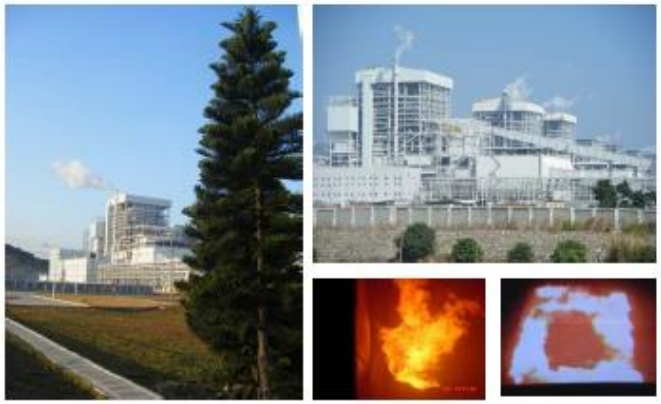
CP-5 & 6 Outages 660MW SC units

Summary:

1) Full outage support
2) Pressure parts inspection
3) Firing System inspections
4) Pulverizer system inspection
5) Airpreheater Inspections
6) Controls checks
7) Combustion adjusting
8) Performance testing
9) Spare Parts supply

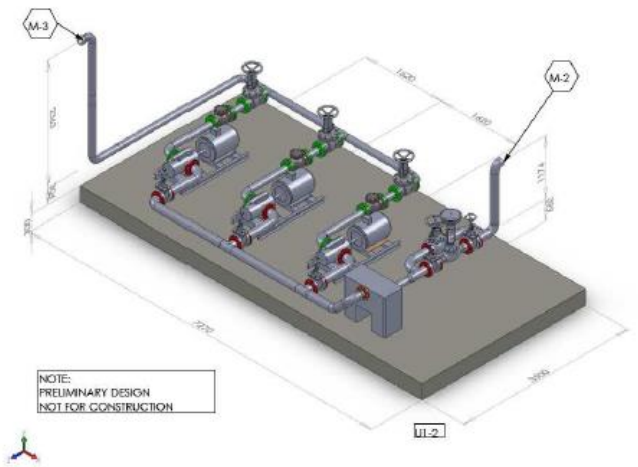
Note: continue to support each outage



Hong Kong Electric Lamma Unit#2 Oil Conversion

Unit#2 Hong Kong Electric
Lamma Island
27Feburary2010
First Re-Firing with Alstom's
Fuel Oil Conversion

AB-3

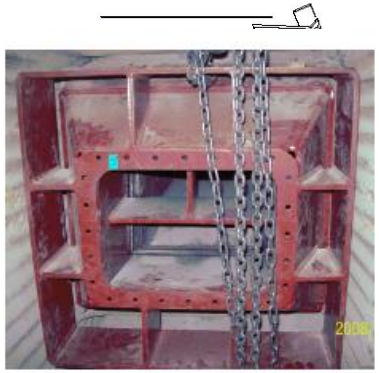


Note: All with in TFCN, design, installation, commissioning and testing

Burner Upgrade and material supply

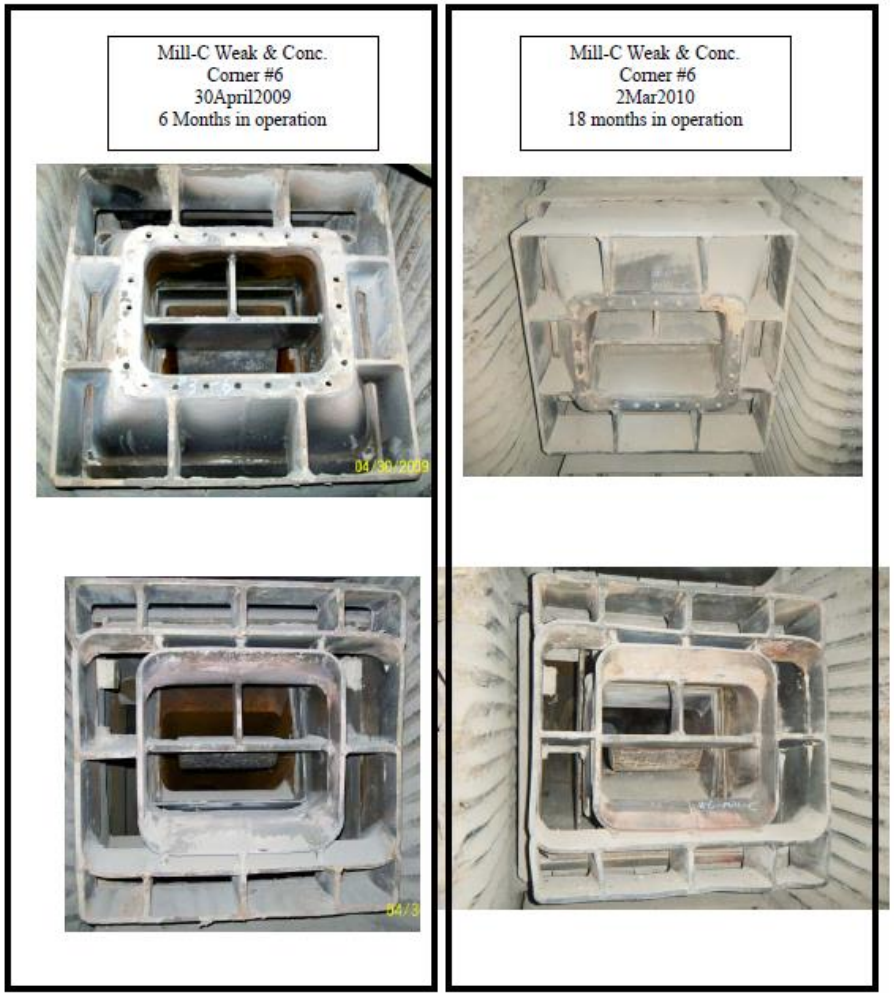
Received order to replace MHI's original design nozzles with Alstom's nozzles.

