IMPLEMENTATION OF A NEW MINING COURSE AT POLYTECHNIC/ NUST IN NAMIBIA

Status, Tasks & Problems

PRESENTATION TO
SOCIETY OF MINING PROFESSORS

29 June 2009

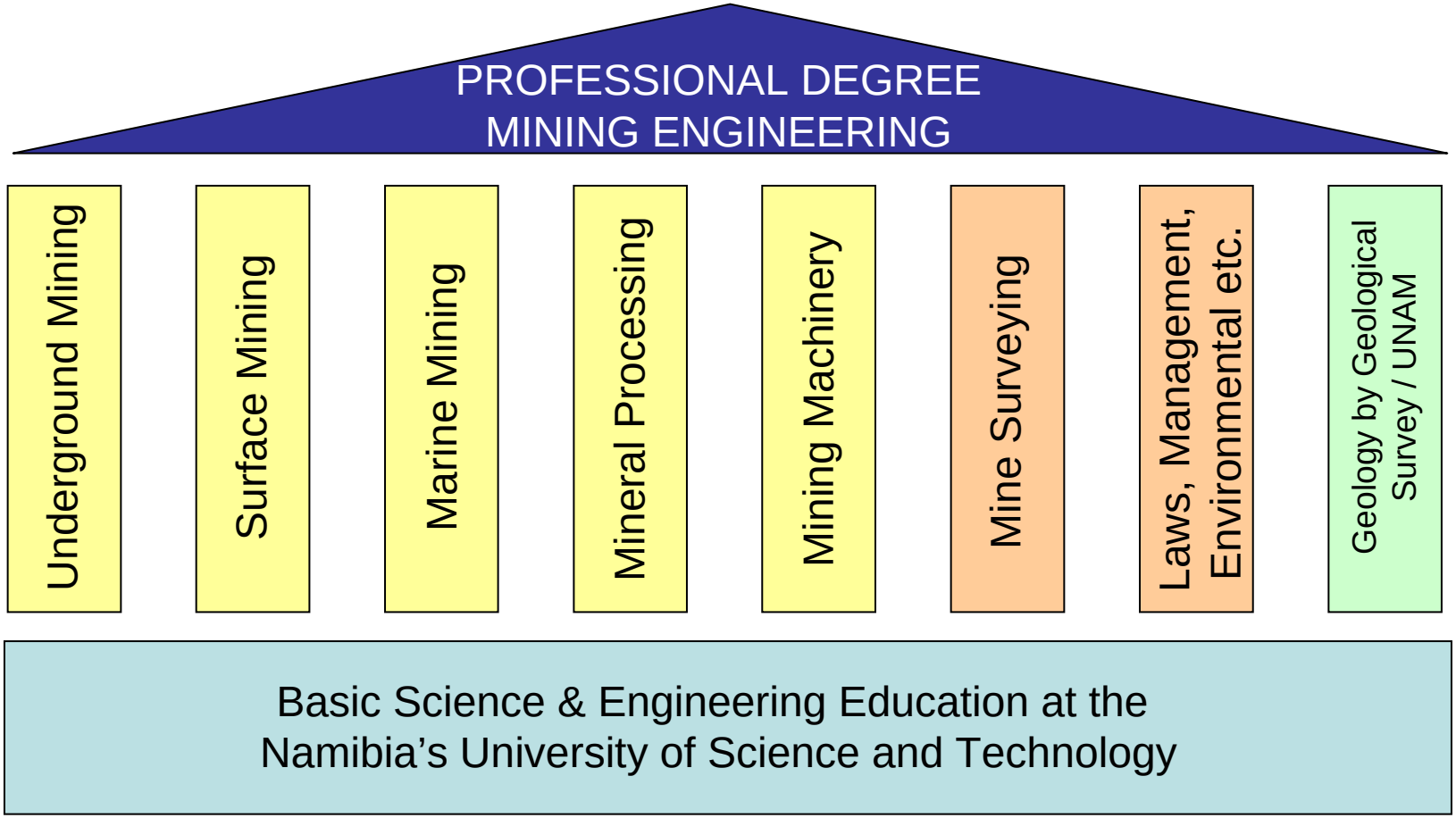
CONTENTS

- Status of the Implementation of the Mining Programme
- Mining In Namibia – an Enabling Environment?
- Staff Development and Outlook
- Problems with Sourcing of Qualified Staff
- International Collaboration
- Godfather System for Capacity Building
- Geo-Centre

