# AES Galabovo - Power Plant Features

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**December 11th , 2012**

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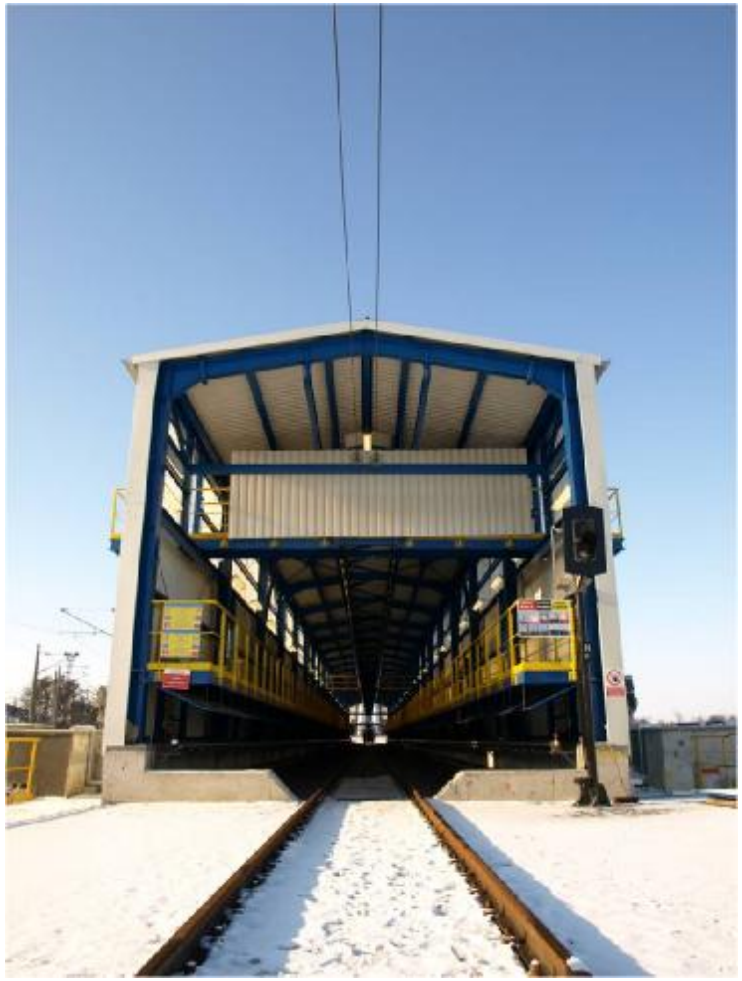
# AES Galabovo

# AES Galabovo - Overview

- Ø2 units x 300 MW Lignite Fired
- Ø35% Net Efficiency
- ØSub Critical Steam Cycle
  - §167 bar 540 C main steam
- ØFlexible Operation
  - §40 -100% turndown
- ØLow Airborne Emissions
  - §NOx 200mg/Nm3
  - §SOx 400mg/Nm3
  - §Dust 30mg/Nm3
  - §CO 250mg/Nm3
- ØZero Liquid Discharge

