PULVERISERS FOR
SUPER CRITICAL UNITS
PRESENTATION BY:
M.V.R.MURTHY & SATISH GHATGE
AGM/ PULV ENGG, BHEL HYD,
RANGE OF PULVERISERS FOR SUPERCritical UNITS

- HP1103 BOWL MILL WITH STATIC CLASSIFIER
- HP1103 BOWL MILL WITH DYNAMIC CLASSIFIER
- HP1203 BOWL MILL WITH STATIC CLASSIFIER
- HP1203 MILL WITH DYNAMIC CLASSIFIER
PROJECTS COVERED IN PRESENTATION ARE

NTPC-BARH STAGE-II 2x660MW AND

APPDCL-KRISHNAPATTANAM 2x800MW
BARH STAGE-II CROSS SECTION OF HP 1103 BOWL MILL WITH STATIC CLASSIFIER
KRISNAPATNAM CROSS SECTION OF HP 1203 BOWL MILL WITH DYNAMIC CLASSIFIER
<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>HP 1103 (STATIC CLASSIFIER)</th>
<th>HP 1203 (DYNAMIC CLASSIFIER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILL CAPACITY (TPH)</td>
<td>NTPC BARH-II 2x 660 MW</td>
<td>KRISHNAPATTANAM 2x 800 MW</td>
</tr>
<tr>
<td></td>
<td>87.1 TPH (DESIGN COAL)</td>
<td>121.6 TPH (DESIGN COAL)</td>
</tr>
<tr>
<td></td>
<td>81.7 TPH (WORST COAL)</td>
<td>102.3 TPH (WORST COAL)</td>
</tr>
<tr>
<td></td>
<td>[DOMESTIC WASHED COAL; IMPORTED COAL = 70:30]</td>
<td>[DOMESTIC WASHED COAL; IMPORTED COAL = 70:30]</td>
</tr>
<tr>
<td>NO. OF MILLS</td>
<td>9</td>
<td>6 (2 ELEVATIONS/MILL)</td>
</tr>
<tr>
<td>WT. OF ONE MILL (TONS)</td>
<td>150</td>
<td>190</td>
</tr>
<tr>
<td>BOWL RPM</td>
<td>33</td>
<td>30</td>
</tr>
</tbody>
</table>
| WEAR LIFE (HOURS)         | GR. ELEMENTS: 7200  
INNER CONE: 25000  
MDV: 15000                                            | GR. ELEMENTS: 6000  
INNER CONE: 25000  
MDV: 15000    |
<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>HP 1103 (STATIC CLASSIFIER) NTPC BARH-II 2x 660 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM COAL FLOW TO MILL (TPH)</td>
<td>21.772 TPH (DESIGN COAL)</td>
</tr>
<tr>
<td>AIR FLOW @ MAX. COAL FLOW</td>
<td>130.770 TPH (DESIGN)</td>
</tr>
<tr>
<td>AIR FLOW @ MIN. COAL FLOW</td>
<td>92.201 TPH (DESIGN)</td>
</tr>
<tr>
<td>MILL OUTLET TEMP.</td>
<td>77° C (DESIGN)</td>
</tr>
<tr>
<td>MILL MOTOR</td>
<td>696 KW, 1000 RPM</td>
</tr>
<tr>
<td>LUBE OIL FLOW</td>
<td>210 LPM</td>
</tr>
<tr>
<td>BOWL DP HIGH</td>
<td>356 mmwc – set point for run-back feeder to minimum or as per Operating experience</td>
</tr>
<tr>
<td>TRUNNION ECCENTRIC POSITION</td>
<td>“O” – 12 O’ Clock position to start with</td>
</tr>
<tr>
<td>CLASSIFIER VANE POSITION</td>
<td>#5 or as per Operating experience</td>
</tr>
<tr>
<td>WING TIP SIZE</td>
<td>69.85 mm or as per Operating experience</td>
</tr>
<tr>
<td>PARAMETER</td>
<td>HP 1103 (STATIC CLASSIFIER) NTPC BARH-II 2x 660 MW</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SPRING PRE-LOAD</td>
<td>13.608 TONS or as per Operating experience</td>
</tr>
<tr>
<td>RING TO ROLL GAP</td>
<td>4 FLATS or as per Operating experience</td>
</tr>
<tr>
<td>SPRING ASSY. TO JOURNAL HEAD GAP</td>
<td>1.5 to 1.6 mm or as per Operating experience</td>
</tr>
<tr>
<td>INVERTED CONE TO INNER CONE CLEARANCE</td>
<td>76.2 mm or as per Operating experience</td>
</tr>
<tr>
<td>FEED PIPE TO INNER CONE CLEARANCE</td>
<td>114.3 mm or as per Operating experience</td>
</tr>
</tbody>
</table>
FEATURES OF HP-1103 AND 1203 MILLS
MILL SIDE AIR INLET HOUSING