Note: Design and supplied 100% TFCN



The nozzle was position in the coal compartment as normal installation, position as shown in 0 degree horizontal

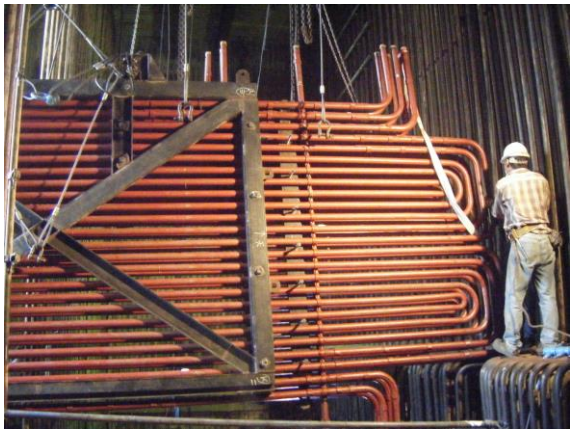
Tilt check to ensure bulbous back keep the proper clearance while tilting full up and down position.

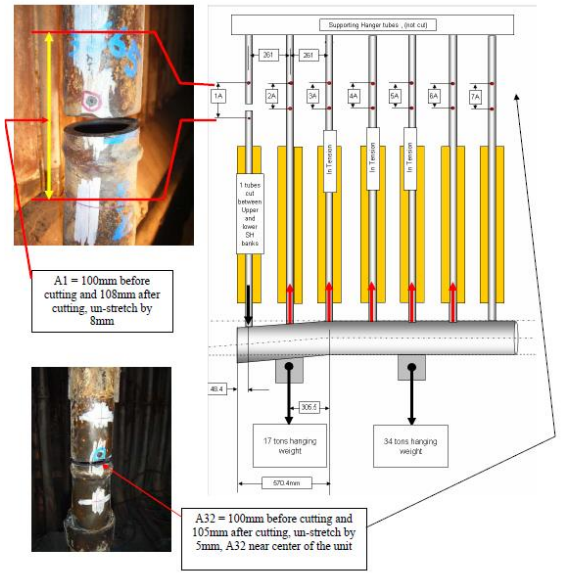


Hong Kong Electric Lamma Unit 5 Superheater Replacement

1) Developed removal and installation procedure
2) Supervised the installation and removal

Note: Design 100% TFCN

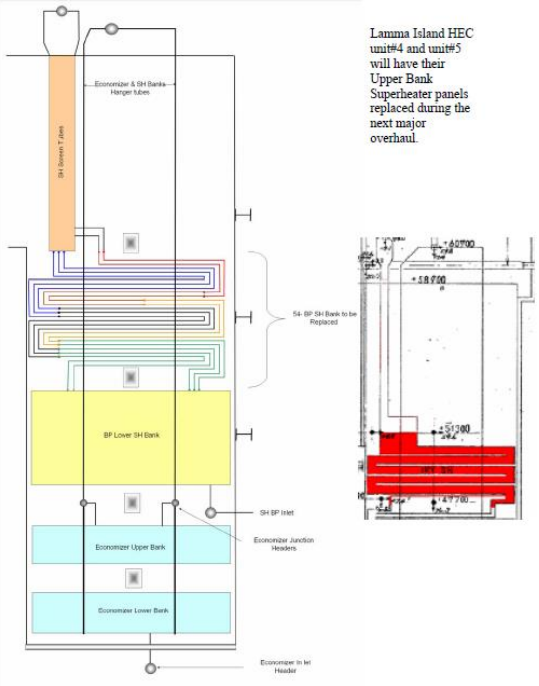


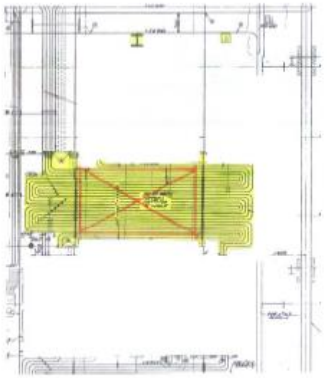


Hong Kong Electric Lamma Unit#5 Back Pass Superheater Replacement

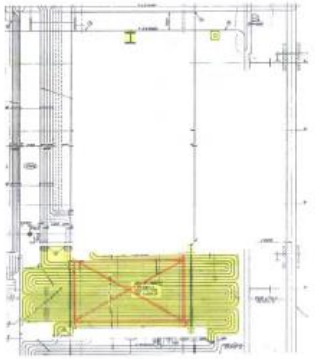
1) Developed removal and installation procedure
2) Supervised the installation and removal