Status of the Implementation

- Mining Programme started in January 2009
- First intake: 9 students
- Mining Department created in June 2009
  - Surface Mining
  - Underground Mining
  - Mineral Processing / Metallurgy
  - Geotechnic in Mining
  - Marine Mining

Structure of the Mining Engineering Programme at Polytechnic / NUST



B.Eng. (Mining) – Curriculum (I)

Year, Semester & Courses		Existing Courses at Polytechnic SoE	RP	NQA LEVEL
Year 1	**S1 - 2009**			
	Engineering Mathematics 115	same as for DME	DMS1	5
	Engineering Mechanics 114	same as for DME	SM1	5
	Engineering Physics 114	same as for DME	SM2	5
	Engineering Drawing 114	same as for DME	DM1	5
	Computer User Skills 113	same as for DME	SIT1	5
	Communication Skills 114	same as for DME	SCL1	5
	Engineering Geology I 114	similar as for DCIV	DCIV	6
	Mining Practice I 110		DMinE	4
	S2 - 2009			
	Engineering Mathematics 125	same as for DME	DMS2	5
	Engineering Chemistry 123	same as for DME	DCIV	5
	Material Science 124	same as for DME	DEE1	5
	Mechanics of Materials 124	same as for DME	SM3	5
	Electrical Engineering 124	same as for DME	DEE2	5
	Computer Aided Drawing 124	same as for DME	DM2	5
	Engineering Geology II 124		DMinE	6
	Mining Practice II 120		DMinE	4
Year 2	**S3 - 2010**			
	Engineering Mathematics 215	same as for DME	DMS3	6
	Geomechanics - Soil Mechanics 214	Same as Geotechnic1 for DCIV	DCIV	6
	Mechanics of Materials 214	same as for DME	SM5	6
	Fluid Mechanics 214	same as for DME	EE1	6
	Electrical Machines 214	same as for DME	DEE3	6
	Surveying 1	Same as Survey for DCIV	DLM	5
	S4 - 2010			
	Numerical Methods 224	same as for DME	SM6	6
	Thermodynamics 225	same as for DME	EE2	6
	Principles of Design 224	same as for DME	DM4	6
	Surveying 2 - Mine Surveying 223	Taken from t DLM	DLM	7
	Geomechanics - Rock Mechanics 223	probably at DCIV?	DMinE	6
	Introduction into Mining 223		DMinE	6
	Mining Practice III 220			4

B.Eng. (Mining) – Curriculum (II)

	S5 - Compulsory - 2011	**Existing Courses at Polytechnic SoE**		
	Machine Design 315	same as for DME	DM6	7
	Environmental Engineering in Mining 314		DMinE	7
	Engineering Management 314	same as for DME	PM2	7
	S5 - Electives - 2011			
	Specialisation Mining Production			
	Mining Law and Licenses 313		DMinE	7
	Mineral Deposits 313		DMinE	7
	Geophysical Systems 313		DMinE	7
	Specialisation Mineral Processing			
	Statistics 314	same as for DME	DMS4	7
	Systems Modeling 313	same as for DME	SM9	7
	Experimental Methods 315	same as for DME	SM10	7
Year 3				
	S6 - Compulsory - 2011			
	Mineral Project Management 323		DMinE	7
	Professional Writing 324	same as for DME	SCL2	6
	Mineral Processing I 324		DMinE	7
	Mine Planning I 324		DMinE	7
	S6 - Electives - 2011			
	Specialisation Mining Production			
	Mining Methods Underground Mining 323		DMinE	8
	Mining Methods Surface Mining 323	same to DCIV	DMinE	8
	Specialisation Mineral Processing			
	Electronics 324	same as for DME Electronics 224	DEE4	6
	Control Systems 324	same as for DME	SM11	7

B.Eng. (Mining) – Curriculum (III)

