuses only on electricity production cost and the externality of GHG emissions. The Panel notes that Bank policy, and</p>	<p>Comment: The assessment provided in the PAD goes beyond “least cost”. In addition to least <i>economic</i> cost (as required by OP 10.04, net present value greater than or equal to net present value of mutually exclusive project alternatives), and GHG emissions, the PAD (and the economic analysis background report, Meier 2010) examines, among others, financial feasibility, technological and geopolitical readiness as additional criteria (Meier 2010, paragraph 5).</p> <p>For example, both nuclear and Inga III (hydro import from Democratic Republic of Congo) are identified as options that are economically feasible at low valuations of avoided GHG emissions. But these are not feasible in the time frame because of the state of development of these options as well as technological and financing constraints.</p> <p>Wind and other renewable energy options may be seen as</p>

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	<p>corresponding provisions of South African law, does not focus narrowly on “least cost”, as referred to in the PAD, but on whether there are other <i>feasible</i> alternatives available that could meet project objectives and reduce or avoid significant externalities and impacts.</p>	<p>technologically ready, and economically feasible (with sufficiently high carbon valuations), but the incremental financing requirements make them <i>financially</i> infeasible. Additionally, some of these technologies – wind in particular – have an impact on system operation which imposes technological limitations. Moreover, to replace Medupi with an equivalent capacity of wind power would require USD20.5 <i>billion</i> in additional financing (PAD, Annex 9, and Table 2). Installation of this capacity is not feasible, as it has system operation constraints and a high cost of generation, and the financing required is an <i>order of magnitude greater</i> than what the global community can make available to South Africa. Finally, with respect to options such as DSM and smaller hydropower projects, the PAD notes that these are not mutually exclusive alternatives, because they will in any event be implemented <i>in addition</i> to Medupi.</p> <p>In other words, based on a wide range of criteria in addition to economic least cost, Medupi is the preferred option to meet South Africa’s immediate electricity needs.</p>
9.	<p>Local Socio-economic Impacts</p> <p><i>Influx of laborers, land development and local impacts.</i> The Panel’s assessment is that the issue of impacts of the Medupi Power Plant on the local municipality and public services for which the Municipality is responsible is serious, and potentially detrimental to the rights and interests of the Requesters. The Panel finds that the EIA accepted by Management did not adequately identify mitigatory measures commensurate with its conclusion of impacts of “<i>high significance</i>” on public infrastructure and services, as required by OP/BP 4.00 and relevant NEMA principles. Management’s acceptance of the EIA with this shortcoming is not consistent with OP/BP 4.00.</p> <p><i>Commercial Farming and Ecotourism.</i> The Panel finds that the assessment of possible impacts on tourism in the EIR accepted by Management is not comprehensive and certain conclusions are not backed by empirical analysis. In this sense, the Panel finds that Management’s assessment of</p>	<p>Comment: Management notes that the Panel’s Report recognizes Eskom’s efforts to support the local economy including employment, infrastructure development and social services. As the Panel observed in its Report, the impacts of urbanization that may be induced by the development of Medupi on commerce, agriculture and ecotourism are difficult to predict.</p> <p>However, it is a fact that a key issue of concern to local communities during the preparation of the EIR was employment opportunities and Eskom responded by making a significant commitment to optimize local employment both directly and through its contractors and subcontractors. The social assessment done under the EIA for Medupi mentioned employment as a key community concern and determined that: (a) “the proposed power station would lead to the creation of a number of job opportunities, both during its construction and operation” and (b) social investment and infrastructural improvements will be developed by Eskom (Chapter 15 Page 413). Also, beyond employment creation, Eskom committed to assist in dealing with infrastructure constraints that existed and might be aggravated by the Project.</p> <p>Employment generation: The on-site labor force has been sourced as fully as possible from the local area. It is ascertained by available data that as of August 2011, Eskom reported that the Project had created 12,571 direct jobs and estimated that it had led indirectly to 20,000 additional jobs. As of May 6, 2011, the Eskom labor force was 11,863 people, of which 5,868 employees (49.5 percent) are from the Lephalale municipality and 6,337 (53 percent) are from Limpopo Province. Of 4,252 employed as unskilled workers, 4,244 (99.8 percent) are from Lephalale. Of the 2,311 employed as semi-skilled workers, 1,345 (58 percent) are from Lephalale; adding in the 385 semi-skilled workers from elsewhere in Limpopo Province, 75 percent of labor in this category comes from the province. Workers below the age</p>

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	<p>these aspects of the EIR is not fully consistent with OP 4.00, Table A1's requirement that the country system should call for <i>"appropriate studies [to be]undertaken proportional to potential risks and to direct, and as relevant, indirect, cumulative, and associated impacts."</i> On the other hand, the Panel notes that though the Medupi investment will contribute to further urbanization and a change of the sense of place, the net effect of this factor on ecotourism and commercial agriculture is difficult to predict.</p> <p>Local Poverty Reduction. The Panel finds that links between the Medupi Power Plant and issues of poverty in the impact area of the plant are not addressed in the Project's PAD or SDR, and feature only indirectly in the EIR accepted by Management. Social and livelihoods impacts are dealt with in the PAD and SDR primarily in terms of resettlement. These documents are largely silent on other socioeconomic impacts and their mitigation or compensation in the Lephalale area. This is not consistent with provisions on poverty reduction of OP 10.00. Properly addressing this issue might have resulted in a more proactive approach to address conditions that affect or benefit the livelihoods of poor and vulnerable communities.</p>	<p>of 35 constitute about 50 percent of the labor force, of which about 40 percent are from Lephalale Municipality. Eskom estimated that by May 2011 it and its contractors had disbursed ZAR31.7 billion (USD3.8 billion) in wages and local contracts for goods and services in the region.</p> <p>Infrastructure upgrading: Eskom was also committed, as noted in the Panel's Report, to assisting Lephalale Municipal Government with wastewater treatment. Eskom has made investments in upgrading the wastewater treatment system for Marapong, which is completed (see first supervision report), and building additional capacity for wastewater treatment at Lephalale (more than doubling the wastewater treatment capacity at Paarl Farm from 4 to 10 million liters/year). The latter work is on schedule to be completed in July 2012. By August 2011, Eskom had constructed 1,000 units of housing for Project staff. Many of these will become available on the local housing market when construction of Medupi is complete. In addition Eskom is investing in road improvements, housing construction, electricity supply, and sewage systems in the Marapong and Lephalale communities.</p> <p>Social services delivery: In an effort to generate benefits that have more sustainable impacts on poverty including education and training in technical skills, and social services, high emphasis is placed on local skills development, training, and education. The Project has contracted 1,980 local young people for technical skills development.</p> <p>In addition, Eskom has approved and is in the process of procuring a supplier to provide capacity building for small and medium enterprises to take advantage of emerging markets around the New Build Program sites, of which Lephalale is one.</p> <p>A Medupi Legacy Program. A budget of ZAR45 million for deployment in the Lephalale area over the next 3 years has been established for Eskom's Corporate Social Investment program. About half is to be spent in the rural villages and Traditional Authority Areas. About 90 percent of the budget will be spent on health and education-related infrastructure, with emphasis on improving teaching skills in math and sciences, and addressing HIV/AIDS. Enterprise development for black female-owned businesses will also be supported.</p> <p>Finally, Eskom is contributing to local social services by supplying medical equipment to clinics in the villages around Lephalale to the value of about ZAR3 million. An additional ZAR2.4m has been committed already to investing in creches and primary schools.</p> <p>It must be mentioned that in order to avoid a piecemeal approach to local development, Eskom is working and coordinating with local government and other corporations involved in the construction, provision of equipment or otherwise to the Medupi Power Plant (i.e., Exxaro, Hitachi, Sasol, and Alstom).</p> <p>In this circumstance, the EMF that is part of the country system</p>

