



CHAR PRODUCT OVERVIEW

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What is Char?

- Char is formed when coal is devolatilised at temperature in the absence of oxygen

Comparison between coal and char:

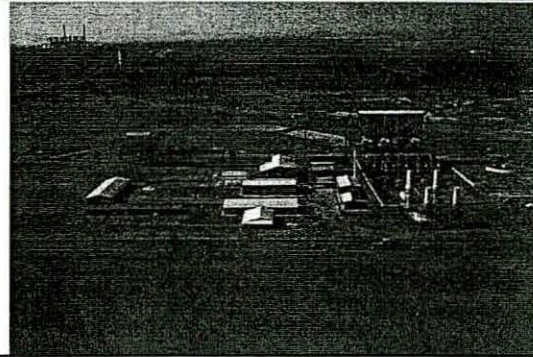
	COAL	CHAR
Fixed carbon	82.3%	84.2%
Ash	12.5%	14.4%
Volatiles	24.1%	1.3%



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CHAR PLANT

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CHAR PLANT – AS BUILT

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CHAR PLANT - OVERVIEW

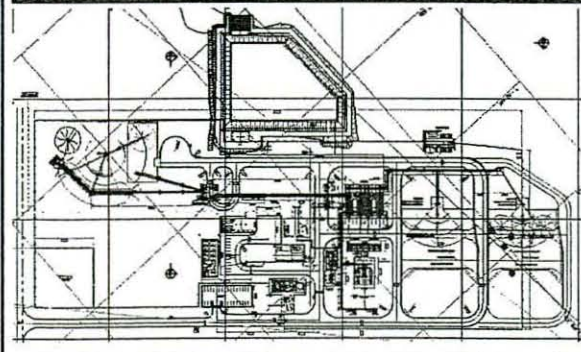
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- 4 Retort units commissioned between June and November 2009
- 140 ktpa Char production capacity
- Plant units:
 - Coal stockpile with plant feed conveyors
 - Product stockpile and handling area
 - Retorts with gas cleaning and cooling section
 - Tar storage and truck loading facility
 - Liquor destructor area with liquor buffer vessels
 - Excess gas flares
 - Utilities – Steam, Compressed Air, Diesel and LPG
 - Bunded areas for process and storage vessels
 - Pollution control dam
 - Non process buildings

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CHAR PLANT LAYOUT - 2007

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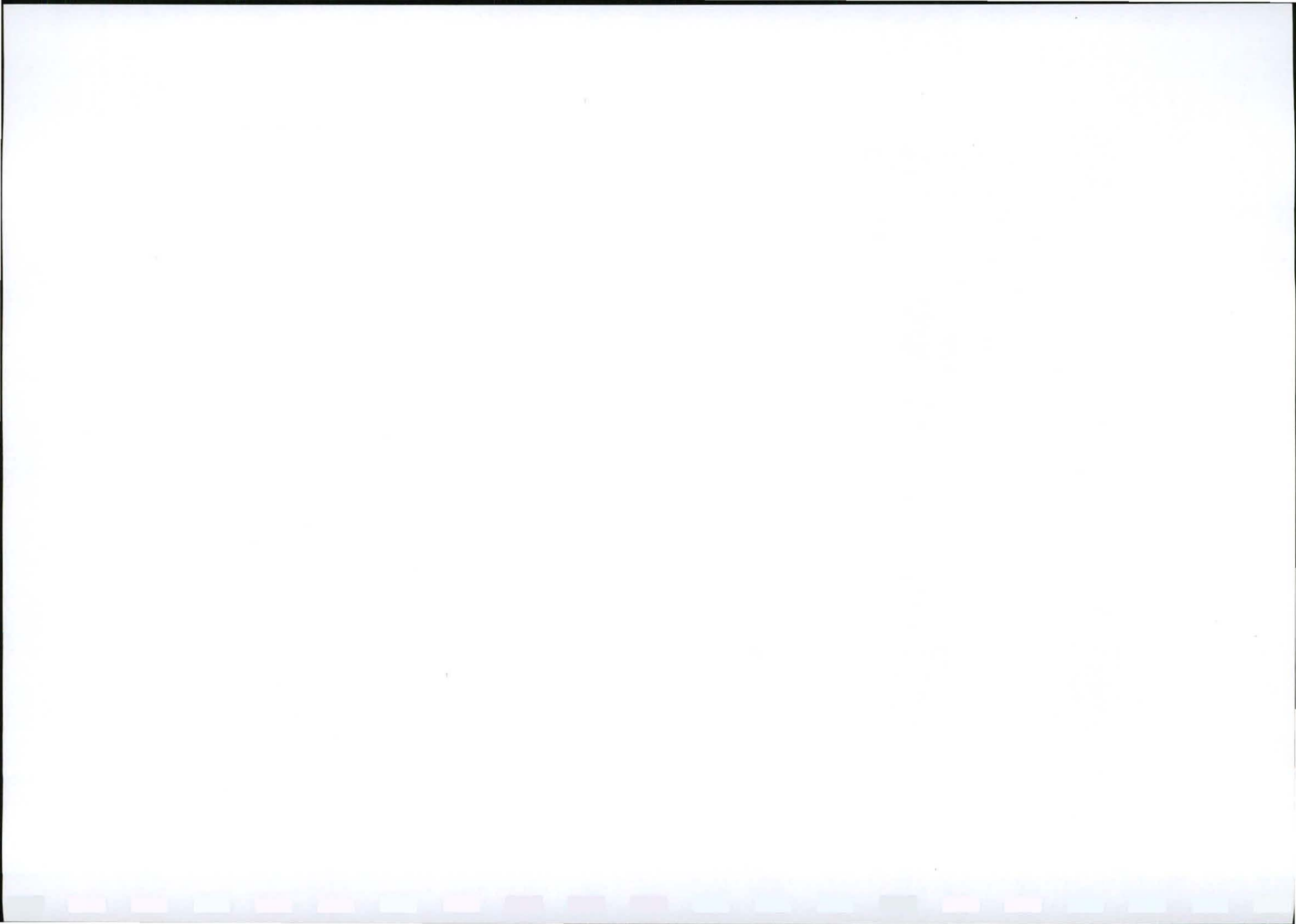
CHAR PROCESS

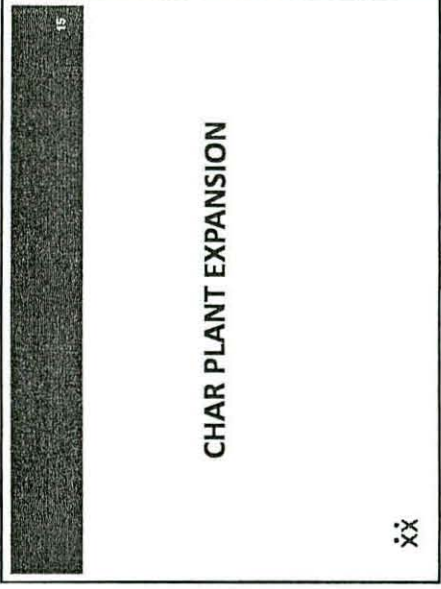
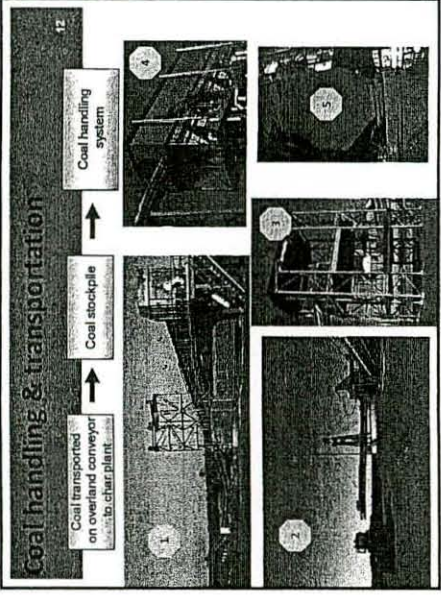
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CHAR PRODUCTION PROCESS

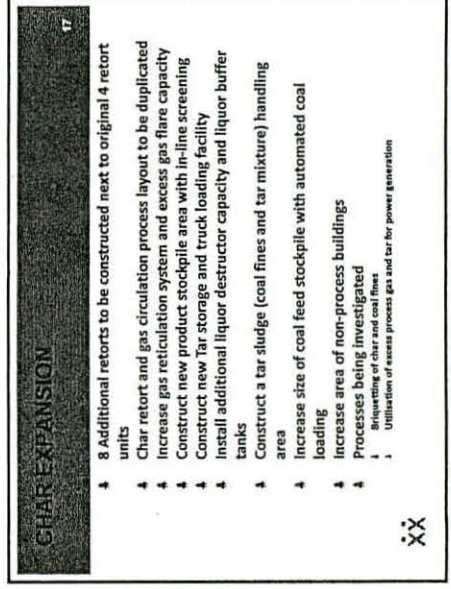
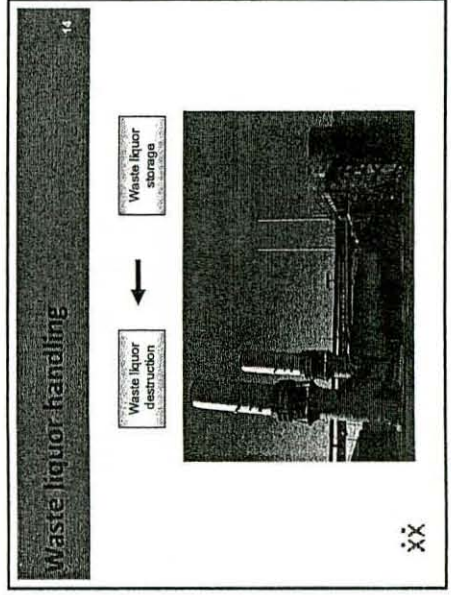
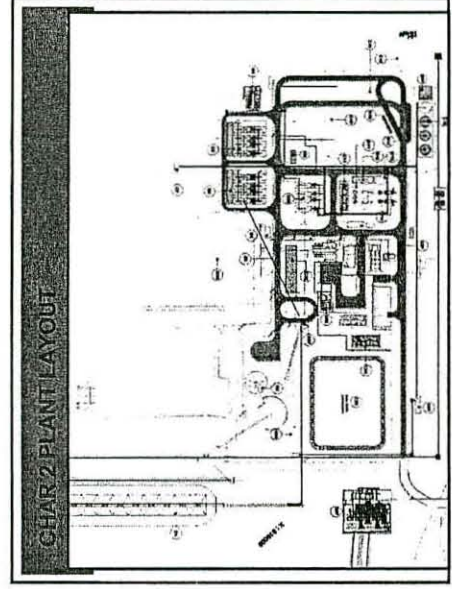
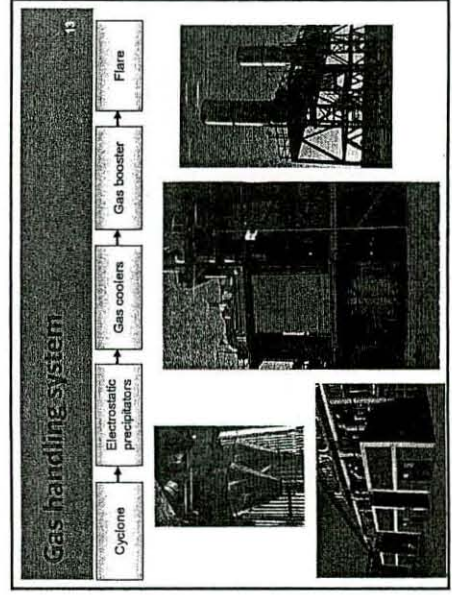
- Feedstock is washed, sized and free of fines limiting the potential for coal dust generation.
- Char process takes place in closed circuit
- Involves the recycling of gaseous heat in the absence of oxygen to maximize recovery of carbon
- Gas from the retort system is passed through electrostatic precipitators where tar and light oils are removed
- Water condensate (liquor) from the cooling systems and gas booster fans are disposed of by liquor destructor that oxidises the contaminants at high temperature
- Char product and tar is transported to the various clients by road transport
- Raw, potable and process water is supplied from the Grootegeluk mine through dedicated pipe lines
- Process water is used to quench the Char product leaving the retort.

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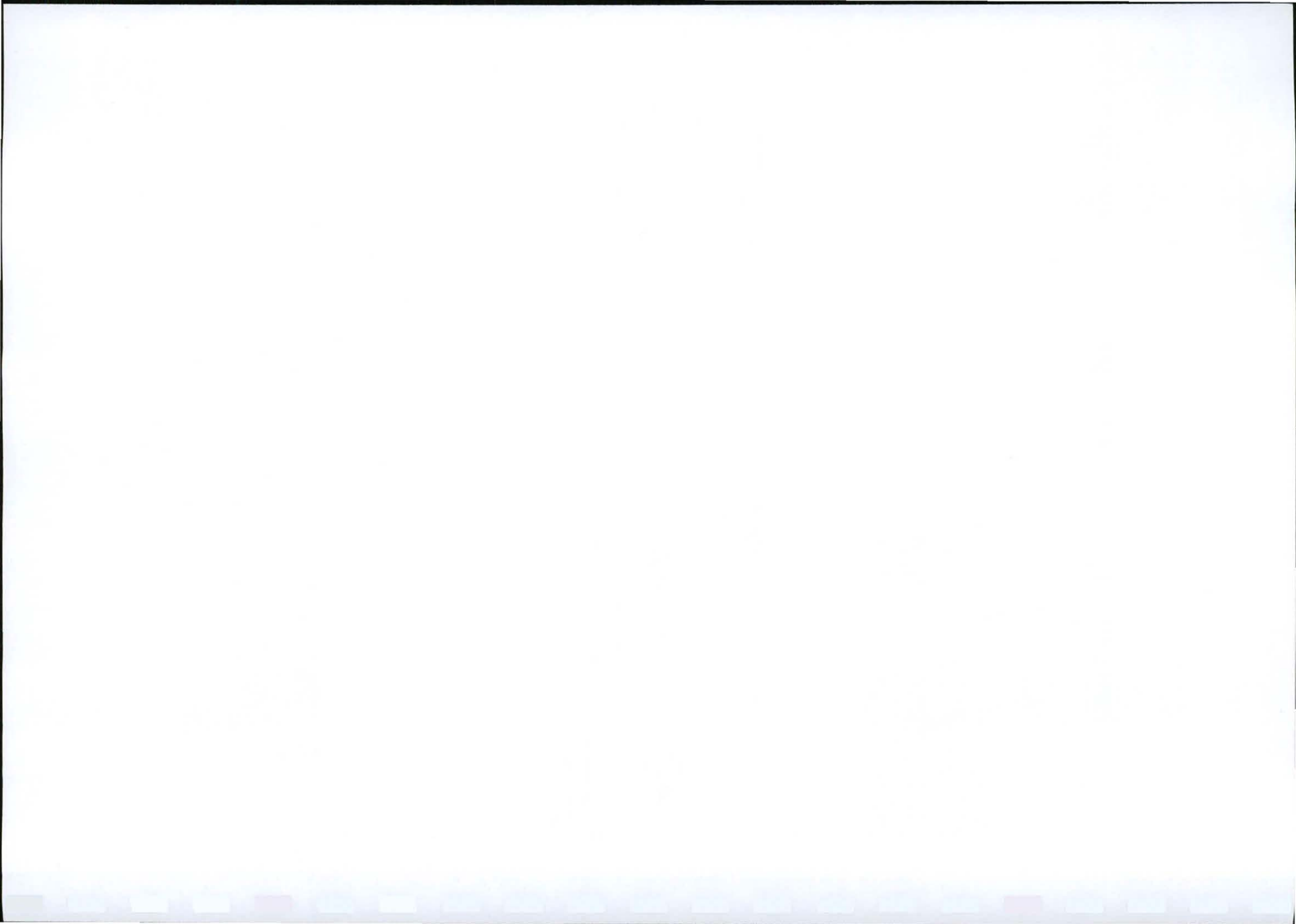


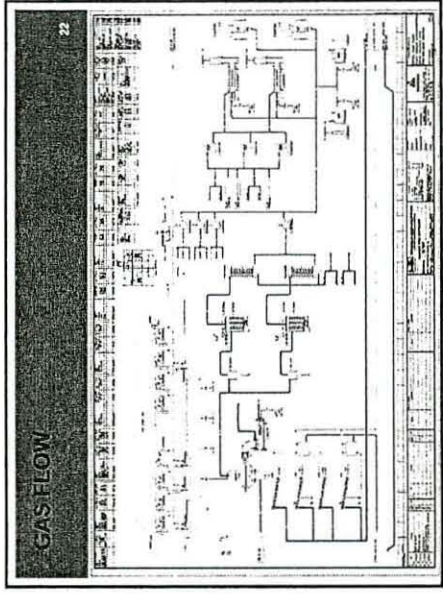
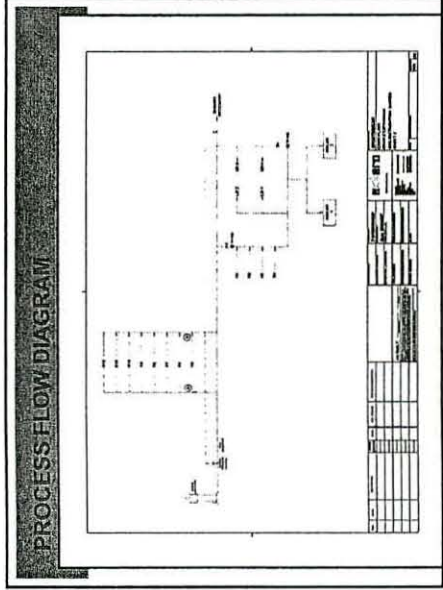
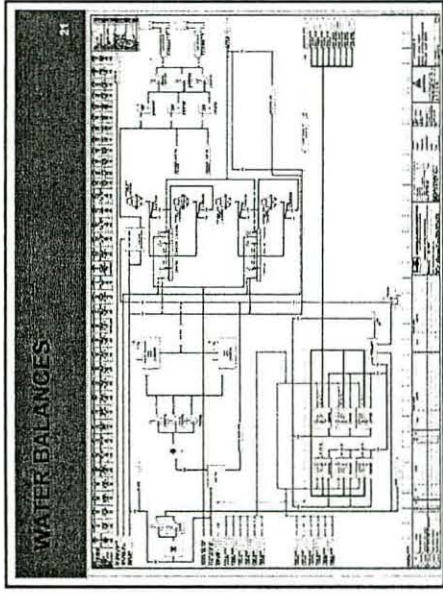
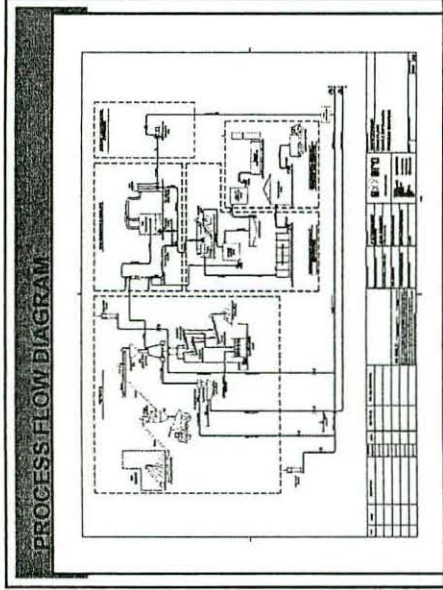
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QUESTIONS ?

