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Changing conceptions of South African coal-based pollution, with special reference to the Witbank coalfield, 1906-1978

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Changing conceptions of Social Articulation, with spec
reference to the Witbank Coalfield, 1901-1978

A Dissertation submitted to the Faculty of Humanities of t
Witwatersrand, Johannesburg by

Michal Singer

In fulfilment of the requirements for the Degree of Maste

Peter N. Delius, Supervisor
Muchaparara Musemwa, Co-supervisor

Johannesburg, February 2010

Declaration

I declare that this dissertation is my own unaided work. It is submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

_____

Michal Singer

15th day of February, 2010

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gave me encouragement and companionship

I have written this thesis in tears, sweat and tears, the memory of have
been affected, and too often destroyed, by the South African m

List of abbreviations

AMD	acid mine drainage
APPA	Air Pollution Prevention and Control Act
APPB	Atmospheric Pollution Prevention Branch
APOLCOM	Air Pollution Control Liaison Committee
CARE	Cleaner Air, Rivers and Environment
CSIR	Council for Scientific and Industrial Research
EPA	Environmental Protection Agency
ESCOM/ESKOM	Electricity Supply Commission
ICU	Industrial and Commercial Union
ISCOR	Iron and Steel Corporation
MDRTB	multi-drug resistant tuberculosis
MLD	Mpumalanga Lakes District
MOH	Medical Officer of Health
NANS	National Association for the Control of Noise Abatement and Smoke
NRDB	Natural Resources Development Bill
NUM	National Union of Mineworkers
SANCO	South African National Civic Organisation
SANTA	South African National Tuberculosis Association
T&DB	Transvaal and Delagoa Bay Colliery
TCOA	Transvaal Coal Owners Association
TDS	total dissolved solids
VFTC	Victoria Falls and Transvaal Power Company
WHO	World Health Organisation

Abstract

This thesis provides an historical analysis of changing id
environmental impact. Special reference to the Witbank coalfie
provides a unique representation of how South African coal
early twentieth century, in which these ideas were shaped b
appearance of different mainstream institutions in the region. Each
provides a thematic representation of different aspects of the way
manifested over the course of the twentieth century. The first
early signs of environmental degradation were easily ignored by State and indust
limited understanding of the broader impacts as well as localized impact
of early signs of pollution by the early 1920s enabled the
growth of the Witbank coalfield. The main product of this development is asse
second chapter explores how industry was regulated by the needs of
Second World War. This resulted in a more stringent legislative framework
way pollution was understood in the region. National re
atmospheric pollution between the late 1950s and 1964 and the
development of South Africa's first legislative framework dealing directly
pollution, the Atmospheric Pollution Prevention Act (APPA
chapter provides insights into the way pollution was understoo
assesses the ideas that influenced the nature of the Act. The final
reviews responses to the APPA by the Witbank coal industry. It
which water pollution was understood in light of the appear
pollution. The central concern of this study is to examine the
that shaped the way in which air pollution has been conceived
study thus reflects how ideas and values have changed over time

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Introduction

In agony I cry!
Because of the state I am,
Being ugly on surface and underneath,
Despite the richdom I am filled with.
I am known as the Coal City
No other land can rival my production
But I remain poor and destitute and my
People sufferdthreflwcotend by the
Greedy.[1]

This thesis examines changing ideas about the environment in light of new know
arising from both scientific and environmental concerns. The environmental threat
described in the poem above has come to the fore in the post-apartheid era in the
based pollution in the Witbank district. This study explores
perspectives of coal as a source of wealth and comfort, to m
knowledge of coal as a major contributor to air pollution. This chapter begins
understandings of coal pollution from 1906 and 1978, when the role
of opencast coal production led to the exponential growth o
moment that the research study in this book took place in June 2007 at a public
which I attended at the Lake Chrissie Lodge in Lake Chrissie,
named after and on the shore of the wetland lake in southern Afri
This large pan also forms part of the Mpumalanga Lake
threatened by the prospect of large scale coal mining in the Mp
province. The tensions between different members of the lo
the political significance of coal as a resource, and sparked cu
about how these conflicts emerged.[2]

[1] Komana, Lucas. Witbank News, March 15, 2002, p. 11
[2] Personal notes on discussion with Koos Greeff, Lake Chrissie, Mpumalang
June, 2007

Witnessing the way in which the local politics of a commu
conflict of ideas-based on population inspired much of the resea
place over the course of this study. Preliminary interview
environmental politics and attempted to gauge perspectives
coal mining and its environmental impacts.[3] This initial phase highlighted the need for a uni
that could reflect the historical evolution of ideas around coal

This thesis provides a critical study of changing conceptions
of South African coal mining, with special reference to t
Mpumalanga Province, in what was previously known as the E[4]
choice of the Witbank region as a case study stems back to the
beginning of the twentieth century, when mining activity has
contributed to the environmental change in the region. The period of study is thu
framed by the long history of mining activity in the region. This has al
served in providing insight to the changing views of pollu
manifested in the region.

Responses to indications of pollution in the Witbank coalfi
contributed to growing global interest in the environmental h
fossil fuels, coal releases the emissions responsible for much of the energy, po
further threat to global climate, already[5] Despite its significant
contribution to climate change, the demand for coal contin[6]
Ongoing coal production in the City has resulted in the degra
local natural resources, including air, water and soil. The c
pollution is thus crucial in the struggle for

[3] See Interview with Christelle Pauw, Lake Chrissie, June 26, 2007; Inte
Lake Chrissie, June 26, 2007; Interview with Vusi Ngwenya, Kwachibikulu
Interview with Nico Steinberg and Ane Steinberg, Lake Chrissie, June 28,
Botha, Carolina, June 28, 2007
[4] Minutes of the Emalahleni Town Council Meeting held on the 4th of November 1964. The Witbank district is
known today as Emalahleni. The area consists of the sprawling Witbank municipal zon
surrounding centres, including Ogies, Phola, and Rietspruit.
[5] Appenzeller, Tim. "The Coaling of China." National Geographic, 2006
[6] Interview with Mohamed, Kwachibikulu, Mpumalanga Lakes District, June

The release of carbons from fossil fuels has been the central cause of global warming, but this was not always the ca experienced different kinds of pollution. Much of it stemmed fro mining processes. Modes of production varied in relation to n as depth of coal seam and weight of the overburden. Process layers of earth, blasting through rock ore, extracting waste processes disrupted the landscape and produced sources of pollu mine drainage and desiccation. Secondary implications of co the combustion of coal. Myriad chemicals have been relea specifically carbons, contributing to air pollution, climate c This thesis demonstrates how broader understanding of e evolved over time in line with ecological change and advance

The impact of coal mining has been seen as a result of the neglect o environmental cost of coal extraction and combustion by consequence of this neglect has been the prevalence of l resulting in early calls for legislation to curb its pollution a pointed out, localized problems related to environmental deg the climate change debate, which positions the economic conside the environmental debate; this top-down framing has tended to obscure through which the former have been manifested.[7] This sight-line the ways in which coal pollution was first addressed, and the changes in these conceptions as the governing principle of anti-pollution wa more over time.

Historically, conceptions of pollution were based on the observa activity affected. The understanding changed with the emergence of n scientific data concerning the relationship between coal and poll

[7] Musemwa, Muchaparara. Early struggles over water: from private to pu Bulawayo, Zimbabwe, 1894-1924. Journal of Southern African Studies, Volume 34, Number December, 2008, p. 881

resources. The more scientists could explain coal and its
process and impact of pollution became. This is reflected in
environmental legislation, usually subject to the constraints of scientifi
coal-based pollution.

The rise of an environmental consciousness of the impacts of coal mining in the la
decades has, in part, led to a more critical consideration of the coal mining
environment by scientific and environmental bodies, local r
the coal mining industry. The development of these perspectives over ti
fully documented and explained. This study will address that

Literature review

This study has drawn on existing literature which has touched
pollution. This literature review demonstrates the paucity of
South Africa-based coal pollution has been undertaken. Historical works
South African coal mining, with the exception of Katherine Aiken
has argued that historians have been slow to analyse the w
interest toward the environment has also affected the study of environmental[8]
The study highlights the value of environmental history as a
analysis of these issues, as well as including local env
explanation. According to Carruthers, environmental history also provides
returning the discipline to political and social relevance
related to current concerns around climate change.[9] This[10] idea and
many other perspectives have been found in South African envi
history, and helped to formulate the conceptual framework u
of these ideas were found in Edwin Wilmsen's South African Environmental History: Cases

[8] Aiken, Katherine. G. Not long ago a smoking chimney was a sign o
community response to pollution at the Bunker Hill Smelter, Idaho, Environmental History
Review, Vol. 18, 1994, p. 67
[9] Carruthers, Jane. Environmental history in Down South, In Edgecombe, R. & W
Guest, B. S. (eds.) South African Environmental History: Cases and Sources, David Philip Publishers,
Cape Town, p. 205
[10] Ibid

Comparison listed by Ruth Edgecombe[11]. The importance of Edgecombe's intelle
influence on this work is shaped by her intimate knowledge
work on the history of Hlobane Colliery in Natal provides a
pattern of economic development in South Africa[12]. This work is especially
valuable when assessing the impact of coal mining on the environment and it
important account of the workings of the early twentieth cen
work serves as a good example of how knowledge into his
narrative. Hea Steyn's assessment of environmental historiograph
conceptual formulations[13]. Jacklyn Cock's critical assessment
formation of a South African environmental movement was
important source of background knowledge[14]. Without conducting
reference to contemporary environmental literature, this stu
The central argument of this thesis is that existing environmental
seeks to go further than such descriptive environmental ch
particularly related to the mining industry.

Literature on the history of the South African mining industry
context for further research on the social and environmental
considerable body of literature on the history of the South
industry. Particularly in older histories of the South African
emphasis has traditionally been on pioneering engineering and
attained through gold and diamond mining. The autobiographical focus of most
works is autobiographical, depicting the challenges faced by
the industry. Kantey and Templer provide a biographical history of Er

[11] See Dovers, S., Edgecombe, R. S. & Guest, B. (eds.) South African Environmental History: Cases &
Comparisons. David Philip Publishers, Cape Town, 2002
[12] Edgecombe, R. Constancy to Change: A History of Hlobane Colliery 1898-1998. The Vryheid
(Natal) Railway, Coal and Iron Company, Ltd, Vryheid, 1998
[13] Steyn, P. The Greening of our Past? An Assessment of South African
New Contree, 46, November 1999
[14] Cock, Jacklyn. Connecting the red, brown and green: the environmen
Africa, a case study for the UKZN project entitled: Globalisation, Ma
Movements - An Apartheid South Africa, Centre for Civil Society, School of Development Stud
University of KwaZulu-Natal

Oppenheimer and the Anglo American Corporation[15] Richard Mendelsohn's biography of Sammy Marks provides some context for the establishment in early twentieth century Transvaal, but focuses mainly on the challenges faced by Marks.[16] Houghton and Dagut's published selection excerpts on the South African economy, provided useful, even if nineteenth and early twentieth century sources.[17] These ways coal figured in economic conceptual the scale of coal production, enabling a more accurate visio of the coal industry in the early twentieth century. Lenta C.H. F valuable critical analysis of South African economic develo account racially determined trends in economic growth.[18] Jo Feinstein's more extensive study on the South African coal industry was valuable in establish for the study, particularly coal in economic growth.

More recent literature on proletarianisation and the social impa workers is extensive, and it has helped make sense of the living of early twentieth century migrant populations. Duncan's asse between 1918 and 1948 highlights the attention drawn to la little reference to Witbank.[19] A Witbank assessment of the highly contes between mine owners and labourers is provided in Bozzoli's Town and Countryside in the Transvaal: Capitalist Penetration an though the selected studies found in this work provided lit mining and production.[20] One exception to this is Peter Alexander's wo Witbank which has provided valuable insight into the way the

[15] Kanfer, S. The Last Empire. Grafton Books, Hodder & Stoughton, 1993
[16] Mendelsohn, R. Sammy Marks: The Uncrowned King of the Transvaal. David Philip, Cape Town, 1991
[17] Houghton, H. and Dagut, J. (eds.) Source Material on the South African Economy: 1860-1970, Volume 3, 1912-1970, (eds.) Oxford University Press, Cape Town, 1973
[18] Feinstein, C.H. An Economic History of South Africa: Conquest, Discrimination and Development. Cambridge University Press, Cambridge, 2005
[19] Duncan, D. The Mills of God: The State and African Labour on the Witwatersrand, 1918-1948. Witwatersrand University Press, Johannesburg, 1995
[20] Bozzoli, B. (ed.) Town and Countryside in the Transvaal: Capitalist Penetration. Ravan Press, Johannesburg, 1983

the first half of the twentieth century.[21] Alexander's study details the poor wo
living conditions endured by African migrant workers in the
little attention is placed on either the political economy of the mining industry
it.

Some references to coal mining are to be found in analyses of the medical
assist in establishing a general context of the coal mining in
silicosis on the South African gold mines provides an interesting parallel in
understandings of mining, power and disease.[22] Literature on asbestos mining a
social health implications provides useful comparative perspectives for the critic
study of coal-based pollution in revealing the extent to which mining
engaged in irresponsible practices, wilfully ignoring the social and
irreversible environmental damage they caused. Jock McCulloch's
way in which the mid-twentieth century British asbestos mining companies
extensive knowledge of the carcinogenic qualities of asbestos and its related dan
exposure to both their employees[23] and the general public.[24] The
industry in this instance raised questions about the extent to
similar exploration and exploitation. Further, the question of in
liability, as well as the state's role in the assessment, mo
coal-based pollution. Renfrew Christie's history of energy poli
a comprehensive intellectual study of South Africa demonstrated the
relevant stakeholders in the history of South African energy
coal industry, and also contextualized the bid for coal withi
Apartheid.

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[21] Alexander, P. Culture and Class in the Early Twentieth-Century Witwatersrand. Unpublished paper presen
on Wednesday 14 May 2008 at the Centre for Sociological Research with
the Department of Anthropology and Development Studies

[22] Katz, E. The White Death: Silicosis on the Witwatersrand Gold Mines: 1
University Press, 1994

[23] McCulloch, J. Asbestos Blues: Labour, Capital, Physicians and the State in S
Oxford, 2002

[24] Christie, R. Electricity, Industry and Class in South Africa. State University of New York Press,
1984

The historical analysis of coal mining and consequent pollution
interdisciplinary approach, and close reference to the sources made of mining
engineering, ecology, geology, and development and conservation. This
becoming familiar with these issues, and ample reference has been
articles. Witcomb and Baxter's case study of abandoned c
provided crucial technical information related to the spec
pollution.[25] The perspective with the impact of environmental changes indu
term coal mining activity was Ahkaeone, Lodewijks, Limpitlaw,
study on mining rehabilitation.[26] The historical value of the technical reports w
faceted, as it was not only the facts presented that facilitated
but also the way in which knowledge was represented. It helped in
actual impacts of coal mining, thus enabling the process of a
how pollution was addressed.

The Coals of the Witbank District (Transvaal Collieries
Committee of the Transvaal Chamber of Mines, is a rare
specifically related to the Witbank coalfield.[27] It provided a detailed understanding
geology and chemistry of the Witbank coalfield. More rece
representations of coal and pollution, but most useful was T
the Conservation of the Mpumalanga Lakes District, in
environmental changes which would likely be triggered by inte[28]
Anthony Turton's assessment of water pollution, from a specific
implications of acid mine drainage, reinforced the need for
context to the reality of mining and pollution in South Africa.[29]

[25] Witcomb, A. & Baxter, B. Case Study: Abandoned Coal Mine Lands
Environmental Management
[26] Limpitlaw, D. Aken, M., Lodewijks, G. Mining Rehabilitation, Post Land Use a
Pollution at Collieries in South Africa, The South African Institute of Mi
[27] Graham, A.C. & Latilla, C.A. The Geology of the Witbank District, The Transvaal Chamber of
Mines, Collieries Committee, 1931
[28] McCarthy, T, Cairncross, B., Huizenga, J. & Batchelor, A. Conservati
District, 2007, Copy received from author
[29] See Turton, SA water and mining policy: a study of strategies for transiti
2009, received draft copy from author

There remains a lack of historical material dealing with the enviro of coal. Barbara Freese's history examines the growth and impact of t coal industry in a global context, but there is little focus on[30] exception is James Clarke's Fragile Land: South Africa's Environm published in 1974, whose critique of the problems related to accessible, technical style is crucial for the purposes of the the[31] study does not provide a critical assessment of production ons The literature review has revealed a significant body of material demons many problems around asbestos pollution, but none address the key is this thesis. This study forms the first attempt to assess idea impact of asbestos pollution, and how these changed over time.

Methodology

Reference to published material was an important prelimina described in the literature review established strengths, gaps and silences in the field of environmental history, and subsequently specifical Close reference to sources of background and technical info debates around environmental concerns, paving the way for Additional research conducted for an undergraduate project of asbestos mining, as well as participation in the[32] for Sustainability in Mining's Asbestos Research Trust to assess t economic implications of exposure to asbestos provided valuable comparative insight into the relationship between mining pr range of sources in this thesis demonstrates an attempt to changing ideas around pollution. The research undertaken with certain assumptions about the contents and availability of

[30] Freese, Coal: A Human History, Penguin Books, Random House, 2003
[31] Clarke, J. Fragile Land: South Africa's Environmental Crisis, Ravan Press, Johannesburg, 1974
[32] See Singer, A., Social History of Mesothelioma in South Africa, 1948-2004, Honours Dissertation, Department of History, University of the Witwatersrand, 2005; The Future of Asbestos Mining and the Environment, Project Report, Final Report, Centre for Sustainability in Industry, University of the Witwatersrand, July 2008

challenges were experienced, including the inability to acc
particularly the Chamber of Mines and Witbank s town record

A major source for this study was the Witbank News. Extensive reference was ma
all weekly publications between 1980 and 1985, selected editions between 1985 and
1981, as well as weekly editions between 2000 and 2008. This source provided
comprehensive knowledge of the town, its politics, and specifically
its coal industry. The News demonstrated an evolving cul
understanding the environmental implications of industrial a
during the Second World War to produce more coal and manu
interesting was the role of the media in the construction
pollution. Direct reference to coal production did not appear until th
1950s, when air pollution became a major problem for the
implicit in the perspectives of the Witbank News taken into account during
analysis of this source, highlighting the source as only part
views, with racially determined exclusion of the experiences
Kwa Guqa and other townships.

A number of visits were made to the National Archives of
Pretoria, where archival evidence back to the establishment of the
century. Detailed minutes, inspectors reports, parliamenta
legal documentation, amongst other primary sources provide
the establishment of the Witbank Coalfield, and mine growth. T
most useful and explicit set of archival material included ext
the passing of the Atmospheric Pollution Prevention Act (AP
with closely in the latter half of the 1960s. To the task of e
changing conceptions of pollution. These archives were valua
after a frustrating attempt to access Witbank s local municip
to predate the 1990s.

This study relies strongly on the findings of archival research, based on oral sources produced during the course of field visits September 2008. The interview process provided insight into of coal-based pollution. Respondents were selected because experience of coal pollution. The interviews provided relevant period after the promulgation of the Atmospheric Pollution 1965, making it necessary to rely on archival findings for Interviews were held in conjunction with a number of site visits workings, dumps, underground fires and communities, as well as other affected coalfields throughout Mpumalanga, Lakes District. This has also included several site visits to mining districts throughout Mpumalanga and Limpopo, enabling of pollution and its role in shaping the history of Witbank and of the study was the local environment of the Witbank coalfield places of interest associated with coal mining and mine dumps and sites of mine water pollution. These field visits were invaluable vision of pollution and its role in shaping the history of Witbank

Chapter Outline

This thesis depicts the shaping of coal pollution, relying heavily the interplay of theme and chronology. Each chapter focuses manifestations of pollution were received by the South African civil sector. The chapters are linked by the question of when study by exploration of specific environmental impacts that affected time. Witbank's pollution did not relate to any specific part of and this needed to be reflected in the structure of the argument and the narrative. The nexus of chronology and thematic structure is nature of pollution itself, considerably influenced by the way pollution was understood.

The first chapter explores the initial period of coal mining in
early understanding based on pollution by tracing the history
industry, town and surrounding areas. The introductory chap
early conceptions of coal mining, and demonstrates how
environmental changes, specifically as a result of coal minin
made to evidence of early twentieth century legislation rel
control of pollution. By the 1930s, demand for Witbank coal g
development and capital investment making it possible for t
dramatically. This also had the effect of increasing the pressures on
environmental degradation.

The second chapter assesses the period from 1930 in light of proc
of industrial transformation set in motion by the Second Wor
1930 and 1947 is conceived as an increasingly critical for Witbank co
The chapter thus depicts the process of change leading to
perceptions realized during the war. This in turn produced a comm
inquiry into the nature of pollution, which profoundly changed th
in which the environmental repercussions of the war were s
the politicization of issues related to pollution. Reference is
the environmental impact of mining, demonstrating how few meas
taken to monitor and prevent pollution. This was not a prio
war, when pressure was placed upon the South African state
production for the war effort.

The process leading to the promulgation of South Africa s fi
the APPA, is addressed in the third chapter. This involve
analysis of air pollution. A scheduled list of industrial poll
for the APPA, with coal listed as a chief polluter. This mean
now subject to inspection. The Act also expected the co
introduce internal pollution monitoring devices. This drama
which the coal industry functioned. The chapter also provide

to air pollution in Witbank, from early records of the appe
community mobilization against the smoke emissions of loc
Highveld Steel and Vanadium Company. The APPA was sign
legal precedent - based on coal pollution, forcing State and industry
attention to pollution control measures.

The implications of South African environmental legislation are
this final chapter. The fourth chapter begins with the impl
demonstrating a considerable shift in the way pollution was
the South African state and provides an assessment of
efficiency of measures taken to implement the APPA, reflect
of the implications of pollution control. It describes the period between the
introduction of the APPA and the growth of industry with the int
large-scale modes of opencast production by the late 1970s. As
observed over time, more attention was drawn to the relat
impact, but this did not change the tide of unforeseen growth th
Witbank and its coal industry by the late 1970s. Responses
civil society stakeholders to new protective legislation su
amended Water Act of 1956 reflected misconceptions of pollution and hi
need for new ways of monitoring pollution.

Chapter One

Undermining the land: a history of coal mining and environ
Witbank Coalfield, 1930-1838

Introduction

> "it's an underground fire, and we are afraid that it will reach the mine and cause explosions"[33] (Mayor of Witbank)

Understanding the gravity of current pollution involves exploring the e legacy of Witbank's coal economy. This chapter explores the e around-based pollution by tracing the history of the local surrounding areas. Coal pollution is widespread in this regio intensity of ecological degradation in areas where Witbank ha coalfield has taken almost a century to be fully felt. This ecological damage throughout the district.