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		<p>approach to addressing cumulative impacts in a strategic manner proves particularly valuable. The objective of the EMF is to ensure that water resources, biodiversity, and ecosystem services are comprehensive and well managed in the expectation of prospective future increases in mining, industrial development, agricultural and tourism activities, and population growth in the Waterberg area. Eskom reports that the EMF Report and the accompanying GIS data sets have been made available to local authorities and agencies at the provincial, district, and municipal level, and that training in their use for planning and permitting purposes is being provided to Interested and Affected Parties by the consulting firm contracted by DEA to facilitate the preparation of the EMF. This report was confirmed by members of the Project team during a meeting with DEA on May 12, 2011, that was held to discuss the potential interest in pursuing a more collaborative approach in preparing a SDR for the next Bank project in South Africa, should the opportunity arise.</p>
10.	<p>Cross-cutting Issues: Analysis of Project Externalities</p> <p>Air Quality. The Panel considers that the economic analysis should and could have included calculations of potential harm from air quality degradation in the area of the Medupi Power Plant. Thus, the Panel finds the economic analysis to be non-compliant with OMS 2.20 and OP 10.04.</p>	<p>Comment: Consistent with the Bank's Handbook on Economic Analysis, which is the basis for OP 10.04, (see Chapter 6, paragraph 5) all factors were considered in the economic analysis of the Project based on the information available at the time of appraisal (2009). At that time no consistent set of externality valuation estimates for South Africa was available.</p> <p><i>"Environmental externalities are identified as part of the environmental assessment, quantified where possible, and included in the economic analysis as project costs."</i></p> <p>The relevant question for the content of an economic analysis is whether the externalities can be <i>monetized</i>. If reliable damage cost estimates do not exist then these should not be included in the economic analysis. As the impacts are site-specific (a function of coal quality, heat rate, population distribution, extant health status, per capita income, etc.), the studies from the United States (Panel Report footnote 258) and China (Panel Report footnote 259) were not considered a valid basis for extrapolation to South Africa.</p> <p>The first reliable and authoritative study,¹ recommended for use for future South African Integrated Resource Plan (IRP) exercise became available only in 2010, after appraisal had been completed and the PAD had already been published.</p> <p>This study in fact shows the positive local externalities of electrification (avoided health damages from kerosene, fuelwood and self-generation) far exceed the negative local externalities (i.e., GHG emissions excepted).</p> <p>The team conducted additional analysis (see Annex 5) to demonstrate the viability of the Project taking into account the local externalities. It shows that if both positive and negative local externalities are monetized based on the July 2010 report, the economic rate of return would be <i>higher</i> than that reported in the</p>

¹ Edkins, et al. *External Cost of Electricity Generation*.

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		PAD.
11.	<p>Water Resources. The Panel finds that the failure to cost the 2 Mm³ of water per year required for expansion of the Grootegeluk Mine does not comply with OMS 2.20 requirement that economic evaluations identify, quantify and value all costs and benefits likely to be involved in the project. The Panel also finds that the approach to analyzing risks in the economic analysis is consistent with OP 10.04.</p>	<p>Comment: The economic value of coal, ex-mine, already reflects the economic value of all of its inputs and adding the value of water in mining separately would amount to double counting. Hence, the analysis did not explicitly consider the water use at the Grootegeluk mine.</p> <p>The economic value of coal is subject to a range of uncertainties and the opportunity cost of water for mining operations is only one of several. The economic analysis evaluated the sensitivity of economic returns to the economic value of coal (Meier, February 2010). That analysis shows the switching value for the economic price of coal (USD155/ton) to be 5 times the assumed baseline value (USD155/ton v. USD32/ton).</p> <p>The team conducted additional analysis to demonstrate the viability of the Project taking into account the valuation of water at the mine (at its opportunity cost): The inclusion of this cost has insignificant impact on the economic returns.</p>
12.	<p>Economic Analysis of Alternatives. The Panel determined that the economic analysis contains an inadequate consideration of risks --in particular, with regard to water and air externalities--associated with the choice of alternatives. The economic analysis includes extensive testing of the sensitivity of the choice of alternatives to CO₂ values but does not test for the sensitivity of alternatives to domestic and transboundary externalities associated with water availability and quality nor air quality degradation. The Panel finds that this omission constitutes non-compliance with OMS 2.20. As a result, the Board did not receive important information for decision-making.</p>	<p>Comment: The economic analysis contains extensive analysis of risks based on information available at the time. When new information became available, additional analysis was conducted which demonstrated that even if the risk factors identified by the Panel were considered, the choice to support Medupi would not have been impacted. Hence, the Board received adequate information for decision-making.</p> <p>As noted by the Panel, OP 10.04 states that quantification and valuation of externalities presupposes that tools are available “appropriate to the task.” Additional analysis of the economic returns which demonstrate the relative importance of GHG emissions as against the importance of local externalities has been carried out based on the information which became available since the appraisal. The Panel’s finding (Paragraph 403) that “<i>domestic and transboundary externalities are likely to be major</i>” is not supported by the evidence. They are in fact minor and their inclusion would not have impacted the results and conclusions of the analysis.</p> <p>The valuation of transboundary externalities depends upon the ability to first quantify the long distance atmospheric transport at the subcontinental scale, and to model the atmospheric chemistry involved. Such studies have been done in the United States, Europe and China, but are not available for Southern Africa. These studies require sophisticated meteorological and air quality databases that are unavailable, and hence the Panel’s presumption that such an analysis is comparable to near field atmospheric modeling and could easily have been done, is not reasonable.</p> <p>As already noted above (Item 10), if the local air quality externalities – positive and negative – are included in the analysis based on information now available, the net economic returns to Medupi would have increased, not decreased, thus</p>

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		<p>information provided to the Board was correct and consistent with the policy.</p> <p>Importantly, even if the positive externalities are excluded, the incremental impact of the negative local externalities is negligible compared to the GHG emission impacts which were the main focus of the environmental aspects of the economic analysis. It is the valuation of <i>carbon</i> that principally affects the choice among alternatives, not local externalities.</p>
13.	<p>Impacts on cultural heritage and practices</p> <p>Grave sites. The Panel notes that grave sites were identified and addressed in the Medupi EIR as part of the heritage study. Furthermore, it is the Panel's assessment that Eskom has made good-faith efforts to identify any grave sites that may be affected by the construction. The Bank has been assured that if any oversight has been made, Eskom would respond to any grievances in accordance with the provisions of the South African National Heritage Resources Act.</p>	<p>Comment: Management concurs.</p>
14.	<p>Impacts on Energy Access for the Poor</p> <p>The Panel notes that this Project is unlikely to diminish electricity access to the poor, and may enhance access by adding more electricity to the national grid. The Panel did not find an issue of compliance with Bank policy with respect to this claim.</p>	<p>Comment: Management concurs.</p>
15.	<p>Impacts on the National Economy</p> <p>A loan of US\$ 3.75 billion phased over Project implementation, and to be repaid in 25 years including a 10 year grace period, is unlikely to have any sustained impact on the exchange rate. The Panel did not find an issue of compliance with Bank policy with respect to this claim.</p>	<p>Comment: Management concurs.</p>