- MILL SIDE HOUSING - CENTER ENTRY
- EXTERNAL INSULATION WITH ROLLED SHEET COVER
- THERE ARE FIVE No.’s OF FIRE FIGHTING WATER SPRAY NOZZLES
- STEAM INERTING PIPE STUB IS ON HOT AIR INLET DUCT.
FEATURES OF PLANETRAY GEARBOX

- KMP 340 – BARH-II 2x660MW
- KMP 400 – Krishnapatnam 2x800MW
- Hydrodynamic lubrication while working for both KMP 340 & 400
- KMP 400 is having hydraulic jacking during start up for 2 minutes.
KMP 340 PLANETARY GEAR BOX – BARH-II
[TESTING AT SIEMENS GERMANY]
PLANETARY GEARBOX – BARH-II 2x660MW
LUBE OIL SYSTEM FOR PLANETARY GEARBOX – BARH-II 2x660MW
BOWL AND BOWL HUB ASSEMBLY HP1103 MILL – BARH-II 2x660MW
<table>
<thead>
<tr>
<th>HP 1103 (STATIC CLASSIFIER) – SEPARATOR BODY ASSEMBLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FABRICATED JOURNAL OPENING FRAME &amp; COVER</td>
</tr>
<tr>
<td>ACCESS DOOR IS WITH HINGE BRACKET TO SWING OPEN THE DOOR</td>
</tr>
<tr>
<td>THERE ARE THREE No.’s OF FIRE FIGHTING WATER SPRAY NOZZLES</td>
</tr>
<tr>
<td>MODIFIED JOURNAL STOP BOLT ASSY. – LOCATED ABOVE JOURNAL SPRING ASSY.</td>
</tr>
<tr>
<td>DEFLECTOR LINER ASSY. PROVIDED FOR PRIMARY CLASSIFICATION</td>
</tr>
<tr>
<td>MODULAR JOURNAL SPRING ASSY. PROVIDED</td>
</tr>
</tbody>
</table>
HP1103 BOWL MILL STACK UP IN SHOP
HP1103 BOWL MILL UNDER ERECTION – BARH-II
VANE WHEEL ASSEMBLY

• MODIFIED VANE WHEEL ASSEMBLY WITH WIND TIP.
  -- TO HAVE BETTER CONTROL OVER VELOCITY ACROSS BOWL
  -- REDUCE SPILAGE.
DEFLECTOR LINER ASSEMBLY
ROLLER JOURNAL ASSEMBLY

STEM CONNECTION BETWEEN JRNL. SHAFT ASSY. & JNRL HEAD ASSY.

TRIPPLE OIL SEALS & WEAR RING

ONE PIECE BEARING HOUSING

INSERT TYPE ROLL CYLINDRICAL FIT

TWO IDENTICAL TAPERED ROLLER BEARINGS
JOURNAL HEAD ASSEMBLY

- Separate trunnion shafts on left and right side of trunnion bore
- Slot on the top side for supporting journal stop bolt
- Grease lubrication for trunnion shaft
- Eccentric position change feature provided for trunnion shaft with initial position “O”
USE TIMING MARK PAINTED ON HOUSING TO LINE UP WITH POSITION "0" (12 O'CLOCK)
JOURNAL ASSEMBLY IN TILT OUT POSITION AT SHOP – BARH-II
## SINTERED CARBIDE GRINDING ROLLS