	S7 - Compulsory - 2012	**Existing Courses at Polytechnic SoE**		
	Research Methodology 414	same as for DME	DCE2	8
	Conveying and Hauling Technology I 413	same as for DCIV	DCIV	8
	Mineral Processing II 414		DMinE	8
	S7 - Electives - 2012			
	Specialisation Mining Production			
	Mine Planning II 414		DMinE	8
	Mining Engineering Project -Underground 411		DMinE	8
	Mining Equipment Surface Mining 413	same as for DCIV	DMinE	8
	Mining Equipment Underground Mining 413		DMinE	8
	Specialisation Mineral Processing			
	Processing Plant Design I - 413		DMinE	8
	Crushing and Grinding 413		DMinE	8
	Process Mineralogy 413		DMinE	7
Year 4	**S8 - Compulsory - 2012**			
	Mining Engineering Project 421		DMinE	8
	Mine Economics and Mine Valuation 423		DMinE	8
	Health and Safety Protection in Mining 423		DMinE	8
	S8 - Electives - 2012			
	Specialisation Mining Production			
	Mine Ventilation and Climate Conditioning 424		DMinE	8
	Shaft Sinking and Deep Foundations 423	same as for DCIV	DMinE	8
	Large Underground Excavation, Drifting and Tunneling 423	same as for DCIV	DMinE	8
	Conveying and Hauling Technology II 423		DMinE	8
	Mining Methods, Marine mining 424		DMinE	8
	Specialisation Mineral Processing			
	Processing Plant Design II - 423		DMinE	8
	Flotation 423		DMinE	8
	Waste Mangement in Mining 424	same as DCIV SWM2	DCIV	8
	Hydrometallurgy 423		DMinE	8
	Cleaner Production 425	same as DME	PM3	8
Year 5	**S9 - 2013**			
	Experiential Training with Bachelor Thesis 510		DMinE	8

Mining in Namibia - An enabling environment?

2007: 18 mines operating
2008: 20 mines operating

Dec. 2008: 4 coppermines from Weatherly PLC put under care and maintenance status

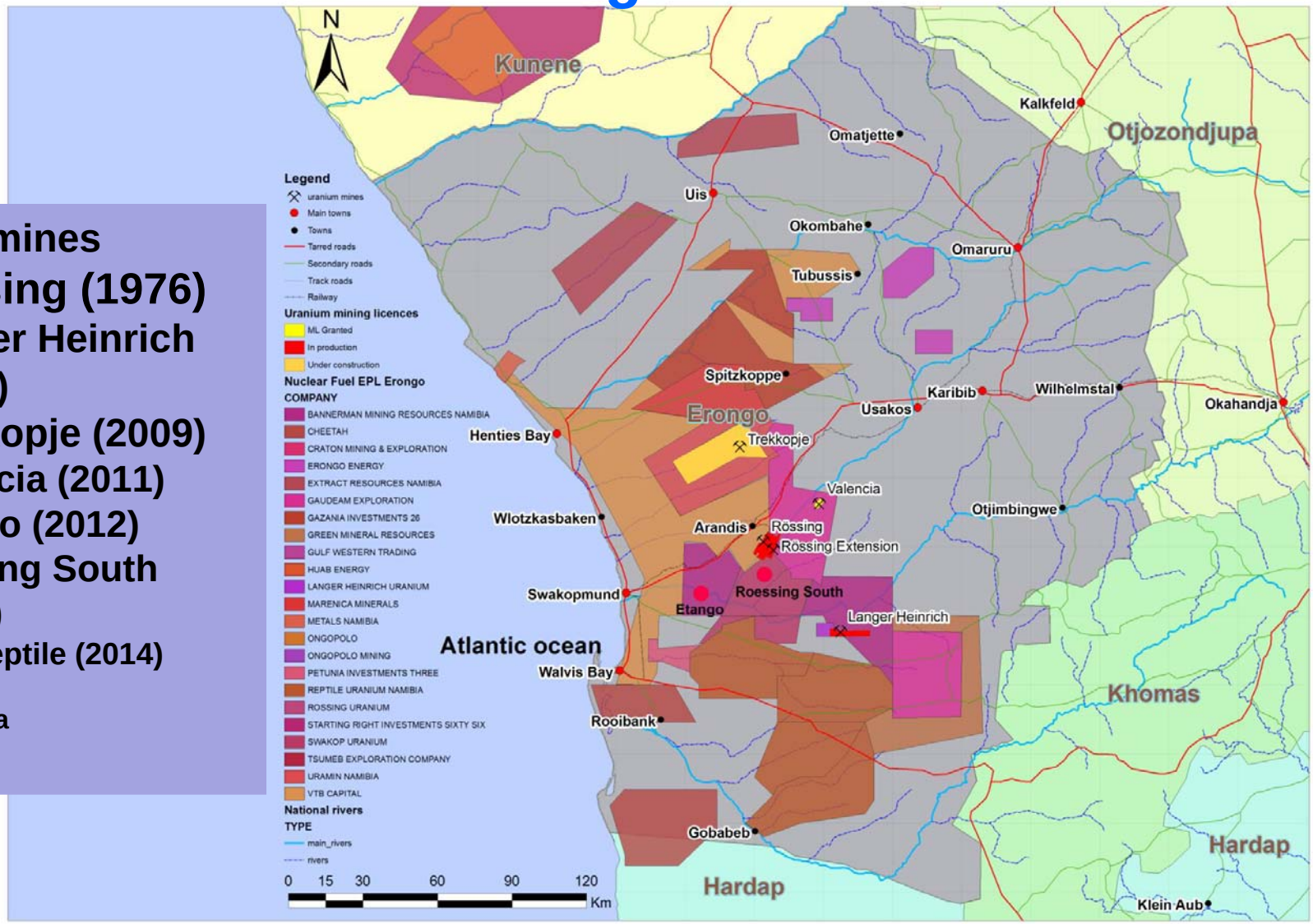
Feb. 2009: All diamond onshore operations from Namdeb under production stop for 5 month