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16.	<p>Inadequate consideration of alternatives</p> <p>Alternatives to coal. The Panel notes that no systematic comparative analyses of emission abatement options and associated impacts, including infrastructure or services required to provide the required materials and manage and dispose of wastes, were undertaken to inform the choice of wet FGD. The Panel finds that the absence of such an analysis is inconsistent with the requirements of OP/BP 4.00 that appropriate studies be undertaken proportional to potential risks. This is also out of keeping with the requirements of OP/BP 4.00 and OMS 2.20 that feasible or worthwhile alternatives be assessed in a manner that would allow identification of the “best practicable environmental option” or optimal option, and/or enable the findings of that assessment to influence decision making on the project design and its implementation.</p> <p>The Panel commends the initiatives by Management to carry out an additional GHG analysis, provide support for the renewable energy and other energy efficiency components, but finds that Management did not ensure that Project documentation adequately considered feasible alternatives, as required by Bank policy, to promote informed decision-making by the Board.</p>	<p>Comment: Based on the EIA, it is understood that “Medupi poses no significant incremental health risk on local communities in regard to increased levels of exposure to mercury, particulates and SO₂” (para 59 of SA Eskom Management Report). Operation of the Medupi plant without SO₂ controls increases the exceedance frequency.</p> <p>The delay in implementation of SO₂ controls was to allow the most suitable and cost-effective SO₂ control option (wet FGD) to become viable, as adequate quantities of required water are not available at present and a water pipeline (from Mokolo dam) needs to be constructed. Studies carried out by multiple independent consulting-engineering firms reached the conclusion that wet FGD is the most viable and cost-effective option.</p> <p>Wet FGD was recommended by numerous independent consulting firms which have been engaged in planning the Project.</p> <p>In 2002/03, ESKOM employed two independent consultants (Lurgi and National Lime) to perform a life cycle assessment of wet FGD and semi-dry FGD. Results of the Lurgi and National Lime studies were reviewed by Black & Veatch.</p> <p>In 2006, EoN Engineering carried out an assessment of all suitable technologies for various levels of SO₂ control (30 percent, 60 percent and 90 percent).</p> <p>Wet FGD was selected as the preferred sulfur abatement/reduction technology based on an assessment of life cycle costs and limited global experience in utilization of “dry-type” FGD for large coal-fired generation units. More specifics from the evaluation: dry and semi-dry SO₂ controls have not been demonstrated in an 800 MW unit. For example, the largest circulating fluidized bed FGD is 420 MW (at Dry Fork station of Basin Electric Power Co. in Wyoming USA); in Europe the largest plant is 300 MW.</p> <p>Semi-dry processes reduce the water requirements by roughly 50 percent; they do not eliminate the need for water.</p>

Annex 2

Medupi Environmental Monitoring Committee Meeting

In terms of the section 3.2.2 of the Record of Decision (ROD)
(Ref no: 12/12/29/695) ESKOM: Medupi Power Station is required to establish
an Environmental monitoring Committee which is held on quarterly basis
(3 months basis).

The Environmental Monitoring Committee is constituted of the following
members:

- Independent chairperson;
- Ecologist;
- Two representatives of the public, one community member from
Marapong and one from Lephalele;
- Environmental Control Officers (ECO); and
- Senior Site Manager.

In many occasions the Environmental Monitoring Inspectorate (EMI) from the
Department of Environmental Affairs and the Medupi Environmental Team at-
tend the EMC meetings.

The main purpose of this committee is to facilitate communication and co-
operation among local constituencies that the EMC members represent, Local
Authorities and Eskom.

The committee is responsible for monitoring and auditing the project's compli-
ance to the conditions of the ROD, Environmental Management plan (EMP)
and relevant Environmental Legislation.

All members of the EMC and the public are invited to attend the meeting
scheduled as follows:

Date: Tuesday 28 February 2012

Venue: Eskom Information Centre, Relebogile Centre, Lephalele

Time: 09:00 – 12:00

For more information please contact Mr Patrick Seloba on 073 724 6803

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Annex 3

From: "Bobby Peek" <bobby@groundwork.org.za>

To: <Rduncan1@worldbank.org>

Cc: <mzaman2@worldbank.org>, <rmokate@worldbank.org>

Date: 02/16/2012 11:35 AM

Subject: South Africa Investment Eskom Support Project: World Bank Management meeting with Requestors representatives and community representatives

Thursday, 16 February 2012

Reynold Duncan
Energy Program Coordinator, Africa Region
Washington D.C. 20433

By e-mail: rduncan1@worldbank.org

CC: Inspection Panel, Mishka Zaman, Operations Officer
World Bank, Renosi Mokate, Executive Director

Dear Reynold

South Africa Investment Eskom Support Project
World Bank Management meeting with Requestors representatives and community representatives

We would at the outset like to record our appreciation for the opportunity afforded to us to make input to the World Bank's management response to the Inspection Panel report on the South Africa Investment Eskom Support Project.

We hope that this dialogue was meaningful for the Management and hope that our concerns and issues raised during the meeting will be duly addressed in your action plan. We would like to record the positive nature of the meeting, as referred to by the South African Country Director in her closing statement. We are all committed to make sure that we have an open, honest and meaningful engagement throughout this process and beyond. Our intent is make sure that the local impacts on the communities and environment can be mitigated and minimized.

In light of wanting to keep this dialogue honest, we cannot concur with the Country Director's statement that 'we are talking from the same side'. It is evident from the limited response by the Management – focusing only on air pollution and water – that Management has failed to come to grips with the reality on the ground as presented by the Inspection Panel report, or that you choose to purposefully ignore it. We hope the latter is not the case. A more detailed and meaningful response by Management would have perhaps brought the parties to the same side.

We would like to also place on record that despite numerous attempts to get a formal agenda for the meeting it was held without any formal agenda. Indeed, something that is procedurally inappropriate. Thus, there was never any certainty as to what really was the objective of the meeting. Over the course of our discussions in January, the objective of the meeting was blurred. Drawing from various statements from correspondence that speak about the meeting, it is stated that the meeting will indicate 'how the Management intends to move ahead', to discussion of an 'approach', and or discussing 'actions'. You also indicated that the Bank's response is confidential until the Board of the Bank makes it public. This was indeed strange for while you were not willing to share your entire approach, you wanted honesty and transparency from the community.

The second procedural issue was that the Inspection Panel report was leaked to the public. Both parties present in the room knew the contents of the report and thus were speaking from an informed perspective, but you failed to comment on the broader issues in a meaningful manner. We believe that this was an opportunity lost. We hope that it is not your intention to ignore these pertinent issues.

The critical issue underpinning the entire development is the cumulative impact of the Medupi project on people and their environment in the area. The South African Country Director also referred to this in her closing comments. This broad based approach and understanding of cumulative impacts needs to be understood urgently, or else the entire area is set to be an environmental disaster zone. To ensure that this does not happen, and that there is a meaningful response from the World Bank Board in their quest to find a socially and environmentally just solution, it is very critical that the South African government and Eskom is supported so that there is informed and proper decision making and management going forward on this project. We thus propose the following to be considered seriously in your response to the Inspection Panel report.

The following proposals are made after having gone through the Inspection Panel report. These issues were raised in the meeting yesterday at various times, particularly by the local communities members, who will be impacted the most by this project. We would like to place them on record so that there is a clear understanding of what our expectations are.