Note: Design 100% TFCN





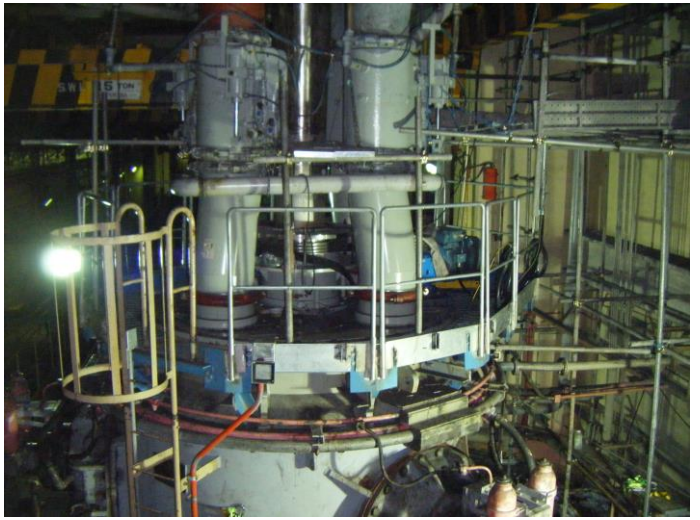
#8 New Panel at the horizontal position

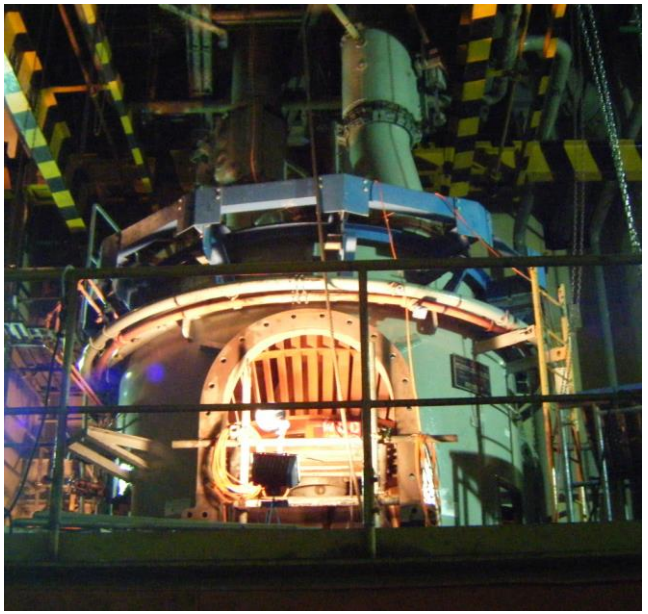


#9 New Panel lowered down to position

Hong Kong Electric Lamma Unit#5 Pulverizer Upgrades XRP-903

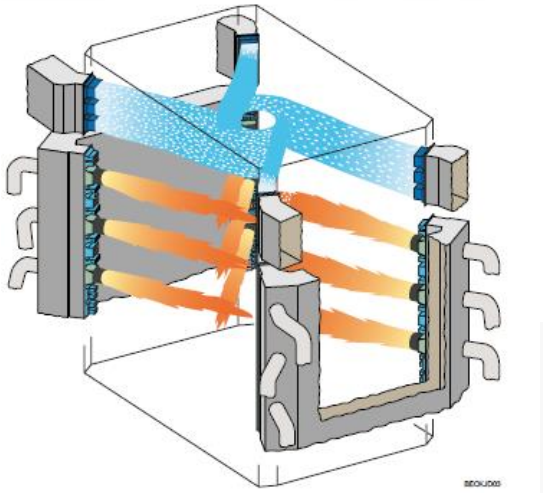
1) Material Supplied in conjunction with Milling Group
2) Site installation
3) Commissioning
4) Testing

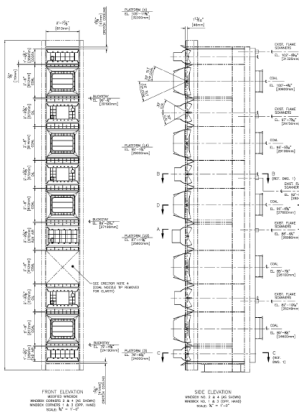


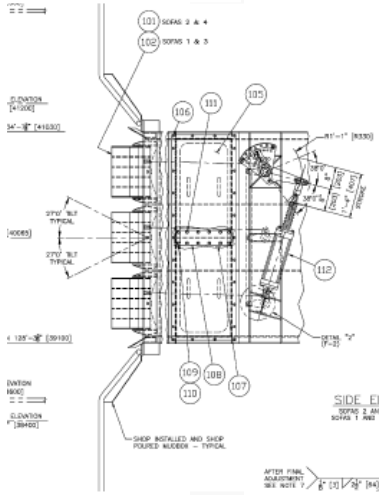


Hong Kong Electric Lamma Unit#4 Low Nox Retrofit

1) Material supply
2) Site installation supervision
3) Site commissioning
4) Combustion tuning
5) Performance testing







Hong Kong Electric Lamma Unit#5 Low Nox Retrofit

1) Material supplied with retrofit group
2) Site installation supervision
3) Site commissioning
4) Combustion tuning
5) Performance testing