<table>
<thead>
<tr>
<th>GRINDING ROLL</th>
<th>HP 1103</th>
<th>HP 1203</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEIGHT IN KG’s</td>
<td>2617</td>
<td>4740</td>
</tr>
</tbody>
</table>
JOURNAL ASSEMBLY – HP1103 MILL BARH-II
BOWL WITH BULL RING SEGMENTS ASSEMBLY – HP1103 MILL BARH-II
SEPARATOR TOP AND MULTI PORT OUTLET PLATE ASSEMBLY

- CONICAL TYPE SEPARATOR TOP
- OUTLET VENTURI IS ELIMINATED
- MPO IS PART OF THE SEPARATOR TOP
- CLASSIFIER VANES ARE MADE OF HIGH CRONE CAST IRON.
- THREE No.’s OF FIRE FIGHTING WATER SPRAY NOZZLES PROVIDED.
- CERAMIC TILED CLASSIFIER CONE AND INVERTED CONE PROVIDED.
- CENTER FEED PIPE WITH DRESSER COUPLING PROVIDED.
SCRAPER ASSEMBLY

- HORIZONTAL SPRING LOADED SCRAPER ASSEMBLY
- ADJUSTABLE SCRAPER BLADES WITH TORSION SPRING TO BRING BACK THE BLADES FROM OVERLOAD AND IT IS PROVIDED WITH VERTICAL SCREWS FOR GIVING SOME AMOUNT OF PRELOAD TO THE SPRING AND ASSEMBLY.

Replaceable, Adjustable wear plate

Horizontal pivot shaft

Torsion Spring
SCRAPER ASSEMBLY
MILL DISCHARGE VALVE ASSEMBLY

- KNIFE GATE VALVE, IN PLACE OF FLAP TYPE MDV, PLACED BETWEEN CERAMIC LINED CONNECTING VALVE OUTLET & VALVE ADAPTOR.
- ALL VALVES OPERATED AT A TIME THROUGH SOLENOID VALVE.
- REDUCED TOTAL ASSEMBLY HEIGHT.
- PROVIDES POSITIVE ISOLATION.
KNIFE GATE VALVE ASSEMBLY
SEPARATOR BODY WITH DYNAMIC CASSIFIER ASSEMBLY
SEPERATOR TOP WITH DYNAMIC CLASSIFIER
DYNAMIC CLASSIFIER MAIN COMPONENTS

- VARIABLE FREQUENCY DRIVE
- VARIABLE SPEED MOTOR (RATING 40HP TO 60 HP)
- WORM DRIVE GEAR REDUCER WITH ADJUSTABLE BASE
- BEARING ASSEMBLY WITH TWO NOS. OF ANGULAR CONTACT BALL BEARINGS WITH EXTERNAL GREASE FITTINGS SO THAT BEARINGS CAN BE GREASED WITH EQUIPMENT IN OPERATION
DYNAMIC CLASSIFIER MAIN COMPONENTS

- TAPERED ROTOR ASSEMBLY, WITH BLADES MOUNTED AT AN ANGLE
- WEAR RESISTANT BLADES
- LABYRINTH DESIGN SEAL WITH SEAL AIR ARRANGEMENT TO PROTECT BEARING FROM THE COAL DUST. SEAL AIR REQUIRED IS TAKEN FROM MILL SEAL AIR HEADER.
DYNAMIC CLASSIFIER

- EFFICIENCY MORE THAN STATIC CLASSIFIER
- <1% RETENTION ON 50 MESH
- BASICALLY USED FOR FINENESS REQUIREMENT BUT CAN ALSO BE USED TO MEET CAPACITY REQUIREMENTS AS IN KRISHNAPATTNAM PROJECT
DYNAMIC CLASSIFIER ROTOR
MODULAR SPRING ASSEMBLY

