MICRO OIL IGNITION SYSTEM (MOIS)

Minimising Fuel oil Consumption

(About one sixth to one tenth of normal consumption)

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Presentation Index

- Principle of MOIS Technology
- Application of MOIS Technology
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Principle of MOIS

The application of Advanced Oil Firing Technology which uses small quantity of fuel oil, compressed air for atomization & gasification of oil releasing sufficient high heat flame (1600~1800 °C)
Principle of MOIS

Ignition Principle

The Mini-oil Ignition Technology is an advanced oil firing technology which combines compressed air atomization with gasification. A strong and stable oil torch with high temperature of 1600~1800 deg C can be obtained by burning only a small quantity of fuel oil only. The pulverized coal goes through the oil flame and quickly absorbs the heat, releasing volatile matters which quickly burst the coal particles and ignite. The start up and low load operation can be achieved with minimal (negligible) oil consumption.
Installation Principle of MOIS

Mini-oil Ignition System
It is proposed that 4 Mini-oil ignition coal burners be installed and replace the present coal burners at lowest elevation (A level) associated to mill A.

The coal nozzles and inlet bend of coal burners needs to be replaced with Mini-oil ignition coal burners together with its dedicated inlet bends, while the tip area of Mini-oil ignition coal burner is the same as that of original burner. LDO/HFO burners will remain unchanged and be kept as standby ignition measure, if required.
Arrangement of New Coal Burner with MOIS
New Coal Burner and Elbow Assembly
MOIS Oil Burner & Oil Gun Assembly
MOIS Gun Arrangement in Corner
MOIS Gun Arrangement in Corner

- Cooling air for flame video camera
- Compressed air for oil-atomizing
- Compressed air for scavenging
- Light diesel oil
- Manual shutoff valve
- Shutoff check valve
- Igniter/spark
- Filter
- Driving device
- Manifold
- Logic protection system
- Oil flame scanner
- To control room TV
- Flame video camera
- Thermocouple
- Combustion air for mini-oil gun
- Primary air & pulverized coal
Development Trajectory of MOIS

- In Oct 2003, MOIS firstly used on a **50MW** bituminous coal-fired unit in Kashi Power Plant.
- In Nov 2007, MOIS firstly used on a **600MW** coal-fired unit in Huaneng Qinbei Power Plant.
- In Dec 2009, MOIS firstly used on **2x1000MW** units in SDIC Beijiang Power Plant, the first application of mini-oil ignition system to 1000MW in China.
- In May 2011, MOIS firstly used on a **600MW** unit in Huaneng Hanfeng Power Plant, its first application on **W-shape boiler** in China.
- As of Dec. 2015, domestic application of MOIS is **over 410 boilers**.
Achievements in China

By the end of 2015:

- **411 boilers**
  - 18 boilers for 1000MW
  - 81 boilers for 600MW
  - 9 boilers for 500MW
  - 204 boilers for 300MW
  - 99 boilers for ≤200MW