The ability of the environment to withstand long-term pollution has delayed react the environment's scale and magnitude by intensive coal mining and p activity. Without evidence of pollution, the capacity of intensiv to pollute was historically not known. Conceptions of coal a on contemporary notions of industrial growth and urban developme tacit acceptance of the changing face of the local environme spatial planning of the new coal town.

[33] Interview with Isaac Mampane, Witbank, June 2, 2008

The Witbank Coalfield: A Geological Account

&ifcoal were not so plentiful one could imagine it lovingly displayed in m[34]

Within the Witbank coalfields there are five known coal seam
labelled No. 1 to No. 5 from the deepest to the shallowest.
which is too thin to be of any commercial value, all seams h
seam is No. 2, whose thickness rarely exceeds 120 metres.
of a high quality, it has carried consistent although values ov[35]
partially workable, the other three seams have either been
difficulties in mining. Thousands of boreholes have been sun
the underlying seams.[36]

The coalfields are contained in grassland and semi-arid rocky ou
of South Africa s Mpumalanga province, in what was previou
Transvaal. These are arguably the most important coalfields
provided billions of tons of coal from over the past century.
relatively unfaulted seams extend over a distance of 180 kil
west to Belfast in the south, with a total of approximately 40 kilo[37]
They are contained within a thick sandstone, shales and grit layer
as the Karoo System, which runs beneath the Western Cape

[34] Freese, C. B.: A Human History
[35] Graham, C. & Lategan, P.C.: The Coals of the Witbank District (Transvaal). Chamber of Mines, Collieries Committee, 1931
[36] Ibid
[37] Smith, D.A.M. & Whittaker, P.W.: The Witbank Coalfield. In: Visser, C.R. & Maske, S. (eds): Mineral Deposits of Southern Africa, 1986. Geological Society of South Africa, Johanne

Kwazulu Natal and Mpumalanga.[38] As late as 1931 a geological survey argued that in coalfields alone (were) found the only coal deposits of economic importance to Africa.[39] The success of these coalfields was also based on Witwatersrand, the locus of gold mining in the Union of So nineteenth and early twentieth centuries. The coal was bitumi easily combustible, and worked well for energy production to activity in the region.

The way coal was formed became common knowledge by the 1930s, late nineteenth century, of high carbon content in coal was l The capacity for coal to burn, and even to sustain combustio of its composition. Understanding of coal was based more o knowledge.

Witbank coal became the subject of early scientific enquiry when glar in Johannesburg stimulated interest in the microscopic exa samples.[40] Coal came to be understood as a volatile organic sub fossilized vegetation of prehistoric forests. The high carbon of photosynthesis by ancient vegetation, stored and concent The rising impetus for coal research was driven by the energy requirements of the gold industry.

Settlement and mining in Witbank: 1838

The areas now being mined must have been inhabited by wild animals&r early days, elephants and lions[41] roamed the countryside

[38] Graham, A.C. p. 1
[39] Coal and Other Fuels, Wagner P.A. in Mineral Resources of the Union of South Africa, Third (Triennial) Empire Mining and Metallurgical Congress, 1931, p. 233
[40] Witbank Coalfields, Witbank News, August 18, 1933
[41] Witbank News, October 16, 1981

The modern discovery of coal in the Witbank district was pr
shallow nature of seams. Numerous coal outcroppings appear
beds of streams.[42] Written historical accounts of South African coal
as early as 1838. There is evidence, discovered through ear
recording signs of primitive extraction. Slag heaps discovered alon
suggested that coal was used by indigenous African groups to
heat furnaces for smelting iron ore into workable tools and
limited to seams of black coal running to the surface of r
establishment of the local coal industry, with the most popular
Witbank district was agriculture, including maize and corn.

The first recorded coal sale in the Transvaal dates back to t
coal was mined and transported by wagon to markets in Piet
prospectors had gravitated to the Highveld, following reports
of coal in the Middelburg district.[43] By 1868, Transvaal coal was describ
explorer Thomas Baines, as looking black, with a wood grain
clean fracture.[44]

On one of his treks from the Transvaal to Natal in 1872,
digging on the farm of Daniel Kruyger, situated on the ba
Despite ready access to water, energy resources were the cardinal
family was using coal as it is today.[45] This simply fuel was cheap, readily a
and a useful alternative to dried dung or firewood. He empat
to the bleak heights of the area, a substitute for wood that
had served as the staple fuel of the pioneers. At night, travellers
to use for fires to cook their meals and warm themselves.[46]

[42] The Stored Wealth of the Transvaal: History and Progress of Mining
the Metallurgical Industries, May 8, 1930, p. 4
[43] Lecture, Mr. W. Baker, 1930, p. 6.
[44] Civil engineer Thomas Baines is remembered as the artist who in his
South African geology. See Electrical Engineers Witbank, August 16, 1935, p. 5
[45] Ibid
[46] Electrical Engineers Witbank, August 16, 1935, p. 5

compared the local coal that was known as the Arley[47] in Lancashire as the
While comparisons to the British coal seams were made, the
expansion of trade was seen as the possibility in the Transvaal.

Local trade, where it existed, was considered important. First
accounts reported that wagons were backed into coal seam
wagons were loaded with high grade coal with the same ea
filled with rock from an ordinary mine.[48] This way coal could be transported and s
the dispersed rural community for approximately fifteen shill

The first few mines in the Middelburg District included the C
Mine.[49] The Brugspruit Mine was named after one of the tributaries of the Olifants R
system, a particularly sensitive water system which encompa
of heavy industrial and mining activities.[50] Early coal mining targeted adi
shallow horizontal shafts, where extraction was most simple.
these seams were exploited it became more difficult to mine
was located beneath a thick layer of solid rock and earth,
which went underground, through shafts such as these had been
as early as 1908, with relatively shallow coal faces being mi

The most popular method of underground mining in the Witb
commonly as pillar and stall.[51] According to A Glossary of Certain Words
Used in Collieries, this was the usual way of working a South Africa
two series of parallel excavations were made at right angles
approximately three quarters of the coal was extracted and one quarter le

[47] Duncan Campbell Francis Moodie, ibid, quoted in article.
[48] Ibid
[49] Lecture, Mr. E. Soar, p. 6
[50] Asmal, Kader. Speech by the Minister of Water Affairs and Forestry, A Member of Parliame
official opening of the Brugspruit Water Pollution Control Works as well
Week 1997 , Witbank, March 17, 1997
[51] This method was also known as pillar and stall.

rectangular pillars to support the roof.[52] For the most part, working
usually sealed off and abandoned.

The popularization of the pillar and bord method of unde
economic windfall for the region. It increased local coal pro
able to compete with the industries in the Cape and Natal. Still, effor
markets were held back by numerous obstacles. The first in
coal that would suit markets. Before contracts could be nego
be tested. Methods used to test the coal were rudimentar
assessments based on visual inspection and limited scientific knowle
understanding of coal and its properties. This was evident i
1902, where several Transvaal coal specimens were tested
markets.[53] An engineer officer of the British naval ship H.M.S.
samples by burning them simultaneously. Placing the sample
observed that they would ignite and burn more readily, a s
period.[54] After receiving two firings in the furnace, the Transvaal wo
throughout the furnace. An iron pricker would be used to pr
Hard, burnt pieces, known as clinker, were easily broken
collected with the ash.[55] Through the use of clinker were signs o
poor quality. Another measure of quality was the ratio of
of water turned into steam by a pound of coal.[56] Calorific content of coal requireme

[52] National Archives of South Africa (hereinafter NASA), Government Native Labour Bureau, 1906 (GNLB) 304/427/18, Glossary of Certain Words Used in Collieries and this Report, December 18, 1918
[53] NASA, Governor of the Transvaal (TAU) 58/2/1, Report on Two Specimens of Transvaal Coal, Trials of Transvaal Coal for Use in British Men-of-War, by R. H. Brittain, Engineer Officer of Thrush, August 9, 1902
[54] Ibid.
[55] Ibid.
[56] Calories are commonly used to derive the energy content of combustion when one gram of water is raised one degree Celsius. In the United States, the British Thermal Unit (BTU) is used. A BTU is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. Wikipedia, http://en.wikipedia.org/wiki/Calorie, August 1, 2006

depended on the specific needs of consumers, ensuring prospective Transvaal colliers.[57]

A second obstacle in the development of the Witbank coal adequate transport infrastructure. This began to change in 1 railway from Pretoria to the port of Lourenco Marques along Delagoa Bay in Po East Africa.[58] The establishment of the Witbank station sped up in As the cost of transport decreased, Witbank coal was abso Transvaal was now more easily marketable to international tr commercial trade of coal be based on calorific value.[59] The Transvaal relied on export markets and public tenders. Standard practices indic composition, including size, presence of rock, and thermal co properties of coal were an important consideration for cons content, which could not be removed from the coal through organic sulphur content, infused fairly strongly chemical bond wit hydrocarbons in the coal, was often too high to meet expor rapid industrial advances, larger chunks of coal referred to Profits were curtailed by the rejection of enormous amounts a coal was only determined once it was brought to the surface large quantities of rejected coal. Colliery dumps of this tim mines, permanently altering the landscape of the rapidly tra[62]

The South African war temporarily halted the growth of the figures by 1902 were a mere quarter of 1898 figures, tonnes appr

[57] Naval and railway markets demanded high quality coal, but use for poo would arise over time.

[58] Jewish Life in the South African Country: Essays in Community History, Beth Hatefutsot Johannesburg, 2002, p. 102

[59] 11.19 Kilojoules per kilogram (kJ/kg) was the average calorific value of 12.5 Kilojoules per kilogram was the minimum acceptable value for railw challenges to the marketing of Witbank coal.

[60] NASA, Colonial Treasurer, 1910 (CO) 150/T33/441 Miscellaneous: Supply o Mauritius, Mauritius Government Gazette, No 14, 1909

[61] Camm, A, Sulphur in Coal Mining, Mining Engineer, 151, 361, October 1991, Institut Mining Engineers, p. 118

[62] Miscellaneous, Mauritius Government Gazette, No 1

but the industry recovered quickly. Early twentieth century
the district. When it became clear that the elusive gold sear
prospectors turned to coal. This seemed also to attract investm
provided ample and affordable ground. Thick, shallow and unfa
coupled with cheap labour, meant that coal could be cheaply[63]

By the turn of the century, production of coal had slight
settlement began to grow with 60 or 70 people (who) had by built thei
haphazardly around the original mine.[64] The township came to be kno
Witbank - white ridge referring to the characteristic white sandstone
district.[65] The township of Witbank was established in 1903 by S
had originally arrived in the Middelburg district as a trader
setting up a trading store near the farm, Zeraatsfontein, ar
farmowner, Jacob Taljaard, let Stanford survey the farm pro
thick seam of coal. The existence of coal in the district was
Stanford was then able to increase the scale of mining from the mere pi
pieces to systematic exploitation.[66]

Through investment from the Neumann Group, Stanford foun
Soon after, the town was laid out in 1903, within relative
numerous workings. While the Witbank Coal Company exerted influence ov
new settlement, colliery management showed little considera
of the underground mining within the town boundaries. In
Lewis, acting manager of the colliery, made an offer to t
Commissioner of Mines in Johannesburg to obtain permiss
Mining operations under the proposed township of Witbank.[67]

[63] Mendelsohn, Sammy, Mar k 119
[64] Ibid
[65] Farming in Witbank, Witbank News, November 20, 1931
[66] Electrical Engineers Visit Witbank, Witbank News, August 16, 1935, p. 5
[67] NASA, Secretary to the Law Department, 1925 (1) 3801 AG 1323/03 Letter from H.W. S
Secretary to the Mines Department, to Office of the Commissioner of Min July 9, 1904

regulation over mining practices during this time, Th
Government Mining Engineer argued that

> in view of the shallow depth at which mining is carried on at Witbank it i
> the surface (would) sooner or later take place which would result in the
> township built over such working.[68]

H.W. Smith, Secretary to the Mines Department, argued that
of the Mines and Works Regulations, mining beneath the tow
prohibited. The application was rejected on the basis t
built environment, the town of Witbank.[69] Namely, mining would compromise the structu
integrity of roads and buildings in the town, which would
subsidence. This argument was also used by residents of the town. This legal e
caution about the inherent dangers of underground mining. T
town's future was recognized, but only insofar as it threate
investment.

Mining remained a staple economic activity in the area, given the natural endowment
especially agriculture. This is illustrated in the case betwe
Daniel Jacobus Malan, a local Witbank farmer. In November
the Office of the Registrar of the Supreme Court of the Tran
Colliery, had concerns over the terms of their contract with
mineral rights to his farm Blesboklaagte in 1898, with
perpetuity,[70] while coal operations were still taking place on the
interim, Malan had constructed several buildings upon his la
contract. As a result, the Mining Department, pursuant to the
Mining Regulations, refused to allow the Witbank Collie

[68] Ibid.
[69] Ibid.
[70] NASA, Registrar of the Supreme Court of the South African Republic and
187-1912 (TPD) 5/590/150/1905 Delagoa Bay Witbank Colliery Ltd vs. Daniel Jac
Malan, 1905

operations under the buildings which[71] The plaintiff contended that that the farmer had interfered with their Mining Rights. The clause granting the Witbank Colliery

> the right to sufficient ground for the sinking of shafts and wells, the facilities & together with a piece of surrounding land for mining purposes and miner rights (would) include and comprehend the right to mine, dig and win other minerals and metals of what nature soever.[72]

Was Malan even aware of the permanent changes to his agr testimony, its impossible to prove. The nature of his contra Colliery revealed early industry knowledge of the immediate coal mining. It serves as historic evidence of the accepted f could affect, or restrict, mining operations. It also reveale preferential treatment of mining over agriculture as a nationa

Finally, Malan s case reflects the environmental challenges mining in the Witbank coalfields. The industry had begun to cultiv the local district far more effectively than local agricultur between town growth and industry growth was thus often blu compromising legal decision making processes around conti developing regional centre.

Environment and labour: twin costs of coal mining in Witbank c.1902-1920

With intensified industrial transformation throughout the Tr Witbank rapidly emerged. An assessment of the town s remarkable insight into the way energy was produced and c decades of the twentieth century. In 1907 the Transvaal C (TCOA) further formalized the emerging coal industry. In the

[71] NASA, ZTP 590/150/1905 Summons from Registrar of Supreme Court to S command D.J. Malan to appear at the Office of the Registrar of the Sup
[72] Ibid

study conducted on the effect of power supply schemes in
reaching obstacles in the process of energy production, par
for the coal industry to make ends meet. The study showed
more from transporting the heavy cargo than the colliery ow
from the sale of coal, especially when one (took) into acc
product at the pit head, as compared with the heavy rate pe
the market.[73] The irregular supply and availability of railway truc
coal to markets also held back production, frustrating Witbar

According to P. Dickson, manager of the Coronation Colliery
output of coal had ripple effects felt throughout the industr
being idle for 38 hours during July, 1911 had

represented a loss of 3500 tons and 30 hours during August which 3000 ave
tons. these shortages had to be made up by overtime. Assuming that the
to the same amount in proportion to their without overtime, would show an
000 tons per month, approximately. The result would mean the closing o
few days if the administration could supply trucks regularly as requisitione
to the various colliery managers.[74]

In many cases, the burden of intermittent stoppages of co
labourers, whose long hours were often extended into overti
loss of productivity caused by lack of available trucks.[75] The Inspector o
Coronation Colliery had argued that the high number of lab
medical attention was directly related to the abundance of ove
was difficult to avoid.[76] The Chief Inspector of Mines also felt that it
contractual agreements with consumers[77] when trucks were ava

[73] Mr. Dalrymple on Power Supply Schemes and Coal Mines, Transvaal Coal Owners' Assoc
60. Quoted in Christie, R. H., Electricity, Industry and Class in South Africa
[74] NASA, GNLB/25/2288/11 Letter from P. Dickson, Manager, Coronatio
Inspector, Department of Native Affairs, Witbank, October 5, 1911
[75] Ibid
[76] Ibid
[77] Ibid

Colliery owners were made obliged to enter into relations with the South A
Railways. In a 1907 letter to the prime minister, the secretary of the Tran
company recognized

...importance of these Railways at any rate assisting and encouraging w
limits the Coal Mines and Coal Industries[78] of the two Colonies concerned.

Each colliery had to enter a Private Siding Agreement in order
construct railway sidings[79] With the threat that they would be cut off
loading stations where bunker coal was loaded to be transpo
there was consequently local colliery owners resisted the policy of
imposing railway rates (on the coals under the Act) and hoped any hop
& building up or even maintaining the bunker trade[80]

Despite restrictions, coal output in the Transvaal grew rapidly. In 1909
345 427 tons of coal were sold in 1910. The Power Act was
under Section 27 the prime minister was given authority to
of local municipal power. Market expansion led to the establishment of
the town of Witbank itself.

By 1918, the Witbank Colliery was granted permission by the Governor-General-in-
Council to supply electric current for lighting purposes
Witwatersrand Native Labour Association on the farm Blesboklaagte,
owned by Daniel Jacobus Malan.[81] By 1920, permission had been granted by
of Mines under Section 27 for the Witbank Colliery to supp

[78] NASA, CT/146/T33/212 Correspondence between Secretary, Vereenigin
Minister of the Transvaal, Pretoria, July 25, 1907
[79] Coals of the Witbank District
[80] High Court of South Africa (Witbank Circuit), Report,
December 14, 1928, p. 7
[81] NASA, Decisions of the Executive Council, 1918 (GR) 1671/1176 Grant of permission ,
Minister s Office, Pretoria, 1918

municipality of Witbank and for the high pumps.[82] By 1921 the annual output of the Witbank coalfield had increased to 6 947 362 tons.[83]

Prior to the establishment of the Electricity Supply Commission, Witbank Colliery provided power generated from its own stations.[84] The Witbank Power Station was built by Escom in 1926, but was owned by the Victoria Falls and Transvaal Power Company.[85] At the time of its construction Witbank Power Station was the largest steam power station in the Southern Hemisphere only with the later construction of the Klip Power Station in 1927 it was to revolutionise not only in the way coal was marketed, but fundamentally in the way to produce energy. The Witbank Power Station was also the first power station to supply how light and power should be supplied to electrified Witbank would be.[86] Witbank was marketed as a model town in an attempt to draw the attention of representing a landmark in the history of electricity in this country.[87]

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[82] NASA, RU/367/1/6/7 Memorandum, Grant of permission, Prime Minister's Office, 30, 1920

[83] Progressive Witbank, Witbank News, September 25, 1925

[84] Ibid

[85] Ibid. Most of the electrical units were bought by the VFTPC from Siemens and sold to the VFTPC. With costs being subsidized through government funding, capital accumulation by the VFTPC was exorbitant.

[86] The Electricity Question, Witbank News, August 27, 1926

[87] Editor, Witbank News, July 1, 1927

Image 1: The area offices of the Electricity Supply Commission in Witbank, undated (circa 1933)

Electricity was an amenity not extended to the hostels that labour for. Those residing in the local hostels worked for som in the district, including the Transvaal & Delagoa Bay, Ca Witbank Colliery.

Living conditions were generally poor. The cramped and warm worse by poor sanitation and diet; the proximity of compoun exacerbated public health conditions. Underground conditio environmental constraints of the labour intensive mining and

thus exposed to a number of health hazards on a daily basis in both occupatio
living environments, including smoke, dust and chemical fum

Consisting mostly of migrant workers from rural South Afri
seasonal workers from across the national borders, the African
state of drudging toil, and the poor pay and working cond[88] The mine owners viewed
exposure to coal pollution and general lack of rights and
considered by the secretary of the regional Industrial and Comm
horrible state of affairs".[89] The arm's length distance of this dissident
was largely silenced by the pressure placed on managers t
more and more coal in line with growing markets.

The unhealthy state of the coal mines did not affect only A
fact that white mine workers, mostly British or European s
companies to the region, tended to earn much more than the average Africa
this placed them at no lesser risk to occupational exposure
would generally get the sack.[90]

[88] Published letter from Thomas Mbeki, Secretary of Industrial and Commercia
Middelburg branch, to Editor, Witbank News, May 7, 1926
[89] Ibid.
[90] NASA, GOV/1027/PC 7/1/8/0/6 Anonymous, Cornelia Colliery, Viljoensdri
River Colony, to Secretary of State for the Colonies, May 31, 1906

Image 2: This undated, unlabelled photograph of Witbank, Mpumalanga, depicts a group of local miners in the early years of Witbank. The mining industry employed many children amongst the visibly impoverished group highlights the widespread use of child labour in New Colonies, c. 1930s

Regulations around working hours were outlined in the Mines but this did little to improve overall conditions. The causal based pollution and poor general health among workers, Herbert Payne, a local Inspector for Native Affairs in Witbank Affairs Department in 1912 that workers were overdriven, themselves and most collieries in the district still worked twelve hour shifts. Besides, the implementation of the regulations defin[91]

[91] NASA, GNLB/25/2288/11 Correspondence between Inspector of Native Native Affairs, May 21, 1912

Act of 1911 was obstructed by the need to fulfil orders. An
demand for workers, and their ability to move from one coll
contracts made it more difficult to address the implications of inte
exposure to coal pollution, including the ingestion of coal
chemical exposure, as well as higher prevalence of tuberculosis. By 19
tuberculosis had become a major health problem in the re
Commission was appointed to enquire into conditions generally avo
taking care of the sick, and workers affected by tuberc
repatriated.[92] Living conditions in the compounds[93]

A visit by the regional Medical Officer in November, 1916, r
attached to the Witbank Colliery were in many ways defec
Regulations. One response to the poor conditions in compou
pollution problem, was the emergence of a common African community in locatio
the verges of the urban settlement.

The theory and practice of environmental legi

Early twentieth century legislation recognized coal mining
pollutant. In fact, the problem was not restricted to a lack o
to the lack of enforcement of existing regulations and legisl
obstructed the advancement of profit within the coal industry
This section interrogates some of this legislation, particular
of pollution, with the aim of establishing how coal pollution was addressed during
the early decades of the twentieth century.

The most immediately felt form of pollution related to co
displacement of the overburden, however, this was not understood in terms o
rather in terms of financial convenience. The risk of pillar c

[92] Notes on Basis of Approach to Appeal , South African National Tuberculosis Association (SANTA), re
National Appeal, 1963, Johannesburg, p. 1
[93] NASA, GNLB/304/427/18 Report of Committee Appointed to Enquire into

outbreak of uncontrollable underground fires, was a constant
1906 the Witbank Colliery s Secretary, H.G.L. Panchaud h
Government Mining Engineer in Johannesburg because of a
and their neighbouring colliery. The Landau Colliery had r
pillars bordering the two separate workings.

