

COALTECH

RESEARCH ASSOCIATION



PROJECT PROPOSAL

1.	Project Number:	6.2
2.	Project Title	Greenhouse gas emission from SA coal mines
3.	Project Leader	Alan Cook
4.	Company & Division	Itasca Africa
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10. Brief Description of Project:

SCOPE

Quantify greenhouse gas (GHG) emissions from underground, surface and abandoned coal mines. Sample for target gases, and analyse for expected low ppm range emissions. Review results as total annual emissions in formats suitable for inclusion in SA national inventory, and/or in format as determined with industry. Develop specific emission models for application by SA mining industry as production, and other relevant factors, change.

This work will combine with, and expand on, the previous methane emission measurement and model development completed for Coaltech 2020 (Cook 2005). Where applicable, it will make use of the previous data, as well as the new data and other available data, and be extended to include more GHG target gases.

Peer review is included for all Tasks, at each significant sub-task (see Gantt chart) to confirm procedures, methodology, evaluation and report.

TASK 1. Underground mines – surface fan emissions. (2009)

Review previous Coaltech data, and other available data from individual SA mines or SA mining companies, including but not limited to spot samples, continuous monitoring, atmospheric

pressure, temperature, methane, carbon dioxide, other gases. Evaluate as inclusion to the emission calculations and models.

Measure emissions of significant GHG such as methane, carbon dioxide and nitrous oxide emissions at a surface fan on five different mines, and measure oxides of nitrogen and sulphur and also ammonia at two mines.

Analyse results in terms of total annual emissions and the relative significance of each gas in terms of GHG coal mining emissions. Review the requirement for extension of the measurements to further underground mines.

Report on the emissions and include the results as input data for the emission models.

TASK 2. Underground mines – goafs, drainage, flares, other sources. (2010)

Develop initial methodology and measure emissions of significant GHG such as methane, carbon dioxide and nitrous oxide emissions from other areas of underground mines. This will include, but not necessarily be limited to, goafs, sealed areas, drainage, flares and other gas usage.

Analyse results in terms of total annual emissions and the relative significance of each gas in terms of GHG coal mining emissions. Review the requirement for extension of the measurements to further areas and additional underground mines.

Report on the emissions and include the results as input data for the emission models.

TASK 3. Abandoned mines. (2011)

Develop initial methodology and measure emissions of significant GHG such as methane, carbon dioxide and nitrous oxide emissions from abandoned mines. This will include for example sealed shaft areas and collapsed shallow workings.

Analyse results in terms of total annual emissions and the relative significance of each gas in terms of GHG coal mining emissions. Review the requirement for extension of the measurements to further abandoned areas and additional abandoned mines.

Report on the emissions and include the results as input data for the emission models.

TASK 4. Surface mines – develop methodology and first site. (2010)

Develop initial methodology to measure GHG emissions from South African opencast coal mines.

Measure emissions of significant GHG such as methane, carbon dioxide, nitrous oxide, and oxides of nitrogen and sulphur, at one opencast coal mine. This will include emissions from the pit, overburden, coal seams, spoil heaps, backfill.

Review the results in terms of the annual emissions, the success or otherwise of the developed methodology, and the extension of the measurements to further opencast mines.

Report on the emissions and include the results as input data for the emission models.

TASK 5. Surface mines – additional sites. (2010)

After initial development by Task 4, refine the opencast methodology, and measure emissions at additional opencast coal mines.

Analyse results in terms of total annual emissions and the relative significance of each gas in

terms of GHG coal mining emissions. Review the requirement for extension of the measurements to further surface mines.

Report on the emissions and include the results as input data for the emission models.

TASK 6. Emission models. (2010 / 2011)

Develop initial specific emission models of significant GHG for coal mining operations, with particular emphasis on factors including, but not limited to, e.g. increased production rates and increased fuel and power consumption.

The existing models for methane emissions for underground and surface mines will be extended to include other gases, and to include all the new input data from underground, surface, abandoned mines as well as the other underground areas and the use of methane or other gases.

Submit all models and emission calculations to review for inclusion as Tier 2 estimation in SA GHG inventory. Note that previous estimates including the Coaltech calculations (2005) are accepted as Tier 2 in the "Greenhouse Gas Inventory for South Africa 1990-2000" July 2009, (email P Lloyd, Sept 2009).

TASK 7. Atmospheric samples – if required. (2010 / 2011, to be confirmed)

Measure atmospheric concentrations of emissions of significant GHG such as methane, carbon dioxide, nitrous oxide, and oxides of nitrogen and sulphur. Samples will be collected by aircraft or similar methodology in the atmospheric plumes from mining operations.