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ENVIRONMENTAL QUANTIFICATION

APPROXIMATE EMISSION COMPARISON: kg/h

ITEM	DIESEL CAR	HAUL TRUCK	BOILER	RETORT
SO _x	0.25	3.8	280	84
HC	1.8	27	900	15
HC #/volume	4.5	65	320	12
CO ₂	3.5	54	1300	258
NO _x	8	65	550	63
Particulate matter	0	0.1	150	3
H ₂ O	1.5	15	350	480
TOTAL GASES (kg/h)	18	245	3530	455

One Retort = 2.1 Haul Trucks' emission = 8.5 Bakkies' emission ; Retort/Boiler = 1/33
 Process: Slow, Low temp, Low Oxygen versus Fast, High temp, Abundance of Oxygen

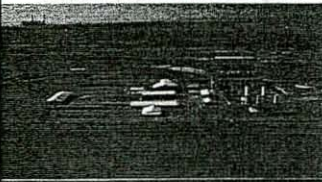
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Exxaro Resources: Char, Coke & Co-generation Plants

Proposed Expansion of the Char Plant and Construction of the Coke Manufacturing and Electricity Co-generation Plants

Environmental Impact Assessment, Environmental Management Programme (Amendment), Integrated Water Use License Application (Amendment), Waste Management License and Atmospheric Emissions License



Public Information Meeting
Date: 17th March 2011

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PURPOSE OF THE MEETING

- Discuss and explain the proposed projects
- Discuss the Environmental Legislative Processes
- Discuss the scope of supporting specialist studies
- Explain the Public Participation Process
- Provide Interested and Affected Parties with an opportunity to:
 - Ask questions
 - Raise issues and concerns
 - Be informed about the future phases of the project

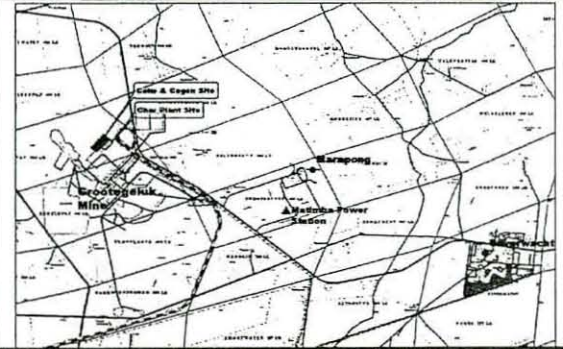
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AGENDA

- Welcome, introduction and apologies (Synergistics)
- Purpose of meeting (Synergistics)
- Project Description (EXXARO)
 - Char Plant Expansion
 - Coke Manufacturing Plant
 - Co-generation Plant
- Environmental Legislative Processes (Synergistics)
 - Environmental Legislation and Reports Required
 - Specialist Studies
 - Public Consultation Process
- Questions and Discussion (Synergistics)
- Way Forward and Closure (Synergistics)

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REGIONAL LOCALITY



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INTRODUCTION TO PROJECT TEAM

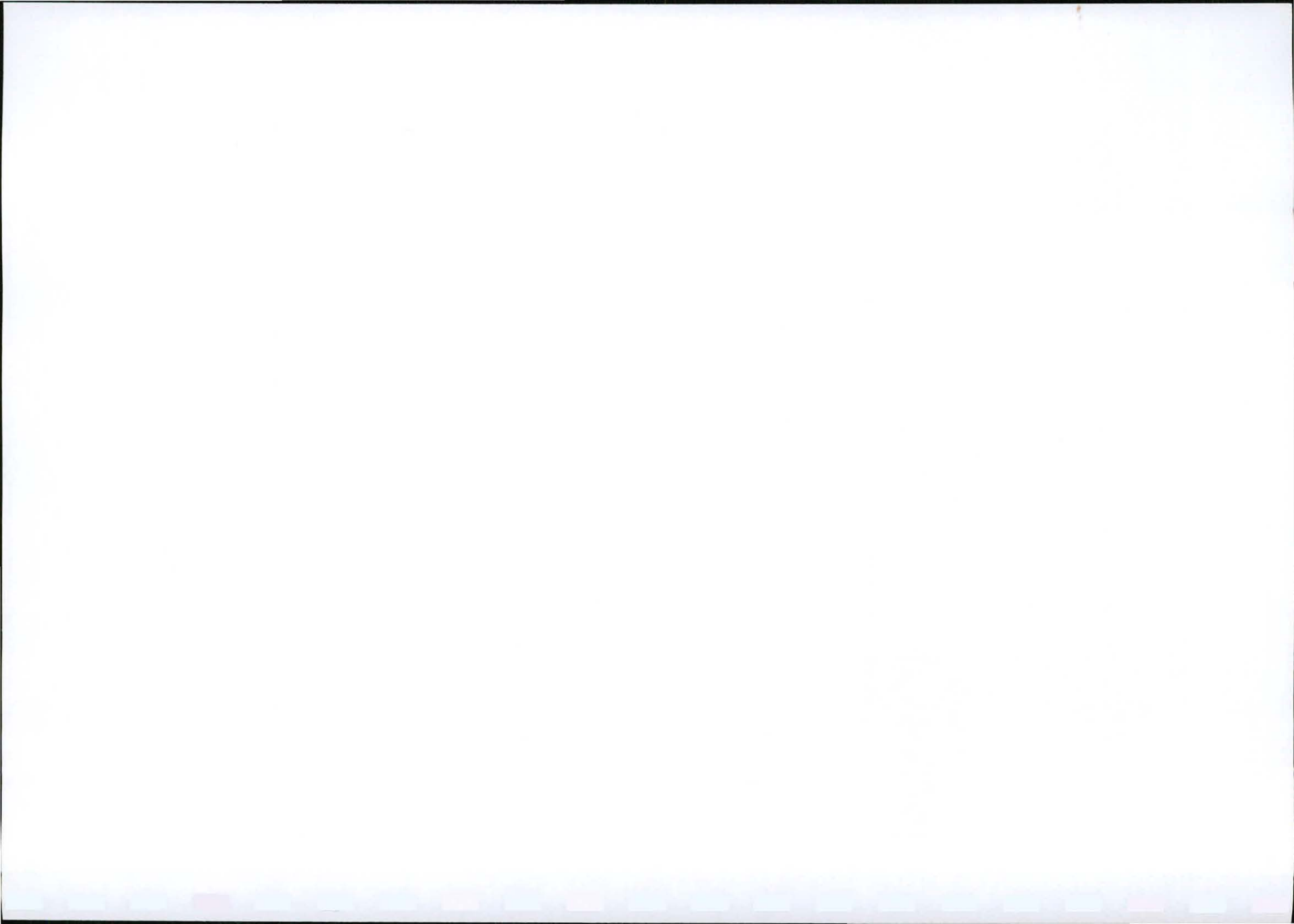
- Project Proponent
 - Exxaro Resources
 - Manager: Jaco van Dyk
 - Project Managers: Guillaume de Swart, Lomie Conradie & Gert Jansen van Rensburg
 - Exxaro Energy
 - Project Manager: Sachin Thakurpersad
 - Exxaro Environmental Specialist (Hydrologist)
 - Charles Linstrom
- Environmental Assessment Practitioner
 - Synergistics Environmental Services
 - Shelley Holt
 - Edwynn Louw
 - Mari Wolmarans (apologies)

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PROJECT DESCRIPTION

- Char Plant Expansion
- Coke Manufacturing Plant
- Co-generation Plant
(Exxaro presentation)

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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **Summary of Environmental Legislative Processes**
 - National Environmental Management Act (No. 107 of 1998). Prohibits the commencement of certain controlled activities without authorisation from a competent authority. An EIA or BA may be required.
 - Mineral and Petroleum Resources Development Act (No.28 of 2002). The Char, Coke & Co-gen Plants are situated on mining land within the boundaries of Grootegeluk Mine.
 - National Water Act (No. 36 of 1998) promotes sustainable water use and protection. Section 21 lists 11 controlled activities which may not be undertaken without a Water Use License.
 - National Environmental Management Waste Act (No. 59 of 2008) prohibits the undertaking of listed waste management activities without a license from a competent authority.
 - National Environmental Management Air Quality Act (No. 39 of 2004). Regulates air quality to protect the environment and prevent pollution.

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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **National Water Act (NWA) (No. 36 of 1998)**
 - Section 21 of the Act lists water uses which require an Integrated Water Use License Application (IWULA):
 - Section 21 (b) Storing water
 - Section 21(g) Disposing of waste in a manner which may detrimentally impact on a water resource
 - IWULA (amendment)
 - An amendment to the existing Grootegeluk Mine IWUL will be submitted to the Limpopo Department of Water Affairs (DWA) for decision.

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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **National Environmental Management Act (NEMA)**
 - GN 543 of June 2010 defines the process for an Environmental Impact Assessment (EIA) and a Basic Assessment (BA)
 - EIA
 - Public Participation
 - Scoping Report
 - Environmental Impact Assessment Report
 - Environmental Management Programme
 - BA
 - Public Participation
 - Basic Assessment Report
 - Environmental Management Programme
 - EIA and BA reports
 - Will be submitted to Limpopo Department of Economic Development, Environment and Tourism (LEDET) for decision.

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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **National Environmental Management: Air Quality Act (NEMAQA) (No. 39 of 2004)**
 - GN 248 of March 2010 lists activities which require an Atmospheric Emissions License (AEL). These activities include Char and Coke Manufacturing Plants.
 - AEL
 - An AEL application will be submitted to the Limpopo Department of Economic Development, Environment and Tourism (LEDET) for decision.

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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **Mineral And Petroleum Resources Development Act (MPRDA)**
 - The MPRDA requires an Environmental Management Programme (EMP) for activities on mining land which could impact the environment.
 - EMP
 - Public Participation
 - Scoping Report
 - Environmental Impact Assessment Report
 - Environmental Management Programme
 - EMP
 - Will be submitted to the Limpopo Department of Mineral Resources (DMR) for decision.

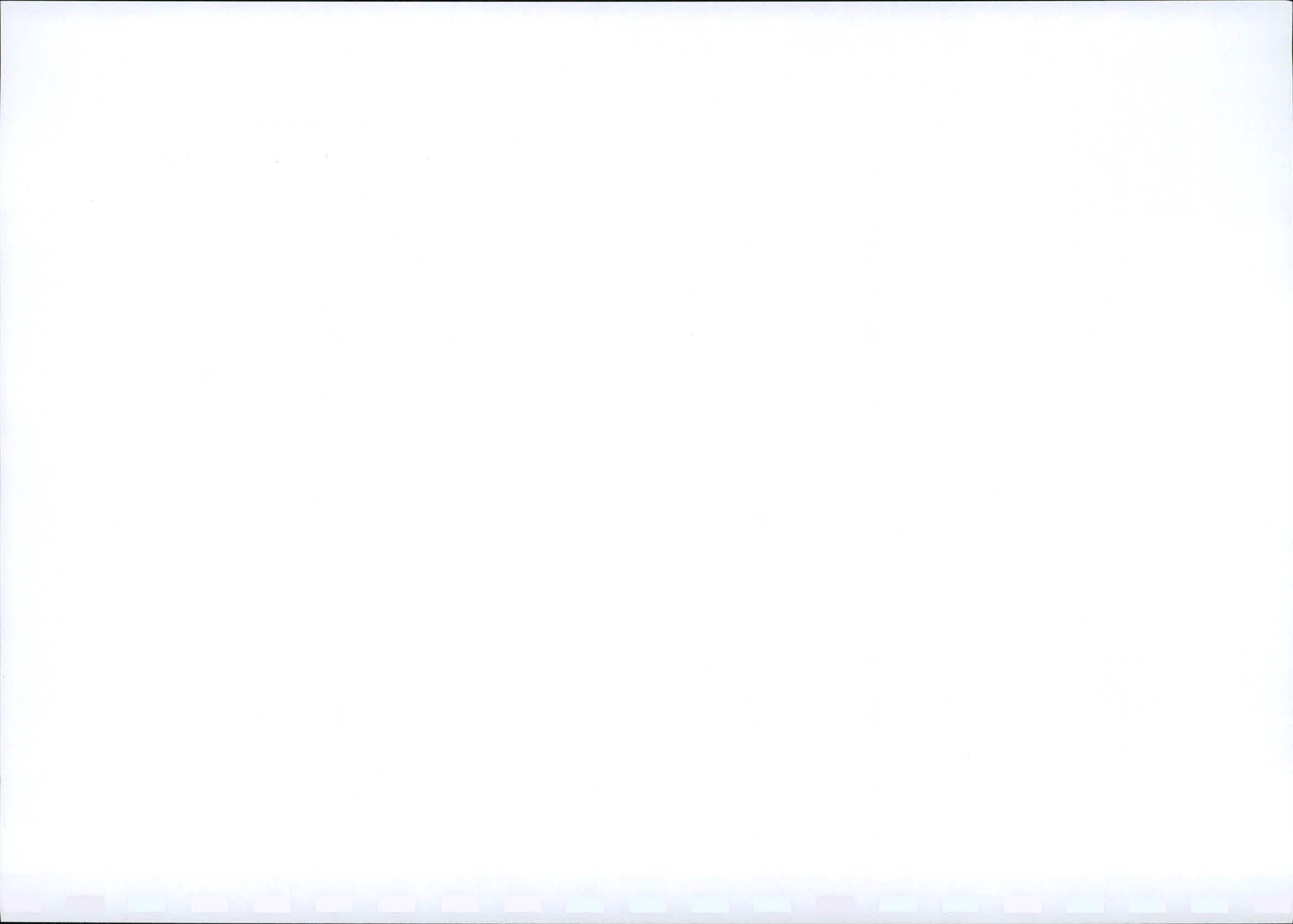
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POWERING POSSIBILITY

ENVIRONMENTAL LEGISLATIVE PROCESSES

- **National Environmental Management Waste Act (NEMWA)**
 - Process to be followed is the same as that of an EIA.
 - GN 718 of July 2009 lists activities which require a Waste Management License (WML):
 - Section 4 states that a WML is required for the storage or reuse of hazardous waste. The waste for the Char and Coke Plants will be classified by a waste specialist.
 - WML (incl. EIA) report
 - Public Participation
 - Scoping Report
 - Environmental Impact Assessment Report
 - Environmental Management Programme
 - WML
 - Submitted to the Waste Management Division of the National Department of Environmental Affairs (hazardous waste)

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- What are the key environmental sensitivities which require specialist studies:
 - Groundwater Impacts
 - Surface Water Impacts
 - Waste Streams produced at the Char Plant
 - Air Quality Impacts
 - Traffic Impacts

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- Surface Water
 - Information review and gap analysis
 - Water balance and salt balance
 - Surface water runoff and drainage components
 - Surface water impact assessment
 - Management and monitoring
 - Technical inputs into the IWULA

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- The following specialist studies will be undertaken in support of the EIA, EMP, Water Use License, Atmospheric Emissions License and Waste Management Licence Applications
 - Groundwater – ERM (Robel Gebrekristos and Hesma Cockrell)
 - Surface water – Jones and Wagener (Mike Palmer)
 - Waste Stream Analysis – Golder and Associates (Elize Herselman and Leon Bredenhann)
 - Air Quality – Airshed Planning Professionals (Gerrit Komelius). The AEL application will be compiled by Julius van Graan.
 - Traffic Impact Assessment – WSP (Rod Strong and Cornelia Hutchinson)

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- Waste Stream Analysis
 - Identification of waste streams at Char, Coke and Co-gen Plants
 - Assessment of waste streams
 - Legislative requirements
 - Impact assessment
 - Management and monitoring measures
 - Technical inputs into the WML

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- Groundwater
 - Information review and gap analysis
 - Hydrocensus
 - Borehole drilling
 - Groundwater samples
 - Hydro-chemical analysis
 - Conceptual groundwater model
 - Characteristics
 - Groundwater flow, rate and direction
 - Groundwater recharge
 - Groundwater impact assessment
 - Management measures and monitoring

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- Air Quality
 - Identification of atmospheric emissions
 - Identification of sensitive receptors
 - Simulation of
 - PM10 concentrations (fine dust particles)
 - Dust fallout
 - Evaluation of human health risks
 - Recommendations
 - Mitigation measures
 - Air quality monitoring programme
 - Technical inputs into the AEL

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exxaro **SPECIALIST STUDIES**

POWERING POSSIBILITY

- Traffic
 - Site inspection
 - Visual assessment of existing conditions
 - Sample traffic counts at selected intersections
 - Forecast future traffic conditions
 - Management measures to mitigate potential impacts

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exxaro **DISCUSSION AND QUESTIONS**

POWERING POSSIBILITY

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exxaro **PUBLIC PARTICIPATION**

POWERING POSSIBILITY

- Public consultation process involves:
 - Informing IAPs about the project
 - Provide opportunity for IAPs to comment
 - Maintain a register of IAPs and comments
 - Provide an opportunity for IAPs to review and comment on all reports
 - IAP comments must be included in reports submitted to authorities

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exxaro **CONTACTS**

POWERING POSSIBILITY

ENVIRONMENTAL CONSULTANTS:
 Synergistics Environmental Services:
 Mari Wolmarans and Shelley Holt

Tel: 011 807 8225 Fax: 011 807 8226

PO Box 1822, Rivonia, 2128

Email: shelly@synergistics.co.za

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exxaro **WAY FORWARD**

POWERING POSSIBILITY

- Written comments from IAPs
- Scoping Report(s) for public review
- Draft IWULA Amendment Report for public review
- Submission of Scoping Report(s) and Draft IWULA Report to authorities
- Engineering designs to be completed
- Specialist studies to be completed
- IAPs to review final reports before submission
- Final EIA, EMP, IWULA, Atmospheric Emissions License and Waste Management License submission to authorities for approval

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MINUTES OF MEETING



Project: Exxaro Projects: Grootegeluk Char Plant Expansion, and Coke and Co-gen Plant

Meeting: Authority Meeting

Date & Venue: 16 March, 2011
DWA (Polokwane)

Compiled by: Edwynn Louw and Shelley Holt
Synergistics Environmental Services

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
84 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1156, Fax: 085 552 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 343 4842
15 Quamy Road, Hilton, 3201

ATTENDANCE:

Name	Telephone	Email
Edwynn Louw	011 807 8225	edwynn@synergistics.co.za
Shelley Holt (SH)	011 807 8225	shelley@synergistics.co.za
Msimanga M.	015 290 1200	msimangam@dwa.gov.za
Sengani V. B (VBS)	083 732 7629	senganib@dwa.gov.za
Mahlatji Malegodi (MM)	015 290 1269	mahlatjim@dwa.gov.za
M. A. Plaskitt (MP)	012 307 7410	mike.plaskitt@exxaro.com
Malusi Buthelezi	012 307 3174	malusi.buthelezi@exxaro.com
Charles Linstrom (CL)	012 307 4100	charles.linstrom@exxaro.com

MINUTES:

SH: Provided the DWA with copies of the background information document. Provided an introduction and agenda.

CL: Description of location on map.

CL: We are applying for section 21 G and B water use license.

MP: Char, coke and cogeneration plants process explanation.