Source: Chamber of Mines Annual Report 2006

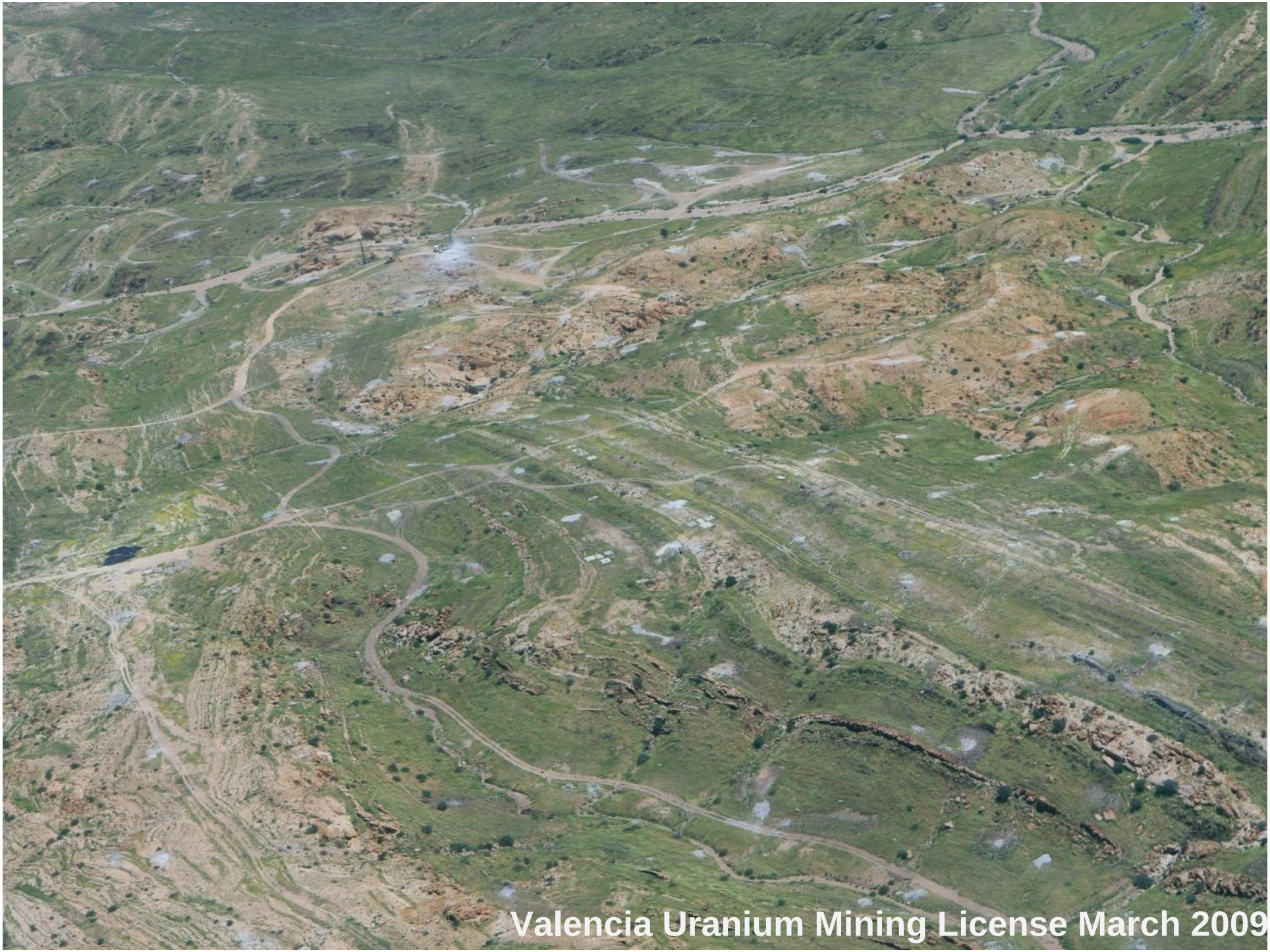
Mining in Namibia – An enabling environment!