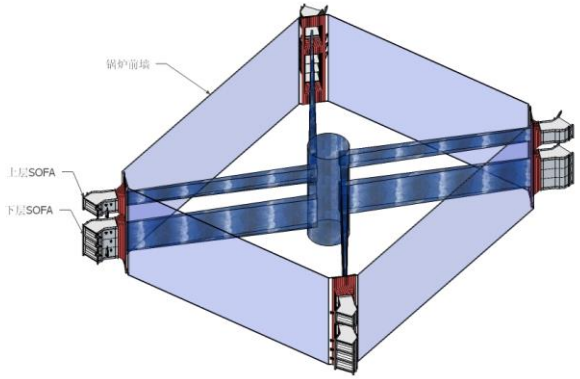
L5 Low NOx System
Summary of Acceptance Test Results (Preliminary)

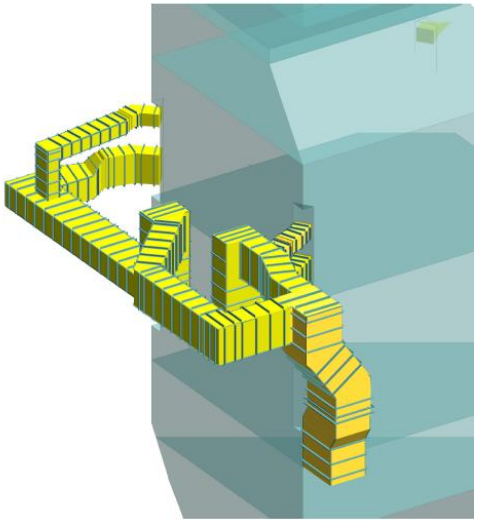
The final test results are pending coal analysis.

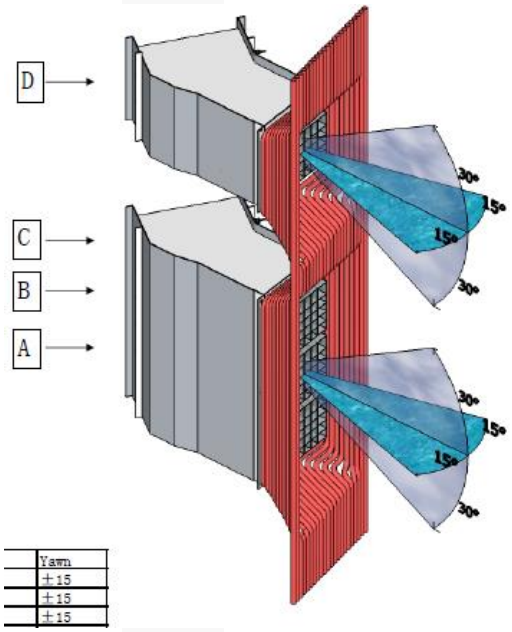
Loading		110 MW Min. Load	122 MW (35% BMCR)	158 MW (45% BMCR)	245 MW (70% BMCR)	350 MW (100% BMCR)
Test Date		11 Mar 09	17 Mar 09	17 Mar 09	19 Mar 09	18 Mar 09
Test Period		22:25 – 23:25	14:00 – 15:00	10:05 - 12:05	20:20 – 21:30	11:15 – 15:15
NOx Emission (at 12% CO_2), ppm						
Guarantee (after correction for coal/ash properties)	ppm	275 (for reference)	200	200	200	200
As-tested	ppm					
•Old Sensor (MHI / Shimadzu)		187.2	182.5	158.6	192.3	197.5
•New Sensor (Siemens / Ultramat)		169.8	162.4	141.3	173.1	174.5
Unburnt Carbon in Ash, %						
Guarantee (after correction for coal/ash properties)	%	---	5%	5%	5%	5%
As-tested	%	0.53%	0.83%	1.06%	0.97%	1.07%
Carbon Monoxide Emission (at 12% CO_2), ppm						
Guarantee	ppm	---	150	150	150	150
As-tested	ppm	5.8	6.3	6.2	7.9	17.9
Boiler Efficiency burning Sang Sang Coal at BMCR, %						
Guarantee	%	---	---	---	---	87.78%
As-tested	%	---	---	---	---	88.93%
Superheater Outlet Steam Temperature at BMCR, °C						
Guarantee	°C	---	---	---	---	569±5
As-tested (adjusted for calibration)	°C	---	---	---	---	564.3
Reheater Outlet Steam Temperature at BMCR, °C						
Guarantee	°C	---	---	---	---	541±5
As-tested (adjusted for calibration)	°C	---	---	---	---	539.5

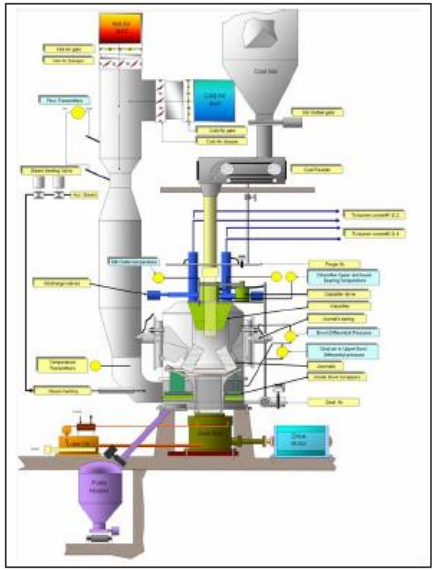
Detail Proposal work for Mills and Low Nox Retrofits

1) Low Nox proposals and Pricing
2) Pulverizer proposal and Pricing
3) Preliminary design developed
4) Illustrations developed