Capacity building

The Inspection Panel report raised concerns about the reliance on self-regulation by Eskom. Coupling this with their concerns on capacity and implementation of local and provincial government to monitor and enforce, it is certain that a gap exists to secure the integrity of environmental and human rights. We believe the Bank could assist with staff development in the relevant regulatory agencies at the national (Department of Water and Environmental Affairs; Mineral Resource), provincial and local levels. As stated in the Inspection Panel report, many of these departments are under-staffed, under-resourced, and also under-skilled.

Cumulative impacts: Use of Appropriate Management Tools to Manage Cumulative Effects

The Inspection Panel report highlighted the concerns of cumulative impacts within the environmental and social realm. With future developments earmarked from the area, and with an increase in coal mining, a broader vision is needed. For more focused and effective management of critical resources such as water, air and social services more research and planning processes on alternatives (involving local communities) need to be used to supplement existing tools such as the catchment management plans, atmospheric emission licenses, environmental impact assessments and reports, and present town planning strategies. Integrated Development Plans need to be able to draw on alternative management tools to secure appropriate development for the area. Considering the Integrated Development Plans have to be reviewed every five years (sometimes mid term reviews are possible) it could be a critical tool to manage the cumulative social impact.

Water

It is welcomed that the Management consider water to be a major challenge. There is a concern however on the Bank's reliance on the Department of Water Affairs to be able to meaningfully respond to the challenge. The water debate in South Africa is well documented, and the Department of Water Affairs has failed society. The most recent scandal has been the acid mine drainage impacts on the Vaal catchment area.

The Bank needs to pay close attention during upcoming supervision missions on how Eskom, the Department of Environmental Affairs and Department of Water Affairs would resolve the water availability issue and decide on the ultimate installation schedule for the flue gas desulfurization units.

We therefore, propose that a rigorous and complementary studies be conducted, with the following characteristics.

Investigate the water availability from the Mokolo dam, and specifically regarding the water users from the Mokolo river upstream from the Medupi area. This should be done regardless of whether Mokolo and Crocodile River (West): Water Augmentation Project Phase 2 will be implemented or not.

Investigate water-usage by poor and small-scale irrigation farmers, mainly women, in the area north of Lephalale. As mentioned in: 'Transforming Water Management in South Africa' (in the journal Water Policy), which clarifies that the poor farmers who were supposed to get more water as a result of a more equitable allocation of water in the country, are not necessarily getting their due share. We only know that the irrigation allocation is still to be verified. In other words, no-one knows with any degree of certainty how much water is used in irrigation, nor how dependent these people are on the water for their livelihoods.

The study should include a survey/assessment of the water storage capacity in the Mokolo reservoir. It is likely that the storage capacity is much less than the design capacity because of accumulation of silt and especially sand in the reservoir during the approximately 30 years since the construction of the dam. The actual storage capacity has a direct bearing on how much water can be stored during periods of high flow and made available during subsequent periods of drought, and hence also only the available water for Medupi and the municipality before the completion of Mokolo and Crocodile River (West): Water Augmentation Project Phase 2.

The study must consider the erratic rainfall, and the cumulative demands on water from coal mining expansion, influx of workers, power stations (etc), a 'reality check' on availability of return flows, to determine more reliably the probable impacts on the system from the downstream users view plus from the reserve perspective.

The study must consider the sand mining issues to understand its impact on water security in the area and to develop systems with the provincial environment authority that monitors and enforces regulations on sand mining issues.

Sewage

The strain on the system was articulated in our meeting. Water quality as a result of untreated sewage inflows is a major issue. An assessment of water quality needs to be done and responsibility for water treatment assigned. This may have improved with reference to Lephalale as the capacity of the treatment plant was or is expanded by Eskom. Monitoring the outflow from the wastewater plant as function of the water supply to the municipality would throw some light on the claim that 50% of the inflow would be available for Medupi during the period of delay in the construction of Mokolo and Crocodile River (West): Water Augmentation Phase 2. Little is known about the quality of the water that will pass from the Gauteng area (considering the acid mine drainage challenge) through the Crocodile River to the Medupi, once Mokolo and Crocodile River (West): Water Augmentation is on line. This would be a good time to ascertain who is responsible for what and who is expected to pay for cleanup.

Waste Disposal

Hazardous waste management in South Africa is an ongoing challenge. Close on 50% of South African landfill sites are not permitted. Wastes disposal is of sources of pollution linked directly and indirectly to the Medupi development and operations. For example, sewage treatment, waste sites, gypsum disposal, waste ash. This will need strong enforcement.

Air Quality

The belief that particulate matter air pollution determined at the Maropeng monitoring station is as a result of ground level pollution sources and does not arise from tall stacks such as the Matimba coal fired power station is falsely premised for the following reasons:

Particulate matter air pollution in the Highveld Priority Airshed is generally out of compliance with the South African ambient AQ standards during the winter periods and according to the Department of Environmental Affairs themselves (Dr. Patience Gwaze) the nature of the pollution is regional rather than local which generally implies an industrial source rather than local domestic burning. Specifically Dr Gwaze has indicated that there is a strong correlation between PM_{2.5} and PM₁₀, which indicates that the sources of these two pollutants are probably the same.

Figure 1 below supports this belief that most particulate air pollution recorded by monitoring station is from industrial sources. Figure 1 and 2 similarly also demonstrates a worrying trend among the air quality monitoring stations generally in SA demonstrating gaps in monitoring because of malfunctioning equipment and the lack of dedicated oversight and management of these networks.