Results will be combined with the site measurements and analysed in terms of total annual emissions and the relative significance of each gas in terms of GHG coal mining emissions. Review the requirement for extension of the measurements to further areas and mines.

Report on the emissions and include the results as input data for the emission models.

11. Proposed Start Date :	Sep 2009	12. Expected Completion Date:	Jun 2011
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13. Research task deliverables:

Quantified GHG emissions for surface, underground and abandoned coal mines
Peer reviewed GHG emission prediction models for SA coal mines

14. IMPACTS:

(i) Safety:
(ii) Health:
(iii) Environment: quantified GHG emissions
(iv) Society:
(v) Economy:

15. Cost Breakdown:

	2008/2009 R	2009/2010 R	2010/2011 R
MANPOWER COSTS Identify each member of the team, either by name or by function e.g. engineer, technician			
Alan Cook (project leader, GHG specialist)	121 600	441 184	165 516
Tony Leach (geologist / rock engineer specialist)		157 120	49 380
Technician (proposed Mr D Kekua)	40 000	112 000	18 000
Engineer (proposed Mr L Maseko)		223 850	84 150
RUNNING COSTS Specify items e.g. stationery, travel Avoid generic terms e.g. consumables, materials Give details of any planned foreign travel Give details of any planned conference attendance			
Travel etc	49 595	173 719	24 206
Sit equipment		350 000	50 000
CAPITAL (i.e. equipment of which the economic lifetime exceeds that of the project) List items			
SUBCONTRACTORS/COLLABORATORS Identify each subcontractor/collaborator, either by name or by function e.g. engineer, technician.			
necsa. Pelindaba Analytical Laboratories	138 500	598 300	90 400
Peer reviewers (Prof P Lloyd, Mr D Marais)	20 000	106 800	33 200
SUBTOTAL	369 695	2 162 973	514 852
VAT	51 757	302 816	72 079
TOTAL	421 452	2 465 789	586 931

16. Details of foreign currency, if any, included above:

Currency Unit:

Amount in Foreign Currency:

Exchange Rate used:

Total in Rands:

	2009	2010	2011
	n/a	n/a	n/a

Forward exchange rate cover:
(Indicate which is applicable)

YES	NO
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17. Details of Subcontractors/Collaborators:

Name of Company	Activity	Cost
PAL, necsa	Specialised on-site gas sampling. Gas analysis (GC-MS)	

18. COALTECH Project Proposal Presented by:

A P Cook
PRINT NAME

SIGNATURE

24 Aug 2009
DATE

Approved by COALTECH Olifants River Steering Committee Chairperson:

PRINT NAME

SIGNATURE

DATE

Approved by the Manager: COALTECH :