Panchaud was opposed to this as posing a significant thre
Witbank Colliery. This referred to the risk of pillar collaps
integrity of the pillars. He also recognized that

> in a coal mine there (was) always more or less danger of a fire and in case of such a
> outbreak a 30` pillar would probably not be sufficiently thick to prevent
> colliery to another, whereas the 100` pillar might keep such a fire[94]

Industry officials the risk of underground fires breaking out,
little knowledge of how to control them, and the conception
sufficiently thick, as opposed to a 100` pillar, was intui
Another objection was the water penetrating through & from a neighb
mine in which mining and pumping operations had ceased.[95] With no agreement su
application between the competing collieries, the discretion
Mining Engineer, who referred to Crown Law under Regulation 17.

Panchaud, speaking on behalf of the colliery s Board of Dire
Cassel Coal Company was granted permission to reduce the
side, their own potential would be reduced as they would co
their duty to leave on this Company s side of the boundary
would mean sacrificing by this Company of 35` of coal throu
boundary.[96] While the Witbank Colliery had some concern over determ
precise boundary pillars, these concerns were based primar

[94] NASA, GM/5480/06 Correspondence between H.G.L. Panchaud, Secretar
the Acting Government Mining Engineer, Johannesburg, November 27, 190
[95] Ibid
[96] Ibid

The collapse of an underground mine ceiling as a result of
have amounted to an enormous loss. What the
was not understood in terms of the
an added cost in the production of coal for a market with
margins.

Early twentieth century records reflect some indication of gove
to control sources of pollution. A brief examination of some
legislation has yielded evidence of consciousness of environ
makers, as well as
pollution, particularly with regard to water resources. Regula
(No 35) of 1908 stipulated that

> no holder of a water right or mining
> into, pollute or make turbid the water of any stream, river or water cours[97]

While this legislation may have taken into account the pote
revealing a very specific knowledge
industry, including coal mining, this could not be
Regulation 7 (Part 1 and 2) of the Mines and Works Regula
attempted to deal with the
attempt to control the extent of the problem. Under no circu
for polluted water to escape without having been[98]
Act went on to define measures which
polluted water, including fencing off contaminated sites to p
as well as posting notice boards in suitable places to warn
such water.[99]

[97] NASA, Department of Mines (GES) 2069/107/33 Report of the Departmenta
of Enquiry on the Bacteriological and Chemical Pollution of Water Supplies, 1919-03
[98] Ibid
[99] Ibid

There are clear indications early legislation was undertaken contributed to the pollution of water and land sources, adv activities such as irrigation. A stipulation in the Irrigation Act No of 1912 also clearly reflected the extent to which the Section 137 of this act appeased mining industry officials contained in this Act shall be construed as derogating from conferred upon the Minister of Mines or any Mining Commissi to mining for precious [100] The jurisdiction of the Witbank coal was thus protected by the state, often compromising alter economic output such as irrigation for agriculture.

In 1921 this Act was amended, citing coal mining and w contributor towards the creation of waste water contaminat industrialization in the area, and growing recognitio large number of industrial processes in which problems of polluting waste waters have to be considered, if river and avoided [101] The legal conception of pollution thus reflects cons appreciation of environmental risks of mining, but did little practices for local authorities to utilized in these pioneering bodies impacts. This can also be seen as government's response to growing compl pollution in Section III of the Public Health Act (No 36) of 1 of water resource management was placed upon local authori

> for preventing the pollution of any supply of water which the district, has a right to use and does use for drinking purposes (whether within or beyond its district) and any such supply which has been so polluted to take measures (including, if necessary, proceedings at law) against any or polluting any stream so as to be a nuisance to health. [102]

[100] Ibid.
[101] Ibid. See Section 137, Irrigation (Amendment) Act (No 8) of 1921.
[102] Ibid.

Witbank had been declared a local municipality in 1914, alth
support from the Witbank Colliery. For the first decade of
Colliery had, in effect, served as the local authority for the
entrenched conflict of interest may be cited as one of the
implementation of the Public Health Act in Witbank. This w
limited comprehension of the extent to which coal mining ac
resources.

Changing concepts of City 1919-1933

Following the electrification of the town, and particularly af
Electricity Supply Commission (Escom) in 1923, offices in Witbank, the Witba
municipality began a campaign to attract further industry t
centre.[103] With an average annual output of six million tons, the
was that Witbank was the coal[104] This town's future seemed assured
mining and levels of output throughout this decade. Loca
government had a duty to support continued expansion thro
lives of existing mines by a reduction in working costs, an
mines.[105] In 1927, Witbank became the most efficiently and ade
Union[106] when the Mayor's wife was called upon to switch on
Lighting System.[107]

With the rapid expansion of the gold industry, coupled wi
secondary industry throughout the Transvaal, came a demand fo
matter of national priority. The Electricity Act of 1922 resu
Electricity Supply Commission under which Witbank was to be supplied.[108] By
March of the following year

[103] The popular acronym for the Electricity Supply Commission was used
known as Escom. To reinstate accuracy the anglicized version is used.
[104] Advertisement, Witbank Municipality, News, May 14, 1926, p. 8
[105] State Aid for Witbank Mines, Nelspruit, June 5, 1925, p. 4
[106] Model Town Lighting, Witbank, News, August 5, 1927, p. 4
[107] Official Opening of Electric Lighting Scheme, Witbank, News, August 5, 1927, p. 5
[108] Much of the early literature refers to the Electricity Supply Commissi
Escom this changed when the term Eskom passed into law in 1987.

Escom was the outcome of recognition by government officials that a public utility and an instrument of industry was needed.[109] It was not a private company, and creation it was not intended to create an electricity supply monopoly.[110] As a public works utility, Escom would function at cost.[111] Throughout the 1920s Escom worked according to these principles. This provided a sense authorities, presumably preventing any conflict of interest between stakeholders.[112] Escom provided new incentive for economic growth industry was supported by the community, such that its establishment almost certain. When Escom was taxed £600 for machinery imports about why this company was being treated differently to the not taxed, but were engaged in what (was) practically equivalent Electricity Supply Co., that is, the wresting of potential power impression of the coal industry and Escom were reflective of a common the natural environment to harness its energy potential for economic not environmental impacts were understood, or felt, by residents perceived role of the coal industry, which underpinned Witbank's[113]

The Fuel Research Act of 1925 demonstrated increased control the state by the 1920s.[114] This Act made it mandatory for prospectors submit information to the relevant state department, and the growth of the industry from this point, revealing key indicators around coal use and resultant pollution.

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[109] Merz, C.H., Electric Power Supply in South Africa (1928), p. 20; Witbank News, January 20, 1933

[110] Ibid

[111] Cheap Electric Power: Work of the Electricity Supply Commission, Witbank News, August 3, 1928, p. 5; While these principles guided Escom at this point, market forces pre time. This led to amendments, particularly regarding foreign investment and agriculture. The first amendment was made in 1947.

[112] The Electricity Question, Witbank News, August 27, 1926, p. 4

[113] Attracting Industry to Witbank, Witbank News, September 23, 1927, p. 4

[114] The Spring bank Coalfield , Anhaeusser, C.R. & Maske, S. (eds), Mineral Deposits of Southern Africa, 1986, p. 1971

The power company claimed that all poisonous gases, su
monoxide, were destroyed through the use of heat and rapid burning of the [115]
This total combustion prevented the atmosphere [116] from be
Remaining ash and clinker from the furnaces were transpo
massive amount of water used was produced and cooled i
daily. These processes were cheap and supposedly easily and pro
of burning coal without poisoning the atmosphere.

While manual recording and later mechanical recording devic
levels of coal combustion, these were not taken seriously in terms
pollution. Claims about improved burning processes, resultin
carbon monoxide, cannot be proven through such statistics, neith
environmental impact assessments from this time reflects h
measured at face value in the establishment of energy pro
growth. Did a smokeless power station really mean safe
regarding public health not only reveal that industry official
public health (and, indirectly, environmental) implications
marketed supposedly cleaner processes as an explanation by whic

By the 1930s, geology, along with economics, was for industrial
development. A geological study of the Witbank Coalfield was pub
of the Witbank District was welcomed by the coal industry. The
written by John Gray, then of the Collieries Committee of t
Chamber of Mines, [117] who boasted that collieries working in this area al
capable of producing all the coal required to fulfil the en
trade. [118] Thirteen active collieries were recorded, including the Witban
Witbank Central Area, Transvaal & Delagoa Bay, Van Dyk, Langlaagte, A
Schoongezicht, Middelburg Steam, Douglas (Witbank), Co

[115] Light and the Muse, Witbank News, November 6, 1925
[116] Ibid.
[117] Foreword, Report on the Witbank District
[118] Graham, Coals of the Witbank District

Clydesdale, Tweefontein & Waterpan, The Witbank and New
published, extracts readers were urged to look itself for other
interesting and surprising statements.[119]

Conclusion

By the 1930s, the Witbank coal industry had grown into a significant producer
well as a range of other mineral and chemical products. Th
spite of numerous obstacles, including the absence of ra
competition and poor coal quality. They were stimulated by the s
marketing of coal stimulated rapid urban expansion, as coa
The environment of the Witbank coalfield was severely comp
coal market. What legislation there was did little to limit, and generally
onus on the industry, as well as the local municipal author
pollution from industry with few enforcement measures implement
the local coal industry mounted political and economic lever
conceptions towards coal mining, and its environmental im
influenced by these power structures. The jurisdiction of th
thus protected by the State, ensuring relatively secure conditions
output. The following chapter deals with the impact of the
stimulus for industrial growth and expansion of coal mining
impact that this had on production in the Witbank district.

[119] The Coals of the Witbank District, Witbank News, January 22, 1932, p. 2



Image 3: As the scale of production grew in Witbank, the transport of co
important, and challenging. This image of the Witbank Colliery would have
be loaded onto waiting trains.

Chapter Two

The effect of war: Witbank's changing environment in a gro 1930-1947

Introduction

By 1930, the Witbank coalfield produced 25% of all coal mined in South Africa. Over the decade, the State began to prioritize indu immediately before and during the war years. It focused parastatals, the Electricity Supply Commission (Escom), Corporation (Iscor). Experienced labour, and innovative development in mine engineering technology to yield greater assess conception of pollution in light of this industrial particularly within the context of the Second World War. The stimulated more intensive forms of coal exploitation, placing available natural resources in the Witbank area under pressure around-based pollution changed as a result of trends direc especially the use of unorthodox methods of underground m production for the war effort. The contributions of the indus celebrated during this time, and little emphasis was placed o cost of intensified levels of pollution. Pollution was viewed as an unavo consequence of industrial development and economic growth conditions in Witbank by the end of the war rapidly changed coal-based pollution.

Towards a different kind of beauty

The continued industrial transformation of the Witbank co marketing of the town for other kinds of industry, resulted in larg

of coal. During the 1930s, with the steady expansion of the
international recognition as principal mining methods in South Africa,[120] many
investors now explored opportunities in the region with rene
delegation of the Third Empire Mining and Metallurgical Co
region in April, 1930. The group was welcomed by General the Hon. John Roy
Transvaal Coal Owners Association (TCOA). Roy addressed visitors and thei
that while the district was (and is) attractive as places previously vi
was crucial for the development of all other industries and the
mankind.[121] Roy made reference to the loveliness of the sunlit Tr
its variety of flora and fauna, riverbeds teaming with wildli
under an expansive blue sky. Witbank was clearly an unus
pleasure-seeking tradition the town had appropriated its industrial a
new form of attraction. Witbank was appealing because of,
appearance-based on pollution.

Coal was seen as essential for industrial transformation in the W
This amounted to a conscious threat to the natural environment
pollution was sublimated by the idealization of local enviro
the increasingly commonplace appearance of a smoky horizon, dotted with s
black mountains of coal waste. In this sense, Witbank reta
location for industrial development, despite having very
scenery.[122] The town took on the qualities of a different kind of beau
clouds of smoke which (could) be seen[123] Conceiving the area in
such a way was seen to be a symbol of progress and
atmospheric pollution and beauty were culturally linked
and development for the region. Witbank Colliery was even f
advertising the town. The Approach to Witbank Colliery fe

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[120] Quoted by Governor General and representative of the Transvaal Coal Owners Association, John R
to a delegation of the Third (Triennial) Empire Mining & Metallurgical Co
Inspect Witbank Mines, Witbank Times, April 25, 1930, p. 4
[121] Ibid
[122] Witbank: the Industrial Centre, Witbank News, June 17, 1932, p. 8
[123] Ibid

stacks and dark smoke alongside neatly planted wattle tree
framing the pathway leading to the colliery. Pollution was
construct, with dark, billowing fumes demonstrative of the w
was pollutioned skies a distinguishing feature of the region
market the town. This resulted in the idiosyncratic ideologic
landscape in line with the rapid industrial changes of the reg

Image 4: Postcard depicting Witbank Colliery Co. Witbank Witbank Collection, undated

Not everyone accepted the overwhelmingly positive percept
dissent could be seen in Witbank News in May, the place stood ou
because of the beneficial employment afforded, nor because of th
but rather because of the[124] The unpleasant and protracted growth of th
industry, coupled with the lack of state regulation over indu
decades meant that opposition to coal would go unheard for
come. The appearance of severe health problems in the area
impact of the daily lives of local residents, however, soon
residents and mine workers alike nearly blasted the[125] smoke stack.

A superhuman battle against spontaneous combustion

One of Witbank s biggest[126] headaches

Witbank s underground coal mines were known for the
fires was a significant challenge for colliery management. O
out, they were largely inextinguishable. The typical coal f
century underground mine was crudely exposed, with no pre
safety. Fine coal particles were strewn around the mine, and
ventilate the working area or wet the coal. This had the effe
area of coal to oxidation. The layer of broken coal covered the
allowing continuous free entry of air into the workings.[127] This
the coal made the coal more susceptible to[128] spontaneous combustion.
Flames could be doused, but the subterranean coal seams would
also had the effect of compromising the stability of the su
widespread subsidence. The fragmented surface, with crown
cracks thus allowed oxygen in, facilitating oxidation.[129] Coal mining could no

[124] Witbank Coal Mining, Witbank News, January 21, 1927
[125] Ibid.
[126] Paxton Road Safe from Flames, Witbank News, October 2, 1981, p. 64
[127] Bullock, S.E.T. Bell, F.G. Some problems associated with Witbank mini
coalfield, South Africa, Environmental Geology, December, 1997, p. 68
[128] Ibid. p. 65
[129] Ibid. p. 68

longer be used. Land affected by underground fires was usu
significant financial losses for the coal company.[130]

In July 1926 a fire erupted in the main shaft of the Witba
millions of pounds of losses for a company which largely contro
the colliery was breaking news. The fire was reported and d
company meetings. It was described as representing a terr
forces of nature on one hand, and really superhuman effor
employees on the other.[131] That the experience of dousing the flames wa
battle reveals an understanding of the natural environme
industry. Nature was seen as a realm to be dominated, contr
Within this paradigm, man was elevated to a superhuman r
a battle against the forces of nature which held him ba
mention was made of the area and later of the fire in relation to the undergro
would argue that although nobody (was) quite sure as to ho
it (was) thought that they (were) a result of the old coal
spontaneous combustion.[132]

Six months later, the underground fire still smouldered. The
abandoned. Mining operations had to continue, and sharehol
contain the fire. The coal frame was isolated by means of stone and water lowered
boreholes sunk from the surface around the affected area.[133] The company gained some
recompense through an insurance settlement of £30 000. Wit
the sealed off section continued to be affected by combustion.
were sunk on the Central section of the Witbank coalfield to[134] The Witbank Herald
importance of continued and regular output of quality coal.

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[130] Ibid.
[131] Fire at Colliery, Witbank, News, July 9, 1926, p. 5
[132] Paxton Road Safe from Flames, Witbank News, October 9, 1981, p. 1
[133] Witbank Colliery, Ltd. AGM: Witbank Colliery Prospects, Witbank Herald, January 14, 1927
[134] Witbank Colliery, Ltd. AGM: Bad Year Ahead, Witbank Herald, January 28, 1928

This experience proved that while the danger, the fire was remin
controllable and besides, the need for continued mining outweigh
example of what could go wrong in a coal mine was soon for
electric coal cutters and centrifugal pumps had put in an appearance
workable coal seams. Owing to the relative dryness of the m
excessively corroded by acidic mine water which would
surrounding river and ground water.[135] The erosion was then public that
even though instances of gas had been found in the Cent
(e)specially.[136] Measures such as safety lamps were obliga
was an assurance that (no) explosion had taken place in the
district.[137] The Witbank Colliery declared that Witbank coal was
freedom from any tendency towards spontaneous combustion.[138] This claim
made, in spite of the July 1926 fire, as the establishment
Still, there was no certainty that such incidents would not
risks of coal mining, the industry continued to develop and e

Marketing energy

The influence of the Witbank Colliery was felt in Witbank's econ
growth and expansion. This was consolidated throughout th
began to expand its scope in the production of electricity. I
the Power Act of 1910 of the Transvaal, the permission to s
electric power to the Town Council and Municipality of Wit[139]
Minister of Mines and Industries, this permission was grante
exceeding 3 pence per unit. The electricity supplied was a 3
alternating system of 50 cycles per second& and the poi

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[135] Ibid.
[136] Witbank Coal Field, News, August 18, p1933
[137] Ibid.
[138] Ibid.
[139] NASA, URU/44 Memo 15 and Grant of permission to Witbank Colliery to su
current to the municipality of Witbank , April 22, 1920

Company s Main Generating Station at its Colliery also arran
to sell most of its generated power to the Victoria Falls and
(VFTPC).[141] Coal was readily available in Witbank, but a central
was the availability of water for the station. In January, 192
Water Court in Pretoria for permission to obtain water from
Witbank Station.[142] The present license of the VFTPC did not allow
power outside of the Rand, but they sold most of their pow
supplied power to the South African Railways. The VFTPC argued that
the Water Court that as Escom expanded, their demand for w[143]

Image 5: Advertisement for Witbank, New, December 12, 1930

[140] Ibid.
[141] Christie, Re Electricity, Industry and Class in South Africa
[142] NASA, Secretary of the Department of Mines and Industries, 1922-1950, Vol 1, 1922
Application for the Victoria Falls and Transvaal Power Company , Water
[143] Ibid.

By 1927, Escom's national grid was complete. This was achieved
Lighting System.[144] Soon, more power stations were constructed near
coal, allowing for reduced capital expenditure. Their proximity
reduce the costs involved in coal production. Kelvin, Twin Cities and
Vierfontein power stations, all providing to the national electricity
serviced by Escom.

A rapidly expanding energy market required cheap and abundant
Transvaal's power stations. These were designed accordingly. Where coal quality
was poor, carbon content was reduced, and the emissions were of greater concern.
Stacks were constructed with higher or lower temperatures,
enabling the consumption of low quality coal. The Witbank Colliery saw this
commencement of an assured market for duff coal.[145] The creation of such a market
for duff coal was met with mixed responses from the coal industry. While
of markets, the selling price of duff was extremely low, and could be
reckoned a profitable part of the business,[146] the risk of spontaneous combustion
argument that the benefits of the power stations would result in the
Witbank area, leading to consumer markets for coal. The Power and
Commission had argued that the use of duff coal would contribute to
preventing the build-up of coal waste.[147] In fact, the coal dumps continued to grow.
At least one of these was situated in the business district of Witbank.[148]

Duff coal may have aided the economic conservation of high quality coal,
consumption exacerbated environmental conditions. Coal released
significant fly ash into the atmosphere. Fly ash, previously referred to as clinker, was the ashen residue of coal
composition of fly ash was complex, and often retained the

[144] Official Opening of Electricity Undertakings, Witbank, August 5, 1927, p. 5
[145] Witbank Colliery Ltd. Annual Meeting, Witbank, January 8, 1926, p. 2
[146] Coal and the Immediate Danger, Witbank Advertiser, October 30, 1931
[147] Christie, R. H. Electricity, Industry and Class, p. 41
[148] The coal dump in the centre of the town was eventually packed under ground solid enough to endure the weight of building on the surface. See De Heuwel, Witbank, June 3, 2008

mercury, amongst other minerals, found in coal. Coal combustion at h
temperatures in the numerous power stations further reduced
the atmosphere. This gave some credence to the public c
silverware would not tarnish as much as electrical power for ther
(was) much less sulphur in it."[149] South African coal was typically low i
content. Still, at least half of the sulphur remained in the
spread by wind and rain throughout the highly polluting land resou
district, and shifting perceptions of coal.[150]

Responsibility for tackling concerns around pollution was re
Mines and Industries. This was emphasised in a 1931 letter from the Minister of External
Affairs J.B.M. Hertzog, advising the British Water Pollution
contact the Secretary of the Department of Mines and Indus
may desire on the subject of the pollution of South Africa.[151] The
Department of Mines and Industries acknowledged the exis
consequence of coal mining and combustion, but little was d
Monitoring and preventing industrial pollution, particularly in
the value of electricity in speeding up industrialization. Wit
the poverty of a sparsely populated veld to the wealth of
town.[152] The environmental costs were thus seen as unavoidable.

Before electricity, energy creation for domestic cooking an
onerous use and maintenance of coal. One housewife quote
argued that even those who mastered the traditional coal fire
fire were willing to concede the immense usefulness of the
surface-fired electrical energy appeared to be entirely safe,[153]

[149] Light and the Municipality, Witbank News, November 6, 1925
[150] Clarke, James, Fragile Land: South Africa's Environmental Crisis, Ravan Press, Johannesburg, South Africa, 1974, p. 38
[151] NASA, Prime Minister, Transvaal, 1910-1931, PM, 1/1/27, 316/PM/88/19/1 Letter from J.B.M. Hertzog, Minister of External Affairs, to the Water Pollution Research Organiza Industrial Research in the UK, re: Prevention of River Pollution, 1931
[152] Witbank, the Centre of Coal, Witbank Standard, October 29, 1937
[153] Electric Fires: Heat When and Where Wanted, Witbank News, January 7, 1937, p. 2

This type of maneouvring typified Escom s strategy. The power company aimed creating further need for electricity, and encouraged the numerous household electric appliances. It emphasized the luxury, attained by those who had already purchased them, and stressed the association between electricity and modernity. A 1933 engin electricity as providing the salvation from depression and disease and of the smoke.[154] The slums would be eradicated and replaced with cl brightness and health& as the work done by the steam engi taken over by electric motors and electric cookers.[155] Escom s campaigners and accoc moral panic that emphasized the dangers of gas as the only way of preventing a throwback to pre-industrial conditions where housewives would be onerous coal fires to get their work done. Without power, t urban development would not be sustainable, but the costs of this were not disc

Escom s domestic consumer market was thus stimulated thr perception of an acceptable standard of living. In part, pres lifestyle resulted from the approach to the market.[156] While the grid already exist the marketing effort was geared towards the production consumer, firmly establishing Escom s political and economic

[154] The Manifold Uses of Electricity, Review & Engineering Supplement to The Star, September 22, 1933, p. 6
[155] Ibid
[156] According to de Certeau, consumer production formed a covert form o not manifest itself through its own products, but rather through its ways a dominant economic order. The Practice of Everyday Life, University of California Press Berkeley, 1984, p. xiii

Coal: 1000 uses for man

(The) power stations are here & the mines are here & we have visited Eskom. You look is here.[157]

The emergence of a local steel industry was a major turnin
This was illustrated in early 1928, when the Iron and Steel
parliament twice, reflecting the political significance of inc
Addressing parliament, the Minister of Mines, Dr Henry H. Cresswell, argued that
whole material fabric of modern civilization from the mere discovery & that the
energy locked up in coal could, by the intervention of suitab
converted to a 1000 uses for man.[158] Industrial growth and employment were
enmeshed within this understanding. The Iron and Steel Indu
passed quickly through parliament. The Iron and Steel C
established in 1928, chaired by Dr Hendrick van der Bijl. Th
the local production of steel to maximise the use of home-mined coal.