Figure 1: PM₁₀ 24 hour concentrations for the months of May, June & July 2009

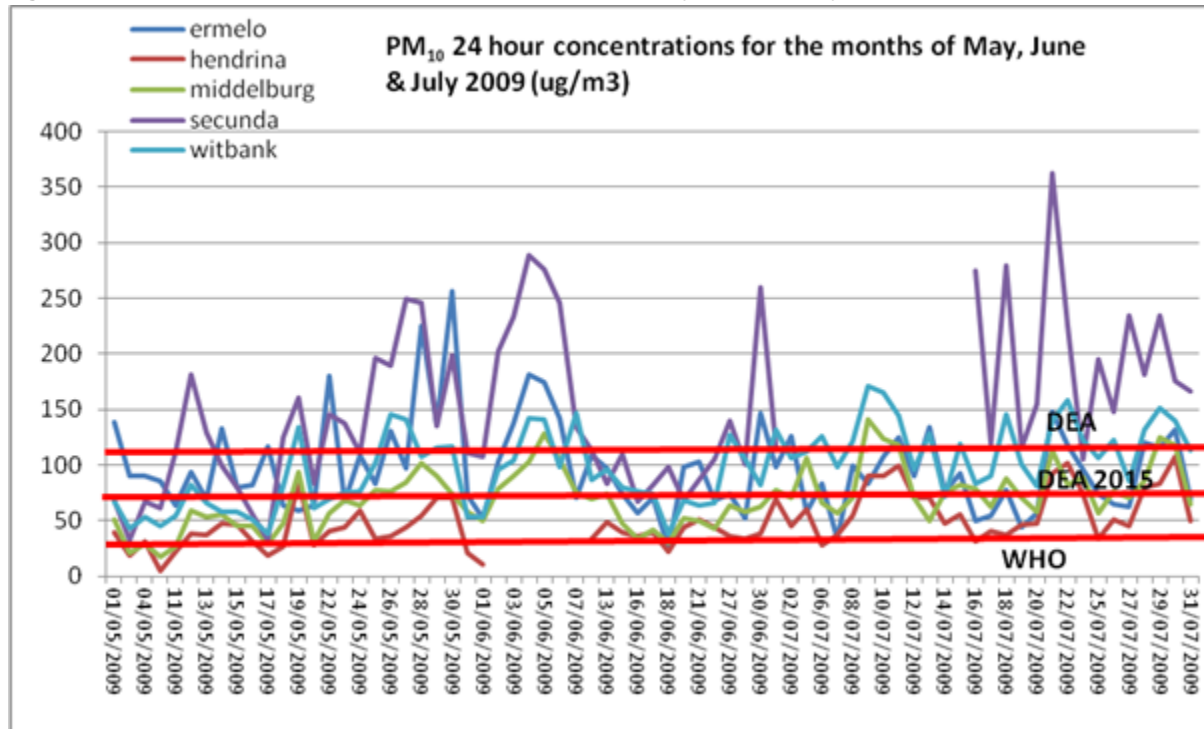
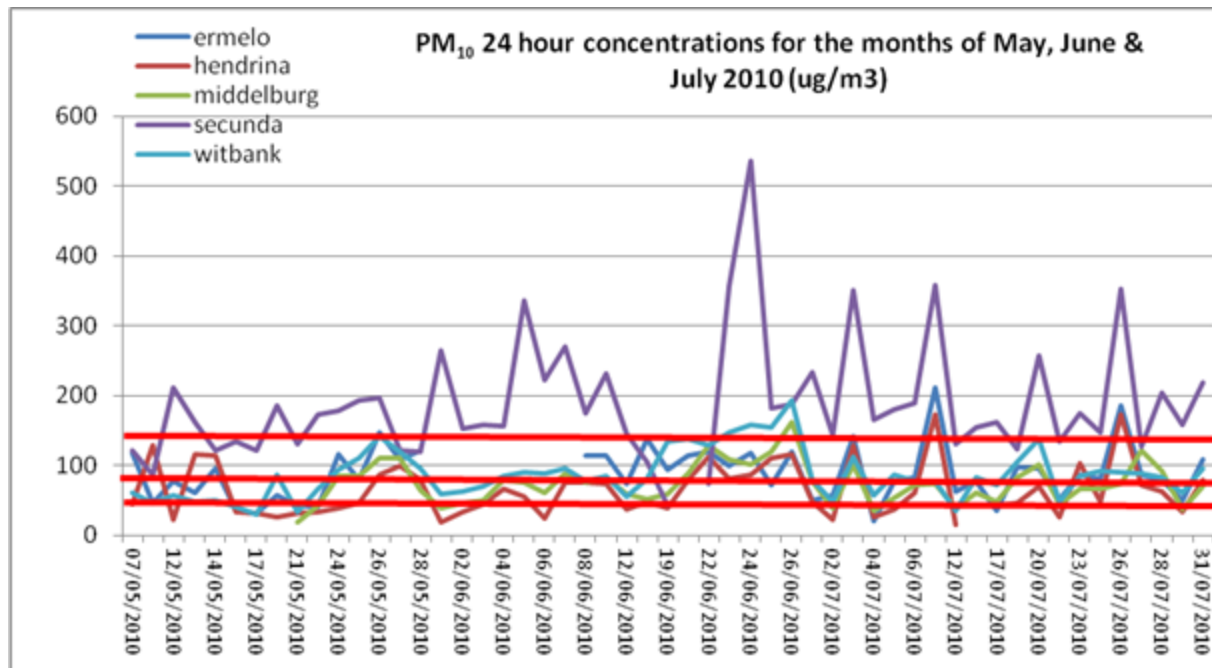


Figure 2: PM₁₀ 24 hour concentrations for the months of May, June & July 2010



The World Bank must work with the district municipality, which has a draft air quality management plan, to help implement and monitor this plan and enforce compliance. Also, development of a comprehensive emissions inventory and characterization of existing air quality in the Waterberg Airshed (the airshed plan is yet to be developed) could be another consideration. From the history of other airshed's that have these plans, such as the Vaal Triangle and the Highveld area (where Kusile is being developed), there has been very little meaningful change in the pollution loads in these areas.

Health

From the experience of other priority airsheds in South Africa the challenge around health has been a major component of the work undertaken. It is critical that the status of the peoples' health is understood in advance. The establishment of a baseline epidemiology to record existing respiratory diseases against which to evaluate possible negative health effects (such effects could arise from a number of 'drivers', but one could at least check trends pre and post Medupi) is critical.

The research should put additional resources into studying and resolving issues of cumulative impacts upon various measures of environmental health in the Waterberg region and in the trans-boundary Limpopo River basin.

Transparency

Transparency was a major part of our debate yesterday. Indeed the manner in which yesterday's meeting was called and facilitated – without an agenda – highlights the World Bank's opaque practice. We hope that this will change and suggest the following:

- Improved transparency on the environmental side would be very helpful, both in terms of public posting of environmental air and water monitoring results on the web and in public spaces in Lephalale, and the posting of the conclusions by Bank monitoring missions about the state of the project's compliance with Bank standards.
- The Bank should insist on public consultations with regard to the evolving Environmental Management Plans. The

current Plans (both construction and operations) are in the process of revision. It was clear from the meeting yesterday that people have little information about what happened. They only knew about it when construction started.

- It was recognised that the Environmental Monitoring Committee set up by Eskom is critical and people are willing to participate in it if it seeks meaningful engagement with action as a result. The Bank should ensure that there is adequate and appropriate representation from all sectors of the affected community on the Environmental Management Committee. The proactive sharing of all environmental information and particularly monitoring data from air and water sources with the Environmental Management Committee and the public will ensure that the borrower – all parts of the affected community – and the Bank are informed about all relevant environmental and social impacts and issues related to the project.

- Supervision missions to date have not engaged with the local people or have done so in a selective manner. In all future supervision missions, the Bank staff should ensure that they communicate to all relevant sectors of the Lephalale community in timely, culturally and socially appropriate ways that they will be visiting the Lephalale community and invite the community to meet with them to discuss the project or to communicate any information they deem appropriate to the Bank staff.

We hope that you consider our comments above not merely as impacted and concerned people, but also in light of our reading of the leaked Inspection Panel Report.

Our understanding is the World Bank sought a more proactive role while giving USD 3.75 billion to Eskom, and your current hands off approach is contrary to earlier public position taken during the loan approval. If the World Bank's intention was to take 'South Africa to low carbon development' and this loan was 'down payment' on a greener future, then it should be reflected in the World Bank's action plan for Medupi particular and Lephalale region in general. As indicated yesterday, it would be critical that your response is not rushed. So please request more time from the Inspection Panel or the World Bank Board – whoever is tasked to grant this time. We support a call for additional time to respond meaningfully to our concerns so that indeed we are 'talking from the same side'.

Finally, we note that the Bank has not taken the concerns of the Inspection Panel on board in a meaningful way. We want to state that we might have to seek redress for harm caused and continuing if the response does not meaningfully lead to a change of action and outcome from the present.

Regards,

S. Peek

On behalf of groundWork and Earthlife Africa

Annex 4

The World Bank

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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March 2, 2012

Mr. Bobby Peek
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Email: bobby@groundwork.org.za

Dear Bobby,

Subject: Eskom Investment Support Project

Thank you for your email dated February 16, 2012. We would at the outset like to express our appreciation for the consultation meeting on February 15, 2012 which took place in a positive and constructive atmosphere.

We have carefully reviewed the issues that were raised during the consultation meeting, including the written input from the above-mentioned email, to make sure that legitimate concerns are covered in the Management Report and Recommendation. As indicated in my earlier email we had requested an extension from the Board in order to allow for additional time to review our response in light of the issues raised at the meeting and follow-up email.