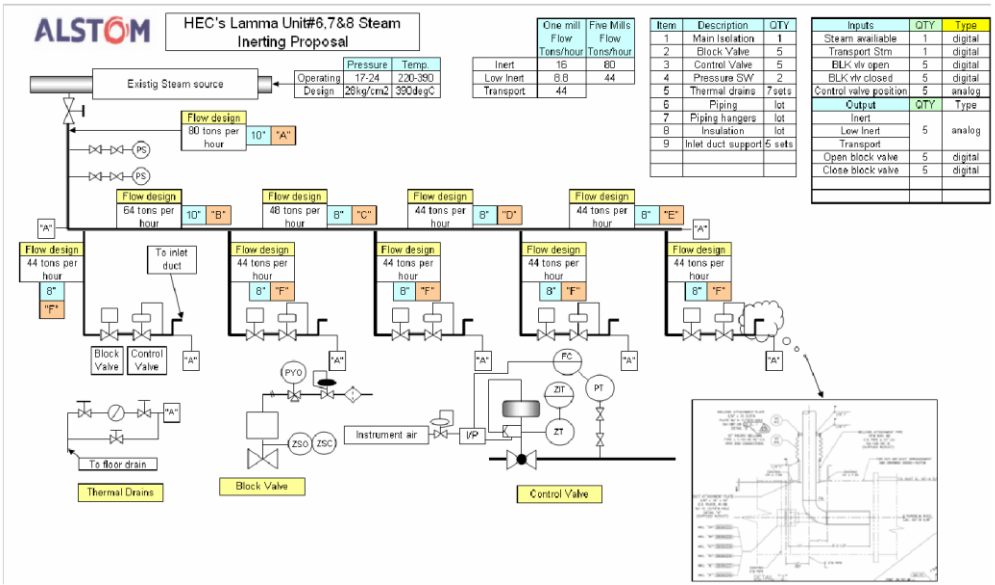


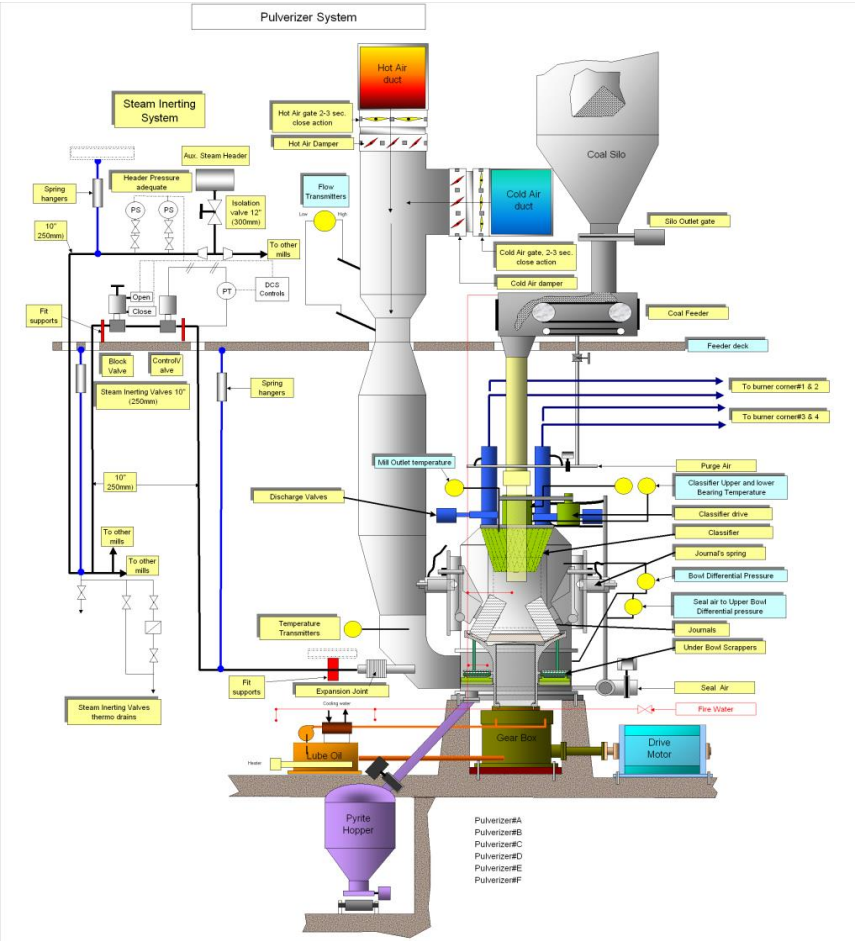
Hong Kong Electric Lamma Unit# 6 & 7 Pulverizer Steam Inerting

Summary:

1) Schedule to be installed in next outage at Lamma Station

2) Design and supplied by TSCN





China CP-5 Outage Service and Parts supplied

Coal Nozzles, Classifiers, Extension rings, Vanewheels, Grinding Rolls, Pressure parts ,service etc.supplied to CP-5 April-May 2010

ALSTOM	Alstom Power Corporation	Developed by: Annie Yang
Document Classification	Installation	Date: 4May2010
		Rev#0
Subject	Cp-5 Alstom TSCN nozzles	Pages total = 1

CP-5 Coal nozzles replacements, 16 sets delivered directly to the unit for installation