In 1928 the Minister of Justice, Tielman Roos, argued that t
obtainable, quality coal could never mean a great export trad[159] This
resonated with the coal industry. While the coal industry had
coal measures suitable for use in the process of steel pr
generally of a higher quality than most bituminous coal. Thi
undergo a distillation process to remove its volatile constituents. The product
could then be used, with iron, in the production of steel. Su
in the Navigation Colliery and Wayland Smelting Co. (Pty) Ltd.[160] The Navigation Coal Co. negotiated a

[157] Interview with Kaizer Mabena, representative of the Emalahleni So
Organisation (SANCO), SANCO Offices, Thushanang, June 4, 2008
[158] Hough, H. and Dagut, J. (eds), Source Material on the South African Economy: 186
3, 1929-1970, (Oxford University Press, Cape Town, 1973, p. 92
[159] National Archives, Pretoria, NAS, Secretary of Justice (JUS) 296/3/C122/20 Correspondence between Van Hulste
Feltham and Ford, Attorneys, Notaries and Conveyances, and the Minis
Flotation of a New Coal Company, 24 November, 1920 Under the auspices of the South A

contract for a provisional 25 000 tons per month to be
to the Pretoria steelworks.[161] This resulted in broader recognition of Witb
industrial development, and by 1934, the first ASA[162] 1936 African
marketing brochure of Witbank by Dr van der Bijl, highlighted
ideal for the industrialist seeking a location from which to
successful in its efforts to crystallize the domestic mark
requirements had steadily grown, and by 1939, electricity[163]
consumption had increased over 17 per cent from the previou[164]

The modernity heralded by domestic and industrial expansion
African locations which, by the thousands, housed workers and
was incorporated into a greater Witbank area. This area included
and Hlahlanikahle. These areas had been constructed spe
Witbank's municipal boundary.[165]

Industrial growth and its ecological effects during the Second World War

The rapidity of South Africa's economic growth was unprecedented
concomitant implications for Witbank's environment. Sudden
both domestic and foreign buyers, and the industrial expansion
grew exponentially by the political uncertainties which stim
foreign demand for coal. Geological surveys of the Witbank coalfields placed
the extractive potential of the mining district at roughly. The Witbank coalfields
output estimate at this point was just over one and a half times the[166]
towards Witbank closely than for overseas raw and coking coal.

Mining and Finance Corporation Ltd, the company floated to make use of the
liabilities of the existing Transvaal Navigation Coal Estates and Cassel Coal Comp
[161] Big Coal Contract 250 000 Tons A Month, News, August 5, 1932, p. 4
[162] Advertisement, Quality Steel from ISCOR, Alan Grey Report on the Republic,
[163] van Der Bijl, Dr., Introduction, Witbank Light, Coal, quoted in Rich i
Potentiality, Witbank News, May 7, 1937
[164] Electricity Supply Commission Annual Report, 1939, Witbank News, June 14, 1939, p. 5
[165] Abandoned mine lands in South Africa, Environmental Management Plan, Volume 2, 2006, p. 9
[166] Coal, the Material Source of Witbank Energy, Witbank News, October 9, 1931

extractive capacity of coal mines was thus stretched to the lim
equally-pushed to transport the bulky commodity. Witbank s
were overwhelmed with orders, and mine expansion was nece

Politician and industrialist, Dr Hendrik van der Bijl, became Director General of War Supplies in 1938. He headed the conversion and expansion of over six hundred factories to support the war effort. This expanded its steel capacity, effectively becoming a war fa[167] activity was sped up to meet the needs of the war placed h demands upon the coal industry, whose profit margins were capital for new companies, Dr van der Bijl suggested that t requirements of coal orders could be provided by the exis involve extraction of top & bottom coal left behind in adherence miles of new work.[168] The coal had been left behind in adherence requirements of environmental engineering design to ensure ceiling, as well as for ease of extraction. At a time when industry need most, the low cost would more than compensate for with[169] time inflation, and narrow profit margins, it was more econo abandoned mining sites to extract the remaining coal from ground. This secondary extraction violated fundamental pri engineering employed in the initial design of the underground[170]

Also known as pillar robbing, this method had a marked ef[171] Pillar and rooms had been designed according to a system of pillars, generally six square metres in thickness, to meet the demands of a vor

[167] Ibid
[168] Oil From Coal, Witbank News, January 28, 1938, p. 3
[169] Ibid
[170] For more on secondary extraction, see Geotechnical Factors Associated W Mined Areas of Coal and Their Impact on Sustainable Development, Jeffrey, L.S., Mass Production Engineering, University of the Witwatersrand, 2002
[171] Bell, F.G. Bullock, S.E.T., Halbich, T.F.J., Lindsay, P. Environmenta Abandoned Mine in the Witbank Coalfield, South Africa.
[172] Mine Fire in Old Workings, Witbank News, August 9, 1946, p. 5

economy, these spherical pillars were whittled down to the margin.[173] While the original rate of extraction was approximately underground coal, subsequent pillar robbing resulted in only pillars being left behind. This created a[174] Where the pillars of were robbed, the remained of them had to hold up the weight of placing tremendous pressure on the strata above[175] and be compression was too great, subsidence would occur. This me compressed topsoil would to the floor level of the underground release of oxygen into the workings through cracks, encouraging smouldering underground fires, increasing the density of ste the surface.

Even abandoned mines in the Witbank coalfield were robbed of years, up to two thousand tons of duff and low grade coa Witbank's numerous waste sites. Despite the immense tonna dumped as waste in Witbank, it was neither economically viable nor to rehabilitate the dumps.[176] While recycling waste coal for local mark sufficed, the quality required for foreign markets was genera was not up to par.

The influence of the war on the steel industry was noted by argued that no special steels had been[177] The war had a prior to stimulated economic conditions for the production of steels to be equal in quality to the finest steels produced in[178] The country part of t of plant and equipment in Britain had resulted in pressure placed on Union to supply a very wide[179] range of steel. Iron and steel showed the greates

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[173] Ibid.
[174] Bell, F.G. et al. Environmental Impacts, p. 1
[175] Ibid.
[176] Letter to the Editor, Witbank Star, September 15, 1944
[177] War Effort Increased Capacity Now Available, Witbank News, July 12, 1940, p. 3
[178] Ibid.
[179] Malherbe, G. (Government Mining Engineer), Annual Report of the Government Mining Engineer, 1946

expansion in the manufacturing sector, doubling net output f
industrial output during the war years.[180] In this way, the SA Coal Estates
whose contract with Iscor had been renewed, was forthcoming to spe
production. To ease pressure at the Pretoria steel works, th
and washing plant for preparing coking coal on site. This p
largest of its kind in the southern hemisphere.[181] By December 1940, the larg
particular increase in the supply of coking coal was to Isc
million tons.[182] The Navigation pit was worked extensively, yie
output of ¾ of a million tons with the new Iscor contract
came into effect in 1942, increasing output expectations to
tons, all of which (would) be coking coal for the steel work
1940 and 1942, total annual average output grew from 556 423 tons per annum

The Witbank Colliery more than doubled the yield from its
1930s and the mid 1940s. While 68 934 tons were produ
representing an average monthly output figure of 4 328 tons.[183] By April 1
output figure was just over 10 000 tons.[184] The 1 080 tons monthly average outpu
for the Coronation Colliery reveal a similar rapid expans
coinciding with the war economic expansion. In January 1935, for example, output was 48
563. This more than doubled to 103 018 tons by December,
both collieries of the Transvaal and Delagoa Bay Investmen
Transvaal and Delagoa Bay Colliery and the Douglas Colliery worked to
maximum capacity.[185] The increased demand for coal-related products in the war
conditions did not always result in accumulated profits for
Transvaal and Delagoa Bay Investment Company complained

[180] Feinstein, Economic History of South Africa, p. 124
[181] Big Coal Contract 25 000 Witbank News, Witbank, November 17, 1932
[182] SA Coal Estates 20th Annual General Meeting, Witbank, December 13, 1940, 1940, p. 1
[183] Ibid
[184] Ibid
[185] Coal Output, Witbank News, Witbank, May 7, 1943
[186] Transvaal and Delagoa Bay Investment Company Annual Report, 1944, p. 4

pressure had incurred considerable capital expenditure.[187] As far as the industry as a whole was concerned, colliery owners had responded to government production. They had delivered on their responsibility, but received little in the way of additional profits and sensed that they were being asked to mine coal entirely in the interests of the war effort.[188] Coal owners also complained about the level of taxation, and the extent to which it was viewed as a company (Witbank Coal Estates) which (was) exploiting a wasting asset.[189] According to the available coal figures, the height of wartime coal production took place between 1942 and 1943, and then began to tail off. Out of the four coal companies surveyed, only one, the South African Coal Estates (Witbank) experienced sustained growth during the years of the war.

The end of the war signaled a shift in the industry. Many companies had exhausted their reserves. While some underground mines, such as Coronation Colliery, continued to systematically mine coal, others had exhausted the available coal reserves on their expansive operations during the pressure during the war to produce coal, irrespective of environmental constraints, had resulted in several serious environmental implications.

This included underground fires, water pollution and the collapse of surface land on exhausted mines, including Middelburg Steam, Station, Uitspanning Colliery, Witbank Steam, Delagoa Bay Colliery and Corona Colliery.[190] While most coal companies had the capital reserves, had little space or incentive to address the problem of pollution caused by coal production. The demands of the war had taken a toll on the natural resources of the Witbank district.

Post-war conceptions based on pollution

[187] Ibid.
[188] SA Coal Estates (Witbank) Ltd, Increased taxation exceeds advance in year's profits, Witbank News, December 11, 1942, p. 2
[189] SA Coal Estates (Witbank) Ltd, Annual general meeting, Witbank News, December 11, 1942, p. 2
[190] Goldswain, Z, No future plans for Witbank Mines, Witbank News, November 22, 2002

The political significance of the Witbank area during the war meant new t
military attack by Italian or German forces from the coast.[191] Security officials
argued that there would be at most thirty minutes warning o
from the coast before the enemy would arrive.[192] Planners insisted that
the Witbank blackout would be rendered useless during daylight hours
fires. They became beacons not only to Witbank, but
Witwatersrand.[193] The Axis powers never visited Witbank, and a trial thirty m
blackout took place.[194] This attempt to make Witbank disappear
the fruits of rapid industrialisation was also aimed at disorienting. One pilot wit
attempt to hide the town. He later recounted his seeing the town pop
out here and there like bursting bubbles&there was the las
Witbank offered an absolute blackness.[195] His account provides insight into
electricity was conceived by the community: a return to wilderness
the removal of power sources like electricity, seemed surre
was assailed with the erie (sic) feeling.[196] After having lost th
momentarily lost the world, tempted by the mine dumps glowi
seemingly flirting with one another as the flames awaited in t
vantage point, the dumps took on an ethereal dimension, co
their own making: the Witbank town.[197]

The harsh economic conditions of the war popularized the id
resources. Rations existed for everything from petrol to pa
their relative scarcity, were reconceived. Thinking of alternate
alternate land uses was never enforced by government, even
were compromised. The gravity of the pollution, which invo
clean air and potable water for sustainable urban development
understood. The immediate impact of pollution was evident in the a

[191] Blackout: Witbank's Next , Witbank News, June 5, 1942, p. 2
[192] CPS: Civilian Protective Services: How Witbank Men Are Co-operating , Witbank News, March 6, 1942, p. 4
[193] Blackout , Witbank News, June 12, 1942
[194] CPS , Witbank News, March 6, 1942, p. 4
[195] The Blackout From the Air , Witbank News, March 24, 1942, p. 3
[196] Ibid.
[197] The Blackout From the Air , p. 3

dumps and smoky With the diffusion of pollution was not as e
it would later become a process of the drainage (AMD)[198]
triggered by the extensive mining of the war years: the oxida
strata within the coalfields gradually altered the pH balanc
highly acidic polluted waters entering the mine shafts and
turn, acidic surface water would enter river catchments, lead
including various heavy metals like iron, aluminium and magn
underground coal shafts were often not backfilled, affecting
tables in the district. The cost of rehabilitation is one of
the rising occurrence of acid mine drainage into river catch
and surrounding district.

With the growth of urban settlements, the severity of pollu
residents associated a time when there (were) not so many co
environment.[199] The danger of subsidence was not restricted to t
outskirts of town but also affected the town itself. By 1940
regulations were established regarding land which would ha
building.[200] Buildings were not allowed because they were und
risk of subsidence.[201] By 1944, the town had

> the atmosphere of a city of as many tens of thousands of people & it (was
> the point of bursting in the place where there should be room to brea[202]

The war had accelerated the gradual build up of pollution wh
ignored. Government Notice No. 873 of 2nd June, 1944, heco
significant shift in State-based policy. The notice announ

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[198] See Bullock, S.E., Bell, F.A., Associated with the Past Mining at a Mine in th
Coalfield, South Africa, Environmental Geology, December 1997, p. 1; Adler, R.A., C
Godfrey, L, Turton, A.R., Water, Mining and Waste: an Historical and E
Management in South Africa, The Economics of Peace and Security Journal
[199] Interview with Sarah Mabena, Thushanang Eco Tourism Project, Ekangala
[200] Mine Fire, p. 5
[201] Ibid
[202] Published in Witbank News, September 8, 1944, p.

establishment of the departmental Committee of Enquiry on the Bac
Chemical Pollution of Water Supplies. It was appointed by t
Demobilization

to enquire into, report upon and make recommendations with regard to the measures to be taken in the w
Union of bacterial and chemical pollution of water supplies used or wh
purposes, including livestock, both[203] in urban and rural areas.

Chaired by Dr. A.J. van der Spuy of the Health Department, the committee
team of experts from the Departments of Health, Public
Agriculture. This research body made use of extensive ora
Government Mining Engineer. Existing legislation was examined[204] and found
while wide legislative powers existed for the prevention
little machinery to implement these powers.[205] In the case of the Public Health
1919 placed the onus of preventing pollution of local wa
authorities for purifying supplies which had become pollut
measures against any person polluting any such supply&sc
danger to health.[206] No regulations existed to guide local authorities
both prevent and mitigate waste water pollution of streams a
made public. An undated letter from the Secretary of Health to th
Officer confirmed that this concern was being treated as s
government had not yet considered, the Report of the Commi
Enquiry on the Bacteriological and Chemical Pollution of Wa
in parliament.[207] By 1948, it was the first to tackle the difficulty of
legislation dealing with mine and industrial effluents.[208] Its report constituted an

[203] Report on Pollution of Water Supplies, p. 1
[204] Ibid
[205] Protective Measures, p. 3
[206] Ibid
[207] NASA, GES/2069/107/3 Correspondence (unofficial) between the Secre
Chief Health Officer, Undated, found with documents relating to the Report of the Depar
Committee of Enquiry on the Bacteriological and Chemical Pollution of W
[208] NASA, GES/2069/107/33 Report of the Departmental Committee of Enqu
Chemical Pollution of Water Supplies, 1943

state recognition of the inability of local authorities to con
waste, particularly mining.

The report listed industries the production of waste water.
mining were notably placed at the top of this rather lengthy
was linked to a wide range of industrial production, revealin
number of industrial processes in which problems of treatment and
waste waters have to be contended.[209] Contributing factors towards water
were classified under three headings, including chemical,
mechanical. This did much to emphasize the relationship betwe
pollution, but the rather narrow formulation of categories
grappled with the multifarious, largely hidden, environmen
production process. Coal was cited in two out of the three techn
including chemical and mechanical. While mechanical pol
process of coal washing, the Committee argued that this cou
method of effluent control.[210] Chemical pollution was defined as the

> discharge of industrial effluents either directly or indirectly into rivers or streams, by which many underground sources of supply (were) naturally polluted by drainage, the excess o water unfit for consumption by man or beast or agricultural purposes. especially those from gold and coal mines, (had) caused acute and chron rendered excellent arable land totally unsuitable for agricultural purposes.[211]

The report did not provide any guidelines for how to deal with ecological
turning point in state conceptions of the environmental impa
industry. For the first time, fully acknowledged the adverse inf
over alternate forms of resource management, such as agri
agency to farmers, both black and white, whose livelihood h
poisoned water and diminished land quality. The process of u
accelerated as farmers recognized the contradictions of ceding mineral

[209] Ibid.
[210] Ibid.
[211] Ibid. p. 9

companies like the Witbank Co-operative Collieries had abandoned their land had become totall
for anything other than mining. With the loss of land use, a gro
Witbank residents, especially farmers, began to seriously q
mining in the district.

The relative impotence of agricultural bodies in preventing w
a 1946 Memorandum on the Irrigation Amendment Bill which v
of Irrigation to the Secretary of the Treasury. The Departme
that it was hampered in its operations by a lack of despite
recognition that the conservation of water (was) an u
important one.[212] This had the effect of disempowering the Departme
the maintenance of irrigation works on riparian land affected

As collieries such as the SA Coal Estates and the Witbank
existing reserves during the war, they abandoned shafts, eit
the remaining reserves. By the late 1940s, many of these sit
onto the surface, with the result that the Committee recogn
streams, particularly those flowing through industrial areas.[213]
The Committee cited Section 137 of the Irrigation Act (No 8
draw particular attention to the immunity enjoyed by the
chemically contaminated water into streams.[214] With continued industrial growth
the provision of more houses with modern conveniences & th
appreciable increase in the next few years in the quantity
required.[215] Local authorities, particularly in Witbank, were ne
financially equipped to take on the dual responsibility of fa
ameliorating coal pollution. The Witbank coal industry was lar
so, as the cost of rectifying water sources would be enormous. The large

[212] NASA, Secretary of the Treasury (TES) 1974 1942743/10/188 Memorandum on the Ir
Amendment Bill 1946, sent from the Director of Irrigation to the Secretar
Amendments to Irrigation Act, 1912
[213] NASA, GES/2069 107/33 Report of the Departmental Committee of Enqu
Chemical Pollution of Water Supplies, 1943
[214] Ibid
[215] Ibid. p. 13

compilers of the Report had sensed general dissatisfaction with the pollution f
had come to regard the pollution as an inevitable opportun
While the report had called for absolute prevention of pollution was
maintained that tightening up the powers would reduce pollution
down to reasonable limits without a serious[216] additional charg

By accepting that pollution, on some level, was an inevita
Committee abated the criticism of government officials. At the same time, the
discussion introduced the complicated task of reducing and
district with ongoing industrial activity, and widespread e
polluter was often tricky to isolate. It was not possible to hold
Mines, and expect these representative organizations to c
pollution that had begun to spread throughout the district.

Individual collieries were hardly ever held liable, even if
proven, as this was generally impossible to do after the im
been closed or the company had ceased to exist.[217] The Committee argued that the a
member of the community hardly realize(d) the problems c
precautions necessary in protecting gathering grounds[218] and wel
The reason for lack of interest in urban areas was attributed
water from local authorities. This argument suggested that
urban dwellers to question the availability of water, especia
where most industry and employment was somehow connected to the coal
With only limited impact on natural resources, urban
changes in their environmental conditions.

The tightening up of power, as suggested by the Committee
pollution, included setting up regional water control board

[216] Ibid.
[217] Bosman, C., Kotze, L.J., Liabilities, Responsibilities and Duties for Remediation a
Under the MPRDA and NWA, Unpublished paper, Water Institute of South
[218] Report on Pollution of Water Supplies, p. 13

populations. This aimed at creating a greater interest bein
people.[219] One of the main duties of the water control boards
existing legislation in the prevention of undue pollution.[220] The
Committee did not outline what a reasonable level of p
demonstrating limited scientific conceptions of the capacity
Future generations would bear the brunt of this invisible sco

By the time the pollution became apparent, those responsible
insolvent.[221] There was, in fact, no one to be held accountable
impelled to contribute to remediation, either financially or thro
Mine closure meant little more than abandonment.[222] These areas effectively became
waste lands, whose potential for productive use was com
destroyed, by unchecked pollution. The industry thus to
governmental regulations by exerting enormous influence.[223] Environmental costs played a very
significant role in determining the path of economic growth, but the[224]
were largely hidden from the public, and obscured in the ba
coal companies. The absence of regulation in the industry
in indiscriminate mining, the failure of the government to rec
ecological damage, and the strength of public perception
outweighed its costs.

Conclusion

Remnants of abandoned mines had become a regular feature of the
1940s. Smoke stacks and massive conveyer belts worked in
industrialized vista. This was celebrated as a part of the fin

[219] Ibid
[220] Ibid
[221] Ibid
[222] Ibid, p. 35
[223] Adler, R., Claassen, M., Godfrey, L., Turton, A.R., Water, Mining and Wa
Economic Perspective on Conflict Management in South Africa, The Economics of Peace and Secu
Journal, 2, 2007, p. 34
[224] Omeje, K., Fadaka, J., Economic Growth, Development and Sustainable

activity between the early 1930s and late 1940s, with little foc
phenomenon of localised pollution, including underground fir
and coal dumps. Evidence of pollution did little to persuade
of intensified coal production and combustion in the district.
Departmental Committee of Enquiry on the Bacteriological a
Water Supplies reflected changing views which saw the need
based pollution. However, its existence in the industrial region was
The Report highlighted a list of major polluters, aiming
reconstruction thus involved research to develop policies
monitoring and control of pollution. The next chapter will assess
decision-making processes, which ultimately led to the emergenc
legislation aimed at minimizing pollution.

Tables and graphs

Tables No 1, 2 and 3 reflect monthly output figures as published between 1930 and 1947. The graphs complement the tables by providing a visual indication of the dramatic rise of during the 1930s and 1940s, especially in coal production during the Second W

Table No 1

South African Coal Estates monthly output figures (Without duplicates)

Monthly tot	Monthly Output (tons)
January, 1	63 126
July, 193(	71 841
May, 1931	56 211
April, 1933	48 796
February, 1	75 253
December,	100 659
February, 1	95 054
March, 194	106 258
August, 19	172 875
January, 1	146 872
April, 194	155 307
May, 1943	163 877
December,	176 509
February, 1	174 875
March, 194	187 616
August, 19	194 320
April, 194	178 234
May, 1945	180 537
July, 1945	174 864
November,	165 363
December,	159 217
January, 1	184 602
March, 194	164 437
June, 194	165 880
July, 1947	165 880

The table shows output figures for most but not all months. monthly output figures ba available published sources.