Regarding your point on the meeting's agenda, I would like to clarify again that the legal background and the purpose and goal of this consultation meeting were explained in my communications to you (letter of December 22, 2011 and emails of January 5, 13 and 19). Given that the only agenda item was to discuss Management's possible actions in response to the Panel Report, which I repeated in each communication, I am surprised that you feel that clarity was lacking about the objective of the February 15 meeting. As regards the draft Management Report, kindly note that Management is bound by the procedure set out in the Inspection Panel Resolution, which requires that the Panel Report be considered by the Board first before it is publicly released. Please note that Management has no influence over these procedures which are set by the Board.

Our Report and Recommendation in response to the Panel Report has been submitted to the Bank's Board and will be publicly released after the Board has considered it in a meeting. Kindly note that Management has no role in the scheduling of this meeting, which is the responsibility of the Board's Secretariat. We expect, however, that the Board will consider the Eskom Investigation Report and Management's Report in the coming weeks.

I would like to take this opportunity to respond to the issues raised in your email of February 16, 2012.

(1) Capacity

The Medupi component of the Eskom Investment Support Project (EISP) is a project of national importance. When the Bank team was drafting the Safeguards Diagnostic Review which would allow the project to be prepared under the Bank's policy on use of country systems (OP 4.00), the national level Department of Environmental Affairs (DEA) was the relevant authority that issued the Record of Decision (ROD) for Medupi. With respect to a project of national importance, as discussed in more detail below, the national government is *de facto* the effective operating authority for purposes of monitoring and compliance.

The administrative capacity for environmental compliance monitoring in South Africa that is relevant for the Project was carefully reviewed. While you assert that there are capacity constraints in the South African Government to implement environmental legislation and that Government at all levels suffers from a lack of staff and budget resources, the Bank has not found evidence of ineffective compliance monitoring and enforcement in the context of the EISP or the Medupi component. On the contrary, DEA has taken measures in recent years to improve the relevant regulatory framework and provide capacity building and training support for more effective environmental management. Although some constraints might exist at lower tiers of Government, these have not been an issue in regard to large projects like the EISP, which are closely supervised by the central Government authorities. For example, the DEA's Environmental Management Inspectorate (EMI), the "Green Scorpions," carried out a spot inspection in December 2010 that generated positive local articles on the project's environmental compliance. In another example, in December 2010, a Department of Water Affairs (DWA) site inspection cited absence of a Water Use License to use wastewater from the batching plant for on-site dust suppression, which was quickly corrected.

The ROD addresses compliance monitoring and enforcement by DEA. This includes the requirement to appoint an independent Environmental Control Officer (ECO) that reports directly to DEA and to an Environmental Management Committee (EMC) and is responsible for compliance, monitoring and auditing. As noted above, the EMC is playing an increasingly important role in monitoring compliance with South African environmental laws, regulations and authorization conditions. The most recent EMC meeting for Medupi was held on February 28, 2012, and was observed by Bank staff.

(2) Cumulative impacts

Let me respond to your point on the need for a broad analysis of cumulative impacts. The South African regulatory framework regarding cumulative impacts is robust. In addition to project-specific Environmental Impact Reports (EIR), DEA has environmental management tools that allow it to address cumulative impacts. The Government uses the Strategic Environmental Assessment (SEA) approach to develop Environmental Management Frameworks (EMFs) for defined areas, such as was done for the Waterberg District. Another such tool is the designation of an area for strategic management; in this case, DEA is proposing to designate the airshed as a National Priority Area for air quality management as a proactive measure, i.e., before the airshed is degraded. This designation is pending Ministerial approval. Other tools include, as you note, the periodic revision of the municipality's Integrated Development Plan. The EMF under national

regulation is expected to be an important guide to the updating of a community's Integrated Development Plan.

(3) Water

Management agrees with the proposal to continue to pay close attention during supervision missions to how Eskom, the DEA and the DWA are addressing the water availability issue and monitor the installation schedule for the flue gas desulfurization units. As we noted in our discussion, measures have been taken to include this subject in our loan agreement. Those measures have been described as loan covenants in the publicly available Project Appraisal Document. In terms of the studies that you have identified these have been or are being undertaken by the DWA.

Regarding the sand mining issue we have had conversations with the provincial authorities regarding the permitting and appeals process and how this relates to sand mining in the Mokolo River. It is clear that the sand for the Medupi project was mined under valid permits.

Murray & Roberts JV, as the civil works contractor on the Medupi project, awarded a commercial contract on a competitive bid basis to Afrimat in 2007 for the provision of aggregate and sand. Afrimat in turn began purchasing the sand from Chobe Plant Hire & Crushers, which was contracted as a local partner of Afrimat in Lephalale. Chobe Plant Hire & Crushers has sand mining permits in its owner's name, as well as working with several local small enterprises that hold permits for sand mining. The contract between Murray & Roberts JV and Afrimat is explicit in performance criteria, and stipulates that suppliers/subcontractors must be legally compliant and available for inspection. In addition to frequent monitoring by the Department of Mineral Resources (DMR) and DWA (which, with respect to Water Use Authorization occurs monthly), Murray & Roberts JV conducts frequent verification inspections and weekly walkabouts of Chobe Plant Hire & Crushers' operations. Water quality monitoring is done through an accredited lab, with the results submitted monthly to DWA by Chobe Plant Hire & Crushers.

(4) Sewage

As project construction began, Eskom began working with the Lephalale Development Forum as a member. Two key issues of concern were identified by the Forum as priorities for the community: constraints in capacity at the municipal wastewater treatment plant (WWTP) at Lephalale, and substandard solid waste disposal at Lephalale. Eskom became engaged with the community on both issues to discuss solutions. It was agreed by the Forum that Eskom's role was to work with wastewater treatment. Eskom has made investments in upgrading the wastewater treatment system for Marapong, which is completed, and is building additional capacity for wastewater treatment at Lephalale (more than doubling the WWTP capacity at Paarl Farm from 4 to 10 million liters/yr). The latter work is on schedule to be completed in July 2012.

(5) Solid Waste Disposal

After careful deliberation and discussions with the Lephalale Development Forum, Eskom has decided to build its own solid waste disposal facility on its Matimba project site. The EIR for the facility was prepared in accordance with South Africa's EIA process and approved in late June 2010. The facility has been authorized for the disposal of non-hazardous and semi-hazardous materials, and is undergoing detailed design. Hazardous wastes will continue to be transported to a certified disposal facility in the Gauteng area. In the meantime, all other solid waste is also being transported to landfills in the Gauteng area. Exxaro and Eskom are still

considering ash disposal as backfill in the mine. Exxaro has now reached the “bottom” of the coal deposit, but three or four years will be needed to produce a large enough area of mined-out pit to consider ash disposal as backfill. Additional studies are needed to consider the impact of ash disposal as backfill on groundwater quality. In the interim, Eskom is developing its approved landfill site for Medupi ash with the view of providing containment capacity for at least the first four or so years of operation.

(6) Air Quality

We note that the data you present in your email is for the *Highveld* located in the Gauteng area and does not relate to the Medupi project area. However, we would like to respond to the underlying point that you make regarding the source of particulate matter.