**China Resources**
- Changshu #1~#3
- Fuyang #1/#2
- Shouyangshan #1/#2
- Huaneng Qinbei #1~#4
- Huadian Tangzhai #1/#2

**Guodian Jianbi**
- #1/#2

**Guohua Xuzhou**
- #1/#2

**SDIC Beijiang**
- #1/#2

**CPI Changshu**
- #5/#6

**Huaneng Qinbei**
- #5/#6

**Guohua Panshan**
- #1/#2

**State Grid Shentou**
- #1~#3
- Guohua Panshan #1/#2
- Datang Int’l Shentou #3

**CPI Changshu**
- #1~#4

**Huaneng Nanjing**
- #1/#2

**China Resources Banqiao**
- #1/#2

**Datang Int’l Shentou**
- #3

**Fengcheng**
- #2~#6

**Jilin Baicheng**
- #1/#2

**Akesu**
- #1/#2

**CPI Tonghua**
- #1/#2

**Yudean Maoming**
- #5
## Some Overseas Projects

<table>
<thead>
<tr>
<th>Name of Power Plant</th>
<th>Unit Capacity</th>
<th>Retrofit /New</th>
<th>Corner(T)-wall-fired</th>
<th>Coal</th>
<th>Status Quo</th>
</tr>
</thead>
<tbody>
<tr>
<td>India, Jhajjar CLP</td>
<td>2x600MW</td>
<td>New</td>
<td>T-fired</td>
<td>High-ash coal</td>
<td>In operation</td>
</tr>
<tr>
<td>Cambodia, Sihanouk Port</td>
<td>3x135MW</td>
<td>New</td>
<td>Corner-fired</td>
<td>High-moisture coal</td>
<td>In operation</td>
</tr>
<tr>
<td>Indonesia, Jeneponto</td>
<td>2x125MW</td>
<td>New</td>
<td>Corner-fired</td>
<td>High-moisture coal</td>
<td>In operation</td>
</tr>
<tr>
<td>Indonesia, (CFK) East Kalimantan</td>
<td>1x60MW</td>
<td>New</td>
<td>Corner-fired</td>
<td>High-moisture coal</td>
<td>In Operation</td>
</tr>
<tr>
<td>India, Adani Power Group</td>
<td>12x660MW</td>
<td>Retrofit</td>
<td>Corner-fired</td>
<td>High-ash coal</td>
<td>Seven finished, others in process</td>
</tr>
<tr>
<td>Pakistan, Qadirabad</td>
<td>2x660MW</td>
<td>New</td>
<td>Corner-fired</td>
<td>Bituminous coal</td>
<td>In process</td>
</tr>
</tbody>
</table>
Monitoring System

- Flame Video Camera
- TV
- MOIS Control Cabinet
- Cold state PA Warming system
- Pulverizing System
- Mini-oil ignition coal burner
- Combustion air for mini-oil gun
- Mini-oil gun
- Oil piping system & compressed air system
- Control System
Case Study- Adani Power, Mundra Plant, India

Unit Overview:
- Unit Capacity: 5 x 660MW (Unit #5/#6/#7/#8/#9)
- Boiler Supplier: Harbin Boiler Company, Corner-fired boiler
- Type of coal: High Moisture Indonesian Coal, Var≈ 22%, Aar ≈ 16%, M ≈ 25%, HHV ≈ 4000 kcal/kg
- C/O date: 2008 / 2010

Application Results:
- All the units retrofitted from July 2014 to July 2016, oil saving rate from 85% to 93.2%.
- All the 5 units MOIS modifications were finished successfully.
Relative Advantages over conventional Light-up

- Extremely small quantity of oil is required for startup (Boiler light-up upto 40% BMCR load)
- Greater than 80% oil saving achieved as compared to conventional light up method.
- Startup can be controlled smoothly matching the boiler temp & pressure ramp-up curves
- Less maintenance as compared to conventional oil guns due to simple micro oil gun construction
- Clear chimney conditions during cold start-ups
- Very consistent, stable & concentrated oil flame enabling coal combustion during start-up
- Long time (several hours) can not be synchronized, due to the turbine or other equipment problems, will not significantly impact the SOC KPI.
Patents & Certificate
Project Certification & Appreciation Letters in Mundra Plant

Appreciation Letter

Expert services provided by Mr. Yu Jianzhi for erection, commissioning and operation of Micro Oil Gun System (MOGS) in M/s Adani Power Limited, Mundra (APL) Unit 5, 6, 8 & 9.

On 31st May 2016

Mr. Yu Jianzhi has provided services for erection, commissioning and operation of Micro Oil Gun System (MOGS) in M/s Adani Power Limited, Mundra, Gujarat, India in Unit 5, 6, 8, 9.

Mr. Yu Jianzhi has managed M/s APL’s plant’s during erection, commissioning and operation of MOGS. He has provided quick response to all the problems faced during erection and commissioning of MOGS.

Mr. Yu Jianzhi has positive attitude and commitment to his work.

Mr. Yu Jianzhi is very prompt and he never left the site during emergency and has provided the best possible solution to problems.

Mr. Yu Jianzhi shared his knowledge during commissioning and operation of MOGS.

Mr. Yu Jianzhi timely communicated instructions to avoid any delay in erection and commissioning.

Mr. Yu Jianzhi has provided his services 2017 on cell phone also.

M/s APL appreciates the work of Mr. Yu Jianzhi for successfully completion of Micro Oil Gun System in APL Unit 5, 6, 8 & 9.

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Thank you