TFCN supplied Classifiers Rotors

TFCN supplied Extension rings

Grinding Rolls

TFCN supplied Grinding rolls

TFCN supplied Vanewheel

Nice Packing of TFCN parts

TSCN parts being installed

EHS Checking

Staff going to the unit CP-5

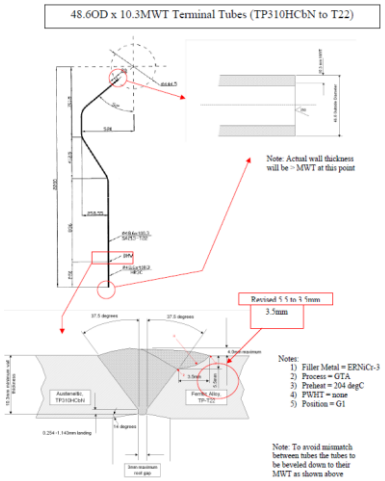
ALSTOM	Alstom Power Corporation	Developed by: Annie Yang
Document Classification	CP-5 Outage	Date: 2May2010
		Rev#0
Subject	CP-5 Outage inspections and support	Pages total = 12

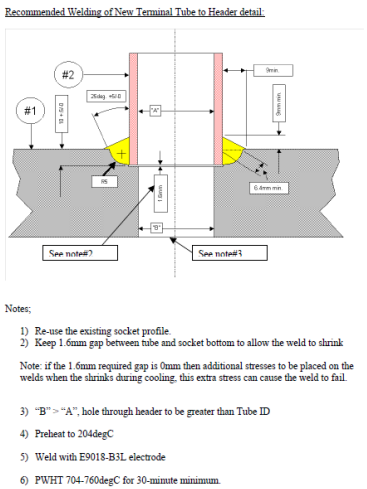
Our team starting the work on CP-5 Outage Operational

Check the tube thickness

Pressure Parts to Alstom's and MHI's Unit

Pressure parts supping to Alstom's and MHI's unit in China and Hong Kong





In addition to other products, Alstom is also capable of supplying boiler pressure parts with high quality for our customers, such as panels (waterwall, RH, SH etc.)， all loose tube materials (RH tube bends, SH tube bends, economizer tube bends…). We will try our best to satisfy all your requirements on boiler pressure parts. 除了其它产品以外，阿尔斯通还可为客户提供各种优质的锅炉压力部件，如：水冷壁、过热、再热管屏等，以及所有零星管材（再热管弯头、过热管弯头、省煤器弯头等…）。阿尔斯通将竭尽所能满足客户各种需求。

Fin panels 鳍片管屏

Final SH bends 末过弯头

Eco. Bend 省煤器弯头

Positioning Tube Bends 定位管弯头

SBW Zhuhai Station Pulverizing and Combustion testing












ALSTOM | Alstom Thermal Service China

Document Classification	Service Work	Date: 13June2010
Subject	Zhuhai Power Station testing and adjustments	Pages total = 9

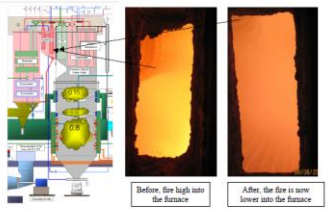
Zhuhai Station 2 x 660MW Supercritical units

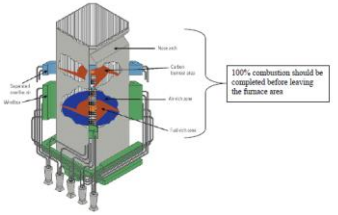
Activities:
1) Pulverizer airflow testing and adjustments
2) Pulverizer Coal fineness testing and adjustments
3) Combustion tuning

Alstom Team:
1) Mr. Peter Cui
2) Mr. Lin
3) Mr. Zhang
4) Annie Yang
5) David Pickers

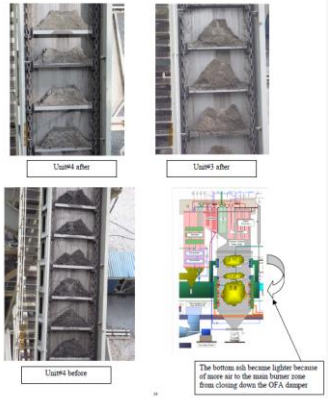
Status: On Going, in progress

The above allow the combustion to remain more in the furnace area.





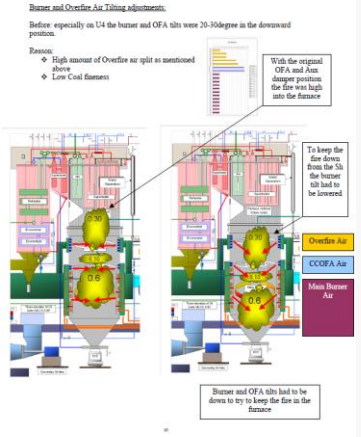
Bottom ash and Fly ash:



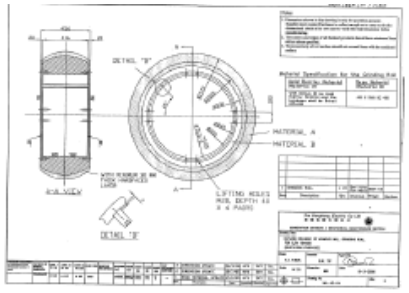
Burner and Overfire Air Tilting adjustments:

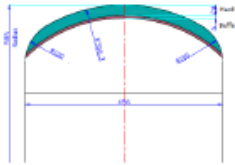
Before: especially on U4 the burner and OFA tilts were 20-30degree in the downward position.