As required by the Medupi ROD, Eskom monitored air quality in Marapong. The Air Monitoring Report, based on three years of continuous monitoring for PM₁₀, SO₂, NO₂, and ozone, concluded that air quality in Marapong will not be affected by Medupi. Coarse particulates (PM₁₀) are the major pollutant of concern in the area. The main sources of PM₁₀ are: vehicle traffic; blasting and drilling at nearby mine sites; earthmoving at nearby construction sites; and wind erosion from bare soil. High particulate levels observed in other regions of South Africa have the same sources. The most current USEPA research demonstrates that power plant emissions are not significant sources of coarse particulates. The nearby Matimba power plant is in any case equipped with electrostatic precipitators that have 99.77% design efficiency for removal of particulates, and both stacks are continuously monitored.

The Medupi ROD also requires Eskom to control particulate emissions (including dust) consistent with national ambient and emissions regulatory standards. These requirements were included in the construction stage Environmental Management Plan for Medupi, which Eskom will implement. Compliance will be monitored by the ECO and the EMC. The plant will be equipped with ultra-high efficiency particulate control and monitoring technology. The Air Monitoring Report mentioned above concluded that no further actions are required at Medupi or Matimba for air pollution control in Marapong, so long as emissions and ambient regulatory requirements are met. Monitoring of construction impacts, including ambient air quality, is ongoing, and the Bank will continue to review these data as part of supervision.

(7) Health

Both the DEA and the Bank follow the widely accepted and long used definition that risk is a product of hazard and exposure. In the case of human health risk from air emissions, the measure of hazard is the pollutant concentration in ambient air, and exposure is the likelihood that people will be present. When the EIR was being prepared for the project, Schedule 2 of South Africa's Air Quality Act (2004) was applicable; its ambient air quality standards were closely aligned with World Health Organization (WHO) guidelines for the protection of human health and with European Union Directives.

As noted earlier, DEA has proposed to designate the Waterberg airshed as a national priority area for air quality management before the airshed degrades. This is in addition to the DEA imposing the requirement in the ROD that Eskom reduce emission levels if ambient air quality criteria are exceeded.

(8) Transparency

We wish to clarify that the Environmental Management Plans are already subject to public disclosure and consultation. As you pointed out the revision of the current Plans is forthcoming.

The ROD required Eskom to establish an independent EMC for Medupi that includes representatives of local communities (Marapong and Lephalale), representatives from DEA and the provincial environment department, a senior site manager from the main contractor, and qualified professionals from the EIA preparation team. The EMC oversees implementation of the project in compliance with the requirements of the ROD, environmental legislation, and specific mitigation measures stipulated in the approved EMPs. Such an EMC has been established for Medupi and is actively engaged in monitoring project implementation.

In addition to the regular meetings of the EMC that are locally advertised and open to the public, Eskom maintains a Communications Center on Pika Street in Lephalale town. The Communications Center is open to the public and serves as an information source about the project and a location where local citizens can bring concerns and grievances regarding the environmental impacts of Medupi project operations.

Management is taking into consideration your recommendation to coordinate future supervision missions in a manner that coincides with a meeting of the EMC and attend as an observer as we did at the last meeting held on February 28, 2012. Disclosure by the World Bank of reports on its implementation support visits is done through its bi-annual Implementation Support Reports, which are in the public domain. Furthermore, Management and Eskom are developing an approach to make accessible to the public more details on the findings of Bank environmental and social supervision missions for the EISP.

I trust this response addresses the issues you raised, and we look forward continued engagement that will assist in ensuring the project meets its development objectives. We would like to encourage you to make greater use of the existing fora for dialogue and participation, such as the EMC meetings, as well as strategic planning exercises that are held by the Departments of Energy, Water and Environmental Affairs among others. In addition, we would welcome continuing the dialogue with the Requesters and their representatives within the context of our regular supervision missions.

Sincerely,



Reynold Duncan
Program Coordinator
Africa Energy Group

Cc: Renosi Mokate, Executive Director for South Africa, World Bank
Mishka Zaman, Panel Operations Officer, Inspection Panel

Annex 5

Medupi Power Project
Summary of Additional Economic Analysis Conducted in 2011

Peter Meier
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23 January 2012

PREFACE

This report documents the economic analysis that has been conducted since publication of the PAD in early 2010. In particular we have examined the impact on the economic returns of local environmental externalities, the impact of delays in the FGD system, and the impact of higher oil prices.

Local environmental externalities

1. At the time of the economic analysis in 2009, there were no reliable, South Africa-specific estimates of local externality damage costs. Experience from other countries suggested that compared to damage costs from GHG emissions, these would be quite small.
2. However, in July 2010, after completion of the PAD, a set of damage cost values recommended for use in South African integrated resource planning was published, with average values of damage costs, by technology, as shown in Table 1.¹

Table 1: Local externality costs of coal generation

	RandCents/kWh	UScents/kWh
positive externalities	18	2.40
<i>negative externalities</i>		
combustion air pollution	-1.35	-0.18
biodiversity loss	-0.7	-0.09
acid mine drainage	-2.1	-0.28
fuel production health impacts	-0.36	-0.05
Total negative externalities	-4.51	-0.60
Net benefit	13.49	1.80

source: Edkins et al, op.cit. Executive Summary Table 1.

3. As evident from Table 1, the *positive* local externalities of electrification exceed the *negative* local externalities by a factor of 4 (18 Randcents/kWh as against 4.51 Randcents/kWh).² In other words, if the economic analysis had used the best available estimates of local externalities, negative and positive, the economic returns of Medupi would have been *higher*, not lower, as some have suggested.
4. One may note that the definition of health impacts of fuel production (i.e. largely associated with the occupational health impacts of mine workers) as an *externality* is questioned by many economists (since it double counts on grounds that wage rates reflect the occupational health differentials)

¹ Edkins, H. Winkler, A Marquard, R. Spalding-Fecher, *External Cost of Electricity Generation, Contribution to the Integrated Resource Plan 2 for Electricity*. Report to the Department of Environment and Water Affairs, Energy Research Centre, University of Capetown, July 2010.

² See below for an explanation

Table 2: comparison of local and global externalities (2009 Randcents/kWh)

	coal	nuclear	Gas-CCGT	Diesel-OCGT
GHG emissions	48	0.3	27	45.5
Range	25-71	0.2-0.4	11-32	24-67
Local health impacts	1.35	0.03	0.34	0.22
Range	1.0-1.7			

Source: Edkins *et al*, *op.cit*, Summary

5. Clearly, damage costs from GHG emissions overwhelm the air quality health impacts – by a ratio of 48 : 1.35 with a range of 25:1 to 42:1. The hypothesis of the original economic analysis is confirmed: The valuation of GHG emissions is by far the most important question.

6. We have re-estimated the economic returns using the above estimates for externalities (as well as those at the high end of the range of these externalities). Even when the negative externalities are taken at the high end of the range (see Table 2), the ERR falls from 24% to 22.9% - and when one also adds in the positive externalities, the net effect is indeed an increase in ERR, to 25.8% (Table 3).

Table 3: Economic returns to Medupi as a function of local externality variations

	ERR
Baseline	24.0%
+local externality costs, average value (at 0.6 UScents/kWh)	22.9%
+local externality costs, high value of Elkins <i>et al</i> a range (at 0.95 UScents/kWh)	22.2%
+local externality benefits (Elkins <i>et al</i> , 2.4UScents/kWh)+high value externality costs	25.8%

7. The switching value for externality cost is 8.5 UScents/kWh, *more than 14 times the baseline estimate*. In short, if one uses the default values suggested by Elkins *et al.*, the quantification of local externality values has no significant impact on the economic returns.