# AES Galabovo – Fuel Delivery

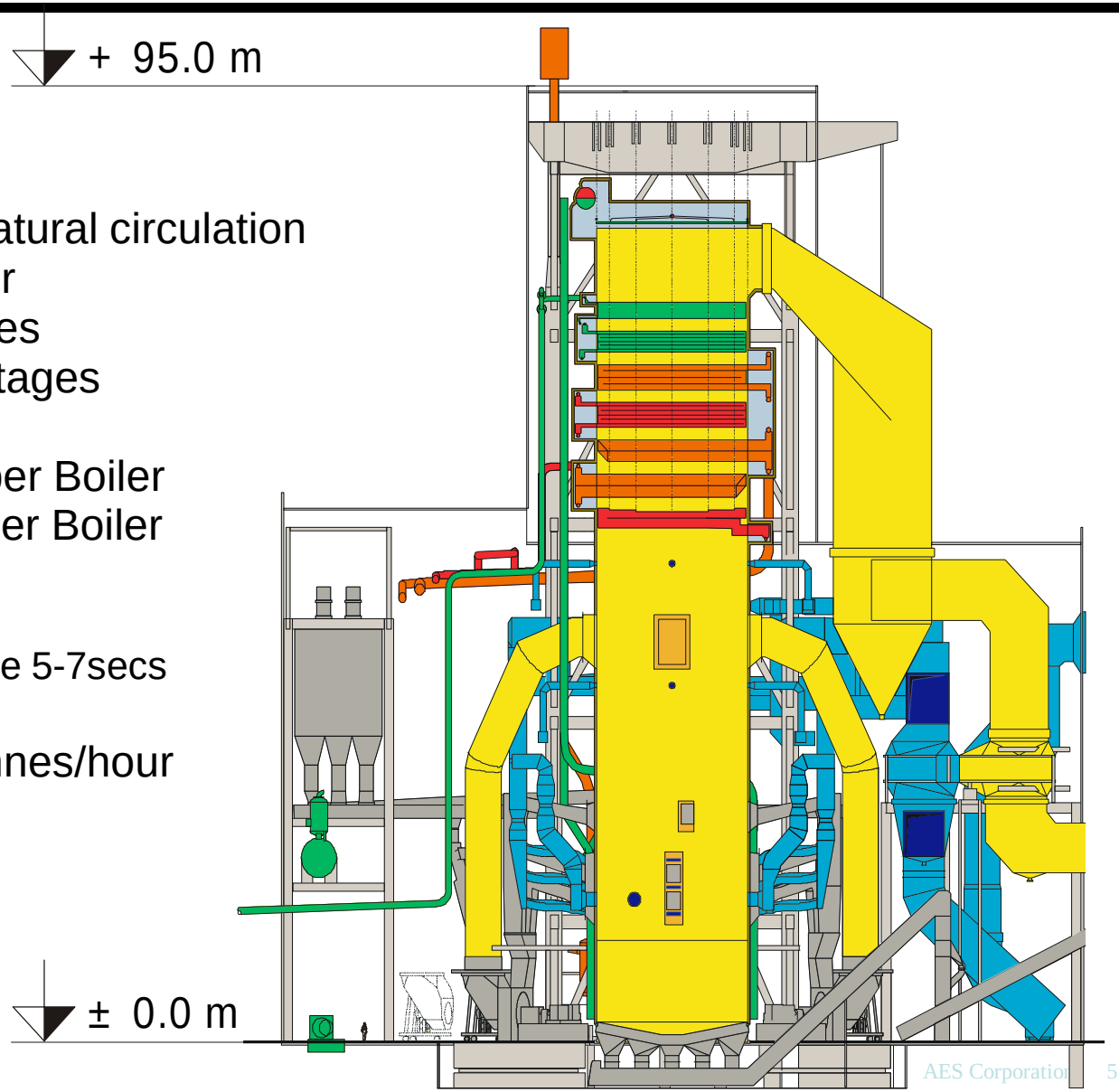
- Fuel Delivered – Crushed and Stocked Out
  - Train unloading capacity 4 trains per hour, 2000 tonnes/hour
  - 2 belts to coarse crusher 2000 tonnes/hour
  - 340,000 tonnes stocking capacity
  - 2 combined stacking and reclaiming machines each 100% capacity
- Fuel Reclaimed – Crushed and Delivered to Bunkers
  - Reclaim from stock
  - Fine Crusher facility
  - 2 belts to bunker bay
  - Shuttle conveyors feeding bunkers to mills



# AES Galabovo - Boiler

Tower type
Equipped with a drum, natural circulation

- Ø6 Beater Mills per Boiler
- ØEconomizer – two stages
- ØSuper Heater – three stages
- ØReheater – two stages
- Ø2 Axial Flow FD Fans per Boiler
- Ø 2 Axial Flow ID Fans per Boiler
- ØCombustion Chamber
  - §16m x 16m x 40m
  - §Optimised residence time 5-7secs
- ØBoiler Height – 95m
- ØSteam Output 1016 tonnes/hour



# AES Galabovo – Water Steam Cycle

- Main Steam Pressure – 167 bar
- Main Steam Temperature – 540 C
- Main Steam Flow – 1016 tonnes/hour
- Reheat Steam Pressure – 35 bar
- Reheat Steam Temperature – 540 C
- Regenerative Feed Heating
  - 4 LP Heaters and 2 HP Heaters
- No Hydrazine – minimum ammonia dosing

# AES Galabovo – Steam Turbine

- HP Cylinder – Single Flow
  - Compact design
  - 1+23 stages
  - High velocities – low resistance
- IP Cylinder – Single Flow
  - Compact design
  - 17 stages
  - High velocities – low resistance
- LP Cylinder – Double Flow
  - Equal thrust
  - 6/6 stages, lateral location of the condenser
  - Water injection to cool last stages in part load
- Modular Condenser Design
  - Ease of maintenance
- Hydrogen Cooled Generator – 20kV
- Step Up Transformer 400kV Power Export

# AES Galabovo - Flue Gas Desulphurisation

- FGD Process
  - Limestone slurry prep and storage
    - Limestone arrives by train
    - Pre crushed and conveyed to silo
    - Slurry Produced with ball mills
  - SO2 Absorption
    - 1 Absorption tower per Unit
  - Gypsum dewatering
    - Vacuum belt filters
- No Gas/Gas Heat Exchanger
- No FGD By pass
- GRP Pipes and Ducts