Reason:
- High amount of Overfire air split as mentioned above
- Low Coal fineness



HEC Grinding Rolls refurbishment

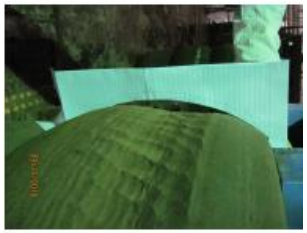


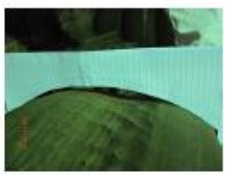


420kg new hard facing

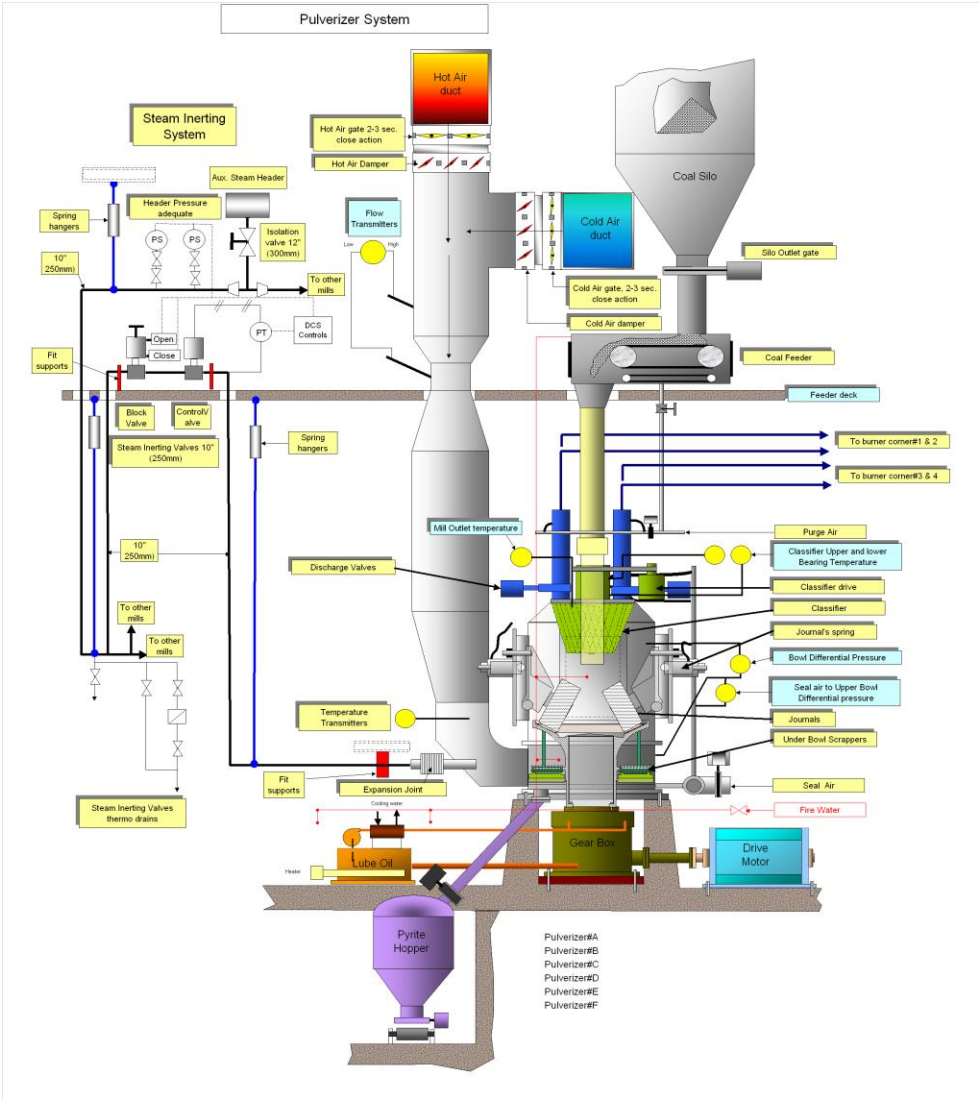
Sample #1 = 105kg (25% worn)
Sample #2 = 74kg (18% worn)
Sample # 3 = 131kg (31% worn)

