INDO-US WORKING GROUP MEETING ON COAL

PRESENTATION

ON

COAL BENEFICIATION

By

Bharat Coking Coal Ltd.

4th April 2006, New Delhi

INTRODUCTION

- **BCCL incorporated in January, 1972 to operate the Coking Coal mines.**
- **Only source of Prime Coking Coal in the country for supply to Steel Plants.**
- **The company operates 6 Coking Coal Washeries and 4 Non-coking coal Washeries.**
- **Raw Coal input capacity:**
  - **Coking Coal Washeries - 9.13 MTY.**
  - **Non-coking Washeries - 4.4 MTY.**

  (Two Washeries (Barora & Lodna) with 0.9 MTY Capacity are temporarily closed.)

EXISTING WASHERIES

Name of Washery	Yr. Of commissioning	Operable Capacity (MT/Y)
Coking Coal:		
Dugda - II	1968	2.00
Bhojudih	1962	1.70
Patherdih	1964	1.60
Sudamdih	1981	1.60
Moonidih	1983	1.60
Mohuda	1989	0.63
Total		**9.13**
Non-Coking:		
*Dugda-I	1961 / 1998	1.00
**Madhuban	1998	2.50
***Barora	1982	0.42
***Lodna	1990	0.48
Total		**4.40**

*Dugda-I stopped since Oct'96 for safety reason and its Sink Upgradation section is being used for production of Washed Power Coal since 1998.

** Madhuban Washery started washing Non-Coking Coal from June 2003

***Barora & Lodna Washeries have been temporarily closed.

WASHING PROCESS

Washery	System of Washing
Dugda-II	HM Cyclone (13-0.5mm), Flotation (-0.5mm)
Bhojudih	Deshaling Jig (75-0mm), HM Bath (75-25mm), Batac Jig (25-0.5mm), Flotation (-0.5mm)
Patherdih	Deshaling Jig(75-0mm), HM Bath(75-13mm), HM Cyclone (13-0.5mm)
Barora	Deshaling Jig (75-0mm), HM Cyclone (25-0.5mm), Flotation (-0.5mm)
Sudamdih	2 Stage HM Cyclone (37-0.5mm), Flotation (-0.5mm)
Moonidih	2 Stage HM Cyclone (30-0.5mm),W/O cyclone(-0.5mm)
Mohuda	HM Cyclone (25-0.5mm),Hydro Cyclone(-0.5mm)
Lodna	Barrel (-50mm) /Cyclone washer(-13mm)
Madhuban	Batac Jig (13-0.5mm), Flotation(-0.5mm)