Uranium mines

1. **Rössing (1976)**
2. **Langer Heinrich (2007)**
3. **Trekkopje (2009)**
4. **Valencia (2011)**
5. **Etango (2012)**
6. **Rössing South (2013)**
7. **Inca/Reptile (2014)**
8. **Namura**
9. **Marenica**
10. **Erongo**
11. **...**



Trekkopie Heap Leach Facility March 2009


Valencia Uranium Mining License March 2009

Staff Development and Outlook

Year==>	2009	2010	2011	2012	2013
Students	9	30	55	80	100
STAFF:					
Professor	2	1			
Associate Professor			1		
Senior Lecturer		1			
Lecturer		3	3	1	
Junior Lecturer				1	3
Lab Tech	1	2	1	1	
Secretary	1		1		
Workshop Staff			2	1	

Problems with Sourcing of Qualified Staff

- Currently two professorial chairs are being advertised (Surface Mining and Metallurgy)
- All mining engineers in Namibia are employed by the mines, poaching between the mines is common practise
- Extremely rigid and slow work permit process
- Polytechnic cannot compete with industry in terms of remuneration

Godfather System for Capacity Building

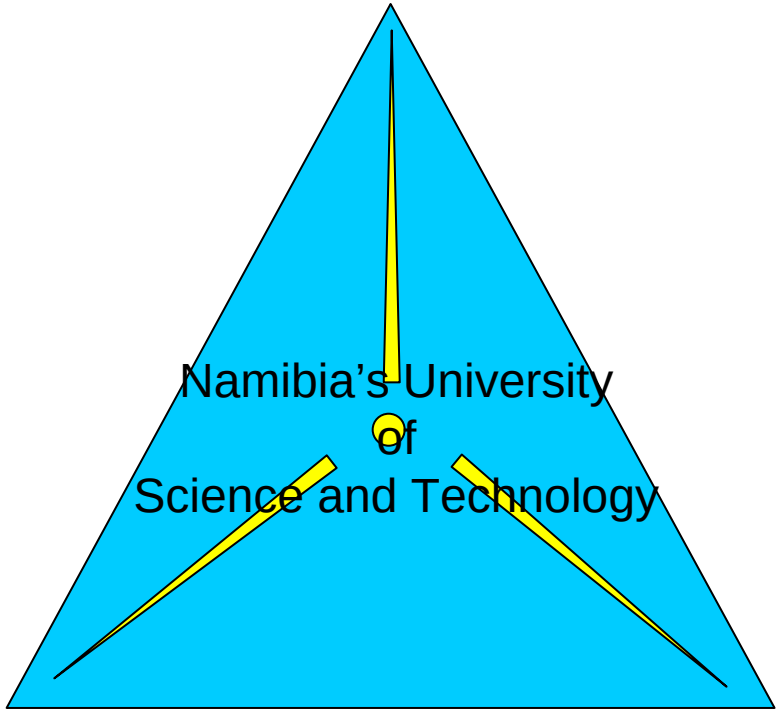
- Tying-in Professors from Partner Universities worldwide for taking a godfathership on a course and offering block lectures