Question/Issue Raised:	Answer:
V.B. Sengani – DWA (VBS): Will the level of CO ₂ released be minimal?	Mike Plaskitt – Exxaro (MP): Yes, much less than a normal coal boiler stack. In our case, only 15% of coal (volatiles) is burnt off, therefore we burn one sixth of the amount of a normal boiler. Thus we have cleaner stacks.
VBS: What is the potential for acid rain from SO ₂ .	MP: We will design the plant to minimise SO ₂ and CO ₂ . We will

	<p>comply with regulations.</p> <p>Shelley Holt - Synergistics (SH): We are applying for an AEL.</p>
<p>Charles Linstrom – Exxaro (CL): We will apply for a WULA under section 21 G and B of the NWA. We have a surface water specialist and a groundwater specialist, whose data we will use in the application. We will also update the Integrated Water and Waste Management Plan (IWWMP) for the mine.</p>	
<p>VBS: Can we see a presentation of the results of the surface and groundwater monitoring?</p>	<p>CL: Yes, however we are in the early stages. We can give you the results at a later stage.</p>
<p>MP: Waste water dams will also be constructed.</p>	<p>CL: Does DWA still require a 2 mm HDPE lining on the pollution control dams? Animals at our plant damage the HDPE lining. We may need to make a concrete lining.</p> <p>MM: Give us different 3 options for dam lining and we will recommend the most appropriate one.</p>
<p>VBS: Will there only be section 21 G and B applications?</p>	<p>MP: Regarding section 21 A, the Grootegeluk Mine has a current allocation from the Mokolo and Crocodile Water Augmentation Project (MCWAP).</p>
<p>CL: Does dust suppression fall under section 21 G?</p>	<p>VBS: It is still a section 21 E activity.</p> <p>MP: Some dust may occur, but not large amounts. No crushing or screening takes place at the Char plant.</p>
<p>CL: Under the stockpile areas, what must we use to mitigate groundwater pollution from the stockpiles? We will also ask the groundwater specialist to recommend suitable measures.</p>	<p>VBS: Concrete. The leaching of sulphates, can affect the ground water. We will check the application and whether the mitigation measures will reduce/prevent impacts.</p>
<p>MM: Will you factor in the water balance and salt balance?</p>	<p>CL: The water balance will dictate stormwater constraints, thus we may need to expand the pollution control dam, and ensure that it can withstand a 1:50 year flood. The water specialists will come up with a water monitoring programme.</p> <p>MP: The water specialist's water balance will ensure we recycle as much water as possible and that we have enough water.</p>
<p>MM: There have been issues with the public regarding water in the area, so please include water issues in the public participation.</p>	<p>CL: Water issues will be included in public participation from the start.</p>

**CHAR, COKE AND CO-GEN PROJECTS
AT GROOTEGELUK MINE, LEPHALALE**

AUTHORITIES MEETING WITH DWA



Date: Wed 16 March 2011
Time: 14H30 – 16H00
Venue: DWA Office, Polokwane

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
64 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1156, Fax: 086 562 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

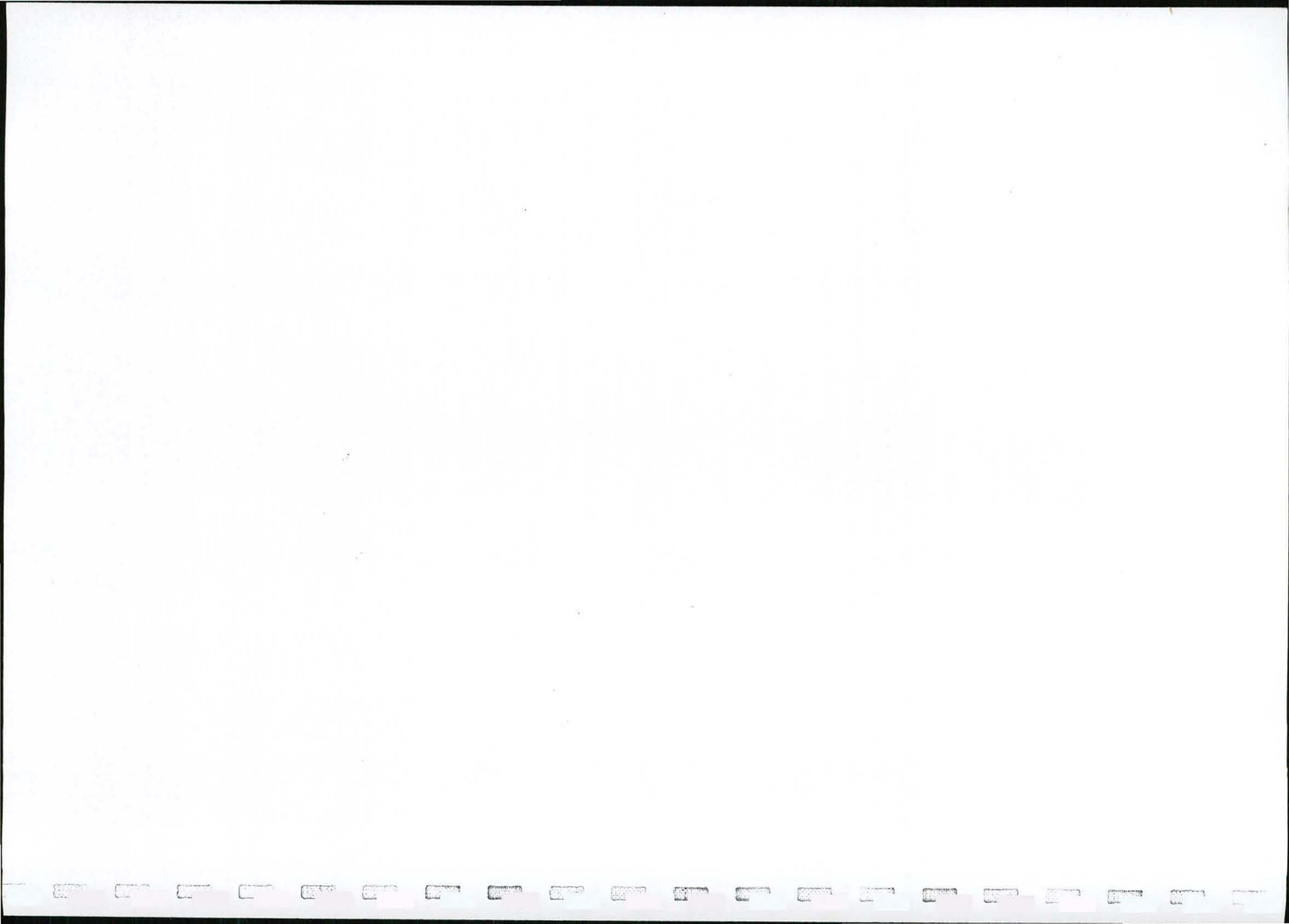
KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quarry Road, Hilton, 3201

AGENDA

1. INTRODUCTION AND PURPOSE OF THE MEETING
2. BRIEF PROJECT DESCRIPTIONS
 - 2.1 Char Plant Expansion
 - 2.2 Coke Manufacturing Plant
 - 2.3 Co-generation Plant
3. WATER USE LICENCE AMENDMENT APPLICATION
 - 3.1 Application Process and Reports to be Compiled
 - 3.2 Specialist Studies
 - 3.3 Public Consultation Process
4. QUESTIONS AND DISCUSSION
5. WAY FORWARD
6. CONCLUSION



Directors: KC Fairley, ME Wolmarans & MG Hemming
Synergistics Environmental Services (Pty) Ltd
South Africa Registered No. 2003/030216/07

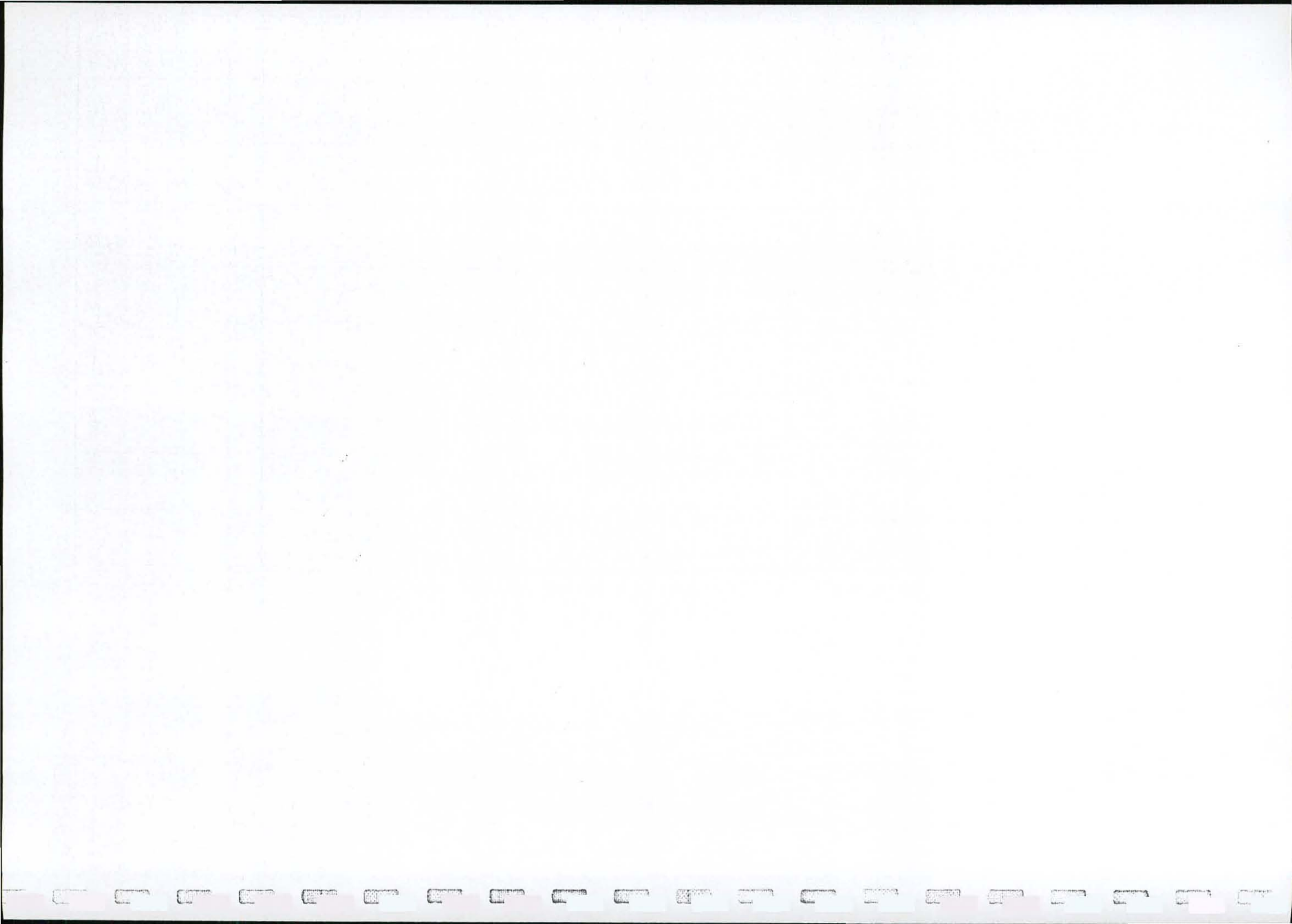


GROOTEGELUK MINE CHAR, COKE AND CO-GEN PROJECTS

DWA MEETING 16 MARCH 2011

ATTENDANCE REGISTER

NAME	POSITION	TEL	FAX	E-MAIL	POSTAL ADDRESS
Msimanga M.M	AASD	015 290 1200 082 9083179	015 295 3249	msimanga@m dwa.gov.za	P/B 9506 Polokwane 0700
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Mahlati Molegozi	AWPCO	015 290 1209 082 8085825	015 295 3249	mahlati@m @dwa.gov.za	P/Bag X9506 Polokwane 0700
M.A. Paskitt	Engineer	012 3077410	012 307 7161	mike.paskitt@exxaro.com	Box 9229 Pretoria. 0001
MALWI BUTHELEZI	ENVIRONMENTAL PROJECT MANAGER	012 3073774	012 3075158	malwi.buthelezi@exxaro.com	PUR BAG X09 PRETORIA 0001
E. Louw	Environmental Scientist	0118078225		edlouw@synergistics .co.za	
C. Linström	EXXARO - HQ	012 3074100 083609017	-	charles.linstrom @exxaro.com	PO Box 12349 OFF HOEWES 0163
S. Holt	Synergistics	0118078225	0118078226	shelley@synergistics co.za	



MINUTES OF MEETING



Project: Exxaro Projects: Grootegeluk Char Plant Expansion, and Coke and Co-gen Plant

Meeting: Authority Meeting

Date & Venue: 16 March, 2011
LEDET (Polokwane)

Compiled by: Edwynn Louw and Shelley Holt
Synergistics Environmental Services

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8228
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Eastern Cape: Tel: 041 583 1155, Fax: 085 562 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quarry Road, Hilton, 3201

ATTENDANCE:

Name	Telephone	Email
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Tinyiko Malungani (TM)	015 290 7000	malunganitp@ledet.gov.za
M.A. Plaskitt (MP)	012 307 7410	mike.plaskitt@exxaro.com
Victor Mongwe (VM)	015 295 4013	mongwev@ledet.gov.za
Masungi Tshuketani	015 295 5528	tshuketanim@ledet.gov.za
Malusi Buthelezi	012 207 3174	malusi.buthelezi@exxaro.com
Charles Linstrom (CL)	012 307 4100	charles.linstrom@exxaro.com

MINUTES:

SH: Provided the LEDET with copies of the background information document. Provided an introduction and agenda.

CL: Description of location on map.

MP: Description of char, coke and co-generation plant processes.

Question/Issue Raised:	Answer:
Victor Mongwe – LEDET (VM): Will you burn the coal?	Mike Plaskitt – Exxaro (MP): There are volatile gases in the coal. We heat the coal to remove volatiles to produce Char or Coke. The gases are then combusted and forced into a boiler, which drives a generator.
VM: How will you deal with the sulphur from the coal?	MP: 1% of the sulphur is released as SO ₂ . When tar is precipitated, SO ₂ goes into the tar and later in the precipitated water called liquor.

<p>Tinyiko Malungani – LEDET (TM): Are you doing separate applications?</p>	<p>SH: Yes, the applications are for the Char, Coke and Co-gen plants. We are also doing AEL applications and an air quality study. Once done we will engage with AEL officers at LEDET.</p>
<p>VM: We must confirm whether the waste is hazardous waste or not. Waste management licensing is not the core of the project. If it is a by-product LEDET will deal with it.</p>	<p>MP: We think it is likely to be hazardous. We may add the tar to the gases for burning, to produce electricity. Tar is a by-product, not waste, as it can also be sold. We will also burn the liquor to produce heat and generate electricity.</p> <p>SH: We do have a waste specialist who is working on the project.</p> <p>MP: The specialist will classify the waste. All our "waste" will be converted to energy. The only "waste" will be atmospheric emissions. No solid or liquid waste will be left.</p>
<p>TM: With PPP, language gaps must be addressed. The dominant language of the area should be identified.</p>	<p>SH: We will do this.</p>
<p>TM: Is it our competency to run with electricity production, or do we need to delegate to DEA?</p>	<p>VM: We must focus on the main process, in this case, to produce Char by erecting the facility.</p>
<p>TM: If applications are submitted separately, the processes should be separate. If it is one process, applications should possibly be combined.</p>	<p>MP: Coke and Co-Gen are interdependent.</p>
<p>TM: How will you align the MPRDA and NEMA processes? If you submit the reports to the DMR and LEDET at the same time, and the report is inadequate, there could be issues.</p>	<p>VM: Let's follow the NEMA process. If we are satisfied, we will give authorisations.</p> <p>TM: I would advise submitting the reports to DMR after we have approved the reports.</p>

**CHAR, COKE AND CO-GEN PROJECTS
AT GROOTEGELUK MINE, LEPHALALE**



AUTHORITIES MEETING WITH LEDET

Date: Wed 16 March 2011
Time: 12H00 – 13H30
Venue: LEDET Office, Polokwane

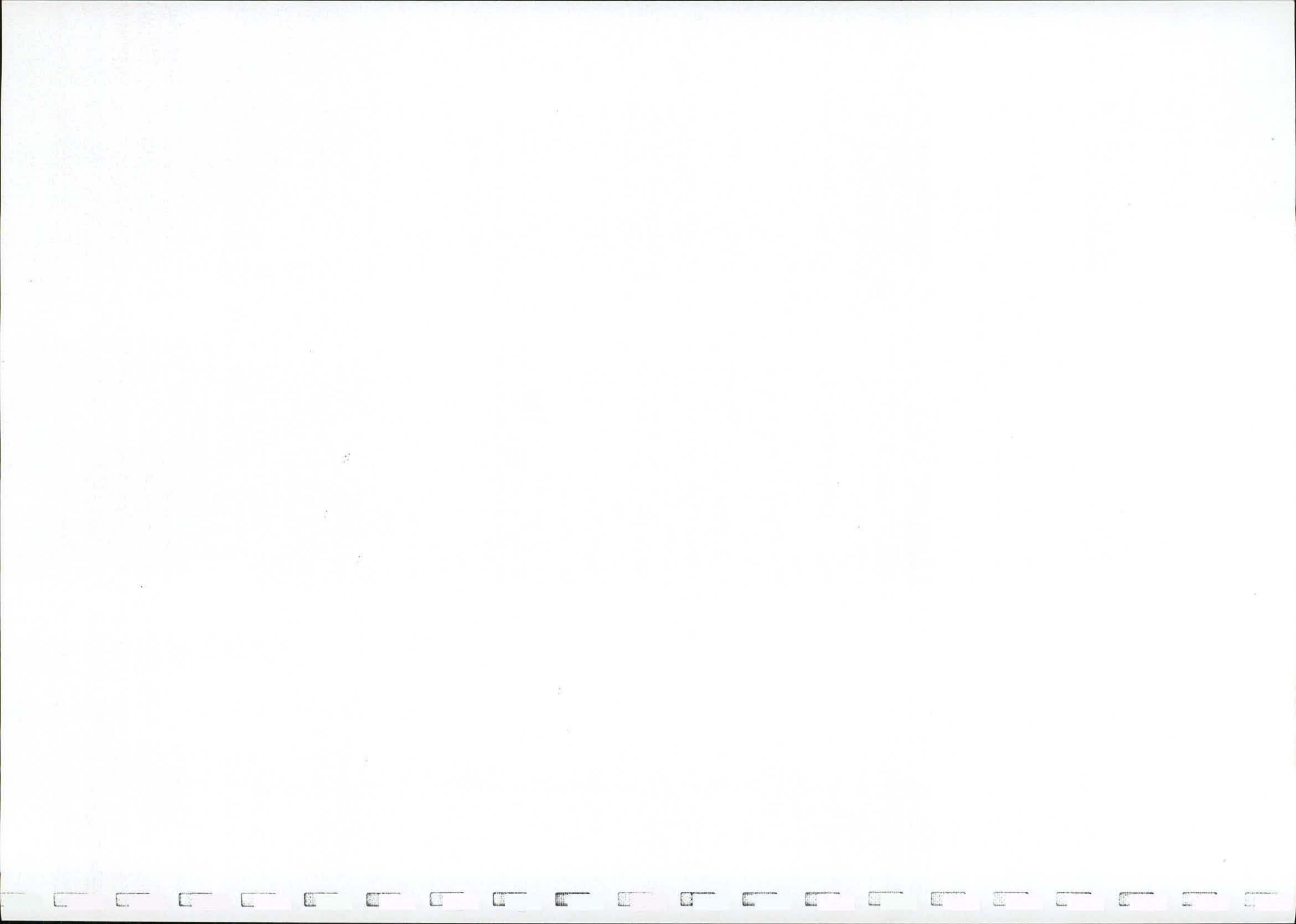
Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
64 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1156, Fax: 086 562 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quarry Road, Hilton, 3201

AGENDA

1. INTRODUCTION AND PURPOSE OF THE MEETING
2. BRIEF PROJECT DESCRIPTIONS
 - 2.1 Char Plant Expansion
 - 2.2 Coke Manufacturing Plant
 - 2.3 Co-generation Plant
3. NEMA EIA APPLICATIONS
 - 3.1 EIA Process and Reports to be Compiled
 - 3.2 Other NEMA Enviro-legal Processes (Atmospheric Emissions License and Waste Management License)
 - 3.3 Specialist Studies
 - 3.4 Public Consultation Process
4. QUESTIONS AND DISCUSSION
5. WAY FORWARD
6. CONCLUSION