Graph No. 1
South African Coal Estates (Witbank) monthly output f

This graph demonstrates a dramatic rise in monthly coal output figures b
the official supplier of coal to Iscor, the SA Coal Estates and was
improve production during the war

Table No. 2

Witbank Colliery monthly output figures

Monthly t	Monthly Output (tons)
January,	71 472
July, 19	77 377
May, 19	59 681
April, 19	53 457
February,	68 934
Decembe 1937	90 643
February,	72 954
March, 1	84 115
August, 1	102 330
January,	79 933
April, 19	108 081
May, 19	108 443
Decembe 1943	136 768
February,	138 494
March, 1	159 336
August, 1	149 143
April, 19	136 697
May, 19	148 941
July, 19	136 571
Novembe 1945	137 506
Decembe 1945	136 240
January,	148 064
March, 1	128 954
June, 19	114 677

As the oldest, most established colliery in the region, Witbank Colliery e
during the war years. This had positive financial spillover effects, leadin
and industry.

Graph No.

Witbank Colliery, Ltd. monthly output figures

The coal output figures of the Witbank Colliery reflect a similar trend of the height of the Second World War. This would not necessarily correlate with the capital sinking new shafts. Costs were generally reduced through the wartime abandoned underground mines.

Table No. 3

Coronation Colliery output figures

Monthly to	Monthly Output (tons)
January,	71 472
July, 193	77 377
May, 193	59 681
April, 19	53 457
February,	68 934
December,	90 643
February,	72 954
March, 19	84 115
August, 1	102 330
January,	79 933
April, 19	108 081
May, 194	108 443
December,	136 768
February,	138 494
March, 19	159 336
August, 1	149 143
April, 19	136 697
May, 194	148 941
July, 194	136 571
November,	137 506
December,	136 240
January,	148 064
March, 19	128 954
June, 19	114 677

Evidence of coal based pollution was still apparent in 2008, more than 70 years after the closure of the mine. The impacts of coal dumps and ash pits. Since the early 1990s, informal settlements have sprung up on some of these dumps, often constructed on the subsoil (see image on page 129 and 133)

Graph No. 3

Coronation Colliery output figures

The Coronation Colliery s coal output figures rose dramatically, reaching
1945.

Chapter Three

Responses to the changing atmosphere of Witbank, 1945-1965

Introduction

Post-war reconstruction involved significant shifts in the way
The evolving systems of knowledge related to the coal indu
general scope and depth of understanding. This interest was n
war economy, which continued to experience growth on a ma
become widespread after the war. The profusion of air pollu
world had pushed local scientists to interrogate the relatio
industry and its contribution to air pollution. This chapter w
pollution that took place in the decades immediately followi
resulting in the emergence of South Africa's first legislat
pollution.

Witbank simultaneously experienced the problems of exhauste
shafts and gave birth to new ventures. The injection of new capital and investment into n
New factories opened, and power stations were built to s
national grid that delivered electricity to towns througho
sprawling expansion of urban residential and commercial, the
large population of the Witbank coalfield had become plague
contributing to high rates of lung disease, particularly
tuberculosis. This chapter will outline the findings of the
and task teams who worked towards passing of the Atmosphe
in 1965. The research conducted before any parliamentary
regarding its promulgation was pivotal in shaping post-war conceptio

Growth, prosperity and environmental awareness in a single-coal town: 1948-1952

By the late 1940s, coal pollution had become a regular part of life in Witbank. Soon after the war ended, a team of journalists from the Johannesburg newspaper drove to Witbank to investigate rumours of an underground fire broken to the surface near a public road en route to the town. The week, with flames shooting up to a height of three feet.[225] The area of the fire was reached by the journalists without difficulty, and was met with surprise by residents, who found it hard to understand why so much fuss was made of the latest in a series of fires.[226] Such fires, such as the Apex mine described in the previous chapter, were common throughout the coalfield, and thus did not disrupt the life of the town. The visit of these journalists was thus significant in its complacency of both the industry and residents of the coalfield with coal-based pollution.

Demand for Witbank coal had been largely uninterrupted after the war ended. Bunker trade was adversely affected by shipments from coal oil, but local demand continued to grow.[227] The local industry was thus largely insulated from the post-war slump that hindered other economic activity, giving it a competitive advantage after the war. The state relaxed numerous controls to back capital expansion during the war, thus stimulating a new boom. New shafts were sunk throughout the coalfield, and by the end of 1948 two-thirds of the Transvaal's collieries[228] were situated in Witbank.

A number of chemical processing plants emerged along the railway line bordering abandoned mine workings. This new economic activity helped Witbank's emergence as a regional centre.[229] The new plants not only served

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[225] Mine Fire, Witbank News, 9 August, 1946 p. 5
[226] Ibid.
[227] Sealey, A. The Coal mining Industry, Mining Survey, 1st Edition, A36, October 1991, p. 1
[228] Lang, J. Power Base: Coal Mining in the Life of South Africa, Johannesburg, 1995, p. 128
[229] All Coal Records, Witbank News, 27 August 1943

mines. One notable example was Rand Carbide, which had be
away from residential areas.[230] The factory produced carbide, a compound
carbon and metal used in the headlamps of miners. The C
established in the district, producing cyanide, a poisonous a
ore in refineries. Another was Federale Mynbou Metals, built close to the c
and Delagoa Bay Colliery.

Escom had grown significantly during the war years. As the
changed, so did that of energy, thus affecting the relatio
parastatals and the state. By 1947 the Electricity Act of 1922 w
changing policies of an increasingly protectionist state. It
African energy, the existing bodies such as the Victoria Falls P
were automodeled. Domestic and industrial sale of units of electrici
large enough to warrant servicing by Escom, and largely pow
Witbank coal. The massive demand for munitions during the
demand. Production thus expanded to facilitate further outpu
emerged throughout the district as the company grew. Witba
growing Transvaal coal industry, was one of the few coal ce
to meet the demand of local and foreign consumers after the
this point was not the availability of coal, but rather the lac
carry coal to markets. By 1951, shortages were experienced
to deliver coal to markets. The state responded during the w
embargo on the export of coal, temporarily.[231] This relieving coal m
shortfall, but transport problems would remain central to plague t
for decades to come.[232]

New corporate structuring characterized the growth of Witban
half of the century. A major economic turning point for loca

[230] Rand Carbide Sets the Witbank Standard, 14, 2000
[231] Lang, Power Past, 131
[232] The greatest development in markets took place in 1976, with the opening
Richard s Bay Coal Terminal on the east coast of South Africa.

involvement of the Anglo American Corporation in Witbank after it experi
massive financial windfall with the discovery of gold in the
The mining finance house soon amassed enormous profits, a
mineral interests, purchasing the coalfield. At least three c
opened since the middle of the war to supply Iscor with c
Springbok Colliery.[233] The company also took over several coal companies
including the SA Coal Estate Limited. These collieries closed down as they ex
reserves. Damage to mined land was written off by both th
municipality. General industrial practice was to level the co
officials thus had little cause to regard such land as undermined
took on several layers of meaning: not only did it allude to
bord mining methods widely employed, but also implied the l
the advancing signs of surface degradation. Signs of this include
subsidence of the land, which had become too dry and desic
as acid mine pollution of varying intensities. Areas where c
were usually affected in some way, and thus the term also came to
played a significant role in the urban development of Witb
areas.[234]

Growth of the town was thus determined by the physical and bio
limitations of this unusable land. These sites had become de
patchy terrain, woefully short of trees in a place that was[235]
Locations surrounding the town had started emerging in the
population density was notably greater in the Witbank Township.[236]
Vosman and Lynnville, although set on the[237] hillsides, housing working class to

[233] Witbank News, November 20, 1964
[234] Bullock, S.E.T. & Bell, F.G. Some Problems Associated With Past Min
Coalfield, South Africa, Environmental Geology, December 1997
[235] Witbank News, February 18, 1949
[236] Notes on discussion with Isaac Mampane, Witbank, Emalahleni, June 2,
[237] NASA, Department of Native Administration - 1937; Development of the
Departments of Bantu Administration and Development, Co-operation and Development, Plural Re
and Development (1975-1993) (SAO) 3/544/A2/17/4/1/K120 The informal settleme
the town of Witbank were granted in 1982, under Section 2 of the Bl

built on the verge of underground fires from mine dumps, and adjacent to powerful streams, the lives of African, Indian and foreign temporary migrants coalesced. The eclectic population included the families living in long brown brick mine compounds built relatively close to the seams. As locations developed, they verged dangerously close to the physical separateness enshrined in the Group (Urban) Areas Act, by the insurmountable borders created by mine activity. Pollution, disruption, thus took on a political nature. Apartheid's racialized geographical isolation of these locations.[238]

Witbank prospered after the war, providing both industrial and growing economy. The town's progress simultaneously made use of natural resources, but it soon became apparent that these were incompatible, particularly when it came to the pollution of rivers. In 1948, the Departmental Committee of Enquiry into Bacteriological and Chemical Pollution of Water Supplies had noted that the South African economy was bound up with the health of rivers.[239] Without access to potable water, urban expansion would be severely compromised. Evidence linking mining and water pollution already existed. These included reports that rivers such as the Komati, which has its catchment entering the Loskop Dam, were being polluted by mining activity in the upper reaches.[240] Despite this, further investigation was necessary before the coordination of research into the full arena of environmental purity and suitability of surface water could be undertaken.[241] The need for coordination of policy planning around natural resources had already been

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Authorities Act of 1982. See Establishment of the town council of Kwa Department of Cooperation and Development

[238] Abandoned coal mine lands in South Africa: Environmental Impact Management 2000

[239] NASA, GES/2069/107/33 Report of the Departmental Committee of Enq and Chemical Pollution of Water Supplies, 1943

[240] NASA, Native Affairs Commissioner, Witbank (3) 1/1/1 (3) 1/1/1 (16) Letter from C.A. Rawe, Assistant Native Commissioner, Barberton, to Mining Commissi of the Komati River, August 20, 1940

[241] Ibid

formation of the national Natural Resources Development Council.[242] This
directorate was preoccupied with the South African economy, but its intent
to prevent pollution or conserve resources for posterity. T
investigate the most effective means of exploiting and devel
was largely concerned with planning to attract more industry
balance out the distribution of enterprise throughout the cou[243]

A regional NRDB was formed in Witbank in 1949. This repre
new consciousness concerned with the wasteful exploitation of resources
particularly in light of the vast demand for South-African na
war reconstruction in Europe, Britain and the USA. In 1953,
the council, argued that South Africa should husband its ra
materials.[244] This included coal, which had gained value amid gl
efforts of both regional and national bodies thus changed
materials.

Conceptions around natural resources remained structured by the mentality of
scarcity. Conservation was thus understood to be based on t
future conflict, which would adversely affect access to reso
was superabundant was thus a mere technicality bent on resource cons
local use. However, even as conceptions changed, little a
pollution of resources affected by the extraction of raw mate
had been listed in the 1948 Survey as a chief pollutant. The qu
based pollution remained secondary, and largely ignored, b
change in attitudes towards natural resources as the relative
fuel was brought before.

[242] Development Regional Planning of Natural Resources, Witbank Review, November 22, 1949
[243] Natural Resources Council, Witbank News, November 11, 1949
[244] Conserving Raw Materials, Witbank News, September 4, 1953

Public health-based pollution in the 1946-1955 period:

Soon after the war the Government Mining Engineer (GME) r
cent of deaths on mines were a result of explosions[245] due to fumes
The frequency of fatalities forced the mining industry to p
to its occupational health-existing institutions. These were tasked with trainin
miners in fighting and underground rescue operations, which was centralized under a
management committee, and taken over by the Transvaal and
of Mines in 1945.[246] The Central Rescue Training Station trained se
mine workers to deal with the fumes encountered during explosions. These included
carbon monoxide, carbon dioxide and methane, amongst othe

These revelations irrefutably debunked earlier conceptions
were free from spontaneous combustion. Not only were these
unprecedented and deadly underground explosions, but mere
health implications. Coal workers were constantly at risk of
dust inhalation. The health risk of exposure to coal dust, which caused a host
whose relative severity depended on the chemical composition[247]
Considerable inhalation of dust over an extended period was
pneumoconiosis, a relatively mild condition of the lungs. This was more inte
known as coal workers pneumoconiosis, which could develo
fibrosis, where a dense mass of fibrous tissue (could) occu
lung.[248] Less debilitating was athrocosis, a dark deposition of
lungs. Coal and rock dust containing considerable volume
anthrocosilicosis, a condition resulting in extensive fibrosi
changes.[249] With over fifty thousand coal miners in South Africa
debilitating occupational exposure had become a major conce[250]

[245] Annual Report of the Government Mining Engineer, 1947
[246] Rescue Training Station Handbook (Revised), Chamber of Mines of South Africa, 1972, p. 1
[247] Coal dust: hazards and control, Coal Advisory Board, 1970, p. 86
[248] Ibid
[249] Ibid
[250] Annual Report of the Government Mining Engineer, 1947

South Africa's post-industrial era was, in part, characterized by
billowing out of smoke stacks situated within its numerous i
were often engulfed by a haze of smoke and airborne chemic
any number of industrial and chemical processes. Hence, the
smoke and gases was not restricted to those employed in
intensive as experienced by workers underground, enviro
widespread. The increase of air pollution heightened the risk
and also had deleterious effects on those suffering from ai
1953, tuberculosis had escalated to the level of a daily death
rate of fifty five for all races. Air pollution had a particular
of tuberculosis, whose lung capacity was gravely compromi
diffuse smoke and harmful airborne particulates.[251] The high
region exacerbated the rapid degeneration of air quality in Wi
harmful particles released from power stations, affected
local air quality.

Local experiences and responses to atmospheric pollution w
international wave of scrutiny to this problem. In fact, the t
had grabbed the attention of the world. The problem was underscore
became apparent that its smog was becoming an international pa
The most noted incident of fatal smog had occurred in Dece
of London was struck by a smog which was unprecedented. Accordi
subsequent report, inert weather conditions had held the c
and prevented the formation of winds which would have dis
were accumulating heavily around the city.[252] At the time, coal had been a
energy source for over a century, and the impact of the war
pivotal in changing conceptions of pollution. The changes were n
those of perception, but concerned the future of coal in the city. B

[251] Notes on Basis of Approach to Appeal, Textile Federation South African Natal, 1962,
[252] Pollution and Your Health (published report), US Environmental Prote
Public Affairs, 1976, p. 5

Clean Air Act had been passed, banning the burning of coal
removed much of the visible pollu[253]tion from the air. The Clean Air Act sets a
global precedent in the fight against atmospheric pollution.

The mid-1950s presaged a turning point in environmental
calculations of one scientist's assessment of the possibility of global warm
through continued consumption of fossil fuels. This scientist, Dr. Charles[254]
scientist Charles David Keeling developed the technology
dioxide levels. His measurements showed that these level[255]
According to Kolbert, the fact that the rise was measured so soon after
ago lends credence to the notion that the changes that c
changes that have been witnessed in the century of rising[256]
consumption of fossil fuels, it was only by the mid-1950s that the visible
changes began to garner government attention. In South Afr
legislative reform was rooted in the Council for Scientific
(CSIR). One CSIR liaison officer, Mr. I. Mostert, was tasked to
study the effects of air pollution in the United States. He wa
something should be done.[257] The preliminary research conducted by th
emphasized in 1953, when the port city of Durban experienc
related to industrial emissions. The ability of the council to
existing legislation. The Durban Town Council had little leg
Health Act. This Act was limited, as it was only applicable to local authority
dealing with a distinct health[258] issue. This excluded ameliorating the e
conditions of general smokiness plaguing Durban's envi
significant blow to the municipality, as it was almost impo

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[253] NASA, Secretary of Foreign Affairs (1901-1944) (BTS) A791/107 Letter
Ambassador in London, Congress on the Pollution of the Atmosphere
[254] Joubert, L. Sched: South Africa's Changing Climate, Witwatersrand University Press, Johannesburg
p. 4
[255] Kolbert, Elizabeth, Field Notes from a Catastrophe: Man, Nature and
[256] Ibid
[257] NASA, GES/1642 116/26/D Minutes of Evidence from the Select Commi
Pollution Prevention Bill, March 8, 1961
[258] Ibid

industries in a complex where any number of companies co
nuisance.[259] This case embodied the air problem throughout the c
been the first national body to recognize that two problem w
began to lobby the Ministry of Health.

The Minister of Health was receptive to these calls for state
National Air Pollution Committee in 1955 to investig
recommendations regarding the steps to be taken and, ultimately, elimi
problem.[260] The committee was made up of numerous relevant go
representatives, the CSIR, provincial administrative represe
industrial representatives. After research, the committee re
smoke had become a major problem in residential areas. It r
be swiftly introduced for the effective prevention[261] and elimi
The Committee s main aim was the preparation of a draft bill large
by measures applied in England and the United States. The
various kinds of air pollution, including coal and asbestos
reflected an awareness of the environmental hazards not only for
working in mines and industries, but also for those in the vic[262]

Smoke was seen by the State as a local problem which cou
authorities. However, the Committee argued that the emission of gases and fum
myriad industrial processes was beyond the capacity of loca
be dealt with at a national level. The draft bill was presen
whose task it was to tackle the problem.[263] This committee was
unable to complete its work before parliament went into rece
a commission be formed to deal with the continued implemen
atmospheric pollution.

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[259] Ibid
[260] NASA, GES/1642/116/26/D Report of the Committee to Consider Measures for the Prevention
Bill
[261] Ibid
[262] Ibid
[263] Ibid

The newly formed Commission of Inquiry into the Air Pollution P
crucial in the debate around air pollution that would unfold over t
be small, and the process of implementation gradual, as it was
considered to have assumed such proportions as to justify the par
number of officials.[264] Most vocal in the deputation was Dr. E.C. Hall
scientist belonging to the National Physical Research Labo
included several notable members, including representatives
Railways, the City Council of Durban, the Department of
Government Mining Engineer. The inclusion of industrial rep
main polluters, on the Commission was significant. It seemingly ove
conflict of interest created by such a move. Nonetheless, th
recognition of the interests of industries, the mining indus
connection with the administration of this Act.[265] The result of creat
tremendous mistrust between state and civil society as the
the impression of protecting bad polluters from the public
about us.[266]

Nonetheless, the report defended this move. It saw joint di
industry to be the only way to avoid conflicting instructi
legislation.[267] After all, private industry was saddled with a burd
approval from several authorities when embarking upon ende[268]
The sphere of the prospective legislation was broad, affec
dealing with factories and mines, as well as the existing municip
legislation, the simultaneous enactment of different laws
instructions, often holding back any form of resolution. I
implement effective correlation between the different form

[264] Ibid.
[265] Ibid.
[266] Clarke, J.J. Our Fragile Land: South Africa's Environmental Crisis, Macmillan South Africa, Johannesburg, 1974, p. 47
[267] Ibid.
[268] NASA, GES/1642/116/26/D Response of the Commission of Inquiry into the Air Pollution P Bill

had a bearing on the operation of the Shannon Scheme and thus of industry[269]
and mining in the process of enacting legislation was thus a
important, part of dealing with the problem of air pollution.

In spite of the considerable evidence of water pollution as a r
little attempt was made to minimize the damage of water poll

Securing against the pollution of water supply: Model Areas

The Report of the Departmental Committee of Enquiry on the Bacteri
Chemical Pollution of Water Supplies had also granted speci
of wholesome water supplies.[270] The Committee was influenced by the
international interest in water quality, citing
bodies constituted in countries overseas for administerin
Prevention Act.[271] The purity of water supplies was generally r
major factor in public health and knowledge was seen as the com
obstacle to any policy implementation and the precaution
gathering grounds and wells from being polluted.[272]

Regional water boards were recommended in the report: the
see that undue pollution of water courses (was) not taking pl
under their respective control.[273] The report went on to argue that there w
be an appreciable increase in the next few years in the qua
required in this country.[274] The report challenged how this increase in
be met, and recognized that unfortunately many rivers and
flowing through industrial areas, (were) polluted.[275] The problem was

[269] Ibid
[270] NASA, GEN/2069/107/33 Provision of Wholesome Water Supplies, R
Committee of Enquiry on the Bacteriological and Chemical Pollution of W
[271] Ibid
[272] Ibid
[273] Ibid
[274] Ibid
[275] Ibid

acts related to water resource management between the 193
increased state control over water resources, culminating
1956 Water Act.[276] Not only did the Act give rise to the Water Affairs Department
but Section 23 of the Act empowered the Minister of Water
measures against pollution as a result of seepage or drain
mining operations have been carried on after closure.[277] The operation
The United Municipal Executive of South Africa argued that w
agriculture, industry, municipal use and mining such that
could take place.[278] The Minister of Irrigation argued that existing bodies like the
Natural Resources Development Council be used to impleme
policies, despite the fact that the structure was not original
This reflected a rapidly changing set of conservation and our
management, and that in future (i.e. post-1960) specific provision for important ai
balanced development in the domain of water. Nonetheless,
to conceive of the incompatibility of mining and precious land

Changing conceptions of the environment, 1945-1960

Someone once remarked to me that once the coal dust gets into your hai
It seems if you are born on a coal mine, or have lived and worked there for years
in the same vicinity.[279]

The first half of the 1950s saw unprecedented expansion i
region continued to produce approximately half of the nation
destined for both local and foreign markets. A new trend in coal stoc
amongst local consumers. These were geared towards prote
railway truck shortages, particularly over the winter months.

[276] Burns, M., Findlater, K., Funke, N., Hattingh, H., Nortje, K., Turton,
inequality, South Africa's environmental legacy, January 4, 2007, p. 2
[277] NASA, CT/103/116/26 Letter from Secretary for Health outlining views on Atmospheric
Prevention Bill by Collieries Committee of the Chamber of Mines, 1965
[278] NASA, TES/2743/10/188, September 27, 1956 Letter from Minister of E
the Director of the South African Union at the Annual Meeting of the Un
Executive of South Africa, February, 1957
[279] Dusty column, Coal Dust in my Hair, Witbank News, January 1, 1960

transportation network had put the coal supply so badly that by 1956 the s
embargo on coal export that lasted until last tariff increases. Despite t
local industry, no power station equipment was manufacture
thus still had to rely on foreign suppliers. With the constructio
Station near Kendal, Witbank coal now fed at least two pow
industrial complex.[280] This had a hugely disruptive effect on the bal
atmosphere.