- Employing young Namibian and SADC Mining Engineers (M.E.) for the respective courses as junior lecturers
- Namibian lecturers will accompany and support the visiting Professor during his lecturing campaigns
- Namibian lecturers will have to conduct research and read for their Ph.D. under the supervision of the visiting professor, both in Namibia and at the partner university.
- Namibians will gradually take over lecturing and research tasks from the visiting Professor, who still will act as a supervisor.
- Funds available with academic donor institutions

- Godfather System already successfully implemented in Civil Engineering together with German Universities

International Collaboration

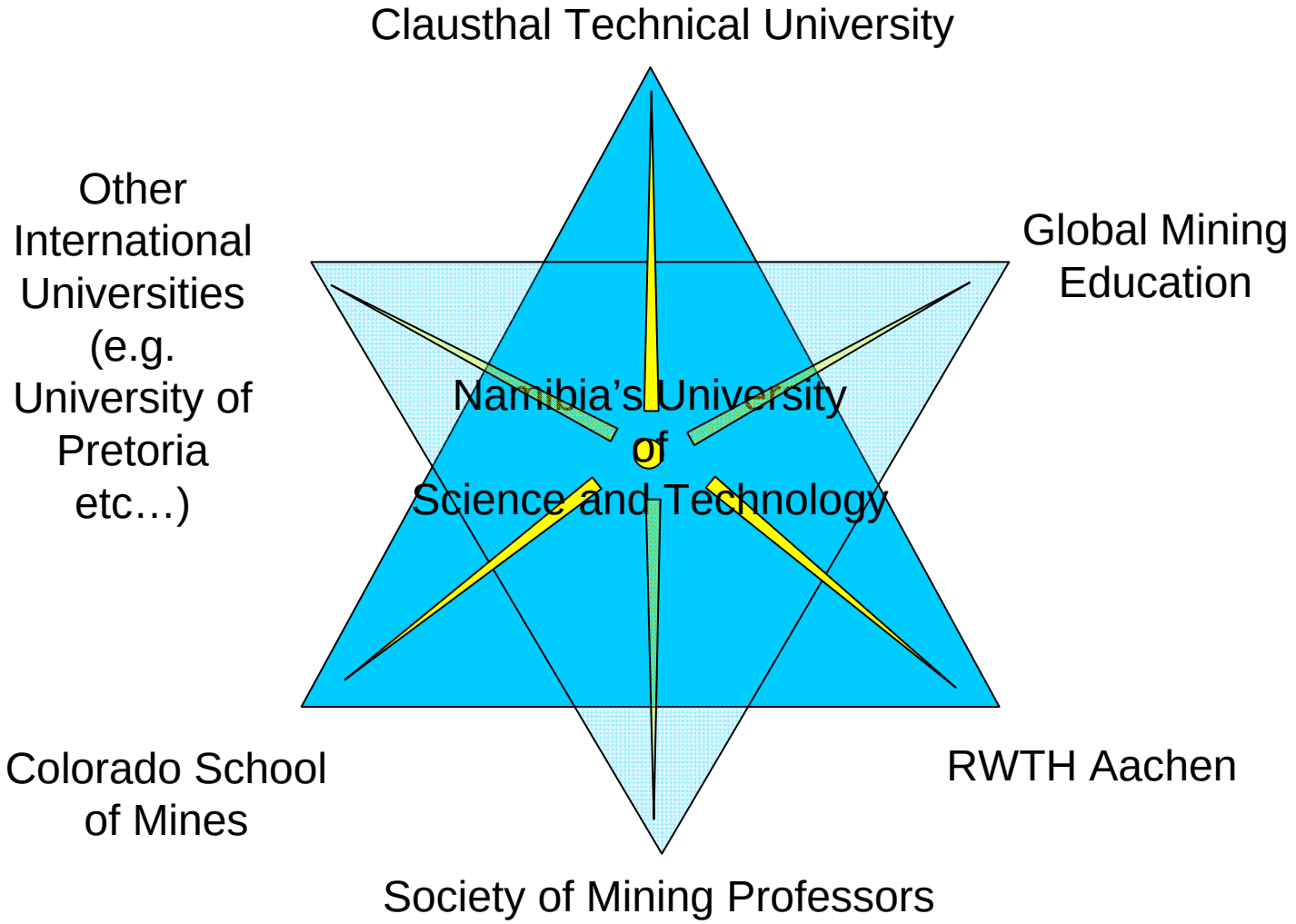
Clausthal Technical University



Colorado School of Mines

RWTH Aachen

International Collaboration – New Partners



Urgent Demand for Local Consultancy and Laboratory Services

- No accredited local laboratories –
  no local laboratories at all!
- No Centre of Excellence for consultancy services available
- No Centre of Excellence for post-graduate studies and further qualifying engineering and management courses