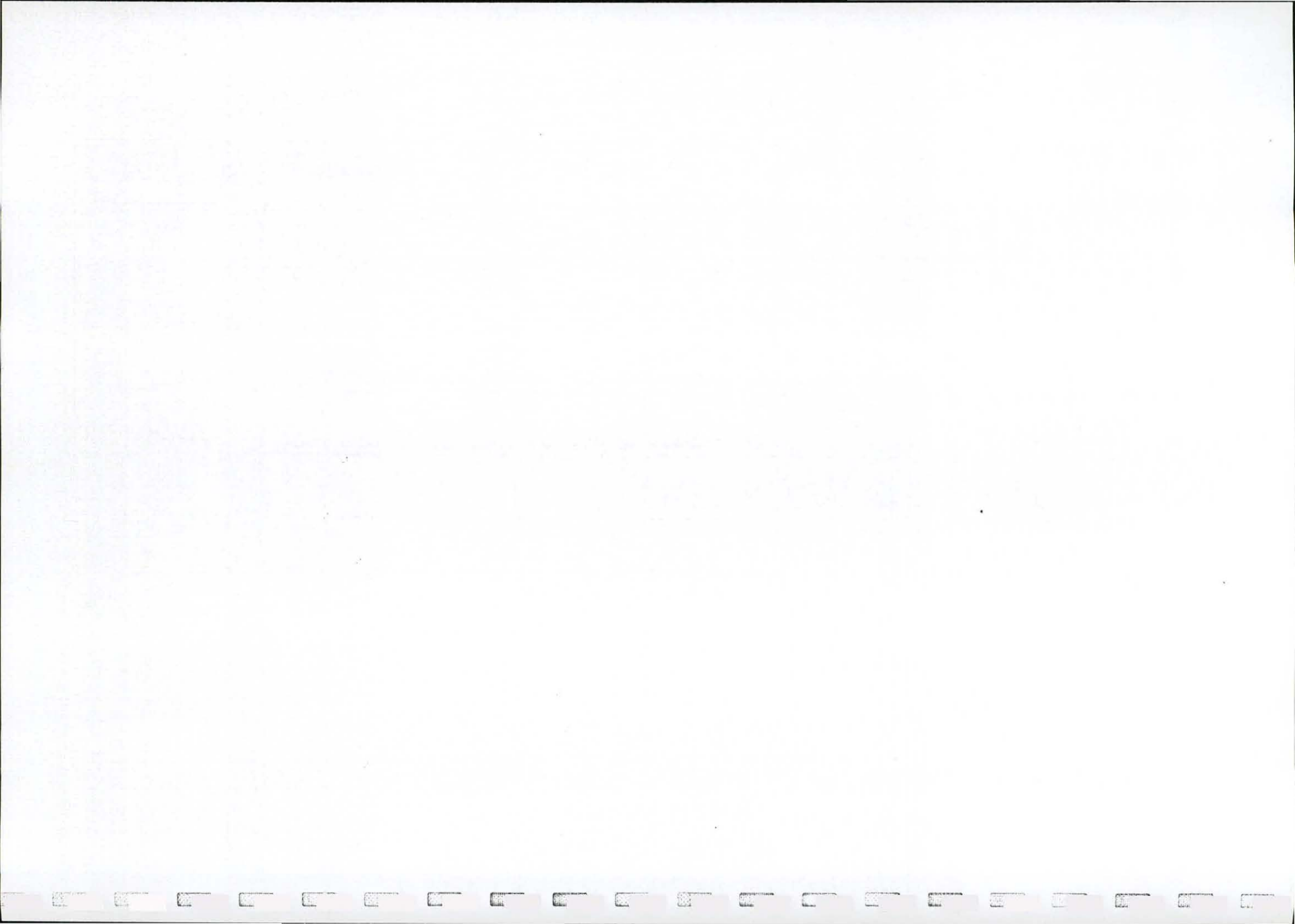


GROOTEGELUK MINE CHAR, COKE AND CO-GEN PROJECTS

LEDET MEETING 16 MARCH 2011

ATTENDANCE REGISTER

NAME	POSITION	TEL	FAX	E-MAIL	POSTAL ADDRESS
TINYIKO MALUNGANI	MANAGER	015 290 7000 082 888 9847	015 295 5015	malungani@tp@ledet.gov.za	P.O. Box 55464 POLOKwane 0700
M.A. Plaskitt	Engineer	012 307 7440		mike.plaskitt@exxaro.com	Box 9129 Pretoria 0001
Victor Mongwe	SM	015 295 4013	015 295 4013	Mongwe@ledet.gov.za	PO Box 55464 Polokwane
Masungi Kshuketana	S.E.O	015 295 5628	015 295 5015	kshuketana@ledet.gov.za	P.O. Box 55464 Polokwane 0700
MALUSI BUTHELEZI	Air Quality Specialist	012 307 3174	012 307 5158	malusi.buthelezi@exxaro.com	
Charles Linstrom	EXXARO - HQ	012 307 4100	-	charles.linstrom@exxaro.com	BOX 12349 DIE HEFWEES 0163
Shelley Holt	Environmental Specialist	011 807 8225	011 807 8226	shelley@synergistics.co.za	
E. Loun	Environmental Scientist	011 807 8229	011 807 8228	edloun@synergistics.co.za	Box 1822, Rivonia



MINUTES OF MEETING



Project: Exxaro Projects: Grootegeluk Char Plant Expansion, and Coke and Co-gen Plant

Meeting: Authority Meeting

Date & Venue: 17 March, 2011
Lephalale Local Municipality, Lephalale

Compiled by: Edwynn Louw and Shelley Holt
Synergistics Environmental Services

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
84 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1155, Fax: 088 562 0165
Suite 7 1, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quamy Road, Hilton, 3201

ATTENDANCE:

Name	Telephone	Email
Edwynn Louw	011 807 8225	edwynn@synergistics.co.za
Shelley Holt (SH)	011 807 8225	shelley@synergistics.co.za
M. A. Plaskitt (MP)	012 307 7410	mike.plaskitt@exxaro.com
Charles Linstrom (CL)	012 307 4100	charles.linstrom@exxaro.com
J. R Teffo	014 762 1515	julius.teffo@lephalale.gov.za
B. Sebola	014 762 1490	100391@lephalale.gov.za
P. J Hlapa (JH)	014 762 1432	joshua.hlapa@lephalale.gov.za

MINUTES:

SH: Provided the Lephalale Municipality with copies of the background information document. Provided an introduction and agenda.

CL: Description of location on map, project description and layout description.

MP: Process description for Char. Process description for Coke and co-generation plants.

SH: We will do an EMP amendment, an EIA for LEDET, an IWULA with DWA, an AEL for LEDET and we will determine if a WML is necessary.

SH: Description of specialist studies. Description of public participation process thus far.

Question/Issue Raised:	Answer:
Joshua Hlapa – Lephalale (JH): The waste and air specialists should ensure that the applicable regulations are complied with. We would like a waste management plan, air monitoring plans and water monitoring plans. I	Shelley Holt - Synergistics (SH): Once the specialist studies are done, we will send you the reports and will update the Grootegeluk Mine IWWMP to include these plants.

spoke to Filomaine Swanepoel at Grootegeluk mine, they have an IWWMP. Is it not a good idea to incorporate the new plants into the IWWMP?	
JH: What will you use to burn the coal?	Mike Plaskitt – Exxaro (MP): We will use coal gas. Once the coal is in the retort, we use LPG gas to start the process. After that, coal gas will heat the coal. We add a little air to burn the gas. Once the process runs, only coal gas is used.
JH: We will have more questions once you have the draft reports for us.	

**CHAR, COKE AND CO-GEN PROJECTS
AT GROOTEGELUK MINE, LEPHALALE**

**AUTHORITIES MEETING WITH
LEPHALALE LOCAL MUNICIPALITY**



Date: Thurs 17 March 2011
Time: 14H00 – 15H30
Venue: Lephale Local Municipality Office,
Lephale

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
64 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1156, Fax: 086 562 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

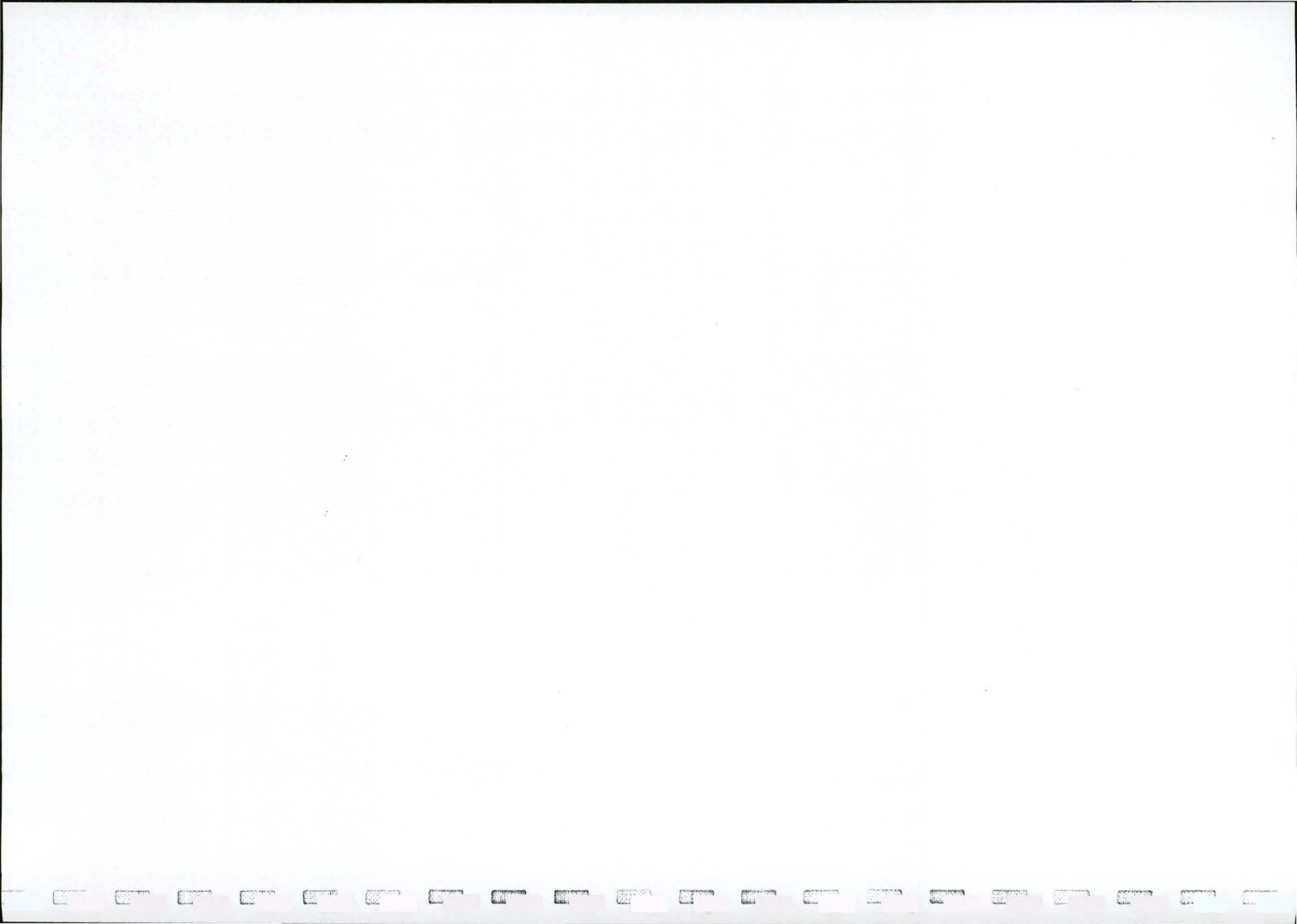
KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quarry Road, Hilton, 3201

AGENDA

1. INTRODUCTION AND PURPOSE OF THE MEETING
2. BRIEF PROJECT DESCRIPTIONS
 - 2.1 Char Plant Expansion
 - 2.2 Coke Manufacturing Plant
 - 2.3 Co-generation Plant
3. ENVIRO-LEGAL PROCESSES
 - 3.1 EMP Amendment for DMR; EIA for LEDET; Water Use License for DWA;
Atmospheric Emissions License for LEDET and Waste Management
License for DEA.
 - 3.2 Specialist Studies
 - 3.3 Public Consultation Process
4. QUESTIONS AND DISCUSSION
5. WAY FORWARD
6. CONCLUSION



Directors: KC Fairley, ME Wolmarans & MG Hemming
Synergistics Environmental Services (Pty) Ltd
South Africa Registered No. 2003/030216/07



GROOTEGELUK MINE CHAR, COKE AND CO-GEN PROJECTS

LEPHALALE LOCAL MUNICIPALITY MEETING 17 MARCH 2011

ATTENDANCE REGISTER

NAME	POSITION	TEL	FAX	E-MAIL	POSTAL ADDRESS
S. Holt	Environmental Scientist	0118078225	0118078226	shelley@synergistics.co.za	
E. Louw	Environmental Scientist	0118078225	0118078226	edward@synergistics.co.za	
M.A. Plaskitt	Engineer (Process)	0123077410	0123077161	Mike.Plaskitt@exxaro.com	PO Box 9229 Pretoria, 0001.
C. Linström	Hydrologist	0123074100	0123075220	charles.linstrom@exxaro.com	PO BOX 12349 DIE HOEFES 0163
J.R. TEFFO	Acting Manager J.S.	0147621531	0147621515	Julius.Teffo@lephalale.gov.za	Private Bag X136 Lephalale 0555
B. SEBOLA	PROJECT OFFICER LLM	0147621490	0865363439	100391@lephalale.gov.za	11
P.S. ALHAMA	DYNAMICS Head in HSE	0147621432	0865878789	Joshua.Hama@lephalale.gov.za	11



MINUTES OF MEETING



Project: Exxaro Projects: Grootegeluk Char Plant Expansion, and Coke and Co-gen Plant

Meeting: Authority Meeting

Date & Venue: 17 March, 2011
Waterberg District Municipality, Modimolle

Compiled by: Edwynn Louw and Shelley Holt
Synergistics Environmental Services

Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
64 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1155, Fax: 088 562 0165
Suite 7-1, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 348 4642
15 Quamy Road, Hilton, 3201

ATTENDANCE:

Name	Telephone	Email
Edwynn Louw	011 807 8225	edwynn@synergistics.co.za
Shelley Holt (SH)	011 807 8225	shelley@synergistics.co.za
Charles Linstrom (CL)	083 609 0173	charles.linstrom@exxaro.com
Mike Plaskitt (MP)	012 307 7410	mike.plaskitt@exxaro.com
Peter Mphela (PM)	014 743 3160	pmphela@waterberg.gov.za
Jubilant Machate	014 718 3325	jmachate@waterberg.gov.za
Stanley Koenaitse (SK)	014 718 3331	skoenaitse@waterberg.gov.za
T. Tshabalala	014 736 5117	ttshabalala@waterberg.gov.za
Lily Mokonyane (LM)	014 718 3300	lmokonyane@waterberg.gov.za

MINUTES:

SH: Provided the Waterberg Municipality with copies of the background information document. Provided an introduction and agenda.

CL: Description of location on map, project description and layout description.

MP: Process description of char, coke and co-generation plants.

SH: Description of specialist studies. Description of public participation process thus far.

Question/Issue Raised:	Answer:
Lily Mokonyane – Waterberg Municipality (LM): We have Integrated Water and Waste Management (IWWM) plans, Air management plans, and EMPs for our municipal area. The Environmental Management Framework combines all three. You	Shelley Holt - Synergistics (SH): We would like to obtain copies of those reports. Health impacts will be assessed during the EIA process.

should also consider the health impacts.	
Peter Mphela – Waterberg municipality (PM): What is the potential for air pollution?	SH: We will do an air quality study. There is existing emissions data from the Char Plant. We will send you our reports, and you will be able to comment on them.
Charles Linstrom – Exxaro (CL): Do you want the Char Plant data in the report? Should we include Medupi Power station in the baseline?	PM: Yes, it makes sense to include Medupi. If not included, will not give a true idea of impacts. Mike Plaskitt – Exxaro (MP): Our plant will have less than 1 % of impact compared to Medupi and Matimba power stations. They contribute 99 % of air pollution due to their size.
PM: How have water issues been considered?	CL: We will compile water balances for the plants. If we don't have sufficient water, we will not go ahead with project. We will update water balances to try save water. I think the water in the Mokolo Dam has been 100 % allocated. DWA has taken over management of the Mokolo Dam, so they allocate the water now. They indicated to us that our existing allocation is the maximum we will receive. MP: We will use the allocated water for the Grootegeluk Mine.
LM: How does the development benefit the community? Short term construction jobs do not sustain people. Ensure the community is included.	SH: We will assess the socio-economic benefits, and jobs that will be created. We haven't assessed this in detail yet. MP: We have a social manager at Grootegeluk Mine. He arranges and deals with all social issues and community projects. SH: We will put those details in the report. MP: We need a lot of labour for these plants, up to 130 jobs will be created at Char and 230 at Coke and Co-Gen.
Edwynn Louw – Synergistics (EL): Would you like to know whether unskilled, local people will be able to be trained to fill the employment opportunities at Char, coke and Co-generation plants?	MP: Yes, we will train the local unskilled people.
PM: You are aware of Waterberg being declared a priority area in terms of NEM:AQA, therefore there may be stricter air quality standards for the area in future. Suitable abatement technology should be in place.	SH: We will take note of this.

**CHAR, COKE AND CO-GEN PROJECTS
AT GROOTEGELUK MINE, LEPHALALE**



**AUTHORITIES MEETING WITH
WATERBERG DISTRICT MUNICIPALITY**

Date: Thurs 17 March 2011
Time: 9H00 – 10H30
Venue: Waterberg District Municipality Office,
Modimolle

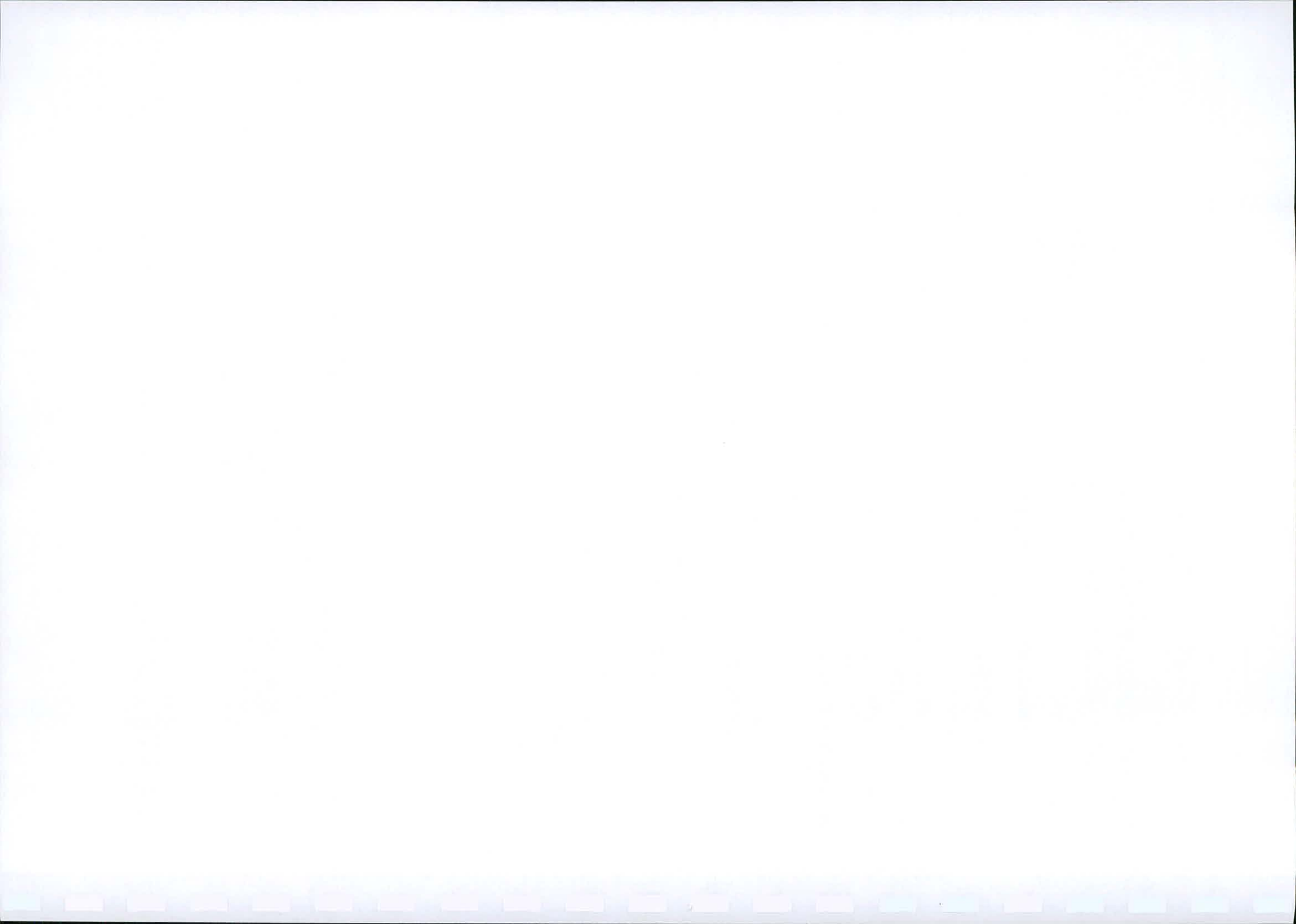
Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226
PO Box 1822, Rivonia, 2128
64 Wessels Road, Rivonia

Eastern Cape: Tel: 041 583 1156, Fax: 086 562 0165
Suite 71, P Bag X13130, Humewood,
Port Elizabeth, 6013