Air pollution involved both aesthetic and chemical changes.
laced together by outlines of jutting cement stacks and black smoke
smoke. The proximity of these power stations to the town no
general environmental degradation compromised an already environm
Smoke was a definite concern amongst local residents, but
growing list of local problems related to coal mining and c
1948, the clout of the coal industry had been challenged by
racially oriented land policies. It retained strength in places
thousands of land plots were owned by mining companies. I
regulation and control, informal locations had amassed up
holdings, beyond the control of regional land policy makers.
out around a relatively uncontained urban sprawl, interspersed with
pristine grassland, residential development and industrial sit

Local authorities, tasked with removing these locations an
(Urban) Areas Act, had thus encountered numerous difficulti
farmers for whom private mine land already posed a threat. O
farmer, Sgd. H.J. Stevens, wrote his complaints to the Depa
Pretoria.[281] He was frustrated with the lack of regulation over mus
privately owned land. He implored the state to take action, ask

[280] During the 1950s, other power stations were built throughout the East
Hendrina, Arnot and Kriel. These were not all necessarily fed by Witban
associated collieries in the Vaal Triangle and Natal.
[281] NASA, Secretary of Native Affairs, 1/PTA, 1/1/1850, 178/1/971/H3 3/5/1, Open letter from H.J.
Stevens, Witbank, to Department of Native Affairs, Pretoria, December 8,

you have no control over it.[282] He went on to say that he had spent years trying to secure labou
to no avail. He could not compete with private landowners w
for accommodation on so-called private land as opposed to[283] farm land.
relative autonomy of the mining industry in terms of its dominating land
this case. Local authorities had little control over the use of
even less control over the use of the carboniferous wealth th

Undermined land continued to restrain development in an ex
was only further complicated by the implementation of Apartheid measures
migrancy to and from the labour district had invariably led t
African settlement, resulting in high mobility and insecure tenure
the implementation of the Group Areas Act, established the
separate burial sites for this marginalized group. By 1955, populous
Witbank town council was adamant that no more municipal la
deceased European employees of the Witbank Colliery.[284] The Witbank Colliery
and regional Native Affairs Department were thus jointly t
gloomy problem. Under strict regulations of racial separati
conform to the stipulated distance of 1000 yards from
dwellings.[285] To further complicate matters, the responsible parti
into account the ensuing problem of undermined land. It w
impossible to establish a burial site out of the subsidence
land holdings. Pollution was understood in racial terms, a
metaphor around white fears of being contaminated by Afri
living in the same ecologically polluted region.

The difficult experience of establishing the cemetery clearly demonstr
and deep inhumanity of racial separation in Witbank. It was
term effects of pillar robbing, which had destroyed the possi

[282] Ibid.
[283] Ibid.
[284] NASA, NTS/10034/606/408K C. Sowry, Manager, Witbank Colliery to
Cemetery Witbank Colliery Ltds, Witbank, 21 July 1955
[285] Ibid.

land earmarked for mining. By July, the Wolwekrans section of the cor
offered for burial purposes. It was situated on ground which
and under which no mining (would) take place.[286] The local District
Native Law wrote to the Chief Native Commissioner the follow
that one morgen of ground should be granted for every 1000
of estimated existence.[287] The required distance of 1000 yards
European dwelling could not be maintained. Both options for both the mu
and the coal company. Witbank Colliery's manager, G. Sowry
be waived. He argued that considerable difficulty would be
alternative site on ground which (was) not undermined, or li
future.[288] Eventually, a representative of the Health Board confi
that the chosen site was satisfactory from a health point of
detract from the amenities of the neighbourhood.[289] The scheme could thus
forward, was not in conflict with any town planning scheme or

The growing demand for graveyards reflected not only a high leve
industrial Witbank. The region had transformed into an in
burgeoning population. The environmental impact of intens
particularly coal consumption in the two power stations, was
of exacerbating conditions of the lung, particularly tubercul
the war ended, become a problem also considered later described as
product of economic conditions - poverty, malnutrition.[290]
has thus been termed a 'social disease' intrinsically linke[291]

[286] Ibid.
[287] NASA, NTS/10034/606/408/K Letter from Lambley, L.V.D.B., Director
Native Commissioner, Eu to Chief Native Commissioner, Subject: Cemetery, August 19, 1955
[288] NASA, NTS/10034/606/408/K G. Sowry, Colliery Manager, Witbank to Native Commissioner
September 30, 1955
[289] NASA, NTS/10034/606/408/K Secretary, Health Board to Native Commiss
undated
[290] Notes on Basis of Approach to Appeal, South African National Tuber
National Appeal, 1961, p. 6
[291] Tremblay, G.A. Historical statistics support a hypothesis linking tube
by coal, International Journal of Tuberculosis and Lung Disease 1997; 1(3): 272-278.

According to Tremblay, it is the disease most closely assoc[292]
In Witbank this related to the arrival of migrant labour seeking
employment in the coal mines and factories of the coalfield
taken precedence, giving no time for the development of h
services generally, increas(ing) the problems of its great[293] Witbank and
surrounding locations showed no exception in the presence o
Transvaal Tuberculosis Association, an early public health b
that there was almost complete lack of facilities for the treatment
(sic).[294] This began to change in 1952 with the establishment
National Tuberculosis Association (SANTA) as a result of t
in response to an appeal from the Commission of Inquiry[295] The formation of early
body was the culmination of a form of loose networks of vo
organizations around the country.[296] SANTA saw itself not only as a
public health organization, but as a social movement in t[297] Its main
practice, however, it mainly owed its origins to the work of
Tuberculosis Association.

The SANTA branch in Witbank was formed at a public meet
1955, with the election of Dr. H.J.E. Schultz as chairman. Its main goa
establishment of a SANTA clinic for Europeans in order to alleviate th
local TB problem.[298] Progress was slow. Initial efforts saw the loca
Witbank negotiating with the Witbank Municipal Estates, the Anglo Ame
Coal Corporation, to secure the compound buildings of their Scho
cooperation from the industry, a permit for occupation f

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[292] Ibid. The link between tuberculosis-based lung disease and specifically, atmospheric pollution, was not scientifically proven, but the prevalence of the disease in Witbank du arguing that carbon monoxide in lung macrophages from coal dust may combine with Mycobacterium tuberculosis, as well as the concept that a specific workplace pollutan the disease, ibid, p. 728

[293] Notes on Basis of Approach to Appeal, p. 6

[294] The TB Tamtam, Witbank, July 1960

[295] Notes on Basis of Approach to Appeal, p. 2

[296] Ibid.

[297] Ibid.

[298] H.J.E. Schultz Centre, Witbank, January 29, 1960

Department and the Land Tenure Board in 1957. A site was found in 1958 when the municipality of Witbank offered the south of the European hospital and a fresh application for a Gr made.[299] This permit was eventually granted, the first patients only admitted in November 1959. The new H.J.E. Schultz S brought comfort to many sufferers of tuberculosis, but it i suitability of the ground granted by the Emnorpic Municipality. The brown brick building complex could be found on the left drivin on the Ferro Metals Road. It was also adjacent to the barren & Delagoa Bay Colliery.

The hospital was a refuge for terminally ill patients, but this by its proximity to industry. Depending on weather conditi chemicals floated around the local atmosphere, often landin who could least afford it.[300] Soon became a popular (and cruel) people near the industries.[301] These areas were dubbed (sic) every night, after about six, seven o'clock.[302] Dust entering lungs infected by the tuberculosis was lethal. Nonetheless, the organization sought to change. The case of this hospice thus highlights the irrelatio pollution and tuberculosis, and begs the question of SANTA by severe malnutrition.

By the end of the decade, the problem had begun to infil local press. More information was provided about the dange wellbeing. In 1960, one local columnist wrote after a visit asking

ever seen anyone affected by carbon monoxide poisoning? The real danger lies in it being so difficult to detect, for the gas is colourless, tasteless an headache, weakness, paralysis of the nervous system, and slowing dow

[299] Ibid.
[300] Notes on discussion with Isaac Mampane, Witbank, Emalahleni, June 2,
[301] Ibid.
[302] Interview with Sarah Mashanang, Emalahleni, June 4, 2008

respiration& in spite of numerous warnings that are issued each winter, i
exact number of Europeans so perish through carbon monoxid[303]

The dangers of carbon monoxide were well known to industry insiders, and
workers, but it was only at this point that such discourse in
problem continued to grow with the increasing rate of coal
electricity had grown by 8 per cent per annum throughout t
showed no sign of slackening.[304] Eskom constructed the Komati Power St
point, situated midway between Middelburg, Witbank and Be
largest thermal station in Southern Africa at the time of
completed station consuming coal at the rate of 1.0 to 1.5 million tons
lower grade duff coal in the process of consumption, dump
throughout the district. Coal extraction retained a steady pace
of demand resulted in the heavy dumping of surplus duff c
requirement took place from December 1961, and continued a[305]

The low grade waste was prone to sporadic flaming. None of th
but the profusion of the dumps led to new concerns within
simultaneous growth of dumps and urban residence had the
perceptions of the dumps which had previously been taken
community. When children started using abandoned colli
community members began to complain. The abandoned sites
seeking uncontrolled ventilation in the disused shafts and unregulated c
particular instance of this was in the Outspan area of Wit
going down into the disused shafts and old workings of
Colliery in order to collect coal and play games like hide and seek :

[303] Dusty coal dust in Witbank, Jul 15, 1960
[304] Gray, RA, Report on the Republic
[305] New Komati Power Station, Witbank, June 23, 1961

The danger of these children being buried in a fall of earth or overco
Some of them join (ed) a couple of ladders together and descend (ed) i
slip from these ladders, there (was) no known way of saving them. [306] A result (would) b

The abandoned coal dumps had become crucial sources of e
providing fuel for warmth for residents of the enormous locat
distribution of domestic electrification. A new vocal group c
disaster by sealing off the shafts somehow before it (was) [307]

Both the coal industry and local municipality had, until
environmental effects of coal pollution, with even less attention giv
to the very real and physical dangers that existed at the su
soon started taking measures to reduce the underground pr
that only 23 197 tons of saleable duff coal were dumped in
tons in the previous year. [308] Nonetheless, by the 1960s, the cumulative
based pollution had irrefutably changed conceptions of th
environmental legacy. Despite the incidence of innumerable
Witbank, the most overwhelming claim against industrial complex
at this point regarded the proliferation of atmospheric pollut

State, science and the question of pollution: 1961

Can any person living in this fair country of ours imagine what it will lo
man s imagination has not the scope to undertake a project of such a [309] scale

Knowledge of atmospheric pollution, from coal and a host of
more pronounced during the 1960s. Many felt that there was
about air pollution because South Africa s climate still had
swallow up or dissipate the mess that man (under) had [310] On the

[306] Letter, Safety First Drive, Witbank News, August 18, 1961
[307] Ibid.
[308] Review by Mr. T. Reekie, Witbank Colliery, Witbank Chamber of Mines Annual Report, 1965
[309] Batteson, M.A., A Study in Contrasts, Winning high school entry in the Witbank Herald Essay Competition, November 13, 1960
[310] Cleansing Our Air, Witbank News, August 17, 1963

state had now recognized that action was needed unless auth
smog one day and have to spend millions[311] in reconstruction and industry in europ
generated in the 1950s with the appointment of a special comm
atmospheric pollution. The consequent formation of the Com
Atmospheric Pollution Prevention Bill (APPB) should have been a
committee of parliament unable to complete its work by the
session. Its work was largely driven by the work of the CSI
urgency for a technical investigation of certain scientific asp
Africa.[312] This national study would involve an assessment of
economic implications of the use of alternates to bituminous
of smoke production.[313] More particular to Witbank, the study would
question of the diffusion of pollution.[314] This would require significant invest
estimated £15 000 would be required in the first year. Fundi
CSIR, urban local authorities affected by pollution, and industry. It was felt, that
would be more equitable if the research was mostly funded[315]

International pressure to tackle the problem of atmospheri
formation of international groupings such as the World Health Org
Meeting of Experts on Air Pollution, the United Nations for
Smog (NANS) and the Congress of Nations for the fight
atmosphere caused by exhaust gases.[316] Emphasis was placed
the cumulative emission of pollutants, of which was merely one
Hence, the numerous meetings of the Commission of Inqui
around the relative gravity of particular sources of pollutio

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[311] Ibid
[312] NASA, GES/2420/359/38 Secretary of the Treasury to J.J. Due Pre L
(quoting the CSIR), 1960
[313] Ibid
[314] Ibid
[315] NASA, GES/2420/359/38 Letter of inquiry from the Honourable Secre
Vereeniging in the Transvaal (undisclosed recipient)
[316] NASA, Secretary of Foreign Affairs (1/4/1/3) 1991/107 Congress on the Pollution
Atmosphere , 1961 re: World Health Organisation (WHO) Meeting of Expe
15-21 October, 1963, July 10, 1963

variety of public constituents in debates thus illuminated th
often conflictual, conceptions of pollution.

Minutes of a meeting regarding Evidence from the Select C
APPB that took place on March 1961 was a meeting in this regard. Hallida
that air pollution mainly took the form of smoke, caused by
but mostly by the incomplete burning of coal.[317] He thus proposed that this fa
combustive process be engendered, the efficiency; sufficient ex
oxygen and high temperature would facilitate the full comb
remnant would be hot air, carbon dioxide and sulphur dioxi[318] According to
prominent CSIR scientist, the presence of smoke diffusion could thus be
on the basis of its blackness.[319] He argued a large amount of resear
demonstrated that the blackness of smoke (had) a direct re
materials going up the stack.[320] On this basis, Halliday defended the clause of
which gave local authorities the power to control smoke. Thes
laws would thus impose restrictions for the emission of sm
blackness for limited periods only.[321] He argued that such a specification that smoke cont
take place for limited periods reflected the weighty influenc
the legislation. Even this internationally renowned authori
control of pollution was forced to admit that total smoke prevention was
since any factory or furnace or boiler burning coal must, fro
removed and when this (was) done, you can no longer avoid the making[322] The proposed
of dark, undulating smoke in industrial processes was inexorable
confines of affordable technology. The Commission of Inquir

[317] NASA, GES/1642/116/26D Minutes of Evidence from the Select Commit
March 8, 1961
[318] Ibid. The fact that carbon emissions were not problematized as a major co
reflects a limited conception of atmospheric pollution and the relevant
[319] Ibid
[320] Ibid
[321] Ibid
[322] Ibid. E.C. Halliday was regarded as a renowned national authority on atmospheric pol
demonstrated in his 1963 appointment to the World Health Organization
Pollution on Environmental Health. See also NASA, BTS/79/107 Congr
Atmosphere, 1961-1962, August 18, 1963

the promulgation of the bill, control would be secured b
compulsion.[323] Most important was that atmospheric pollution cou
controlled in the selected areas & and that the cost of such
industry or the local authority.[324] This would necessitate the cooperatio
provincial and local authorities and various payers.

The work of the Commission of Inquiry into the APPB was gr
resolve the entire problem of atmospheric pollution. When,
Halliday was asked for his opinion on causes of cancer, having a
cause of cancer, his position here (was) similar to that of

The National Committee did not attempt to deal with it because it did not[325]

Halliday's response was certainly ambivalent in the drafting o
The drafting of the APPB was, in fact, complicated by stiff
span of legal recourse around pollution. It had remained
pollution made the most obvious move to atmospheric pollution. As en
Halliday, the scope of the Bill was thus limited to restriction
known technical remedy could be found. There was no doubt
was a main contributor to dropped the list of the 1948 Report of t
Committee of Enquiry on the Bacteriological and Chemical Po
but the scope of the problem of air pollution had expanded.

Two other main sources of atmospheric pollution were identified: vehicle exhaust
fumes from motor vehicles and dust from mine dumps. The
meetings of the Commission of Inquiry had brought these pr
growth of consciousness around the environmental degradatio
public health had already been revealed in the formation of
focused on tuberculosis, which was directly affected by at

[323] Cleansing Our Air, The Star, August 17, 1963
[324] Ibid
[325] NASA, GES/1642/116/26D Minutes of Evidence, March 8, 1961

revealing of responses to changing conceptions of pollution of
Anti-Diesel Pollution Society in Mayville, Natal[326] was organized
awareness of the dangers of diesel, specifically its relatio
organization was well represented at meetings of the Commission of Enquiry.
emphasized the very strong evidence that revealed that th
to health and argued that it was not good enough to pol
Africans had no choice but to breathe[327] the air around them. The organization that a
urgent adjustment to popular conceptions of pollution.[328] In addition, a pamphlet was
written by G.C. Myddelton entitled Diesel Fumes and Lung Cancer[329] against
the mainstream view still held that as long as the fumes were invisible
evidence connecting diesel fumes to lung cancer.[330] The pamphlet was written
response to a statement made by Dr. P.J. Lawther, Director
Council Group for Research on Atmospheric Pollution, in which he
many ill informed attempts to incriminate the diesel engine
not merit serious discussion.[331] Myddelton argued that the possible c
between diesel fumes and lung cancers contained in the (ed) se
Anti-Diesel Pollution Society was thus pivotal in reshaping
pollution was conceived.

New knowledge presented by this group included expanding
of air pollution which had previously been equated with smoke & which
obvious to the eye.[332] This association was thus revealed to be entire
all sorts of gases and vapours, many of them irritant and
invisible and existed in quantities as low as parts per million.[333] One set of carcinogenic chemical
constituents included the full variety of aromatic polycyclic hyd

[326] NASA, Town Clerk, Pretoria (MPA 971/4/7/3/69/D1/37/A) Formation of the Anti-Diesel Pollution Society in Mayville, Natal, undated
[327] Ibid
[328] Ibid
[329] NASA, MPA/1/4/7/3/69/D1/37/A Myddelton, G.C. Diesel Fumes & Lung
[330] Ibid
[331] Ibid
[332] Ibid
[333] Ibid

famous and notorious benzpyrene.[334] The measurement of benzpyrene w
fact, used as a guide to certain polycyclic hydrocarbon pollutio[335] At
this stage, the national incidence of lung cancer had risen
cause of the disease had been scientifically determined.[336] Nevertheless
possible factor should be investigated.[337] Mylroie was adamant that adherin
theory that there was only one cause was obscuring the fact
far more powerful, causes of lung cancer.

Conceptions of pollution had become far more complex and sophisticated
be central, but not singularly important, in the production
Numerous amenities of modern living, including the product
and motor vehicles, were now being connected to the in
carcinogens into the atmosphere. Despite the lack of definitive proof these rema
unregulated. Such questions certainly had the effect of
understanding of pollution and its dire repercussions. Despi
major source of pollution, with broad representation in the di
of Enquiry.

The Commission was riddled with opposing viewpoints on the
links to both environmental and health problems. Such tensions
others. Mr. R. Mitchell, the town engineer of the Springs M
outspoken about the dust problem.[338] He was critical of the fact that
dumps had not even warranted enough attention to undertake any considerations
being merely a nuisance.[339] Mitchell also considered the mine dump
dust was a local problem.[340] He unequivocally regarded this as a nati

[334] Ibid.
[335] Ibid.
[336] Ibid.
[337] Ibid.
[338] Springs had long been associated with gold mining. In fact, one common geolog
for the Witbank coalfield. With the coal mines and refineries.
[339] NASA, GES/1642/116/26D Minutes of meeting of the Commission of In
town engineer of the Municipality of Springs, April 19, 1961
[340] Ibid. Referring to mine dump dust as a local problem meant that mitiga
government authorities and civic organizations.

covering the Witwatersrand proper, the Western Transvaal, Eastern Transvaal, Springs to Kinross and part of the Free State.[341] This area did not fit the des of local. He went on to argue that there were more towns dust from slimes dams at present, than there were (when) towns.[342] These towns w situation was simply getting worse with time, and would cont degree that

> in 40 or 50 years it (would) probably be impossible to find towns that are not in the area forms of atmospheric pollution stops when the agency producing i reverse (was) rather true, because the real problem (was) created after a slimes dams and mine dumps steadily erode as the consolidation and weathering process the hard crust at the surface, so thick layers of dust become thicker and process although they may differ as to the composition of the material.[343]

Mitchell's description was certainly intended to encircling the town an of Witbank. He went a step further by arguing that this con problem than that created by slimes dams.[344] Dust was more intensive[345] and destru His message was urgent, in that there wa

> limit to the time within which rehabilitation should be completed after a mine is closed down Otherwise, who is to be held responsible for such measures after the m going to finance them?[346]

Mitchell's argument frustrated the core group of the Commi who were already tasked with a massive set of land-based concerns atmospheric pollution. Despite his renegade attitude and inc line when it came to the mining industry. He deferred t specifying that he did not want to be interpreted as being u

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[341] Ibid.
[342] Ibid.
[343] Ibid.
[344] Ibid.
[345] Ibid.
[346] Ibid.

companies[347] even defended the damage already done by the
that the pollution problem by 1960s had not been anticipated by them
had only started when dumps[348] were abandoned.

The Air Pollution Prevention Bill was approved by the Minis
1963. Copies were printed in both official languages and made available to individu
and organizations to give time for comments on the Commi
before the draft legislation was introduced to parliament. By
announced the promulgation of the Atmospheric Pollution Prevention Act (APPA). T
central objective was the control and amelioration of th
implications of air pollution.[349] The administrative powers of the APPA wo
in the Ministry of Health. Much of the work related to the Act was
of an engineering or a chemical engineering nature, or
combustion engineering.[350] To assist the Minister, a National Air Pollution Advisory Co
established to assist the Department of Health with technical
Act in effect empowered the Minister of Health to take action
by declaring any area to be a controlled site in terms of th

The human cost of mining industry

Nobody will deny that & the mines say you don't have to smoke in Witbank, y
outside and take a deep breath.[351]

The 1950s and 1960s saw tremendous changes in the way pol
social and scientific connections were being made and t
and health implications of ongoing uncontrolled atmospheric
affecting the health of the environment, with indelible impl
general-being of communities windswept by the pollutants
released in the process of industry. Often, these effect

[347] Ibid.
[348] Ibid.
[349] NASA, GES/1643/116/26E Point 1, Air Pollution Prevention Bill, House
[350] Ibid.
[351] Interview with Le Clus Taute, Goedehoop Colliery, Mpumalanga, June 5

Throughout the Witbank coalfield, this was felt in terms of t
of living of those nearby active or unrehabilitated underground mines, slag
dust-blown coal dumps and industrial sites.

Malcolm Suttill, an English engineer for whom Witbank had
through his recruitment by Anglo's subsidiary, Highveld Stee
his initial arrival in the area in mid 1968. His first winter was spe
compound accommodation made available for professional
permanently settle in the town. He vividly recalled the mis
black, gritty dust blown from the smoke stack of the Witbank pow
power station had closed by the time of his arrival,[352] but the
single quarters were quite close to it:

> in windy weather I mean the dust was absolutely horrible & and that continued fo
> lot of years before they seemed to get on top of it, or they grassed over and so most of i
> um & it was horrible, it used to blow all over the place &. I can remembe
> window blew in and seeing the wind blowing and then blowing this ash up as
> living anywhere near that thing at the time[353] & yes, that was bad.