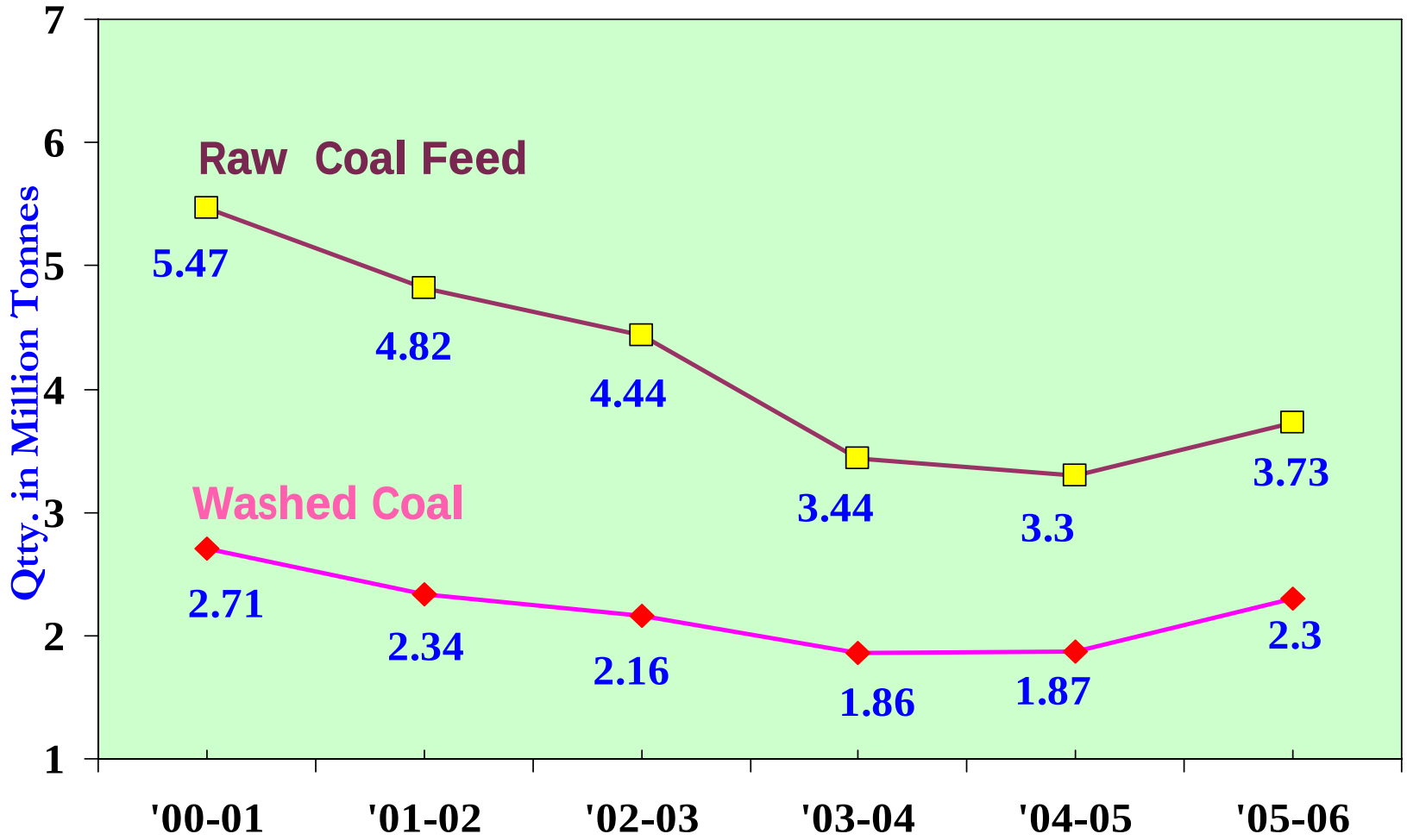
DESIGN PARAMETERS
vs.
CURRENT STATUS

Washery	Design Parameters			Current Status (April '05 to March '06)		
	RC Ash (%)	WC Ash (%)	Yield (%)	RC Ash (%)	WC Ash (%)	Yield (%)
Dugda-II	25.0	16.5	56.5	28.4	19.6	63.9
Bhojudih	22.0	17.0	85.0	28.4	19.7	64.8
Patherdih	23.0	16.0	73.0	34.6	20.4	34.0
Barora	30.0	17.0	47.0	-	-	-
Moonidih	25.0	17.5	70.0	24.8	18.8	64.0
Sudamdih	26.0	18.5	60.0	30.6	19.5	47.1
Mohuda	24.0	17.0	64.0	23.4	18.5	86.5
Madhuban	29.5	17.0	45.2	37.8	33.9	91.0

DESIGN PARAMETERS & CURRENT STATUS

- The design parameters were based on Coal from Upper Seams which is no longer available.
- Coal of Lower Seams have inferior Washability Characteristics.
- Besides, coal from Lower Seams have higher ash content.
- This has created serious imbalances in the washing circuits.
- Most of the Washeries are 20-40 years old and have outlived their life.
- Modification/Revamping of Washeries is needed.