KwaZulu Natal: Tel/Fax: 033 343 4642
15 Quarry Road, Hilton, 3201

AGENDA

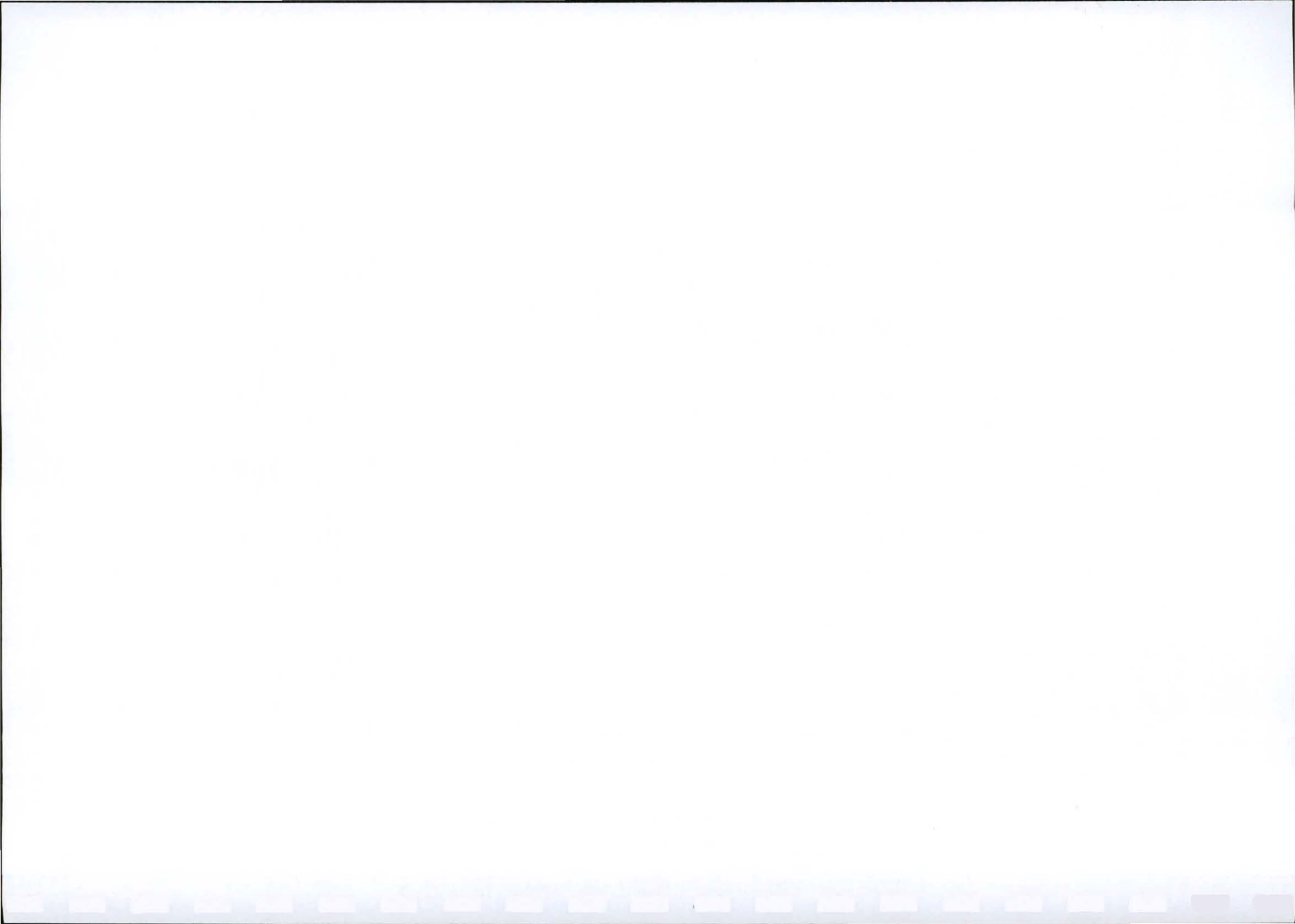
1. INTRODUCTION AND PURPOSE OF THE MEETING
2. BRIEF PROJECT DESCRIPTIONS
 - 2.1 Char Plant Expansion
 - 2.2 Coke Manufacturing Plant
 - 2.3 Co-generation Plant
3. ENVIRO-LEGAL PROCESSES
 - 3.1 EMP Amendment for DMR; EIA for LEDET; Water Use License for DWA;
Atmospheric Emissions License for LEDET and Waste Management
License for DEA.
 - 3.2 Specialist Studies
 - 3.3 Public Consultation Process
4. QUESTIONS AND DISCUSSION
5. WAY FORWARD
6. CONCLUSION



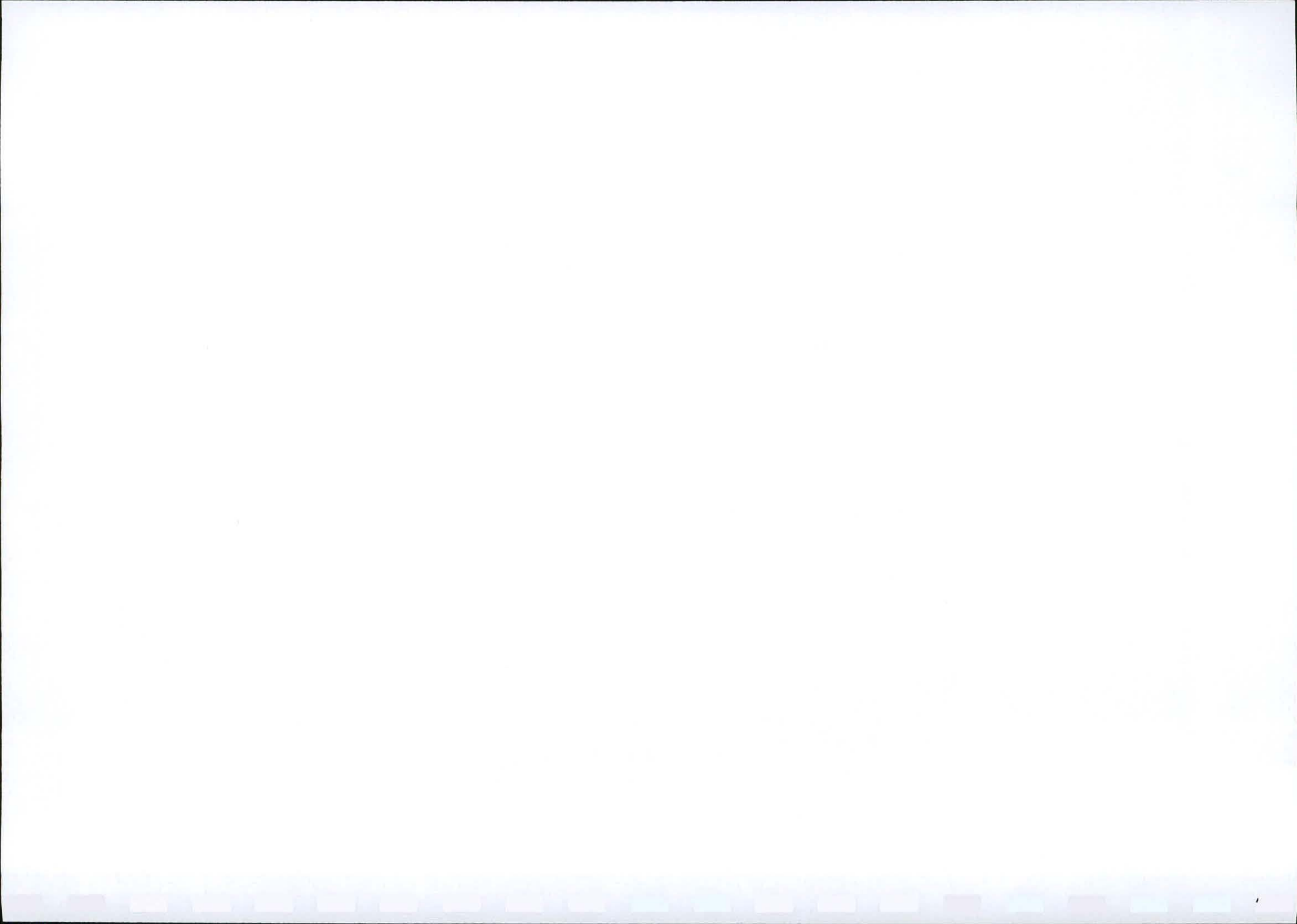
GROUWEGELUK MINE CHAR, COKE AND CO-GEN PROJECTS
 WATERBERG DISTRICT MUNICIPALITY MEETING ¹⁷ ~~16~~ MARCH 2011


ATTENDANCE REGISTER

NAME	POSITION	TEL	FAX	E-MAIL	POSTAL ADDRESS
Shelley Holt	Environmental Scientist	0118078225	0118078226	shelley@synergistics.co.za	Box 1822, Rivonia 2128
Charles Linstrom	Hydrologist	0836090173	0123075220	charles.linstrom@exxaro.com	PO BOX 12349 DIE HOEWES 0163
Edwyn Louw	Environmental Scientist	0118078225	0118078226	edwyn@synergistics.co.za	Box 1822, Rivonia 2128
M.A. Plaskitt	Project Engineer (Process)	012 307 7410	012 307 7161	mike.plaskitt@exxaro.com	PO Box 9229 Pretoria. 0001
Peter Mphela	Head Health Services	0147433160	0867544304	pmphela@waterberg.gov.za	Private Bag 1018 Modimolle 0510
Jubilant Machabe	Head Health Services	047183325	0865329154	jmachabe@waterberg.gov.za	Box Private Bag 1018 Modimolle, 0510
Stanley Koenig	Air Quality Officer	0147183331 0825782641	0147173298	skoennie@waterberg.gov.za	P/Bag 1018 Modimolle 0510
TEBOGO TSHABALALA	HEAD: HEALTH SERVICES	014 236 5117	014 236 3366	ttshabalala@waterberg.gov.za	P.O. BOX 121 Beta-Beta 0480
Lilly Mokoje	Manager Social Development & Community Services	0796665819 0147183300	0866086118 0107173298	lmolcomjane@waterberg.gov.za	Mary Gwala Street Modimolle 0510



Appendix 7: Heritage Report and Letter to SAHRA



Date:	2011-04-11	 <p>Synergistics Environmental Services</p> <hr/> <p>Johannesburg: Tel: 011 807 8225, Fax: 011 807 8226 PO Box 1822, Rivonia, 2128 64 Wessels Road, Rivonia</p> <p>Eastern Cape: Tel: 041 583 1156, Fax: 086 562 0165 Suite 71, P Bag X13130, Humewood, Port Elizabeth, 6013</p> <p>KwaZulu Natal: Tel/Fax: 033 343 4642 15 Quarry Road, Hilton, 3201</p>
Our Ref:	S0342/S0438/S0493	
Attention:	<p>Donald Lithole SAHRA Limpopo P.O. Box 1371 Polokwane 0700</p> <p>cc. Mary Leslie SAHRA Head Office P.O. Box 4637 Cape Town 8000</p>	
<p>Expansion of the Char Plant and Construction of Coke and Co-generation Plants at Exxaro's Grootegeluk Mine in Lephalale, Limpopo Province</p>		

Dear Mr Lithole

The National Heritage Resources Act (No. 25 of 1999) requires that the responsible heritage authority must be informed of 'any development or other activity which will change the character of a site – (i) exceeding 5000 m². Exxaro Reductants is proposing to undertake a development that will alter the character of a site with an extent greater than this and the SAHRA are hereby informed of this.

The proposed projects are described below.

Project Description – Char Plant Expansion

A 4 retort Char Plant has been in operation on the farm Daarby 458 LQ, within the boundaries of the Grootegeluk Coal Mine since June 2009. The char plant is owned and operated by Exxaro Reductants (Pty) Ltd and is therefore a separate entity to the Grootegeluk Mine (owned by Exxaro Coal). The existing plant covers an area of approximately 5.5ha.

The proposed expansion to the Char Plant involves increasing the number of retorts from 4 to a maximum of 12. The expansion would therefore involve the construction of an almost identical replica of the existing Char Plant. The Char Plant expansion will be located directly



Directors: KC Fairley, ME Wolmarans & MG Hemming
Synergistics Environmental Services (Pty) Ltd
South Africa Registered No. 2003/030216/07

adjacent to the existing plant and will occupy a combined area of approximately 8.5ha (refer to Appendices 1 to 3 for locality maps and aerial photos).

The char plant involves the conversion of lumpy coal blends to high quality carbon reductants (char) through devolatilisation by releasing volatile compounds through heating the coal at approximately 900°C. The process takes place in a closed circuit and involves the re-application of gaseous heat in the absence of oxygen, which maximises the recovery of lumpy carbon – this reaction takes place in vertical retort. Char is a metallurgical carbon reductant and is increasingly used to supplement market coke due to the limited availability of imported coking coal. The char plant is therefore in a prime position, as it has access to suitable coal feedstock as well as being close to major consumers (ferro-chrome, ferro-manganese and platinum producers).

The volatile gases leave the top of the retort and contain methane, hydrogen, tar and oil gases and a small quantity of Sulphur Dioxide. This off-gas is then cleaned by first precipitating the tar into tar tanks and then cooled to precipitate water which will contain a small amount of hydrocarbon oils and sulphur. Thereafter the gas is clean gas consisting of hydrogen, methane and air. The precipitated water is termed liquor due to fact that it still contains some hydrocarbons and sulphur, therefore it is destructed in a liquor destructor by using gas produced by the plant to harmless CO₂ and H₂O (steam) which exit the stack.

Infrastructure associated with the char plant which will be expanded as part of this project includes:

- Admin buildings;
- Gas boosters;
- Gas cleaning and cooling equipment;
- Tar storage tanks;
- Liquor buffer tanks;
- Liquor destructors;
- Liquor destructor stacks;
- Retort vents; and
- Coal and product stockpiles.

Additional infrastructure, not included within the existing char plant, but to be included in the expansion project includes:

- Oil and water separating plant;
- Tar conditioning facility;
- Briquetting plant;
- Spare store; and
- Tar storage and reclaiming facility (TSRF).

The project programme for the development of this char plant expansion is earmarked to commence construction in October 2011 and to begin operation of the plant in April 2013. Currently the exit gases from the char plant is a source of wasted energy, and at a later stage the char plant intends to convert this wasted energy into steam to generate electricity.

Project Description – Coke and Co-generation Plants

Exxaro Reductants (Pty) Ltd and Exxaro Energy (Pty) Ltd would also like to develop a Coke Manufacturing Complex with electricity Co-generation Plant at Grootegeluk Mine, located on the farm Daarby 458 LQ in Lephalale (Ellisras). The complex is envisaged to consist of 120 Coke ovens and fitted with a co-generation section which together with the char co-generation plant will produce 120 MW of electricity. The complex will be approximately 21 hectares in size and will be located near the existing char plant which is to be expanded (refer to Appendices 1 to 3 for locality maps and aerial photos).

Semi-soft coking coal is crushed to less than 2mm and then stamped into 45 ton blocks. Each 45 ton block is pushed into a coke oven at 900°C and the coke block is devolatilised in the oven for a period of 65 hours at an oven temperature of 1200°C. During this heating cycle, coke is formed and volatile materials in the coal (off-gases) are released. The gases, which are mainly rich in carbon monoxide (CO) and hydrogen (H₂), would have been burnt and released to the atmosphere under normal circumstances. The off-gases contain large amounts of energy and are combusted above the coal block, beneath the oven floor, in the gas off-duct and lastly before the waste heat boiler. This project will use the coke oven gases in a waste heat boiler which will supply steam to a turbine in order to drive a generator to produce electricity. The project has the potential to produce 70 MW which will cater for the total electricity demand of Grootegeluk Mine. The produced electricity will be fed directly into the Eskom grid.

By using the coke oven flue gas as a primary fuel for electricity production, significant environmental benefits are gained, since burning the same amount of fuel more efficiently means fewer emissions for the same level of output. The coke plant utilises all the tars, oils, and gases in the coal to produce steam and electricity i.e. it produces no by-products other than final electricity.

The infrastructure required for the co-generation plant mainly consists of four waste heat boilers, gas combustion system, steam system, turbines, water condensation system, alternators, switchgears, generator and control gears.

The project programme for the development of the coke and associated co-generation plants is to begin construction in April 2013 and to begin operation of the plants in April 2015.

Heritage Assessment

The National Heritage Resources Act requires that the responsible heritage authority be informed of developments exceeding 5000 m². The SAHRA must then notify the applicant of their requirements.

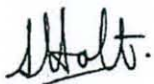
The footprint of the proposed Char Plant Expansion will be increased from 5.5 ha to 8.5 ha and the footprint of the new Coke and Co-gen Plants will be approximately 21 ha in extent. However, the proposed sites have been previously disturbed by coal stockpiling undertaken on the sites for the past 40 years (see aerial photos in Appendix 2 and 3). The possibility of artefacts of cultural or heritage significance being located at the site is therefore considered to be negligible.

A phase one Heritage Impact Assessment has been conducted for the entire mining rights area for the Exxaro Grootegeluk Mine (previously owned by Kumba Resources Ltd), which includes the proposed site of the Char Plant Expansion and the new Coke and Co-gen Plants. For your information, I have attached a copy of this report, dated September 2005 as Appendix 4. The investigation was conducted by J. van Schalkwyk of the National Cultural History Museum, who also wrote the report. The results of this report indicate that the closest archaeological site to the proposed developments is 3.16km away (see Appendix 2 and 3). For this reason, it is assumed that no additional heritage mitigation is required for these developments.

This letter therefore serves to inform SAHRA of the proposed developments and to provide motivation for not undertaking any further heritage assessments for these developments. Please direct a response to Synergistics Environmental Services. Should there be any queries, please do not hesitate to call the undersigned.