- Polytechnic/NUST and Chamber of Mines have jointly executed a sectorwide review to determine the demand

Engineering Services & Consultancy: Industry Feedback

Questionnaire GEO-Centre

Please complete the following questionnaire and send it back to:

Prof. Dr. Helmut Mischo
Polytechnic of Namibia
Private Bag 13388
Windhoek

Contact details:
Tel: (+264-61) 207-2064
E-mail: hmischo@polytechnic.edu.na

RESPONDENT

Name:Nico Rossouw

Title:Director - Mining

Company:EPS Mining Namibia

Contact Details:

Requested GEO-Centre Services	*yes*	*?*	*no*
1. Human Capacity Development	×	☐	☐
1.1 Specialised Qualifications and Courses (See suggestions below)	×	☐	☐
1.1 In-House Training	×	☐	☐
1.1 Internship	☐	☐	×
1.1 National and International Technical Meetings and Colloquia	×	☐	☐
2. Mining Engineering Consultancy / Studies / Research	×	☐	☐
2.1 Mine Planning Consultancy	×	☐	☐
2.2 Ore Body Modelling	×	☐	☐
2.3 Deposit Visualisation	×	☐	☐
2.4 Validation of Deposits	×	☐	☐
2.5 Open/Underground Pit Visualisation	×	☐	☐
2.6 Geotechnical Calculation and Consultancy Services	×	☐	☐
2.7 Mine Layout Optimisation (Resource Saving/Cost Reduction)	☐	☐	×
2.8 Mining Machinery Consultancy (Design, Selection and Efficiency)	☐	☐	×
2.9 New Mining Technologies/Latest Development	×	☐	☐
2.10 Mining Safety and Rescue	×	☐	☐
2.11 Mineral Processing Consultancy	☐	☐	×
2.12 Work Organisation – Planning Optimisation and Consultancy Services	☐	☐	×
2.13 National and International Mining Law and Regulations	×	☐	☐
3. Laboratory Services (eg. Experimental, testing, standards)	×	☐	☐
3.1 Samples Testing (Geotechnical Testing)	×	☐	☐
3.2 Ore Testing and Analysis	×	☐	☐
3.3 Ore Processing Tests	×	☐	☐
3.4 Metallurgical Tests	×	☐	☐
4. Geo-thermal studies/research	×	☐	☐
4.1 Environmental Studies/Research	×	☐	☐
5. Independent Energy Supply	☐	☐	×
6. Environmental Studies/Research	×	☐	☐
6.1 Solutions for the Minimisation and Compensation of the Effects/Impacts of Mining (Social/Economic/Ecological/Infrastructural)	×	☐	☐
6.2 Rehabilitation and Restoration of former Mining Areas and Plants	×	☐	☐

Others (your Suggestions):

7. Rock Engineering Courses (From basic Strata Control to more advanced Rock Engineering Courses/Qualifications)	×	☐	☐
8. Mine Managers Training (Course other than tertiary qualification, For people who have management potential and ability but have not had the opportunity to have tertiary education.)	×	☐	☐
9. Engineering Management and Maintenance Planning (Little is understood about the effect this has to the mining cycle and what impact this can have on the overall productivity of a mine)	×	☐	☐
10.	☐	☐	☐
11.	☐	☐	☐
12.	☐	☐	☐

Engineering Services & Consultancy

- Fully equipped GEO-CENTRE at Polytechnic, institutional & technical design and business plan developed together with German and Finnish partner institutions
- Competence and services for the Namibian mining community
  - Mineral Processing
  - Rock Mechanics
  - Mine Ventilation
  - Mining Methods
  - Mining Machinery
  - Minerals Processing
  - Mine Planning
  - Environmental Engineering

Geo-Centre at NUST

- 1st Floor: Classrooms and Mining Laboratories
- 2nd Floor: Department of Mining Engineering
- 3rd Floor: Geo-Centre

THANK YOU

&

GLÜCK AUF!