01/23/2005
HP1103 MILLS ERECTED AT BARH-II 2x660MW UNIT-4
MILL STEAM INERTING (CONNECTED TO AIR INLET DUCT)
MILL STEAM INERTING (PROVIDED ON AIR INLET DUCT)

PIPE (BY BHEL) PENETRATES AIR DUCT AT ELEVATION SHOWN

STEAM INERTING PIPE (BY ALSTOM)

SUPPLEMENTAL STEEL PROVIDED BY BHEL FOR SUPPORT OF STEAM INERTING PIPE AND DUCTING TO MILLS

MIXED PRIMARY AIR DUCT TO MILLS (BY BHEL) REF. DWG. 00108-1E0044

EXPANSION JOINT BY ALSTOM

ELEVATION VIEW
STEAM INERTING PIPING AT EAST SIDE MILLS (4) PLACES LOOKING SOUTH

PIPE SUPPORT BY ALSTOM MOVEMENT AT THIS POINT:
NORTH/SOUTH ± 3mm
EAST/WEST ± 3mm
UP/DOWN ± 0mm
FIRE FIGHTING WATER SYSTEM

NOTES
1) ALL PRESSURE TAPINGS ARE OF SIZE NAM5.
2) WORKING MEDIUM SERVICE WATER.
3) DESIGN PRESSURE: 15 kg/cm² (g).
4) DESIGN TEMPERATURE: 50°C.
5) ALL FITTINGS SHALL CONFORM TO IS 1283 (PART-2).
6) KNF VALVE, SCHEDULE RATING ENGG. NO. 4-00-303-3539.
7) FOR INSTRUMENT SCHEMATIC REFER ENGG. NO. 4-00-303-153-0001.
8) VALVES SHALL BE SUITABLY LOCATED FOR EASE OF APPROACH & OPERATION IN CASE OF EMERGENCY.
9) ALL PRESSURE INSTRUMENTS ARE DIRECT MOUNTED.
10) FOR MILL DETAILS REFER ENGG. NO. ALL/03/CRG. NO. 1060-00-02-01-04-0001.
11) SILENOID VALVE IS SUPPLIED BY EMIL-HYO

PIPE SCHEDULE

| PIPE SIZE | DESIGNATION | MATERIAL | NOMINAL
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 x 5/16</td>
<td>HEAVY</td>
<td>IS 1239</td>
<td></td>
</tr>
<tr>
<td>3/4 x 5/16</td>
<td>HEAVY</td>
<td>IS 1239</td>
<td></td>
</tr>
<tr>
<td>3/4 x 4/32</td>
<td>HEAVY</td>
<td>IS 1239</td>
<td></td>
</tr>
<tr>
<td>3/4 x 5/32</td>
<td>HEAVY</td>
<td>IS 1239</td>
<td></td>
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UTILITY REQUIREMENT

<table>
<thead>
<tr>
<th>NO</th>
<th>DESCRIPTION</th>
<th>OPERATING</th>
<th>GT/Y</th>
<th>TOTAL GT/Y</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>FEEDER (FIRE FIGHTING)</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>EMERGENCY</td>
</tr>
<tr>
<td>02</td>
<td>MILL FIRE FIGHTING</td>
<td>7</td>
<td>21</td>
<td>9</td>
<td>EMERGENCY</td>
</tr>
</tbody>
</table>

NTPC DRAWING NO.: 0560-010-01-PC-PWM-L-006

NATIONAL THERMAL POWER CORPORATION LTD
BARH STPP, STAGE-II (2 X 660 MW)
UNIT NO. 4 & 5
STAM GENERATOR PACKAGE

RHEL DRAWING NO.: 02-00-305-31480

คณะวิศวกรรมไฟฟ้า
เซ็นทรัล ปิ้งเนชั่นแนล
FIRE EXTINGUISHING SYSTEM: HP MILLS

WATER SPRAY NOZZLES ARE PROVIDED ON MILL

SEPERATOR TOP: 3 NOS.

SEPERATOR BODY: 3 NOS.

MILL SIDE HOUSING: 5 NOS.

TOTAL 11 NOS. NOZZLES FOR EACH MILL.
Thank you