# AES Galabovo – Cooling Tower

- Integrated Cooling Tower and Stack
  - Individual Flues
  - Increased buoyancy reduced ground level concentrations
- Tallest Structure on Site
  - 135m high
  - 80m Diameter basin
- Basin Fire Water Reservoir
  - No fire water storage tank
- Light weight Low Fouling Fills
- Make Up from Lake “Rozov kladenetz”

# AES Galabovo – Waste Disposal

## Conveying system

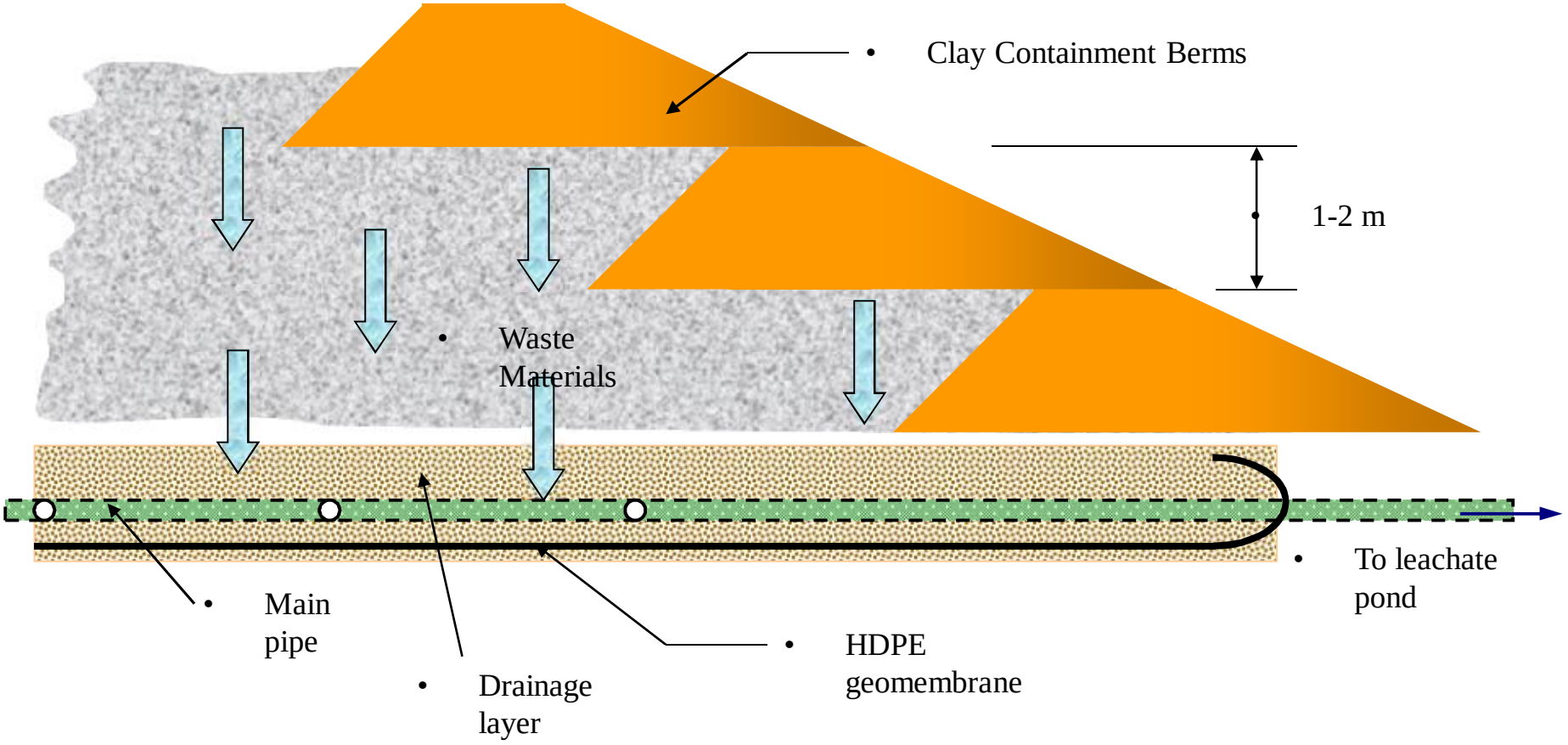
- 500 m trough belts system at power plant, 4,500 m tube length;
- 400 mm pipe diameter; 4.8 m per second belt speed;
- 1,400 tph max capacity;
- Variable frequency drives;
- No dust emissions during transport;
- Active dust suppression at transfer points;
- Idlers with reduced noise levels;
- Two drive stations;

# AES Galabovo – Waste Disposal

## Disposal Site:

- Old mine spoils disposal site;
- Engineered facility, not a landfill;
- Reliable lower and upper insulation systems;
- Separate systems for leachate and storm water management;
- Settlement and ground water monitoring facilities;
- Full final closure and remediation arrangements;
- Cell 1- 520,000 m2

# By products management
# Disposal site / leachate drainage



# AES Galabovo – Q & A

Any Questions ?