FLUE GAS CLEANING
SELECTED REFERENCES
FLUE GAS DESULPHURIZATION (FGD) SYSTEM

Elektrownia “Kozienice” S.A. (Poland) / Kozienice P.S. / Unit No.4-8

Kozienice II FGD (860MW equiv.)

MAIN DATA

Boiler Fuel: Hard Coal
FGD Process: Wet Limestone-gypsum
Gas Flow Rate: 3,480,000 m³N/h (wet)
(One absorber handles the flue gases of total 4 of 8 boilers, 215MW each)
Inlet SO₂ Conc: 3,200 mg/ m³N (dry, 6%O₂)
SO₂ Removal Eff: 93.75 %
Operation: Dec., 2006

EPC by Hitachi-Poltegor
Sirius Engineers role: EPCM

1 ABSORBER / 4 BOILERS
NO GAS REHEATER
WET STACK (FRP MADE)

World’s largest capacity FGD upon its startup
Sines FGD (4x314 MW)

MAIN DATA

- **Boiler Fuel:** Hard Coal
- **FGD Process:** Wet Limestone-gypsum
- **Gas Flow Rate:** 4x1,500,000 m³N/h (wet)
- **Inlet SO₂ Conc:** 2,600 mg/ m³N (dry, 6%O₂)
- **SO₂ Removal Eff:** 90 %
- **Operation:** Sep. 2008

EPC by Hitachi - Cobra
Sirius Engineers role: Engineering services

GAS-GAS HEATER
FLUE GAS DESULPHURIZATION (FGD) SYSTEM

Unión Fenosa Generación, S.A (Spain) / Narcea P.S. / Unit No.3

Narcea FGD (350MW)

MAIN DATA
Boiler Fuel: Hard Coal
FGD Process: Wet Limestone-gypsum
Gas Flow Rate: 1,500,000 m³N/h (wet)
Inlet SO₂ Conc: 4,200 mg/ m³N (dry, 6%O₂)
SO₂ Removal Eff: 95 %
Operation: April 2009

EPC by Hitachi - Cobra
Sirius Engineers role: EPCM

GAS-GAS HEATER
FLUE GAS DESULPHURIZATION (FGD) SYSTEM

Unión Fenosa Generación, S.A (Spain) / LaRobla P.S. / Unit No.3

LaRobla FGD (350MW)

MAIN DATA

- Boiler Fuel: Hard Coal
- FGD Process: Wet Limestone-gypsum
- Gas Flow Rate: 1,500,000 m3N/h (wet)
- Inlet SO₂ Conc: 4,200 mg/ m³N (dry, 6%O₂)
- SO₂ Removal Eff: 95 %
- Operation: April 2009

EPC by Hitachi - Cobra
Sirius Engineers role: EPCM

GAS-GAS HEATER
FLUE GAS DESULPHURIZATION (FGD) SYSTEM
Elektrownia “Kozienice” S.A. (Poland) / Kozienice P.S. / Unit No.10

Kozienice III FGD (560MW)

MAIN DATA

Boiler Fuel: Hard Coal
FGD Process: Wet Limestone-gypsum
Gas Flow Rate: 2,500,000 m³N/h (wet):
Inlet SO₂ Conc: 3,200 mg/ m³N (dry, 6%O₂)
SO₂ Removal Eff: 93.75 %
Operation: December 2010

EPC by Hitachi - Energomontaz Polnoc
Sirius Engineers role: EPCM

NO GAS REHEATER
WET STACK (not in EPC scope)
CATALYTIC deNOx SYSTEM (SCR)

Vattenfall Heat Poland; PGNiG Termika / Siekierki CHP, Warsaw (Poland)/ Boilers No.10,11,14 and 15

Siekierki CHP (4x120MW equiv.)

MAIN DATA

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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<tr>
<td>Boiler Fuel:</td>
<td>Hard Coal</td>
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<td>deNOx Process:</td>
<td>SCR</td>
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<td>Gas Flow Rate</td>
<td>4 x 434 000 m³N/h (wet):</td>
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<td>Inlet NOx Conc:</td>
<td>550 mg/ m³N (dry, 6%O₂)</td>
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<td>Outlet NOx Conc</td>
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<td>• Take-over for boiler 10:</td>
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<td>• Take-over for boiler 11:</td>
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<td>• Take-over for boiler 15:</td>
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<td>• Take-over for boiler 14:</td>
<td>Dec 2013</td>
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EPC by Hitachi - Energomontaz Polnoc
Sirius Engineers role: EPCM

The first SCR for a power company in Poland
Kozienice FGD IV (860MW equiv.)

**MAIN DATA**

- **Boiler Fuel:** Hard Coal
- **FGD Process:** Wet Limestone-gypsum
- **Gas Flow Rate:** 3,480,000 m$^3$/N/h (wet)
  (One absorber handles the flue gases of total 4 of 8 boilers, 215MW each)
- **Inlet SO$_2$ Conc:** 3,200 mg/ m$^3$/N (dry, 6%O$_2$)
- **SO$_2$ Removal Eff:** 93.75 %
- **Operation:** July, 2015

**EPC by Babcock-Hitachi KK**

Sirius Engineers role: EPCM

- 1 ABSORBER / 4 BOILERS
- NO GAS REHEATER
- WET STACK (FRP MADE)
Kozienice Unit 11 FGD (1075 MW)

New unit

**MAIN DATA**

- **Boiler Fuel:** Hard Coal
- **FGD Process:** Wet Limestone-gypsum
- **Gas Flow Rate:** 2,900,000 m³N/h (wet)
- **Inlet SO₂ Conc:** 3,200 mg/ m³N (dry, 6%O₂)
- **SO₂ Removal Eff:** 96.5%
- **Operation:** July, 2017

**FGD by Babcock-Hitachi KK - Polymex-Mostostal**

**Sirius Engineers role:** Engineering services

**1 ABSORBER FOR NEW 1075 MW UNIT**
**NO GAS REHEATER**
**FLUE GASES TO COOLING TOWER**