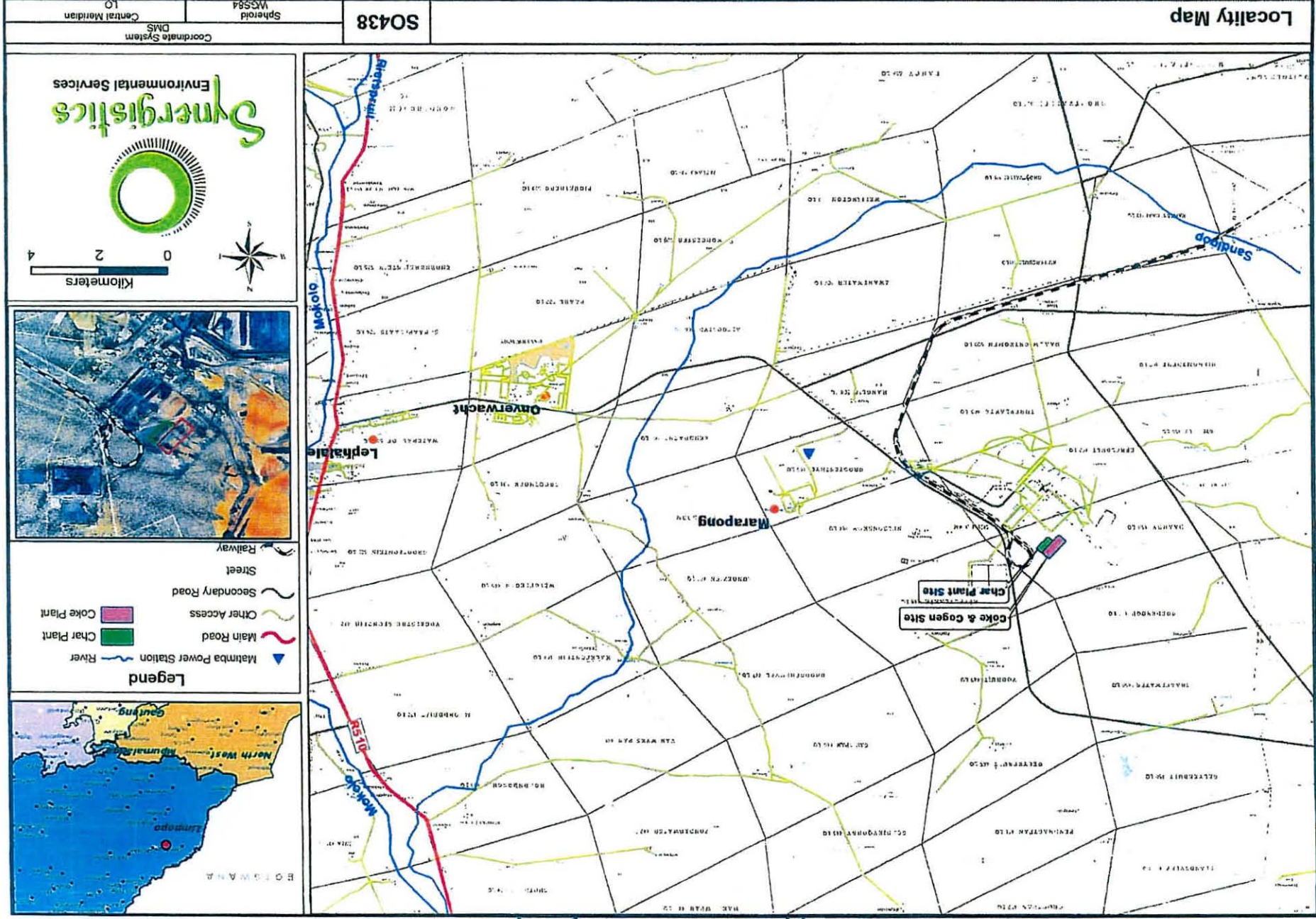
for Synergistics Environmental Services

Yours sincerely,



Shelley Holt
B.Sc. Hons
Environmental Scientist

Appendix 1 – Locality Map



Locality Map

SO438

Coordinate System
DMS

Spheroid
MSS84
Central Meridian
10

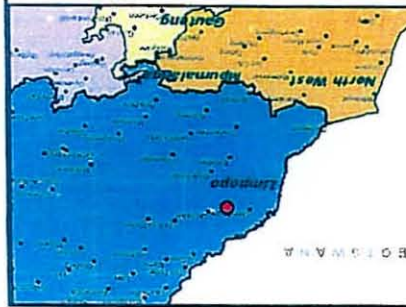
Synergetics
Environmental Services



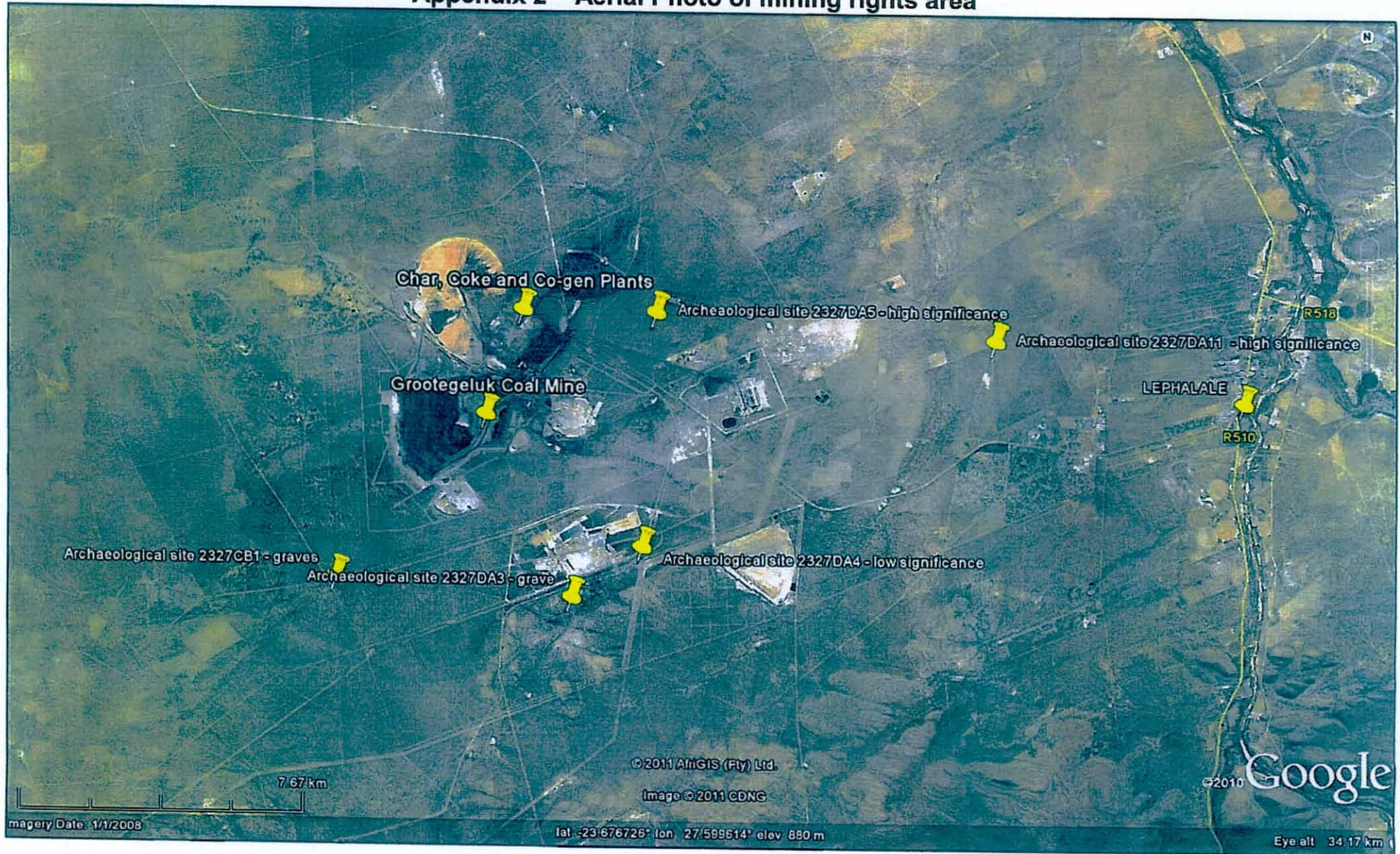
0 2 4
Kilometers



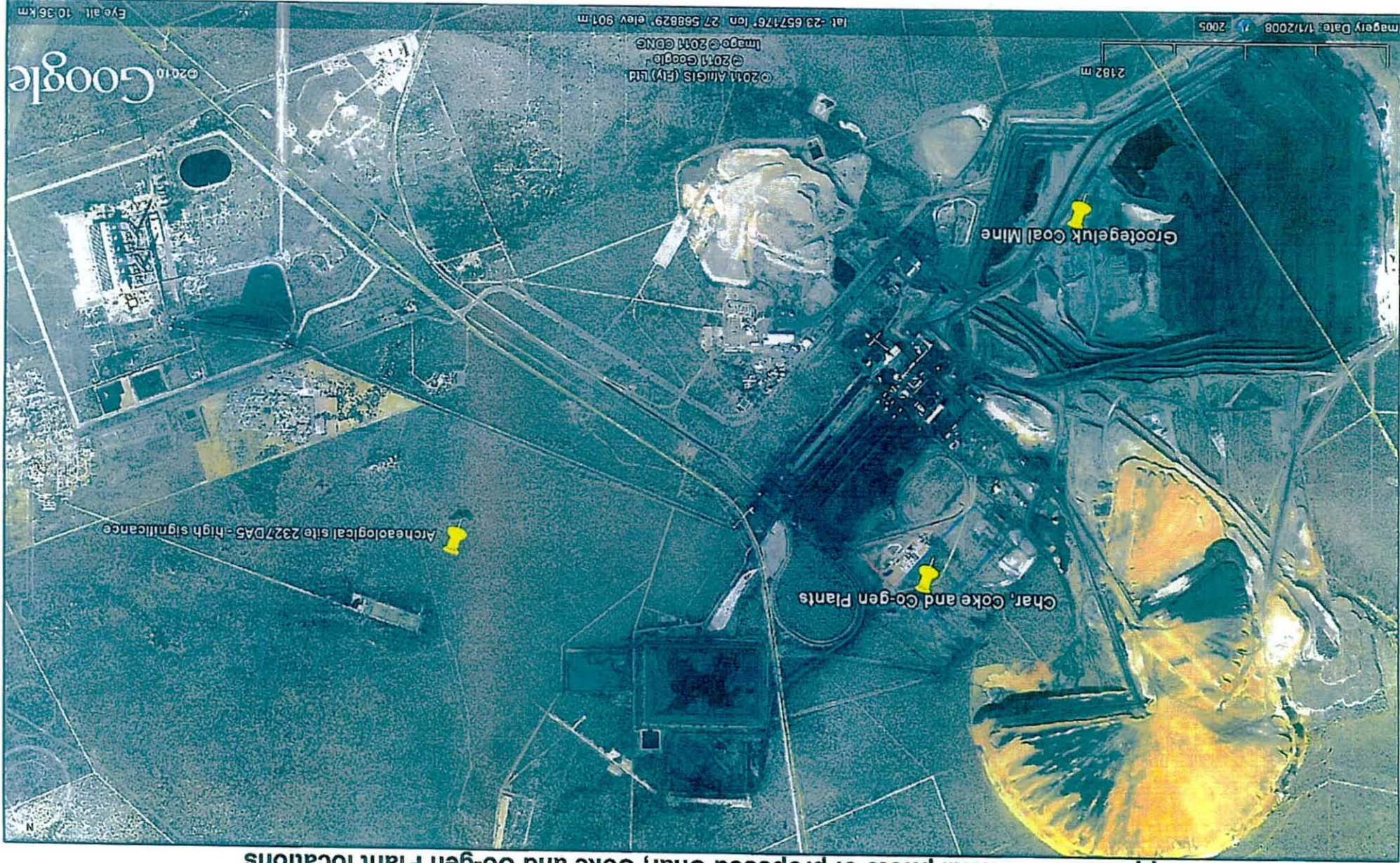
- Legend**
- River
 - Char Plant
 - Coke Plant
 - Main Road
 - Other Access
 - Secondary Road
 - Street
 - Railway
 - Matimba Power Station



Appendix 2 – Aerial Photo of mining rights area



Appendix 3 – Aerial photo of proposed Char, Coke and Co-gen Plant locations



Appendix 4 – Heritage Survey Report for Grootegeluk Mine

**HERITAGE SURVEY REPORT OF THE KUMBA PROPERTIES AT
GROOTEGELUK MINE, LEPHALALE AREA, LIMPOPO PROVINCE**

For:

**KUMBA RESOURCES LIMITED
GROOTEGELUK MINE
PO Box 178
LEPHALALE
0555**

Survey conducted and report prepared by the:

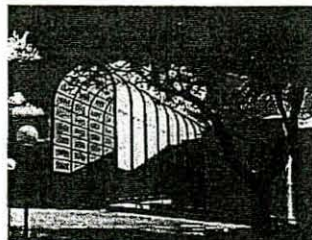
**NATIONAL CULTURAL HISTORY MUSEUM
PO Box 28088
SUNNYSIDE
0132**

Telephone - (012) 324 6082
Telefax - (012) 328 5173

REPORT: 2005KH90

Date of survey: September 2005

Date of report: September 2005



**NATIONAL CULTURAL HISTORY MUSEUM
NASIONALE KULTURHISTORIESE MUSEUM**

SUMMARY

Heritage survey report of the Kumba properties at Grootegeluk Mine, Lephalale area, Limpopo Province

The aim of the survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the boundaries of the property of the Grootegeluk Mine.

Only a few sites were identified. It seems as if people avoided this area in the past, largely due to its inhospitable environment. It was only during historic times that significant numbers of people started to settle here. This increased drastically after the mining activities started.

Two of the identified sites are viewed as having high significance. In Section nine of this report, extensive recommendations are made as to their preservation. In short, the following are recommended:

- The location of the sites should be added to an overall mine development plan in order to avoid them or to implement the proposed mitigation proposals in time.
- The hill known as Nelson's kop is obviously a site of high significance as it had (still have?) ritual importance for both hunter-gatherers and African farmers. Development in this area should be avoided.
- The cemeteries should be avoided. Alternatively, if that is not possible, mitigation measures can be implemented by relocating the graves.
- If archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.

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HERITAGE SURVEY REPORT OF THE KUMBA PROPERTIES AT GROOTEGELUK MINE, LEPHALALE AREA, LIMPOPO PROVINCE

1. THE SURVEY

The National Cultural History Museum was contracted by Kumba Resources to survey their properties at the Grootegeluk mine, consisting of a number of farms. The aim of the survey was to locate, identify, evaluate and document sites, objects and structures of cultural importance (Fig. 1) found within the boundaries of the mine properties (Fig. 2).

2. TERMS OF REFERENCE

The scope of work consisted of conducting a Phase 1 archaeological survey of the site in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

This include:

- Conducting a desk-top investigation of the area;
- A visit to the area under consideration.

The objectives were to

- Identify possible archaeological, cultural and historic sites within the area of interest;
- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical resources;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

3. DEFINITIONS AND ASSUMPTIONS

The following aspects have a direct bearing on the survey and the resulting report:

- *Cultural resources* are all non-physical and physical human-made occurrences, as well as natural occurrences that are associated with human activity. These include all sites, structures and artefacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development.
- The *significance* of the sites and artefacts are determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

- Sites regarded as having *low significance* have already been recorded in full and require no further mitigation. Sites with medium to high significance require further mitigation measures.
- The *latitude* and *longitude* of archaeological sites are to be treated as sensitive information by the developer and should not be disclosed to members of the public.

According to Section 3(1), for the purposes of the Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.

(2) Without limiting the generality of subsection (1), the national estate may include-

- (a) places, buildings, structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and palaeontological sites;
- (g) graves and burial grounds, including-
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves of victims of conflict;
 - (iv) graves of individuals designated by the Minister by notice in the Gazette;
 - (v) historical graves and cemeteries; and
 - (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) sites of significance relating to the history of slavery in South Africa;
- (i) movable objects, including-
 - (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - (ii) objects to which oral traditions are attached or which are associated with living heritage;
 - (iii) ethnographic art and objects;
 - (iv) military objects;
 - (v) objects of decorative or fine art;
 - (vi) objects of scientific or technological interest; and
 - (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Figure 1. Categorization of heritage resources according to the National Heritage Resources Act, No. 25 of 1999.

4. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are mainly dealt within two acts. These are the South African Heritage Resources Act (Act No25 of 1999) and the Environment Conservation Act (Act No 73 of 1989).

4.1 South African Heritage Resources Act (Act No 25 of 1999)

Archaeology, palaeontology and meteorites

In terms of Section 35(4) of this Act, no person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or material or any meteorite; bring onto, or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Structures:

Section 34(1) of this Act states that no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

“Structure” means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith;

“Alter” means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.

Human remains:

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

4.2 Environment Conservation Act (Act No 73 of 1989)

This Act states that a survey and an evaluation of cultural resources should be undertaken in areas where development, which will change the face of the environment, is to be made. The impact of the development on the cultural resources should also be determined and proposals to mitigate this impact are to be formulated.

5. METHODOLOGY

5.1 Preliminary investigation

5.1.1 *Survey of the literature*

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the heritage potential of the area. In this regard, various anthropological, archaeological and historical sources were consulted - see the list of references below.

Literature dealing with the area specifically is largely non-existing. Most of which that could be found, deal with the agricultural potential (Mentz & Coetzee 1973) of the area or coal mining exploration and activities (Cloete 1980, Faure 1993).

5.1.2 *Data bases*

The *Archaeological Data Recording Centre* (ADRC), housed at the National Cultural History Museum, Pretoria, was consulted. The *Environmental Potential Atlas* was also consulted.

5.1.3 *Other sources*

The topocadastral and other maps were also studied - see the list of references below.

5.2 Field survey

The area that had to be investigated was identified by *Kumba Resources* by means of maps. As this is a very large area, and, based on previous knowledge and the desktop study that indicated that very little would be found, an approach to the field survey was developed that was aimed at locating all possible sites:

- Firstly, each of the farms was investigated by driving across it, using the existing roads. This gave the necessary insight into the area, its geography, topography, vegetation, etc. and, as a result, an idea of what could be expected.
- Secondly, special attention was given to natural features, e.g. pans (e.g. Eendrag Pan – Fig. 3) and outcrops (e.g. Nelson's Kop and Koei and Kalf – Fig. 4) as well as other topographical occurrences such as trenches, holes, and clusters of trees.
- Thirdly, the remains of previous habitation such as farmsteads were plotted from the 1:50 000 maps and the sites were then visited (Fig. 5 & 6).
- Lastly, where possible, the different landowners/occupiers were interviewed in an effort to obtain information on the existence of known sites.

5.3 Documentation

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual

localities were determined by means of the *Global Positioning System* (GPS)¹ and plotted on a map (see Fig. 1). This information is added to the description in order to facilitate the identification of each locality.

Map datum used: Hartebeeshoek 94 (WGS84).

¹ According to the manufacturer a certain deviation may be expected for each reading. Care was, however, taken to obtain as accurate a reading as possible, and then to correlate it with reference to the physical environment before plotting it on the map.

6. DESCRIPTION OF THE AREA

The area that was investigated is indicated in Fig. 1. It included approximately 19 farms, all of which are located in the Lephalale (formerly Ellisras) district of Limpopo Province.

The topography of the area is very flat, with very few features (e.g. hills, outcrops or rock shelters, rivers) that usually drew people to settle in its vicinity, are found in the area. Only a few small hills or outcrops occur. All the rivers crossing the area are non-perennial. The biggest river, the Makolo, passes some distance to the east of the study area, flowing from south to north.

The geology is made up of alternating bands of arenite and shale, with a basalt intrusion to the west of the study area. All is overlain by sand, probably aeolic in origin, having being laid down from the west.

The area can be described as typical savanna, with the original vegetation consisting of Mixed Bushveld, with a section to the north classified as Sweet Bushveld.

In the recent past, all of these properties were used for cattle farming. As a result, farming related infrastructure was developed. When the properties were bought up by Kumba Resources, the land use on most farms changed to game farming and, as a result, people moved off the farms.

7. DISCUSSION

Probably because of the somewhat inhospitable environment, being very flat, hot and dry (less than 300 mm of rain per annum) and with few sources of surface water, people did not settle in large numbers in the area in the past. As a result, only a few sites of cultural significance were identified in the study area (see Appendix 2).

In the larger region, in areas where there are outcrops, especially close to rivers, rock art sites have been documented. The ones closest to the study area are located on the farm Grootfontein 501LQ, on the northern outskirts of the town of Lephalale. Other rock art sites are found further away to the south and the east.

Early and Later Iron Age sites are similarly found to the south and the east, as well as to the north. As these people were agro-pastoralists (and did not have the technology to extract subterranean water), they preferred to settle in areas where such resources were readily available.

The historic period starts off quite late in this part of the country. Probably one of the earliest published sources that refer to the area, in a generalised sense, is that of the explorer Thomas Baines who passed through the area during the early 1870s (Fig. 7). Although for other sections of his travels he gives detailed descriptions of the local population, he does not comment on anybody in this particular area. Although his rendering of the various rivers and other topographical features are quite accurate for the time, he seems to imply that there were no communities settled here (Baines 1877).

Similarly, Van Warmelo (1935) in his encyclopaedic work on the distribution of various Bantu-speaking groups show an area largely devoid of communities, with only a few isolated occurrences, all possibly farm-workers (Fig. 8). The closest community indicated by him are the Seleka, who reside approximately 50 km to the north. To the south, it seems from his maps that the area also used to be claimed by the Seleka. This is a very Sothoised group of Ndebele whom have also lived amongst the Ngwato in Botswana and their arrival in the area date to late Pre-colonial times.

In the town of Lephalale (Ellisras) there is a cemetery containing the graves of some of the earliest white settlers in the area. The town of Ellisras was only laid out in December 1960, and was named after two of the pioneer families in the area, Ellis and Erasmus. In 2002, the name was changed to Lephalale. This latter name is taken from the Phalala River, which is derived from the Tswana verb 'to flow' or 'one which overflows' (Raper 2004: 86, 204).

With reference to the study area itself, the following sites have been identified.

7.1 Stone Age

Stone tools dating to the Middle Stone Age were recorded at a few select spots, predominantly at outcrops and pans (Fig. 9). As these artefacts were found on the surface, they are not in their original context any more and can yield very little information. As a result, they are viewed to have no significance.

However, the opposite holds true for the site at Nelson's kop (see Appendix 2). Here some interesting engravings of animal spoor, cupules and cut marks were identified on the southern face of the hill (Fig 10). In addition, on top of the hill a number of small stone walled sites occur. A few non-diagnostic stone flakes and potsherds occur in the shelter.