Damage valuation issues

8. Use of such aggregate values per kWh as suggested by Elkins *et al* have significant limitations, notably for the air damage estimates. For example, in the case of SO₂, the damage costs are obviously a function of the sulfur content of the coal, the heat rate (efficiency) of the project, and the presence and removal performance of any FGD. Damage cost estimates are much better expressed as \$/kg of pollutant emitted, which would allow a more credible assessment.

9. Table 4 shows the following damage cost estimates in US\$/ton emission per million population per 1,000\$ of per capita GDP income: emissions from modern power plants with state-of-the art emission controls are between 1 and two orders of magnitude less than from standby generators. This explains why the positive externalities (i.e. the avoided externality damage costs of diesel for self-generation³ and kerosene for lighting) are so much higher than the negative externalities associated with health damages from coal-power plant emissions. This reflects the growing literature on the health effects of indoor air pollution (as associated with indoor kerosene and candle use for lighting)⁴

Table 4: Damage cost estimates (at 2000 prices, in \$/ton/1000\$GDP/millionPopulation)

	High stack (modern power plants)	Medium stack (large industry)	Low stack (small boilers, standby generators and vehicles)
PM10			
Range	20-54	63-348	736-6,435
Average	42	214	3,114
SO2			
Range	3-8	10-56	121-1,037
Average	6	33	487
NOx			
Range	1-3	3-13	29-236
Average	2	9	123

Source: Lvovsky *et al.* (2000).

³ Emissions from self generation are typically from engines with no emission controls, occur at or near ground level, and are typically in densely populated urban areas. Modern power plants such as Medupi are typically located in rural areas, have high stacks, and are fitted with state of the art emission controls (low NOx burner, FGD, ESP etc).

⁴ see, e.g., World Health Organisation, *Addressing the Impact of Household Energy and Indoor air Pollution on the health of the poor*, WHO/HDE/HID/02.9., 2009; or S. DasGupta *et al.*, *Improving Indoor Air Quality for Poor families*, World Bank Policy Research Working Paper 4422, 2007.

Impact of FGD system delays

10. It has been suggested that delays in the installation of the FGD system would significantly affect the economic returns if the damage costs of SO₂ were incorporated in the analysis.

11. Using the Lvovsky et al estimates as the basis, when we adjust for the 2010 per capita income of Limpopo province,⁵ and assuming an affected population of 5.2million, the 2010 damage cost is 304\$/ton SO₂ emitted.⁶

12. If we take the non-health damage costs as per Elkins at 0.42UScents/kWh, and add air damage costs from SO₂ as a function of the actual SO₂ emissions, dependent upon

- The sulfur content of the coal, taken at 1.4% (consistent with the environmental analysis in the PAD, Annex 4, ¶6)
- Wet FGD system, removing 85% of the SO₂

13. Then the ERR, assuming *no* benefit for the avoided health damage costs of self generation, kerosene and firewood usage etc., and as a function of when FGD becomes operational, is as follows

Table 5: Economic rates of return as a function of first date of FGD operation

Start date of FGD	ERR
2016	22.7%
2019	22.4%
2023	22.2%
never	21.9%

14. In other words, even if FGD were *never* fitted, the ERR is still 21.9%. Moreover, if the corresponding externality benefits (of the avoided health costs associated with fuelwood, kerosene and diesel self-generation) were added, then the ERR, even under the worst case of sulfur emissions entirely unmitigated (FGD never fitted), the ERR is 25.5%, i.e. *higher* than the base case presented in the PAD.

The opportunity cost of water at the Grootegeeluk Mine

15. The PAD economic analysis did not explicitly consider the water use at the Grootegeeluk mine. However, there is an important conceptual difference between water used at the project for cooling and FGD (which was included), and water used in coal mining. The former is indeed an *incremental economic cost of the project*, but the latter is just one of many

⁵ The World Bank estimate of South Africa's per capita GDP is \$10,486/capita. Limpopo province has a significantly lower value of 6,970 \$/capita.

⁶ This may be compared to the value of 454\$/ton SO₂ (in 2010) used in the Shandong Study cited by the Panel as a potential source of externality valuations.

inputs into coal mining (labor, electricity, water, etc.). The relevant question would be whether the economic value of coal, ex-mine, already reflects the economic value of *all* of its inputs. If it does, then to add the value of water in mining would simply double count.

16. The economic value of coal is subject to a range of uncertainties, among which the opportunity cost of water for mining operations is only one of several. The economic analysis did indeed evaluate the sensitivity of economic returns to the economic value of coal: that analysis showed the switching value for the economic price of coal (\$155/ton) to be 5 times the assumed baseline value. (\$155/ton v. 32\$/ton).

17. When the opportunity cost of water use at Grooteegeluk mine (2 MCM per year) is separately accounted for (at the same cost for other consumptive water use, 20 rand/m³), the ERR falls from 24% to 29.33%. In other words, this has no significant impact on the economic returns of Medupi.

Impact of higher world oil prices

18. In 2009 at the time of project preparation, perceptions of World Oil prices were strongly influenced by the oil price collapse of late 2008, and the baseline estimate of economic returns was based on a long-term oil price of \$75/bbl. However current forecasts by authoritative sources are now much higher: for example, oil prices are forecast by IEA to increase (at 2010 prices) from the current level of around \$100/bbl to \$120/bbl by 2035 (implying nominal prices in excess of \$210/bbl).⁷

19. Oil prices affect economic returns in two ways. On the benefit side, increases in the world oil price increases the cost of diesel for self-generation and kerosene for domestic lighting. On the cost side, increases in the world oil price will affect the coal export price (on which the netback economic value of Medupi coal, adjusted for heat content and transportation differentials, is based). However the linkage between coal and crude oil price is much weaker than the direct linkage of petroleum product prices and crude oil price.

20. Table 6 demonstrates the impact of higher oil prices, under a range of assumptions about the inclusion of externalities. In the baseline case, excluding externalities, the ERR increases from 24% (case 1) to 27.6% (case 6), with similar increases when externalities *are* included.

⁷ IEA 2011 *World Energy Outlook*, November 2011

Table 6: Impact of higher oil prices

Case		ERR	Oil price	CO ₂	local damage costs	local benefits
			\$/bbl	\$/ton	UScents /kWh (1)	UScents /kWh (2)
1	Baseline (PAD)	24.0%	75	0		
2	Baseline (PAD)	21.5%	75	29		
3	with local externalities	23.0%	75	0	-0.53	
4	with local externalities	20.5%	75	29	-0.53	
5	with local externalities	26.5%	75	29	-0.53	2.4
6	higher oil prices	27.6%	100	0		
7	higher oil prices	25.3%	100	29		
8	with local externalities	26.7%	100	0	-0.53	
9	with local externalities	24.4%	100	29	-0.53	
10	with local externalities	30.0%	100	0	-0.53	2.4
11	with local externalities	27.9%	100	29	-0.53	2.4

(1) 4 Randcents/kWh (acid mine drainage, combustion health effects)

(2) 18 Randcents/kWh (avoided health costs of kerosene, candles, improved health in electrified homes)

Conclusions

21. These additional analyses confirm the robustness of the economic returns of Medupi to wide ranges of input assumptions. In particular, we conclude that

- The GHG emission damage costs are indeed much greater than the best estimates of local environmental externalities, confirming the hypothesis in the PAD economic analysis
- The inclusion of local environmental damage costs has little impact on economic returns
- If the positive local environmental externalities are also taken into account, the economic returns *increase*, not decrease

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