J S Beukes
PRINT NAME

SIGNATURE

DATE

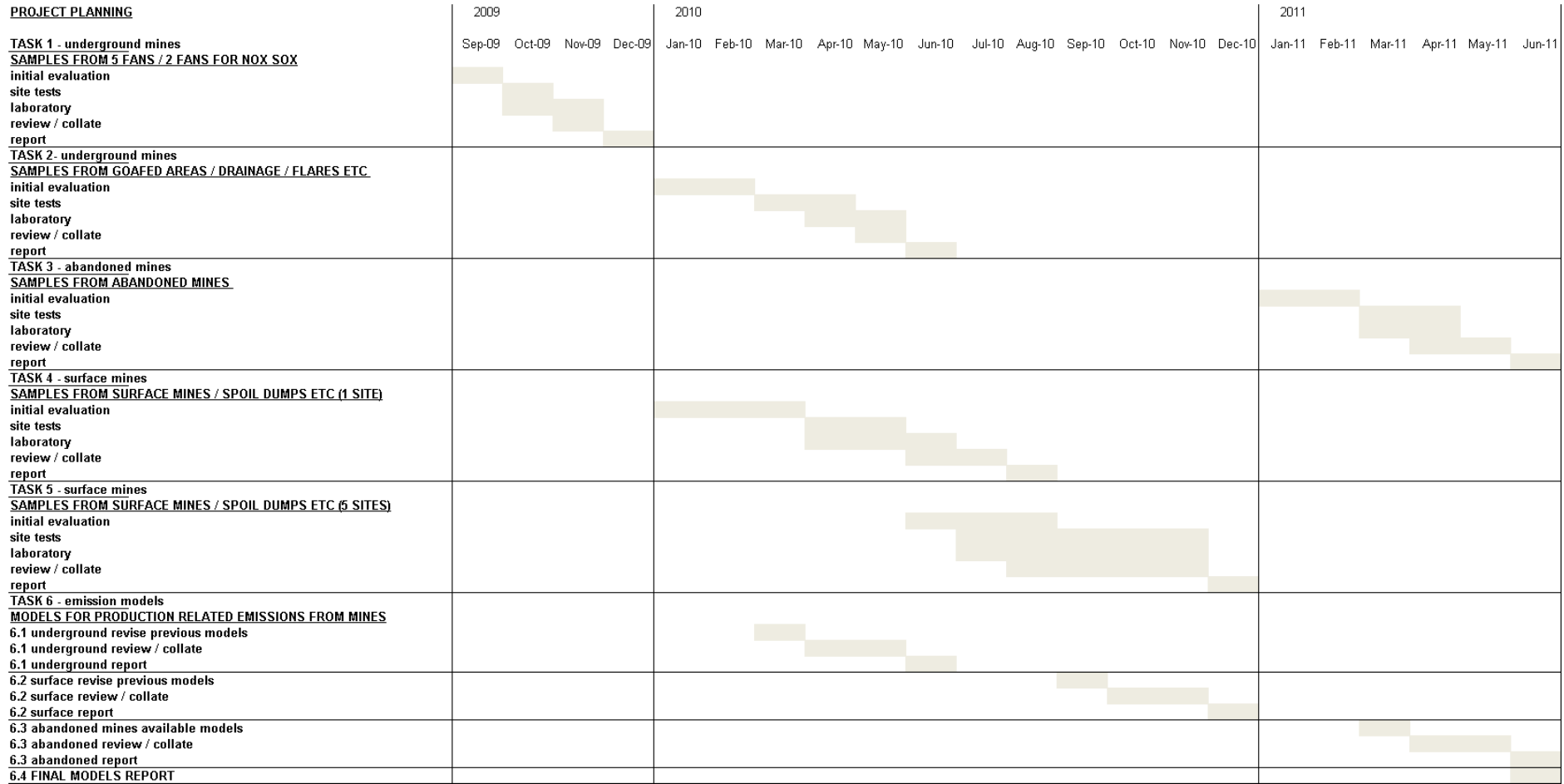
19. Project Plan (a Gantt chart is requested if the task duration exceeds 6 months)

Sub-task No:	Sub-task Description	Expected Result	Deliverable	Start Date	Due Date	Cost
Task 1	Underground mines – surface fan emissions	Quantify all emissions from surface fans and other underground operations	Report on surface emissions from underground mines	Sept 09	Dec 09	R 369 695
Task 2	Underground mines – goafs, drainage, flares, other sources	Quantify emissions from other underground sources	Report on emissions from other underground sources	Jan 10	Jun 10	R 334 825
Task 3	Abandoned mines	Quantify emissions from abandoned mines and similar sources	Report on emissions from abandoned mines	Jan 11	Jun11	R 394 600
Task 4	Surface mines – develop methodology and first site	Develop suitable methodology and measure at one site	Report on methodology and initial GHG emissions	Jan 10	Aug 10	R 421 450
Task 5	Surface mines – additional sites	Quantify emissions from additional surface mines	Report on emissions from surface mines	June 10	Dec 10	R 1 162 550
Task 6	Emission models	Develop GHG emission models suitable for emissions prediction for the SA coal mining industry	GHG emission models	Mar 10	Jun 11	R 364 400
Task 7	Atmospheric samples – if required	High level measurements (aircraft) - if required	Report on plume emissions	No details	No details	No details
			TOTAL (Excl. VAT)			R 3 047 520

GANTT CHART:

COALTECH

Project Number:



20. INFORMATION ON ALL RESEARCH TEAM MEMBERS, INCLUDING SUBCONTRACTORS & COLLABORATORS
(Required by THRIP)

Surname	Initials	Title	ID No.	Academic qualifications	Population group A=African C=Coloured I=Indian W=White	Gender M/F	FRD Rating (if applicable)	Department	Institution	% time spent on this project p.a.
COOK	AP	Mr	6104135244188	MSc Mining BSc HONS Mining Engineering	w	m		Consultant / Director / GHG Specialist	Itasca Africa	25
MASEKO	L	Mr		BSc	a	m		Lecturer / researcher / Engineer	UNISA	16
KEKUOA	D	Mr		Matric Cert	a	m		Technical	Itasca Africa	10
LEACH	A	Mr		MSc Geology	w	m		Consultant / Rock Engineer specialist	Itasca Africa	8
MARAIS	D	Mr		MSc	w	m		Consultant / reviewer	Dial Env Services	2
LLOYD	P	Prof		Prof	W	M		Consultant / reviewer		2