Suttill and his family had joined a wave of English technic
settled in the town during this time. He recalled that they were
health of (their) children.[354] Young small children were more prone to
were not yet fully formed. Inhalation of excessive dust an
unhealthy for this age group. He recalled that-rhinitis and bronchitis, as
ailments were a bit of a[355] His understanding of the gravity of the
implications echoed E.C. Halliday's curious hesitation in
between pollution and lung disease. During one discussion, h
member of the Commission of Inquiry whether he thought t

[352] Interview with Malcolm Suttill, Witbank, June 3, 2008
[353] Ibid.
[354] Ibid.
[355] Ibid.

adversely affect(ed) health to such an extent as to justify t
for the control of industries. In response to this, Halliday had a

> the cautious attitude to adapt towards air pollution would be to say that
> health& generally, when a person is ill, pollution of the air will be one of the causes& but
> there is no doubt that air pollution restricts breathing, although less with[356]

Proclamations made by scientists and health experts were
research. In fact, research had been conducted outside of
occupational health, particularly in relation to environmental exposu
absolute knowledge had become significant in establishing
pollution and respiratory disease. Any level of doubt made it difficult
groups to isolate blame to any of the scheduled industries
mining. In May, 1965, Star published a letter from H. Nelson, a Medi
Health. This formed a cautionary discourse around pollut
ramifications. While he was aware of its possible effect on y
known about what effect it (could) have on the human body.[357] Nelson noted
observed by him were to prematurity and atelectasis of the lungs
unaware of polluted air being the cause of these conditions.[358] This lack of
air pollution was clearly linked to a lack of knowledge. Wit
medi-scientific proof of the relationship between air pollution
could be done, and Witbank continued to change, the effects of
of smoke exposure, and largely reliant on an industrial econ
population was forced to tolerate the unpleasantness of the
cited were Rand Carbide and Cyanamid. One of the complaint

> not about the smoke& we used to get what we called tomato rings on our hats& they were
> one thing. They were some of the products going into pharmaceuticals as well
> and nitrogen type products& and unburnt some of the early antibiotics&

[356] NASA, GES/1642/116/26D Minutes of Evidence from the Select Committ
Pollution Prevention Bill , March 8, 1961
[357] NASA, MPA/1/4/7/3/69/D1/37/A Letter from H. Nelson, Medical Officer
the Editor, Star, Johannesburg, May 12, 1965
[358] Ibid

were burning off some of their gas. It was a constant thing & that was really, really bad pollution & people wanted to move it was so bad and th all got it &.whenever the wind came in our direction that was horrible & to health (although) was affecting our standards of living.[359] (My italics)

The APPA set a new precedent for environmental regulati measure their levels of air pollution. However, smoke from a industry that needed to be halted. Pollution in Witbank cam The strength of the APPA was limited in dealing with the f would remain difficult to neglect the grumblings of residents complaining aesthetic and olfactory pollution of their air.

Conclusion

In the decades following the Second World War, broad shifts in approaches changed beyond recognition. Local and global experiences of the 1950s had raised awareness and fortified the call for res pollution and water conservation, as well as the implementat many instances, research involved mere fine-tuning of the apparatus as Witbank, which not only produced at least half of the nati majority of its conversion into electric power. Witbank als creating an amalgam of smells and effects which did not fit the pollution had been decisively conceived as something to b measures remained restricted by the economic and political and industrial priorities of the day. The following chapter evaluate promulgated in the mid 1960s was implemented, and how t within the existing industrialized ecology of the Witbank coalfi

[359] Interview with Malcolm Suttill, Witbank, June 3, 2008

Chapter Four

Adapting to change: conceptions of pollution in the Witbank coalfields, 1965-1978

Introduction

I am sure we can adapt to the dirt, pollution and noise & adapt that is the re[360]

By 1965, the steady expansion of heavy industry, particul
Highveld Steel and Vanadium in the town compounded environmental pr
town and surrounding veld land. After two decades of deb
mandate, the Atmospheric Pollution Prevention Act (APPA),
legislation on pollution, was passed. Monitoring the prevention o
became a competency of the mining department of the state,
the gravity-based pollution. As a result of growing internat
opening of Richard's Bay Coal and the introduction of open
methods, coal production had grown exponentially by the lat
no longer ignored by the economic growth made it impossible
Responses of government, civil society stakeholders to new
legislation such as the APPA and the amended Water Act
conceptions of pollution and highlighted the need for new w
This chapter addresses the new conceptions of pollution
and 1978, when the Witbank coal industry was swung in
successful implementation of opencast mining methods in the

Responding to the APPA: 1965-1968

The implementation of the APPA changed the nature of legal control
environment. Local and national authorities became regulato
air pollution. Disciplinary measures were set in place for

[360] Dubos, R. Mere Survival is Not Enough (Special Environmental Issue), 49, 3, A
1970

regulations. This included, on a first conviction, a fine not exceeding R200, o
term not exceeding six months. A second conviction resulte
R1000, or up to one year of imprisonment.[361] The Act thus recognized and reco
the liability of industry for pollution. Despite this breakthrou
its terms remained vague, reflecting certain difficulties in im

In terms of monitoring private industry, the Act placed the onus on t
of local authorities to control emissions, and punishments were rar
According to Sections 14(1) and (11) the Minister of Health
local authorities jurisdiction to control atmospheric pollution.[362] This would
include the right to enter premises and to inspect fuel burning ap[363]
Action against those causing smoke pollution could be taken at four
making use of powers without promulgating regulations; pro
regulations; promulgating the number of regulations and promulgating
regulations and establishing a smoke control zone.[364] Lack of clarity over defini
what level of pollution was reasonably practicable led to
various stakeholders.

In Witbank, the ability of the local authority to ameliorate smok
obstructed by the fact that power stations had been added
industries.[365] This meant that they came under the control of the
the locality. Smoke officials were thus required to report c
Officer who would then deal with the power station. This wa

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[361] NASA, Transvaal Council for the Development of Rural Areas - 1931 (TRB) 2/4/93
Circular (No. 9 of 1966) to all local authorities regarding the Atmospheric Pollut
Prevention Act of 1965, re: Standard Smoke Control Regulations, Augus
[362] Ibid.
[363] Ibid.
[364] NASA, TRB/2/4/93 Circular (No 21 of 1966) from Department of Health
Republic, re: Four Levels at which Local Authorities could operate Part
1966
[365] NASA, TRB/2/4/93 E.C. Hasselhay, Air Pollution Prevention, Walmer Town
10, 1967

local smoke official, supposedly relieving him of the burde
owners.[366]

The state was now responsible for the adequate implemen
prevention methods of scheduled industries. Understanding
by definitions laid out in the APPA relating to the definition o
industries subject to government control. The establishment
Advisory Committee was seen as a crucial component
implementation. Gradual implementation of the APPA was s
way of and to shifting environmental conditions. The impleme
thus guided by a principle of tiered application. Explainin
gentle process, E.C. Halliday argued that

> as time goes by the situation is going to get worse & you start ta
> advantage of the Act, you can do it gently; you don t have to be so seve
> had to control and try to reduce as much as the smoke concentration had
> worse, where you had to have a very much more violent reaction and be
> public.[367]

One of the first tasks of the newly formed National Air Poll
was to standardize maximum smoke density.[368] It was necessary to develop
prescribed instrument for measuring and comparing smo
standard.[369] Without this, any enforcement action would be b
opinion.[370] Critics challenged the methods used to measure the
on the imprecision of the method. The scientific basis fo
maximum smoke density was that smoke emissions could no
equal to or darker than the second shade on Ringelmann Ch[371]

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[366] Ibid
[367] Ibid
[368] NASA, MPA/1/4/7/3/69/D1/37/A Letter from Chief Traffic Officer to To
Pretoria, 1965
[369] Ibid
[370] Ibid
[371] NASA, TRB/2/4/93 Memorandum from Department of Health to All Local
in the Republic, re: How to determine the density of smoke , February 1

a number of rudimentary methods specifically developed to
emissions (were) excessive.[372] The chart was held in position by a fir
an appropriate distance from the second person, who acted
representing different shades of grey, would then be held
appear(ed) over the edge of the chart so that the observer (
of the smoke with that of the shades on the chart.[373] A second method used optical
instruments, and was known as the Ringelmann smoke chart.[374] The instrument
instrument was aimed at the top of the chimney or source.[375] The image would be s
then be adjusted so that the filters could be seen with an im
space beside them. This made it possible to compare the da
darkness of the smoke. Testing did not take into account sm
up or overhaul of a fuel burning appliance, or when there was any
disturbance of factory appliances. These diminished the ef
determining permitted maximum smoke density.[376]

The lack of general expertise in the field of smoke and gen
latent burden in the implementation of the APPA. In a 1966 nationa
Department of Health to all competent local authorities, the
being the lack of experience and even when the operator of the boile
unduly black smoke emissions was requested to comply, consider
often encountered within the factory.[377] The Department of Health th
recommended to local authorities that owing to a lack of te
action, such as sending a demand to the owner, (was) not likely[378]

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[372] Ibid. Other devices on the market during this time included the British
Safety Appliance Company's Smokescope. They were generally measured agains
which was regarded to have a high accuracy.
[373] Ibid.
[374] Ibid.
[375] Ibid. A monocular is a magnifying glass device for use through only one
[376] Ibid.
[377] Ibid.
[378] Ibid.

effect.[379] The owner, suddenly forced into a system of smoke co
unlikely to be equipped. The employment of a smoke control
authorist with more sophisticated industries.[380] This became as ind
authority had a right to say whether or not an industry could
siteif they allowed it they could cause their own s area of j
trouble.[381] Hence, additional technical staff with genuine exp
mitigation and prevention was highly recommended. Despite
policy of compromise and settlement, arguing that

> the important thing (was) it to get to the Court as you've failed. An Inspec
> who gets to that stage has lost his friend and may not allow him a big trouble. If
> persuade, push or encourage the industrialist to produce, or make production
> very much[382] better.

The APPA was thus not designed to make[383] a sudden change.
local authorities who were urged to get experience with sm
declare smoke control areas.[384] In Witbank, the void of environmental contr
in the town was made more explicit, as were the financial in
such controls. The difficulty of enforcing legislation was co
factors, including the[385] strength of the industry, South Africa s ongoing reli
a staple source of energy, and the scientific uncertainty a
practicable methods of pollution reduction.

The mandate of the Atmospheric Pollution Prevention Act of
certain industries designated as scheduled. One major criti
which it conceived industry: scheduled industry was gen

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[379] NASA, TRB/2/4/93 Circular (No 21 of 1966) from Department of Health
Republic, re: Four Levels at which Local Authorities could operate Part
1966
[380] Ibid
[381] NASA, TRB/2/4/93 EAC Heidelberg, Air Pollution Prevention, Walmer Town
1967
[382] Ibid
[383] Ibid
[384] Ibid
[385] Ibid

carrying out certain processes & most typically those which emit gases, vapours or grit (etc) m
certain amount of such prescriptions made monitoring and re
emissions difficult.[386]

Responsibility for air pollution from other sources, such as domestic chimneys, industrial premises, n
still fell upon local authorities to control domestic smoke
exhaust fumes. In a letter to the Parliamentary Secretary o
concerning the definition of noxious and offensive gases
Halliday argued that it was desirable only to include all the differ
health officials wish(ed) to put to the purposes of the APPA, the[387]
definition included a host of substances, when in gaseous fo
organic nitrogen compound, beryllium, chromium, mer
(and) dust from asbestos processes.[388] Prevention was understood in relati
best practicable means that could be taken to abate polluti

This policy had been successfully followed in South Africa, following useful precede
South Africa. Item 15 of Part 2 of the APPA declared that no
to be installed in or on any premises unless it was reaso
appliance could be operated without emitting dark smoke or sm
colour darker than may be prescribed by regulation.[389] Part IV regulated dust cont
whereby relevant authorities would take the prescribed ste
been prescribed) adopt the best practicable means for preventing such dus
becoming so dispersed or cast as to be a nuisance.[390] This section also applied to the heig
chimneys and smoke stacks, which were to be as far as
prevent smoke or any other product of combustion specified to be a
a nuisance to occupiers of premises in the vicinity.[391] From the wording of the legislation
practicable means ultimately meant demonstrating to the ins

[386] Ibid.
[387] NASA, GES/1639/116/26A, Halliday, E.C. General Physics Research La
Parliamentary Secretary, Department of Hea
[388] Ibid.
[389] NASA, GES/1643/116/26E Part II, Item 15, Control of Noxious or Offen
[390] NASA, GES/1643/116/26E Part IV, Dust Control, January 22, 1965
[391] Ibid.

of Health taking into consideration the local conditions and the company's financial position, to dictate pollution.[392] This also meant refining budgets to include the co fallout.

E.C. Halliday, a chief APPCA, officer, anticipated resistance from the over the added cost of controlling smoke pollution.[393] He argued that member the National Air Pollution Advisory Committee should not r industrial groups could exert the same degree of compulsion to supp constituency would thus be the duty of the members of the nati air pollution prevention task force to tackle resistance from them to any new regulations.[394]

Communication between state and industry representatives order to comply with new industry standards. These chall correspondence between the Department of Health and the C Chamber of Mines in June 1965, whose interest was founded provisions would have on the coal industry, particularly Witb

> the control of air pollution (was) recognized by all responsible persons same time, it present(ed) difficult problems which (could) best be solved of all interested parties.[395]

The Collieries Committee emphasized the importance of ongo the only indigenous source of fuel in the Republic, supplying 9 fuel needs.[396] Since most large industrial users were able to con combustion techniques, such users were not regarded as an [397]

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[392] Clarke, J., Fragile, p. 47
[393] NASA, CT/710/9 Memorandum (related to the application of the APPA), June 28,
[394] Ibid.
[395] NASA, CT/103/116/26 Letter from Secretary for Health outlining view Prevention Bill by Collieries Committee of the Chamber of Mines, 1965
[396] Ibid.
[397] Ibid.

The blame for ongoing smoke emissions was leveled at small and industrial c
most of all with domestic users, whose total combined coal c
tons, equal to around ten percent of the annual national tor
year.[398]

As a cheap fuel source, coal was popular for heat and energy in segrega
townships throughout South Africa. This included the locati
which would completely disappear under smoke during the
of the High Veld.[399] With almost no investment in infrastructural dev
locations, it was difficult for the state to enforce pollution
switch to electricity or gas, such that even local authorities[400]
This environmental racism was plainly accepted by the Act, rev
its scope. This meant that there was no nice solution for co[401]

Witbank in the pollution-1973me : 1971

In Witbank, energy was still the backbone of the town s local
APPA now required each municipality to monitor the burning of solid fuel sm
all Municipal undertakings placed pressure on the Witbank m[402]
assert control over Debates arose over whether it was possib
least supplement, coal consumption with an alternative s
financial burden was emphasized by the Collieries Committe

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[398] Ibid.
[399] NASA, TRB/2/4/93 Halliday, E.C. Address on Air Pollution Prevention, W
1967
[400] Ibid.
[401] Ibid. Reference to Bantu locations surrounding Witbank was based on t
the Bantu (Urban Areas) Consolidation Act of 1945, which had determined Witbank
the land situate(d) within the area of jurisdiction of the urban local auth
defined and set apart as a Bantu residential area. NASA, Bantu
BAO/3/544/A2/17/4/1/K20 Notice to Municipality of Witbank, signed by B
Bantu Administration and Education, re: Description of Bantu Residenti
14, 1967
[402] NASA, CT/103/116/26, Secretary for Health outlining views on Atmosp
Prevention Bill by Collieries Committee of the Chamber of Mines, 1965

It argued that the production cost of coal should be R4 per ton over a above the cost of the coal which the consumers in a minimum additional levy of R20 million[403] per annum. This would then place local reliance on thermal coal. The Committee felt that this would be cat local economy.

The use of anthracite, a hard, solid combustible fossil fuel South African Anthracite Producers Association. A pampl association after the APPA was passed, explored the benefit a harder version of coal. Compared to bituminous coal, anth impurities, making consumption more efficient. Anthracite making it necessary to refuel only every twelve hours. Anthracit upon & at whatever time during the day or night with carbon[404] The advocacy of coal with staples such as anthracite threatened the relative monopoly rapidly growing energy sector. The best way to maintain profits in Witban would be to develop mechanisms which enabled smokeless co[405]

Comparisons between the quality of South African coal and mor mature coal in the United Kingdom and Europe were common anthracite, mined from the Vryheid region of Northern Natal Dry Steam Coal.[406] Such parallels were not restricted to the qualit extended to popular perceptions of environmental dangers and hazards. and experience, the British industry had placed a lot more earlier, and Witbank s imported skilled personnel were u pollution.[407] This included hired officials of the local Highvel Vanadium factory. With its patented synthesis of iron an reinforced steel, Witbank s Highveld Steel and Vanadium wa

[403] Ibid
[404] NASA, CT/103/116/26 The Burning of Anthracite , a pamphlet produced Association, 1965,
[405] Ibid
[406] NASA, MPA/1/4/7/3/69 D1/37/A, Letter from chairman of SA Anthracite 12, 1965
[407] Interview with Malcolm Suttill, Witbank, June 3, 2008

candidate for environmental APPA. Employing hundreds by th
1960s, it represented a significant growth trend for local ind

The process at Highveld was unique: vanadium would be use
with the same stream.[408] As a subsidiary of Anglo American, Highveld was expected to
maintain international industry standards related to contro
company, there existed a bit of grumble & about looking afte
was never considered to pose a threat.[409] By 1967, however, interest in the
question of the significance of the Air Pollution Research Group (APRG) had
set up to support the implementation of the APPA. The cen
continued control and management of the fund was sought. This
meeting of the body in October of that year, where the CSIR
the basic budget of the Air Pollution Research Group in th
made to the CSIR. N. Stutterheim, CSIR, argued for the removal of the
on the fact that the group (was) now largely supported b
revenue.[410] A request was thus made to dissolve the Standi
Contributors to the Air Pollution Research Fund to the CSIR
The financial report of the Air Pollution Research Group (A
second quarter of 1967, specifically April until July, reflecte
of R4943, which was more than the contribution for R4943 f
APRG budget for 1967/68 projected more than R30 550 coming fr
contribution.[411] The CSIR argued for greater control over the work
case, the onus fell on them.[412][413]

Another active body was the Air Pollution Advisory Bureau, which held a confe
Johannesburg in February, 1968, to assist municipalities wit

[408] Ibid.
[409] Ibid.
[410] NASA, TRB/2/4/93 Notice of the 6th meeting of the Standing Committee of the Air Pollution Rese
Fund, October 26, 1967
[411] Ibid.
[412] Ibid.
[413] Ibid.

the APPA.[414] This featured a range of speakers, including the Me
from Johannesburg, the Environmental Sciences Library of the C
Mines, an economist from Wits University, industrial represe
Pollution Control Officers, and even a number of delega
municipalities.[415] The proceedings revealed shifting co
of the relationship between pollution and public health, the e
and to the consumer, as well as effective use of the APPA. I
in combustion and gas cleaning, as well as ways in which to establish a
industrial environmental control section. The seminar ended
to measure pollution, what levels of control to use, when a
controls, approving and enforcing effectively using smoke indicators
Ringelman.[416] Symposiums also targeted specific industries, in
August, 1968, for the South African Institute of Foundrymen.[417] This symposium focused on four ways
appropriately technically with the control of gaseous emissi
and steel foundries, assessment of dust and fume inside
evaluating the value of fabric filter dust collectors, as well
relation to dust. The initiative brought together speakers from
Research Group, under E.C. Halliday. Concerns over the rela
lung disease were presented by Dr. J. Webster, head of th
Research Unit.

Such visible interventions by the CSIR dramatically changed
pollution in Witbank was understood, but this did little to d
an APPA clearance certificate was nothing more than a lice
general shortcoming was that no set standards had been la
arbiter of whether a factory is applying the best practical

[414] NASA, MPA/1/4/7/3/69/D1/37/A Letter from S. Thomas, General Manage
Advisory Bureau, Johannesburg, to the Secretary for Health, Pretoria, Applicati
by Municipalities of the Atmospheric Pollution Prevention Act of 1965, F
[415] Ibid
[416] Ibid
[417] NASA, MPA/1/4/7/3/69/D1/37/A, National Institute of Foundrymen, Air Pol
Symposium, CSIR, Pretoria, August 1, 1968
[418] Clarke, J. Fragile Earth, 1974, p. 47

officer of the Industrial Hygiene Division[419] "Without adequate personnel
out standards, the credibility of these APPA was supposedly made
thumb decision by [420] "With merely five inspectors industrial 745
operating more than 1000 scheduled processes, it (was)
overwhelmed."[421] In addition, inspectors conceived of themselves as adv
foremost, (so) they tend(ed) to get pretty pally with pollute
their first names."[422]

Such shortcomings paved the way for an initiative from the civil po
sector, which was visibly active by 1968. By March an actio
establish an environmental organisation to fight agains
pollution. The chairman of the committee, J.L. Easterbrook
Clean Air Society would provide a forum for airing differ
controllers and could also ensure that industries, organ
general public were equipped to speak publicly on air pollution
be given to public thinking.[423] Although, the existence of environmenta
certainly did not mean that pollution would be seen as a priority
would, in fact, benefit industry, providing the implementation
air pollution control. The Clean Air Society would serve
government authorities and scheduled industries who feared
unfavourable attention be directed to their activities[424]

Opposition to the formation of such a group came from the
Pollution Research Group, who felt that the Clean Air Societ
such claims, Easterbrook argued that the society provided

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[419] Ibid
[420] Ibid
[421] Ibid
[422] Ibid
[423] NASA, MPA/1/4/7/3/69 D1/37/A Proposal for National Clean Air Associ
Clean Air Society, March 5, 1968
[424] Ibid
[425] Ibid
[426] NASA, TRB/2/4/93 Letter from J.L. Easterbrook, Chairman, Action Commi
Dr. J.S. De Leeuw, re: Proposed National Clean Air Association, undated

communication between stakeholders. Easterbrook referred problems of pollution, specifically the outlying residential z part of the local municipality. Here, local air pollution had concern. Clewer's natural water resources were already co water mine pollution of the Brugspruit stream before it en destined to the Loskop Dam. With the arrival of numerous fa district by the late 1960s, conditions of pollution in the area began to spiral.[427] Community representatives, namely the regional s Air Society, were adamant that grave measures should be a South Africa's Chief Medical Officer had even committed to pollution problem and to take measures to resolve the proble[428]

This pressure from the civil servants forced the Transvaal Board for the Develop Peri-urban Areas to investigate the issue. Upon closer inspec the major local polluter was Highveld Steel and Vanadium, northern side of Witbank industrial area. Its plants daily emitted smoke wh looked like red smoke.[429] The colour of the smoke was harm concerns over the poison gases contained in Highveld's sc blowing dangerous smoke and particulates into Clewer mea to regularly endure these conditions.[430] [431]

By 1968, the definition for noxious or offensive gas was ex South African Government in order to more clearly sketch out th smoke emitted from industrial sanctions.[432] The minor scientifically pr definitions included polycyclic hydrocarbons, smoke, grit a

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[427] NASA, TRB/2/4/93 Memorandum from Regional Secretary, Action Committee, Clean Air Pollution in Clewer, May 31, 1968 (Translated from Afrikaans)
[428] Ibid.
[429] Ibid.
[430] NASA, TRB/2/4/93 Letter from the Transvaal Board for the Development of Peri-Urban Areas to Witbank Town Council, June 7, 1968 (Translated from Afrikaans)
[431] Ibid.
[432] NASA, TRB/2/4/93 Extension of definition for noxious and offensive g 2117, July 5, 1968, p. 11

amended definition reflected the idea that not only visib
dangerous.[433] By October 1968, the Chief Medical Officer, who had
visited Highveld Steel and Vanadium the previous month, w
General Manager of Highveld[434] informed him that processes at Highv
been included under a second schedule of industries subje
APPA. He emphasized the need to more closely monitor carb
that in view of the particularly hazardous nature of this
possibly serve a useful purpose.[435] He also argued that high value of the
content of Highveld's ore, representing the whole world co
ago, there was a dire need for MCH to further[436] recommended
introduction of periodic vanadium estimation in view of em
of the element had not been established.[437] The MCH was also concerned with
Highveld managed its iron ore dust, saw as well as the way dis
controlled pollution when installations broke down. This allu
of red dust and smoke emitted during emergency shut-downs.[438] By
December, Highveld had restored its smoke prevention dev
begun to draw attention to the need for more civil particip
Witbank's local natural resources. These were leading comp
pollution, as well as growing awareness of poisonous gases
recognized as harmful to people and animals[439] with which the

The Clean Air Society continued to function during the 1970s, a
known as the National Association for Clean Air. This group
clean environment and public health, and even hosted a co

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[433] Ibid. The extended list defining noxious and offensive gas included fu
aluminium, magnesium, molybdenum, titanium, tungsten, selenium, potassiu
phosphorous and compounds, carbon monoxide, acetylene, benzene, a
polycyclic hydrocarbons, smoke, grit and dust.
[434] NASA, TRB 2/4/93 Report to Action Committee of the Clean Air Society, re: A
November 13, 1968
[435] NASA, TRB 2/4/93 Assistant Secretary Report to Action Committee of t
inspection of Highveld, December 6, 1968
[436] Ibid.
[437] Ibid.
[438] Ibid.
[439] Ibid.

entitled Smoke, the Citizen and Control[440] and aligned with organisations
the Institute for Public Health, whose first newsletter gave
industrial coal users regarding air pollution. The newslette
smoke-filled air (was) the cause of the lowering of the resistan
bronchitis and other chest ailments.[441] The newsletter advised domestic coa
replace the ordinary coal stove with a smokeless one, to u
heaters, and not to burn refuse.