From ethnographic sources it is known that hills or promontories, for example in the Karoo, are important features to the San because they offer vantage points in an otherwise remarkably flat landscape from which the springbok may be watched (Deacon 1988). This is probably the purpose of the stone circles on top of Nelson's Kop, serving as lookout points. The fact that there is a big panel with a variety of engravings on it indicates that this is in all probability a site of potency, for the making of rain by the San and later Sotho-Tswana speaking people in the area (see Van der Ryst *et al* 2004).

Although such sites are not unknown, this is currently the only known one in the larger region. Furthermore, it might even be linked with the other rock painting sites in the larger region, e.g. on the outskirts of Lephalale. A negative impact on this site would then, by extension, also have a negative impact on all the other sites. Based on its uniqueness, scientific and religious value, this site is viewed as having high significance and development should not be allowed to take place on or near it.

7.2 Iron Age

No sites dating to the Iron Age were identified. A few pieces of pottery were found at an outcrop on the farm Kuipersbult (Appendix 2). However, these did not include any diagnostic pieces and it is therefore difficult to determine its dating or identity. They are viewed as having no significance.

7.3 Historical period

Although a number of old farmsteads occur in the area, all have been demolished and little of them remain. As far as could be ascertained from available resources, none of these can be related to a significant event or an important historical individual. As a result, they are also viewed as having no significance. Two small informal cemeteries that relate to this period of farm occupation were identified (see Appendix 2).

Other structures, such as water troughs, windmills and dams, some dating to the days when the farms were used for cattle farming, are still in use. However, these all conform to general patterns and none exhibit unique technology or solutions.

The mining history in the area is represented by the the headgear of the first shaft that was sunk, leading to the eventual large scale mining activities (Fig. 11).

7.4 Intangible heritage

Some farms names have recently been changed (e.g. Kafirsdraai to Kromdraai), and rightly so as the old names are derogatory. Other farm names reflect on the earliest settlers and their Dutch origin or, more probably on the original surveyors and their background, such as the obvious Dutch influence in the spelling of some farms e.g. Schrickvoorby and Eendrachtpan. Others, such as Vaalpensloop presents tantalising evidence to the possible prehistory of the area. The name Vaalpense was used to refer to a group of impoverished people of a mixture of San and Bantu-speaking origin that used to populate large areas viewed as marginal by other groups (Van Schalkwyk 1985).

However, to document all of this falls outside the scope of this report, as it would entail tracking down previous inhabitants and interviewing them in detail.

8. IDENTIFICATION OF RISK SOURCES

Scoping exercises usually focus on two phases of a proposed development: *the construction and operation phases*. The following project actions may impact negatively on archaeological and other sites of cultural importance. The actions are most likely to occur during the construction phase of any proposed project.

TABLE 1:

Construction phase:

Possible Risks	Source of the risk
Actually identified risks	
- damage to sites	Construction work
Anticipated risks	
- looting of sites	Curious workers

Operation phase:

Possible Risks	Source of the risk
Actually identified risks	
- damage to sites	Not keeping to management plans
Anticipated risks	
- damage to sites	Unscheduled activities

9. MANAGEMENT PLAN

There are only a few cultural heritage resources known to exist in the surveyed area and their future management would not present much of a problem. Any mining activities would have very little impact on these sites, unless it takes on the form of a physical impact. Fortunately, from ground level, the development does not have a visual impact on any of the sites.

- As a first step the location of the sites, presented in Appendix 2, should be added to an overall mine development plan in order that they can be avoided in future. However, if development is to take place on or near a site, the recommended management action proposed in Appendix 2 should be implemented.

The old mine headgear site enjoys a certain amount of conservation at present, largely due to its isolated position and the fact that it is already fenced off.

- It is recommended that the environmental team at the mine inspect it annually. This can be combined with a general cleanup of the area.

The only site of cultural significance for which no mitigation would be acceptable, is the rock engravings and stone circles at Nelson's Kop. It therefore requires and special management actions to preserve this site:

- It is recommended that a buffer zone is created around the hill by declaring an area from the base of the hill in any direction for a distance of at least 250 metres as a no-go area for development.
- Furthermore, visitors should be informed of the sensitivity of the site and they should not be allowed to visit the site unsupervised. Fortunately, the current land user allows only hunting in the area. He knows about the importance of the site and is sympathetic towards the conservation thereof.
- Inspection of the site should be done annually by the environmental team at the mine.
- A general clean up of the site is recommended, but only of the very obvious litter such as beer cans and bottles and bottle tops.
- No fires, e.g. for braais or picnics are to be allowed in or near the shelter.
- As part of the current survey, the site was documented by the archaeologist. It is planned to present this information in published format at some time in the near future. This would serve as baseline information on the status of the site.

The biggest risk posed by any development project would be the accidental uncovering of unknown sites.

- In such a case, an archaeologist should be contacted in order to investigate the occurrence and to make suggestions with regard to suitable mitigation measures.

10. SUMMARY

The aim of the survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the boundaries of the property of the Grootegeluk Mine.

Only a few sites were identified. It seems as if people avoided this area in the past, largely due to its inhospitable environment. It was only during historic times that significant numbers of people started to settle here. This increased drastically after the mining activities started.

Two of the identified sites are viewed as having high significance. In Section nine of this report, extensive recommendations are made as to their preservation. In short, the following are recommended:

- The location of the sites should be added to an overall mine development plan in order to avoid them or to implement the proposed mitigation proposals in time.
- The hill known as Nelson's kop is obviously a site of high significance as it had (still have?) ritual importance for both hunter-gatherers and African farmers. Development in this area should be avoided.
- The cemeteries should be avoided. Alternatively, if that is not possible, mitigation measures can be implemented by relocating the graves.
- If archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.

11. REFERENCES

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11.3 Maps

1: 50 000 Topocadastral maps – 2327CB, 2327DA

12. PROJECT TEAM

J van Schalkwyk – principal investigator

APPENDIX 1: STANDARDISED SET OF CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON CULTURAL RESOURCES

Significance of impact:

- low where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium where the impact could have an influence which will require modification of the project design or alternative mitigation
- high where it would have a "no-go" implication on the project regardless of any mitigation

Certainty of prediction:

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
- Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

Recommended management action:

For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

- 1 = no further investigation/action necessary
- 2 = controlled sampling and/or mapping of the site necessary
- 3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
- 4 = preserve site at all costs

Legal requirements:

Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.

APPENDIX 2: SURVEY RESULTS²

[Previous site numbers relate to other known sites on a particular ¼ degree sheet already documented in the ADRC, and does not necessarily refer to sites occurring on or close to the specific surveyed area.]

Map datum used: Hartebeeshoek 94 (WGS84).

1. Site number: 2327DA5

Location: Nelsonskop 464LQ: S -23.65094; E 27.58650

Description: A small hill. Some interesting engravings of animal spoors, cupules and cut marks were identified on the southern face of the outcrop (Fig. 10). On top of the hill, a number of small stone walled enclosures occur. The hill is in all probability a site of potency, for the making of rain, by the San and later Sotho-Tswana speaking people in the area.

Discussion: Based on its uniqueness, scientific and religious value, this site has a high significance and development should not be allowed to take place on or near it.

Recommended management action: 4 = preserve site at all costs.

Legal requirements: SAHRA permit

2. Site number: 2327DA4

Location: Kuipersbult 511LQ: S -23.70760; E 27.57939

Description: Small outcrop. A few small pieces of non-diagnostic Iron Age pottery occur on the site. The site could have served as rainmaking site, but no engravings of other artefacts were found here.

Discussion: The site is viewed to have little significance.

Recommended management action: 1 = no further investigation/action necessary

Legal requirements: None

3. Site number: 2327CB1

Location: Vergulde Helm 316LQ: S -23.71142; E 27.49734

Description: An informal cemetery with four graves. Two of these go back to the 1930s, and the other two date to within the last 10 years.

Discussion: This site falls just outside the identified areas and is only mentioned because it is very close to the border with the farm Eenzaamheid 512LQ.

Recommended management action: 1 = no further investigation/action necessary

Legal requirements: If relocation is necessary, SAHRA permit; local government permits; notification of descendants.

4. Site number: 2327DA3

Location: Kuipersbult 511LQ: S -23.71889; E 27.55988

Description: Single grave. Inscription: MS Moloantoa 25/5/1848 - 24/12/1953

Discussion: If development takes place, this feature would have to be relocated.

Recommended management action: Relocate grave if necessary.

Legal requirements: If relocation is necessary, SAHRA permit; local government permits; notification of descendants.

5. Site number: 2327DA11

Location: Groothoek 504LQ: S -23.66140; E 27.67658

² See Appendix 1 for an explanation of the conventions used in assessing the heritage remains.

Description: Apparently this is the headgear of the first shaft that was sunk in this area before large scale mining took place (Fig. 11).

Discussion: Fortunately, this site is located far from future development and would not be impacted on. Furthermore, it is already fenced in and therefore enjoys a certain amount of protection.

Recommended management action: 3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary.

Legal requirements: SAHRA permit

APPENDIX 3: GLOSSARY AND ABBREVIATIONS

This section is included to give the reader some necessary background. It must be kept in mind, however, that these dates are all relative and serve only to give a very broad framework for interpretation.

STONE AGE

Early Stone Age (ESA)	2 000 000 - 150 000 Before Present
Middle Stone Age (MSA)	150 000 - 30 000 BP
Late Stone Age (LSA)	30 000 - until c. AD 200

IRON AGE

Early Iron Age (EIA)	AD 200 - AD 1000
Late Iron Age (LIA)	AD 1000 - AD 1830

HISTORICAL PERIOD

Since the arrival of the white settlers - c. AD 1840 in this part of the country

ADRC - Archaeological Data Recording Centre

core - a piece of stone from which flakes were removed to be used or made into tools

PHRA - Provincial Heritage Resources Agency

SAHRA - South African Heritage Resources Agency

ILLUSTRATIONS

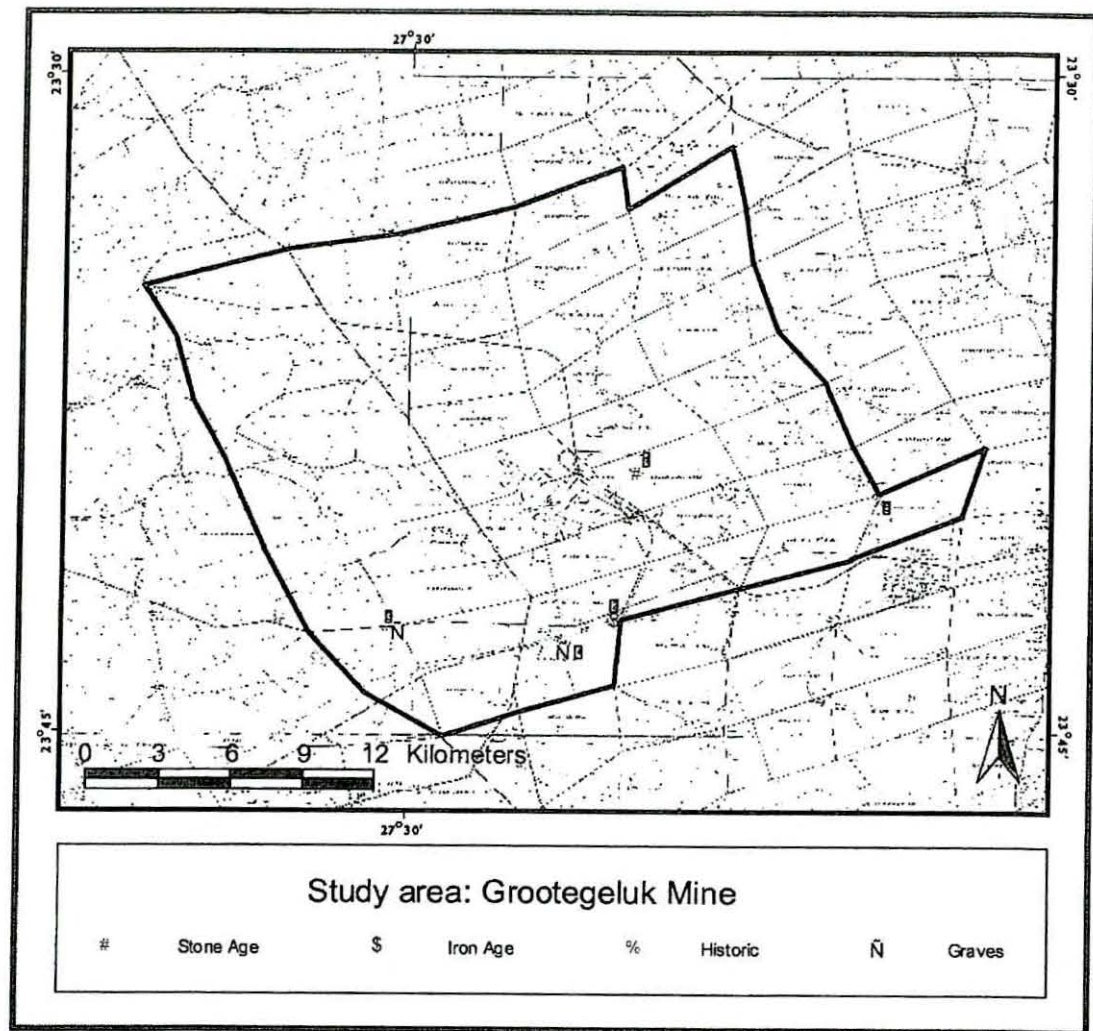


Figure 2. Location of the study area, showing the identified sites.

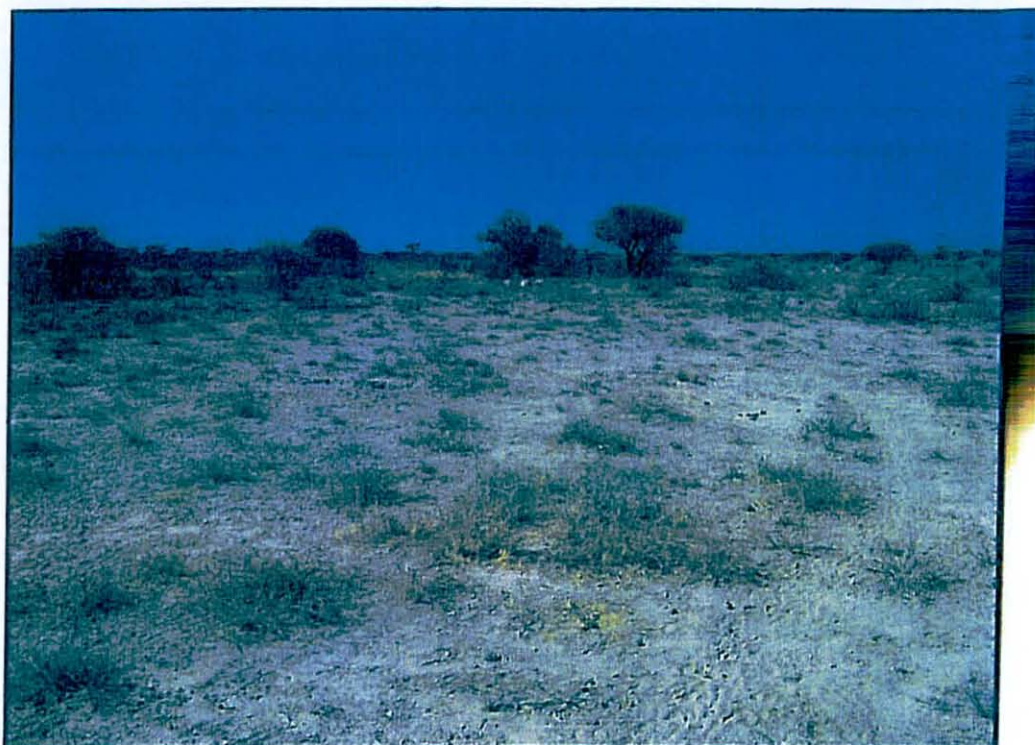


Figure 3. Eendragpan on the farm Gelykebult 450LQ.

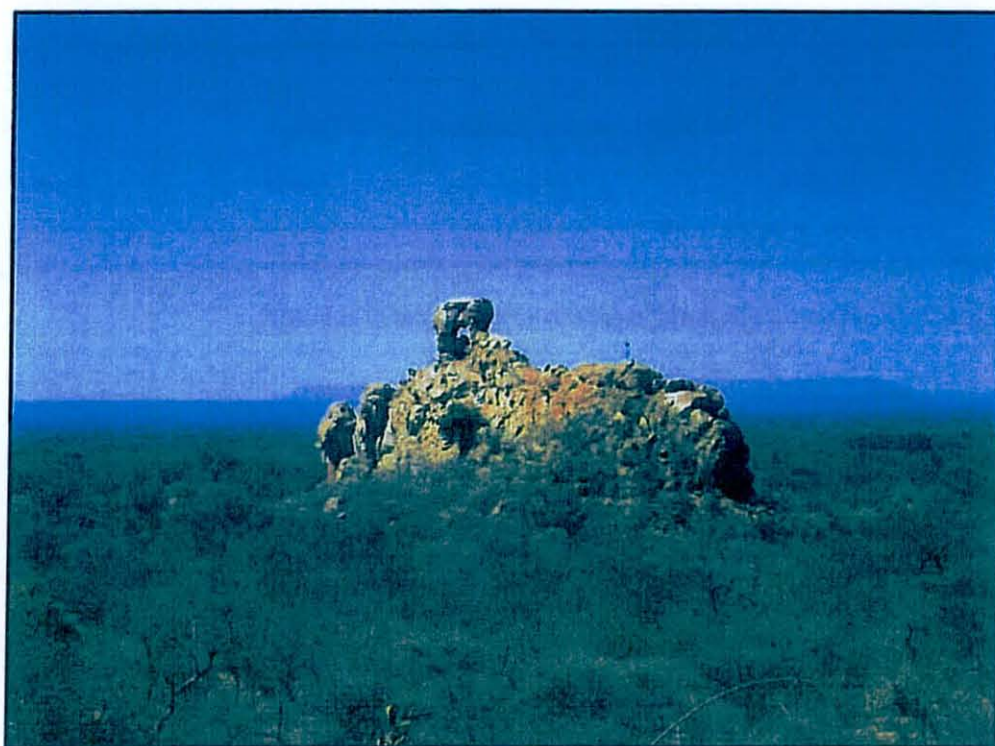


Figure 4. The outcrop known as 'Koei', on the farm Welgevonden 444LQ.



Figure 5. The remains of the old farmstead on the farm McCabesvley 311LQ.

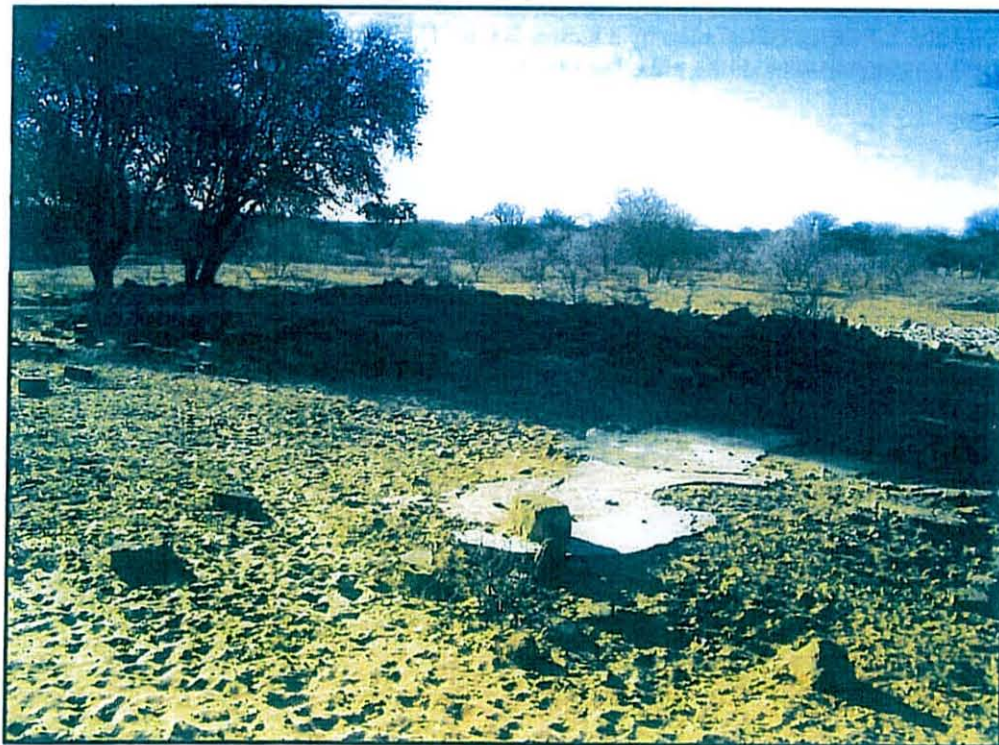


Figure 6. Remains of the old farmstead on Eendragtpan 451LQ.

