

ICVL BENGA CHPP

Supply & Installation of Laser Based Conveyor Mounted Real- Time Ash & Moisture Analyser

SCOPE OF WORKS

Annexure “K”

CONTENTS

1. Background of the company	-----	3
2. Benga Mine Operations - An Overview	-----	3
3. Scope of Work	-----	4
4. Indicative System Design Criteria	-----	5
5. Technical Features Minimum	-----	6
6. Scope of supply	-----	6

Supply & Installation of Laser Based Conveyor Mounted Real-Time ash & Moisture Analyzer**1. Background of the company**

1.1 Minas de Benga, Lda ("MBL") is a company registered under the laws of Mozambique. The company owns an opencast coal mine in Tete province (Moatize District), in Mozambique, named Benga coal mine. MBL is a subsidiary of International Coal Ventures Pvt. Ltd. (ICVL), a New Delhi (India) based company registered under the laws of India. ICVL is a Joint Venture company promoted by some of the largest steel/ mining sector public companies of India, namely Steel Authority of India Limited (SAIL), Rashtriya Ispat Nigam Limited (RINL) and NMDC Ltd.

2. Benga Mine Operations - An Overview

- 2.1 Benga Coal Mine is a multi-seam (Seams B to N), open cast operation with over 200 million tonnes of proven coal reserves. It started mining in the later part of 2012.
- 2.2 The mine has a Coal Handling and Preparation Plant (CHPP) operating since 2012, having a designed capacity to process 5.3 Mtpa Run-of-Mine (ROM) coal. The ROM coal after washing in the CHPP produces three coal products namely Hard Coking Coal at 10% to 13.5% ash (HCC); Thermal Coal (TC) at 27.5% to 28% ash and Low Heat Value Coal at 50% to 60% ash (Power Grade Coal). Coking Coal with 13.5% ash has so far been exported to India for consumption by the promoter companies of ICVL in their own steel plants.
- 2.3 Ash Analysis is done by on-site laboratory with samples drawn by auto-samplers on product conveyors. The turn-around time for the lab analyses is 2-4 hours.

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3. Scope of Work

3.1 Benga Mine intends to improve product quality control by installing Conveyor mounted Ash and Moisture analyzers on the product conveyors. The current addresses the need for installing the first of these Ash and moisture analyzers at the 13.5% ash (HCC) Product Conveyor (CV804)

3.2 The contractor shall:

3.2.1 Design, supervise the installation, commissioning and calibrate the ash and moisture analyzer.

3.2.2 Supply all drawings & Manuals Including:

- Electrical Connection drawings
- General Arrangement Mechanical drawings

3.2.3 Include Product Support Agreement (PSA) for ongoing maintenance support for three years:

- Detailed monthly check including inspection of all raw data, checking all parameters are within bounds, comparison with provided lab data
- Monthly report including trending data.
- Phone/email/VoIP support

3.2.4 Include System Spare Parts for One (1) Year.

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4. Indicative System Design Criteria

Element of Interest	Min %	Max %
Coal Ash	13.2	13.7
Sulphur	0.88	1.1
Moisture	8	12
Calorific Value (CV)	TBC	TBC
Volatile Matter (VM)	TBC	TBC

Particle Size	-0.25mm - 50 mm		
Ash	8% - 15%		
Moisture	5% - 14%		
Ash Composition	Components	Min %	Max %
	SiO ₂	55	59
	Fe ₂ O ₃	25	27
	Al ₂ O ₃	4	5
	CaO	2	4
	MgO	0.5	1
	SO ₃	0.7	1
	P ₂ O ₅	1.5	3
	TiO ₂	1.7	1.8
	Na ₂ O	0.09	0.1
	K ₂ O	1.4	1.6

Belt Width	1,050 mm	
Belt Speed	190m/min (3.16m/s)	
Belt Loading Height	min	max
	100mm	40mm
Belt Feed rate (ave)	350tph	
Conveyor Inclination angle	0 degrees	

Note: Party may collect samples at its own to analyse and design.

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5. Technical Features

LIBS (Laser-Induced Breakdown Spectroscopy) capable of operating under harsh, dusty, humid, and corrosive conditions with ambient temperatures up to 50 degrees Celsius.

- a. Method of the analysis - online LIBS analysis, which provides data on the chemical composition of the material in real-time directly on the belt.
- b. **Design** - weatherproof, heavy-duty design with the temperature control system and stainless-steel case - suitable for operation in a dusty and wet atmosphere containing grit and micron-size dust particles or corrosive atmosphere.
- c. Measurement's standards — complies with ISO 15239.2 / ASTM D6543-00 (Online analysers evaluation standards).
- d. Environment temperature range — +5 °C ... +45 °C
- e. Laser Safety Standards — Comply with the IEC 60825-1 standard as a Class 1 laser product.
- f. **Integration with SCADA** — through Ethernet TCP/IP via Fibre Optic Cable.
- g. **Protection class** - IP65.
- h. Plant Voltages: 400Vac (3ph), 220Vac (L-N) ,24Vdc
- i. **Software Requirements:**
 - Capability to Communicate to Rockwell Control Logix PLC through Ethernet TCP/IP
 - Stand-alone PC with Operator Interface built on SQL database (including all required licenses)
- J. **Accuracy & Precision:**
 - Ash% Reading deviation Tolerance: 0.3
 - i.e. If actual Lab Tested Ash Percentage is 13.5%, instrument reading should, without fail indicate a value between 13.2% & 13.8% Ash Content.

K. Scope of supply (Minimum)

SI	Description
1	ONE LASER REAL-TIME ELEMENTAL ANALYZER Heavy-duty design with air-conditioning system and stainless steel 316 enclosure - suitable for operation under real industrial conditions.
2	All required Licenses, control, and calibration software
3	Manuals and documentation
4	Logistics to obtain Samples on Site as required
5	Commissioning including installation site inspection, mounting and connections supervision, on-site calibration adjustment, training of personnel in operation, maintenance and further calibration fine-tuning as required. System should be working 100% and all punch list items resolved before hand-over.
6	Warranty (minimum 12 months) after hand-over
7	Remote technical support over Internet, including software updates, assistance with calibration tuning within a warranty period. On-Site support if issues cannot be resolved remotely.