Awareness campaigns drew attention to the plight of those
disease, including tuberculosis sufferers. The link between air poll
and lung disease had not been proven, clear indications that
aggravate(d) their symptoms and increase(d) the frequenc
attacks.[442] The belief that early childhood exposure to heavy a
contributed to a lowered respiratory capacity in adults meant that chi
Witbank suffered a greater risk of developing lung disease
in cleaner communities.[443]

The acknowledgement of the relationship between air pollution and lung disea
was no doubt alarming to members of the community. Already fa
evidence of the degradation of quality of air, the pollution o
too onerous to face.

[440] NASA, MPA/1/4/7/3/69 D1/37/A Symposium of the National Association
1972
[441] NASA, MPA/1/4/7/3/69 D1/37/A Newsletter of the Institute for Public Health, September 12, 19
[442] Pollution and your health , EPA, 1976
[443] Ibid

Silent spring: water pollution in Witbank

Like air, water was not limitless, nor free, nor somehow immune to the pollution of the environment.[444]

The recognition that pollution was not only based on what was conceptions of pollution, and, in many ways, sets out to it. The Department of Public Health continued to remind coal users that it is to be pollution attitude went beyond pollution from any specific source, and for responses to water pollution to focus on the effluents found in undertakings or produced as a result of mine water pollution reflected in the amendments made to the Water Act of 1965 t

The Water Act set in motion the new water pollution, and it amendment was enacted in 1961. It specified that anyone w undertaking had to advise the Secretary of Water Affairs of t purification of the waste or wastewater effluent would be produced[446] specified that water use for industrial purposes which, on gallons per day had to apply to the Minister for a permit.

By 1966 another amendment was made, mainly to facilitate the by local authorities regarding water rights. The Commissio Matters created the Water Research Commission (WRC) in 19 research. This had a profound effect on the way water pol exposed new knowledge about pollution which had previous out of the public domain.[447] One of its first research projects involved

[444] Ibid
[445] NASA, MPA/1/4/7/3/6 Vol 3 Letter from Institute for Public Health, September 12, 19
[446] NASA, TES/2743 10/188 Letter from S.S. Morris, Cape Town City Eng Town, re: Water Amendment Bill, 1969
[447] Turton, Awareness and mining policy: a study of strategies for transition 2009, received draft copy from author

human health implications from polluted the growing water supply. This
amendments in 1969, including a section giving consent to l
the rights to water from a public stream from an owner of
jurisdiction, subject to compensation to be paid.[448] It was anticipated that this chang
would help local authorities obtain water supplies. Section 2
amendment, which was soon promulgated as Act No. 77 of 1
of Water Affairs the right to take over those agricultural activ
polluted public or private waters.[449] These harsh terms of regulation u
reflected a considerable shift away from previous state
highlighted new influences affecting the control of water
multinational industry for trade and expansion within the mi
period of exponential growth in production and pollution in
growth would invariably have to be paid for in environmental terms, but not in a p
to resist this re-ordering of Witbank's economy on coal producti
idea that pollution was not something to be prevented, but
ideas were increasingly being met with resistance from a growing int
environmental movement which had, by then, drawn more att
pollution, including the existence of the greenhouse effect and
water acidification.

Local scientists and policy makers were not isolated from the glob
water pollution. Correspondence between departments sugge
awareness and keen interest in global environmental contro
scientific interventions in the mineral composition of water to
impurities.[450] South African research initiatives were lauded inter
African scientists participated in gatherings of the Internat

[448] NASA, TES/2743/10/188 Letter from S.S. Morris, Cape Town City Engi
Town, re: Water Amendment Bill, 1969
[449] Ibid
[450] One example included the February, 1978, Silver Institute Letter (Info
which outlined the attempt of Swiss scientists to electrolytically add a r
water&toxic to bacteria but harmless to human beings. See NASA, DCD 2415 27/2/3/7 Letter
Secretary for Commerce to Secretary for Planning and the Environment, r
as a water purifier, February, 1978

Pollution Research.[451] The work of the South African Water Resear
changed what water pollution research was about. The rhetoric of water pol
prevention did little to ameliorate the exploitative water strategy
management reflected a significant adaptation to a new reality o
and availability.

By the early 1970s, environmental concern had spilled over
Star. Cleaner Air, Rivers and Environment (CAIRE) was a campaign du
platform for a new legion of environmental journalists to dr
which the apartheid state had land, fenced in its creatures a
wild rivers. Environmental journalist John Jordi argued[452]

> it was a mass skirmish fought hardly & almost now we have emerged totally victorious. T
> be our trouble: our victory was too total. In places nature has capitulate
> streams; exhausted in the soil, become more silent.[453]

James Clarke, Star journalist, argued that even if one could m
wand to make the mine dumps disappear, including those of
beds were so impregnated with that it would not ask another cen
before the contaminated stain were removed.[454] Clarke referred to another phenomen
to water pollution which arises when, by a water source such as a dam o
to die because of oxygen starvation after algae have boosted, or
stimulated, by the fertilizing properties of certain pollutants.[455]

Debate around water pollution soon became one arena in which contentio
negotiations around mitigating atmospheric pollution. Val
environmental specialists during the 1970s as a top brain o
that there was now a very real danger of disturbing the

[451] NASA, URU/6123/1893 Letter from H. Edwards, Executive Director of the Prime Minister, r
Stander, vice president of the Water Research Committee, December 1, 1
[452] Jordi, The Star, 10 March, 1970
[453] Ibid.
[454] Clarke, J. Fragile Land, p. 62
[455] Ibid. p. 64

disastrous degree.[456] The term implied the perceived balance between
to pollute and nature's ability to purify.[457] This referred to the diminishing capa
environment to receive pollution and absorb it. Harsher me
major polluters were strongly advocated, leading to the ame
Water Act in 1974.[458]

South Africa's policy of separate development, specifically t
compromised this pollution equilibrium. Unless it was permit
Affairs, Clause 29 of the Water Act of 1956 stipulated that no to
(could) be established on riparian land unless it was permit
Affairs.[459] The definition of riparian land was not all that ea
definition was, in its plain language, according to the Act, referr
bordering a public stream.[460] Riparian land[461] was defined as a

> natural stream which flows and does not cease to flow in the channel is dry during any pe
> of the year and even if its course is only occasionally or periodically marked by water
> would, in fact, require expert knowledge to know whether a stream was a[462]

The Niemand Commission, created specifically for the purp
declaration of bills, was thus faced with the challenge of de
legal definitions. It opposed the amendment, which sough
applications pertaining to land bordered by a stream or wa
Water Affairs.[463] This would bog the decision making process, runnin

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[456] Ibid. p. 65
[457] Ibid.
[458] NASA, TES/2743/10/188 Amendment of Section 23 of Act 54 of 1956, 1975
Act 45 of 1972, Papers dealing with water research, 1974
[459] NASA, TES/2743/10/188 Letter from Mr. Collins, Town Clerk, Johannes
Municipal Executive, Pretoria, 1975
[460] Ibid.
[461] Riparian rights generally denote the legal rights of the land owner on
Water Amendment Bill of 1975, this applied to legal rights granted und
transfer, or state land.
[462] Ibid.
[463] Ibid.

the commission s mandate of speeding up[464] the transformation of the ma best way to make Section 23 work was to bring out a narr land.[465] This formed one of the reasons for the debates around accurately d resources in line with their capacity to withstand pollution.

Such contention resulted in the further amendment of the W purpose was specifically to further define and regulate the pollut water.[466] Only Clause 29, which dealt with the establishmen townships on riparian land likely to be inundated by pu comment.[467] In Witbank, the cost of developing sewerage systems and water flowing downstream from active and abandoned coal mining o the African population in townships dotting the coalfield. Lo would result in constant shortages and reduced quality of su

Debates around environmental legislation were thus conceiv principles fundamentally at odds with pollution prevention. S protection was determined by a policy of racial segregation and excl prejudiced those not classified as white by denying them a access to information around pollution and environmental admittedly given up the idea of ameliorating through the introduction access to services such as irrigation and electricity dem conception of what was then regarded as reasonably practic

[464] NASA, TES/2743/10/88 United Municipal Executive presentation on R on the Water Amendment Bill, 1974, February 12
[465] NASA, TES/2743/10/188 Letter from Mr. Cousins, Town Clerk, Johannesburg, to United Municipal Executive, Pretoria, 1975
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[467] NASA, TES/2743/10/88 Minutes from United Municipal Executive Minute Amendment Act 1975

The city of 1970-1978

&people are leaving this place because of this god damned people & this poll
killing[468]&

By 1970, the limitations of production were determined by the
depth of rock strata overlying the coal, as well as the thick
coal seam. Open cast mining had become a viable alternative
development of more efficient earth moving machinery[469]. The ability to reduce
waste of mounting coal dumps incurred by contemporary m
avoided[470]. This technical innovation was thus seen as being particu
South African coal[471]. The introduction of open cast mining in 1971
dynamic shift in the nature of production[472]. Open cast mining
was seen as the more effective and economical method of
was seen as ineffective: opencast required less engineering
The method involved the removal of large earth which removed t
surface, replacing and denuding fragile topsoil. The ecologic
extracting coal in this way were severe.

Variants of opencast mining methods had been in operation
method had first been employed in the 1940s, whereby strata
as far more convenient for removing thick seams of coal tra
the North American terrain. As methods developed, strip m
more employable; it was easier and more profitable to
1970s, a variety of techniques had been developed to suit
diverse coalfields[473]. World wide, method made liberal use of explosiv

[468] Interview with Kaizer Mabena, Thushanang, Emalahleni, June 4, 2008
[469] Opencast Coal Mining Practice in the UK, Review No. 1, 1965
[470] Ibid
[471] Ibid
[472] Ibid
[473] Mitchell, J.G. When Mountains Move, National Geographic, 2008, p.

seams. The reduced capital cost of strip mining attracted gold mining companies away from in engineering, and to exponential growth in the local market.

By 1976 the South African mining industry experienced mass engineering developments such as open cast mining, the construction of the Richards Bay Coal Terminal. Witbank coal demand was also revolution created by the Organization of Petroleum Export Countries (OPEC) embargo which had increased the price of oil from $3 a barrel to approximately $12 by the end of the decade.[474]

One early opencast mine included the R200 million Rietspruit operations in 1978. The success of monitoring and pollution evaluation local major polluters like Rand Carbide was driven by the expected growth of the coal industry within the first decade after the[475] Knowing the environmental impact of underground mining, conceived as somewhat safer, as the processes of strip mining place was considered to be easier. Topsoil and broken rock from on one side, and after the layer of coal was removed, the land way it was.[476] Companies would backfill the pits around the mines, so (could) see that there (was) little evidence of such.[477] The removal of topsoil and rocks broken from solid underground layers resulted in a trench which would Land would generally sink, leaving as evidence, a visible depression in the eventually, it filled up with water and overflowed, setting process of water acidification known as AMD.[479] AMD in turn damage the reduced pH level of water. When the underground water eventually seeps out of the mines, it leaches the soil, picking up mine

[474] Hudson, Michael S. To play the hegemon: fifty years of US policy toward the Middle East, Journal, 1996, p. 333
[475] Rand Carbide began to implement pollution control measures in 1974.
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[476] Interview with Mohammed Dindar, Kwachibikulu, Mpumalanga Lakes District, 3 March 2000
[477] Interview with Christelle Paul, Lake Chrissie, Mpumalanga Lakes District, 2 March 2000
[478] Interview with Malcolm Suttle, Witbank, 3 March 2000
[479] Interview with Mohammed Dindar, Kwachibikulu, Mpumalanga Lakes District, 3 March 2000

mercury. These particles, commonly known as total dissolved
to public health when ingested.

Both local and international capacity to adapt to pollution wa
the course of the 1970s. The broader impact of pollution on
be ignored. The strength of the environmentalist lobby wa
emergence of statutory bodies such as the EPA. This body u
disease to be the disease of the century and argued that e
become the most important ingredient in any industrial heal[480]
African organisations such as the South African Council for C
Pollution vilified the apathetic attitude of official dom, refl
between the state and civil society over environmental polic[481]
as something to which society could, and should, adapt, par
energy requirements. By 1978 the Secretary for Environme
argued that the cost of energy derived from fossil fuels woul[482]

Conclusion

Environmental conditions in the Witbank coalfield have stea
continue to do so, into the twenty-first century. However, conceptions of
pollution had changed dramatically by the early twentieth ce
the growing incidence of land decay and poor health. This ch
changes through making reference to Witbank, where stakeho
adapt to new regulations governing pollution. This included
industrial pollution control measures and the emergence of
which made recourse to the APPA to affect local change. De
to severe levels of pollution in the region, and prevention
pollution was obstructed by the continued economic centralit

[480] Pollution and Your Health , p. 1
[481] Why not put that dam over Natal?, David Nowsen, November 21, 1978
[482] NASA, DCD/2415/27/2/3/7 Letter from Environmental Planning and Energy
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Image 6: A resident of the Old Coronation Colliery informal settlement gathers coal from the ash heap of the abandoned Coronation Colliery outside Emalahleni, June 2, 2008

Image 7: Exposed mine adits and shafts of the Transvaal & Delagoa Bay Colliery, from the industrial complex border to the west of Witbank, June 2008

Postscript

Act local, think global: environmental justice in the Witbank coalfield

This thesis has placed changing perceptions of pollution in a local context. The narrative in 1978, the year in which opencast provided exponential opportunities to the local industry, resulting in previously u production, sales and resultant pollution have contin to gain momentum, is a testament to the levels of public concern. The study framework for understanding the complex and strained politi environmental justice and, more specifically, this postscript briefly explores some of the central politics specific to Witbank, further relevance of this town as a unique historical study. It is hoped that understanding of pollution in South Africa's energy politics.

Both local and global demand for coal had grown exponentially by the with seventeen separate active coalfields situated within t region had become South Africa's energy nucleus, contributi Richard's Bay's soaring figures, with 24.9 million ton coal expor million ton coal exports by 1981.[484] By 1981, Witbank's opencast Rietspruit already earned R300 million in foreign currency.[485] Open-cast mining entirely rep underground production. Pillar and bord techniques were refined efficient rates of extraction. In fact, by December, Witbank Colliery had sold its highest ever monthly tonnage, one million tons more than Richard's Bay.[486] However, the oil crisis of the 1970s had a lasting effect decade, they prompted new residential areas to abandoned mine exposure to unrestricted, and often dangerous, sites. In resp falling into burning pits close to dumps, efforts were mad

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[483] Witbank News, November 6, 1981, p. 25

[484] Chairman's statement, Witbank Collieries Ltd, Witbank News, November 20, 1981, p. 59. By 19 Witbank Colliery had become a subsidiary of the Barlow Rand Group.

[485] Rietspruit lets the money flow, Witbank News, November 11, 1981

[486] More than a million tons, Witbank News, November 11, 1981

Witbank town to come in the burning[487] This did not satisfy a growi
opposition of local residents, whose lives were increasingly overwhelmi
pollution.

By 1980 Witbank's pollution was reconceived[488] The issue with
understanding land-based pollution in proportionately high prevalen
diseases such as tuberculosis by the black working class&
economic sectors of the Witbank region.[489] Witbank have revealed
residents' attitudes to the full implications of pollution. It is seen
normal – living around it[490] Contributing to the health-implication
based pollution is the pervasive lack of services and educa
settlements near sites of past mining activity. The impact of
pollution in the Witbank district has demonstrated the dange
coal mining. By 2010, it is said that the quality of water flowing i
Witbank Dam would be fit for use in power generation. Water had to be pu
from the Komati and Usuthu Rivers.[491] With the Witbank coalfield,
numerous experimental rehabilitation projects have attem
underground and open workings, eliminating risk factors.[492] South
African scientists have predicted that the rising incidence
Witbank coalfield could take up to five hundred years to[493] Despite
predictions, it is impossible to tell what the exact impact wil
hits.[494]

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Image 8: Residents collect pieces of low-grade coal found along the ash heap of the old Coronation Colliery mine dump. Coal ash from the dump is visible in the foreground. Behind the dump, the edge of the old Coronation Colliery informal settlement can be seen over the subsiding ground on top of the collapsed, burning coal seam abandoned by the mining company. Residents of the settlement have been found to possess significant health risks for coal ash inhalation.

Conclusion

This thesis has focused on evolving understandings of Wit
commodity and source of energy to a-bdaesset dupo lMluatniocnu.rBey of
focusing on changing areas of pollution, the thesis has traced respo
conceptions by the State, local industry, the civil sector,
residents. It sought to answer the central question of how
understood in light of visible environmental damage, as well as s
these changes. The study has concluded that changes in u
influenced by the appearance of pollution, but this did little
framework of rapid and intensive urbanization.

Finding a comprehensive explanation for pollution remaine
producing this study. It was necessary to explore what wa
historical assessment of evolving pollution required some sen
existence. This study has revealed the relationship between
responses to, the pervasive presence of pollution from coal. The first chapt
demonstrated this by describing the early trade in the town,
early observations of coal's properties. Reference to early
has shown how coal pollution was conceived by law, and ho
influenced regulations, inspections and effluent. Archival refer
revealed limited conception of the destructive capacity of in
twentieth century. Reports of tests conducted to test the qua
reflected a superficial understanding of its chemical composition.
understanding reveal the way in which pollution was perceived, and la
extent, ignored. Where attention was given to pollution in e
imposed were ineffective, and rarely implemented. The first chapter pr
this early phase of coal, when the scale of coal production

that new signs of pollution drew further attention to the dest
fuel.

The establishment of Escom and Iscor, Witbank's role as the mid
militarization of South Africa, further marginalised existing
environmental damage. These industries facilitated the gro
Witbank, leading to unforeseen growth in the coal industry.
on the patterns of this growth, exploring the relationship b
energy production, particularly in stimulating the scale of
demonstrates the development of different perspectives
pollution within the context of a more developed industry.

With the diversification of industry in the Witbank region, co
with serious implications for the local ecosystem. The integrity o
mining sites was compromised by the unorthodox nature of
Second World War. Sound engineering principles and popula
methods were disregarded in the acceleration of industrial produc
shaped the way in which pollution came to be understood duri
war years. The most significant indication of these change
devoted by the state to the research of bacteriological and chemica

The third and fourth chapters reveal significant shifts in th
was associated with pollution. This was mainly as a result
pollution, production of land, and the indefatigability of underg
chapter provides a summary of internal debates around th
environmental changes as a result of ongoing coal mining a
of isolated areas where underground fires raged beneath the sun
surface did not pose a problem to the local authorities of W
economic activity, warranting attention by state or industry
levels of atmospheric pollution by the early 1950s throughou
difficult to ignore.

The second half of the twentieth century saw attempts bo
pollution. What became clear was the need for improved
phenomenon-based coal pollution. The third chapter thus describ
which conception-based coal pollution were brought into the rea
discourse through the work of E.H. Halliday and the CSIR
discussions on the APPA. Reference to documentation related
reveal how much more closely definitions of pollution wer
understandings of pollution, particularly the impact of coa
develops the overall argument of the thesis by reflecting how g
coal-based pollution resulted in growing concern from local res

The fourth chapter deals with responses to the promulgation of t
rapidly changing perceptions of environmental concerns. As South
environmental legislation directly tackling issues of pollutio
for renewed interest and alter-based perceptions. This had enor
ramifications for the way in which Witbank industry functioned. Lo
factories were now required to conform to environmental con
State, and also to introduce efforts geared towards envir
changed the way the coal industry approached pollution, but di
scale of growth experienced by the coal industry by the lat
evaluates the efficiency of regulations introduced with the A
continued growth in the scale of Witbank coal production. Wit
opencast mining, the scale of coal production grew exponen
developed conceptions of the environmental implications of
the already compromised Witbank environment.

This thesis has provided an historical analysis of changing
environmental impact. It thus contributes to the growing bod
change. Its value is emphasized by the continued importance of coal in South
staple source of energy, in spite of common knowledge o

implications. Recent claims that declining coal reserves ar
in South Africa reflect changes in the way coal has been un
natural resource.[495] Contemporary attitudes towards coal remain frau
with misrepresentation and prevarication. Processes of pol
study in South Africa, little is known about the full extent of
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