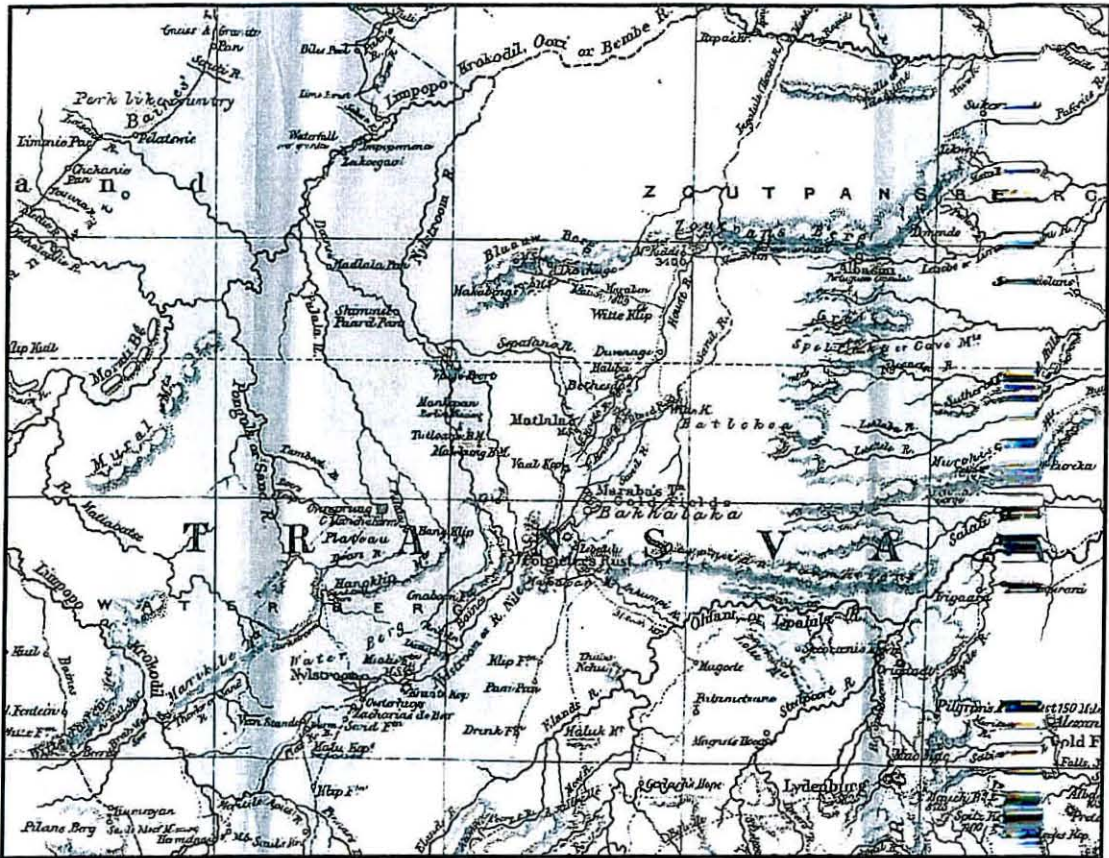


Figure 7. Portion of the map by Thomas Baines (1877), showing not only the absence of settled communities in the area, but also the general lack of knowledge.

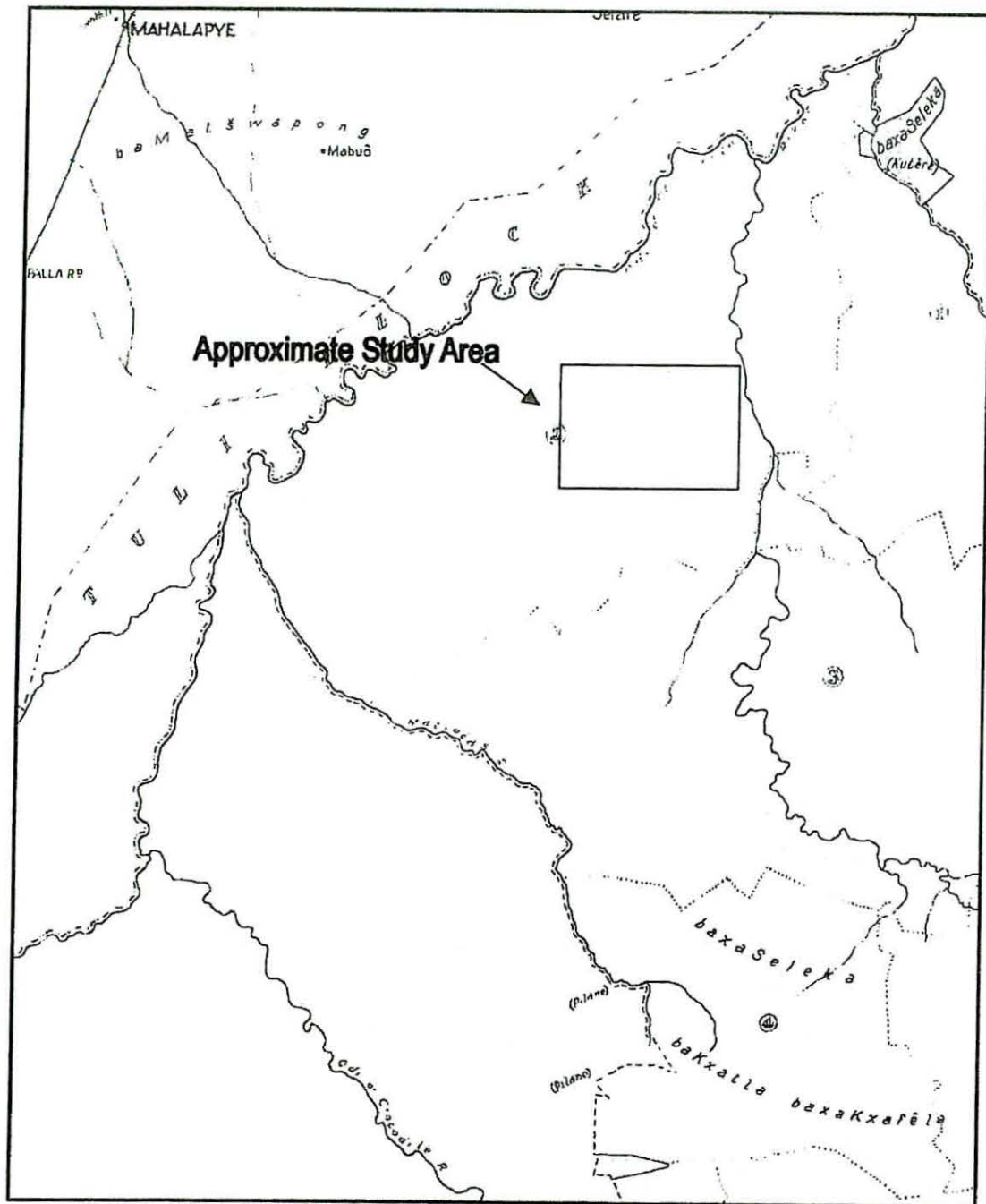


Figure 8. Map of the study area showing the distribution of Bantu-speaking communities in the larger region (Van Warmelo 1935). (One orange dot represents 10 individuals, c. 1935.)

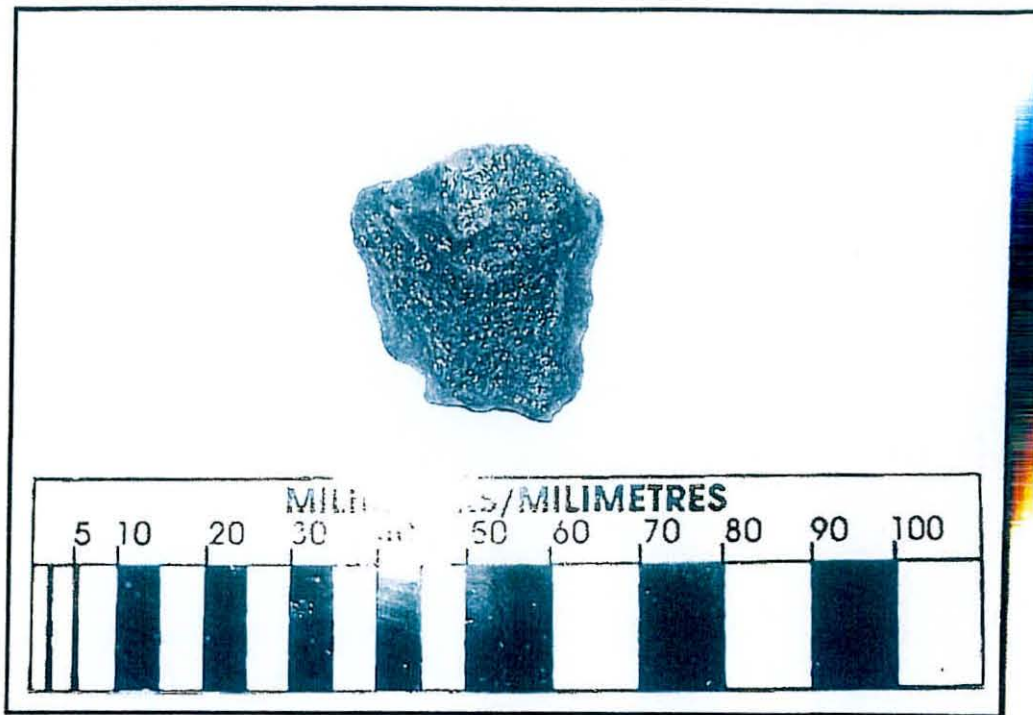


Figure 9. Quartzite stone tool dating to the Middle Stone Age, found near the edge of the pan.

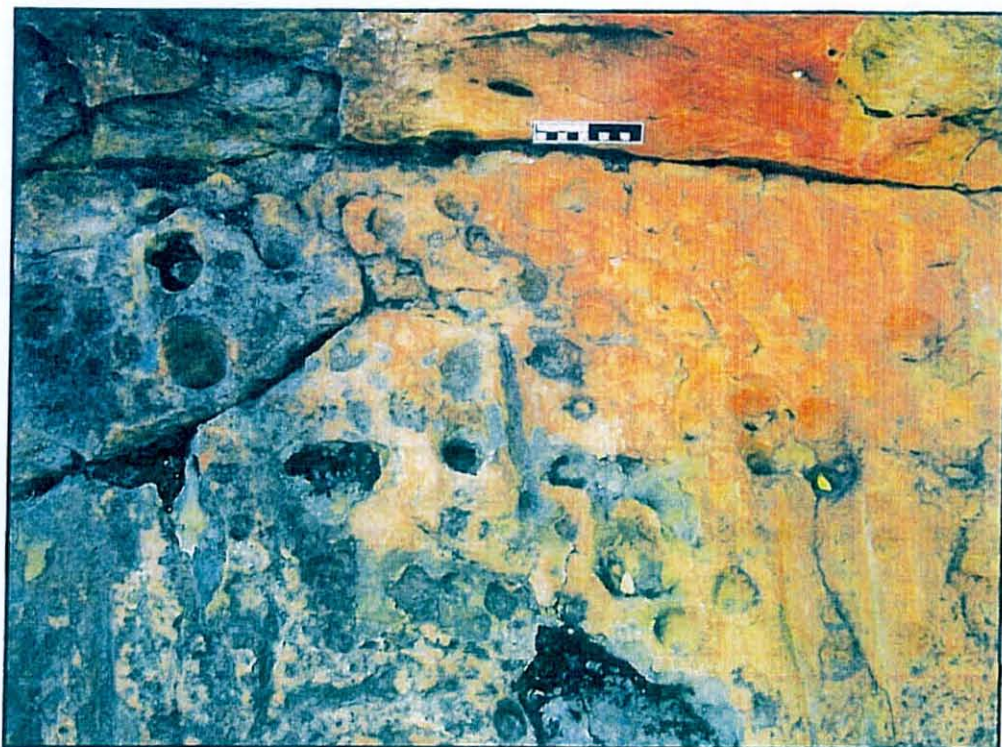
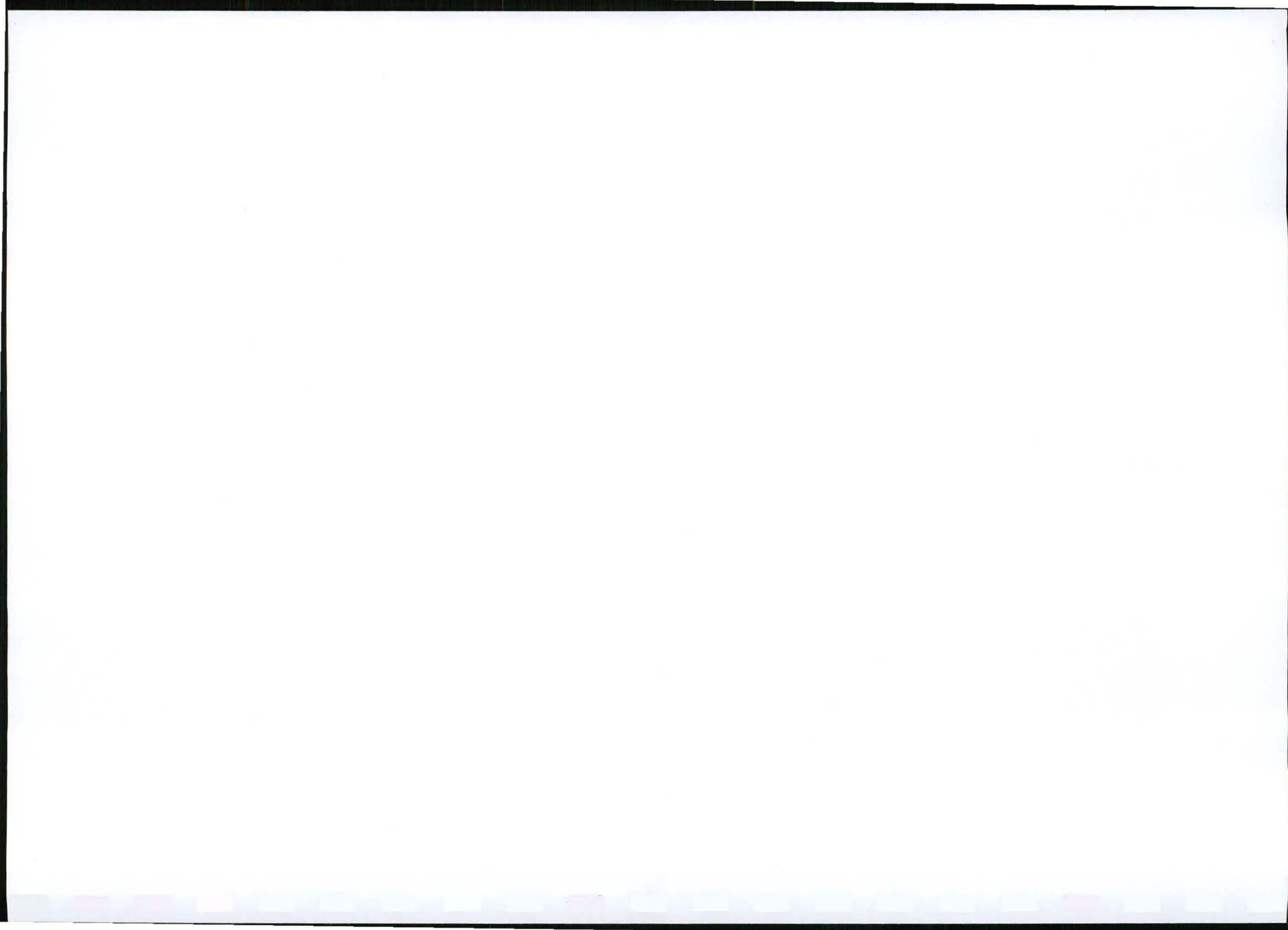


Figure 10. Cupules and cut marks in the rock shelter on Nelson's Kop



Figure 11. The old headgear on Groothoek 504LQ.



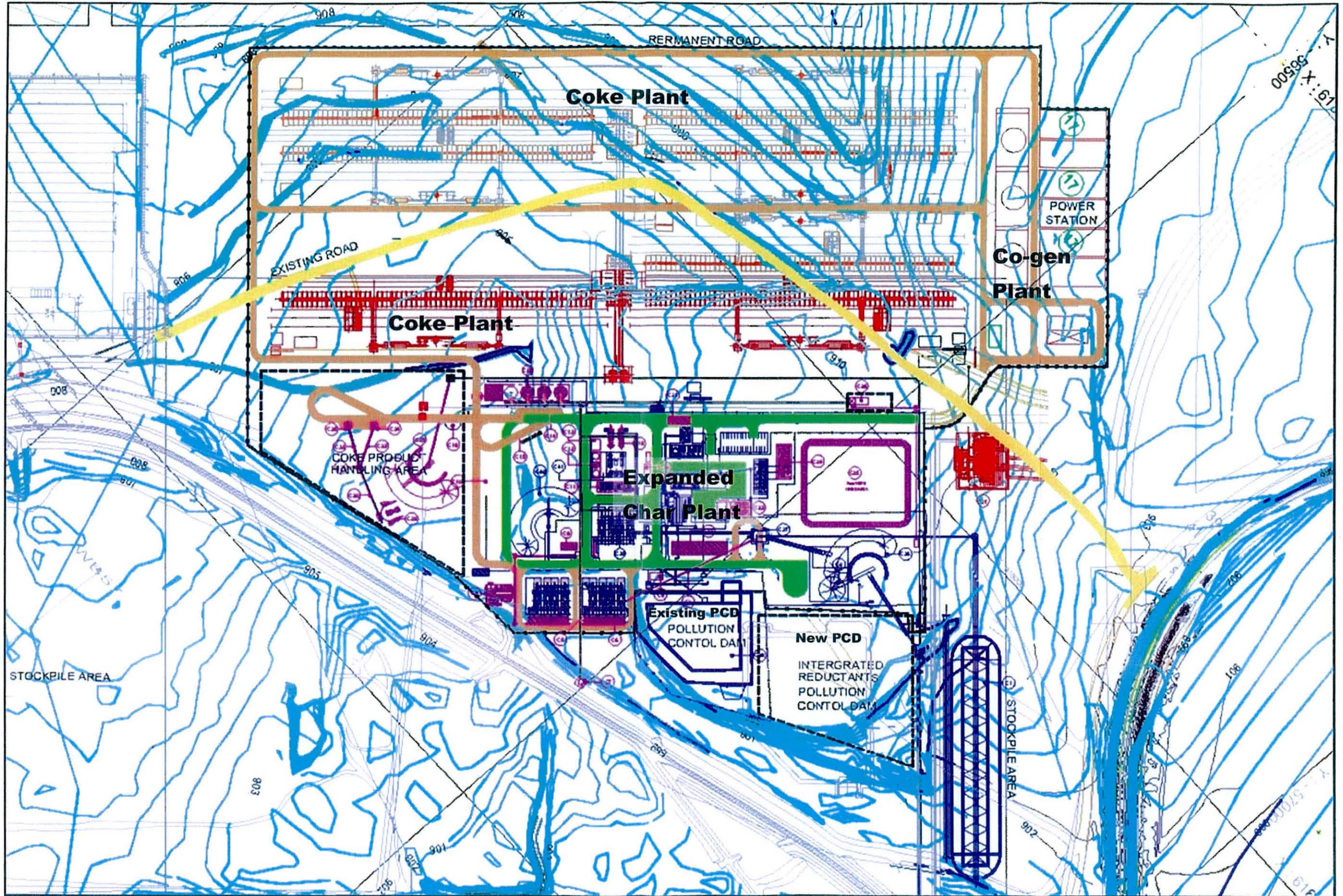


Figure 6: Site Layout of Char Manufacturing Plant Expansion, Coke and Co-gen Plants (undergoing a separate EIA)