Budget = 142kg each 33% worn





Use CMM Measure Extention Ring & Seal Ring at Zhuhai Power plant 22Feb2011



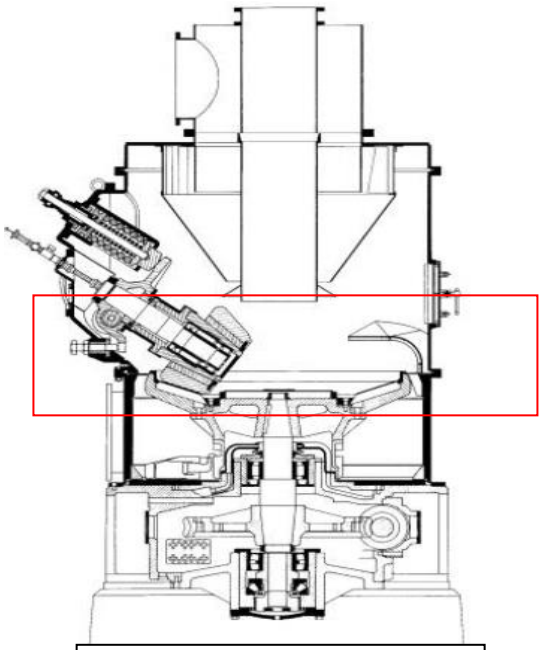
MHI Units #1 & 2, Performance Survey

Pulverizer Upgrade

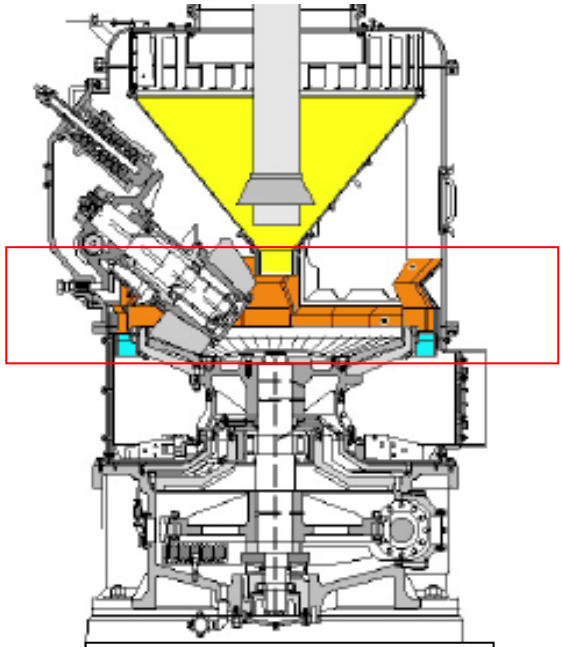
HK Electric 港燈

CONTRACT NO. 10/2203
LAMMA POWER STATION - COAL FIRED GENERATING UNITS
SUPPLY WITH PROVISION OF
TECHNICAL ADVISORY SERVICES FOR
ERECTION, TESTING AND COMMISSIONING OF MILL UPGRADING WORK FOR
BURNING OF LOW GRADE COAL

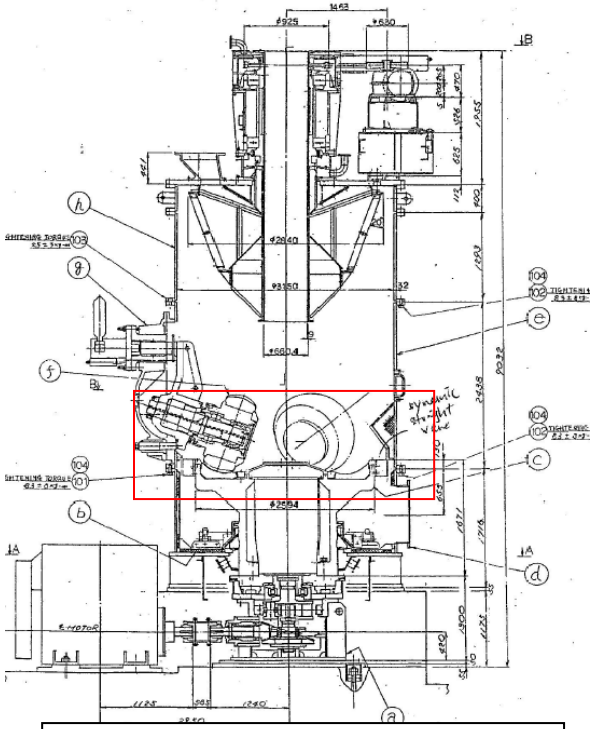
2 5 MAR 2011



U6 with original static vanes and plows

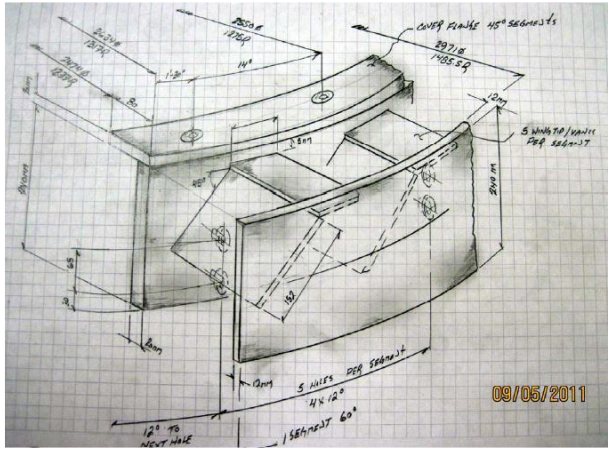


U6 modified with Dynamic vanewheels and defector liners



Unit#7 and Unit#8
MVM24R Vertical Mills

Lamma Unit#7 E mill first testing after Alstom Upgrade, “Coal Spillage undetectable”



Mill	Coal flow T/hr	Test time minutes	Total coal flow kg per test time	Total spillage Kg	Total spillage per hour kg	Total spillage%	comments
				weight the coal			Guarantee
7E	38	30	19,000	0.01595	0.0319	0.000001	<0.03
7E	32	30	16,000	0.03024	0.06048	0.000002	<0.03
7E	21	30	10,500	0.06532	0.13064	0.000006	<0.03
7E	18	30	9,000	0.1672	0.3344	0.000019	<0.03