RAW COAL FEED & WASHED COAL PRODUCTION



TURN AROUND

- **Washed Coal production was continuously declining upto 03-04.**
- **Trend of continuous decline was reversed by modest growth of 0.5% in 04-05.This growth has further consolidated to 23.0% in the current FY 05-06.**
- **Improvement in Capacity Utilization by 4.6% & Yield of Washed Coal by 4.9% over last year.**
- **Introduction of e-marketing for selling Washery by-products resulting in additional revenue generation.**
- **Overall Profit of Rs. 280.0 Crores during FY 05-06.**

DEMAND OF COKING COAL

- With the growing production of Steel, the demand for Coking Coal in the country is increasing.
- SAIL is presently importing about 60% of its requirement.
- Hence there is need to augment indigenous Coking Coal production.

COKING COAL PRODUCTION PROGRAMME

&

EXPECTED WASHED COAL PRODUCTION FOR

X^{th}, XI^{th} & XII^{th} PLAN PERIOD

Item	Production (MT) 05-06	Production in Terminal Years (MT)		
		X^{th} Plan (06-07)	XI^{th} Plan (11-12)	XII^{th} Plan (16-17)
Coking Coal	4.2	5.00	9.9	10.29
Washed Coal	2.3	2.55	4.9	5.07

NEED FOR MODERNIZATION

- Most of the Washeries are old and need

  (a) Modernization / updating of technology and automation.

  (a) Replacement / renovation of old equipments and technological structures etc.

STATUS OF MODERNIZATION

- Revival Plan of BCCL provides Rs. 125 Crores for Renovation of Washeries.
- Study undertaken by CMPDI for performance improvement.
- CMPDI has submitted Reports for performance improvement of Washeries.
- In the 1st Phase the Revival Schemes involving an expenditure of about Rs. 55 Crores has been approved by BCCL Board.

SALIENT FEATURES OF MODERNIZATION SCHEMES

- Enhancement of Reliability of Washery.
  - Replacement of key equipments such as Pumps, Screens, Crushers, Magnetic Separator, Gear Boxes, Motors etc.
  - Strengthening of technological structures.
- Improvement of Performance of Washery.
  - Automation and Instrumentation for process control.
  - Renovation of Fine Coal Circuit modern technologies.
  - On-line Quality monitoring & Control.
- Improvement in Product Dispatch System
  - Renovation of Marshalling Yard.
  - Enhancement of Bunkerage capacity of products to facilitate Rapid Loading System.

FUTURE POSSIBILITY FOR WASHING OF LVC COAL

- About 5MT of LVC Coal is being produced annually.
- These Coals have high Ash(35-40%), Low V.M.(15-16%) and difficult washability potential.
- Presently not being washed due to low yield (about 22%).
- Can be used for Steel production after Washing.
- Installation of state-of-the-art Washeries under BOO Scheme may be considered.

THRUST AREA IN COAL BENEFICIATION: APPROPRIATE TECHNOLOGY

- **Optimization of Process Flow sheets & Circuits for handling Indian Coals with difficult washing characteristics.**
  - **Objective: Superior trade-off between yield & quality of Washed Coal.**
- **Introduction of improved & Effective technologies for**
  - **Beneficiation of Fine Coal**
  - **Dewatering of concentrates/effluents.**
- **Technologies for economic beneficiation of Non-Coking Coals.**
- **Automation/Computer application for generation of Data Bank, Flow sheets, mathematical analysis of Washability Data, Plant Simulation and Optimization of the Plant.**

TECHNOLOGICAL ASSISTANCE REQUIRED

- Recovery of Fine Coal
  - Cost effective & efficient process technologies suitable for Indian Coal.
- Installation of high capacity, high pressure cyclone for extremely difficult to wash coal.
- Efficient process for washing LVC coal.
- Technology for Dry Beneficiation of Coal.
- Cost effective technologies for Utilization of Rejects.
- Long term agreement for interaction,transfer of technology and supply of equipment needed.

Thank you

METALLURGICAL COAL PRODN. OF BCCL – Raw coal & Washed coal