

Power Plant

Amager II, Denmark

How we created value

- Reduced the concentration of pollutants to safe levels
- The plant is capable of handling a wide range of flow conditions
- Effluent can be discharged straight into the Baltic Sea



Coal and biomass fired power plant Amager II / Denmark

Brief

In December 2006 Ovivo engineers worked on an order for a new flue gas washing water treatment plant (FGWWT) for the new block 1 of the Amager II power plant in Copenhagen, Denmark from VATTENFALL A/S, Generation Nordic, Thermal Power. The boiler has a rated performance of 140 kg/s steam resp. 350 MJ/s. Block 1 can be operated with different fuels.

Solution

The power plant's primary fuels are coal and biomass (straw pellets and wood chips) and its secondary fuel is heavy oil. The result is a very wide

spectrum of possible ecologically relevant substances in the flue gas that have to be removed by wet flue gas cleaning. The flue gas washing water is re-circulated permanently within the washing tower, while a part is discharged to the FGWWT in order to maintain a maximum level of chloride. Due to the circulation and evaporation losses and depending on the type of fuel this results in high concentrations of soot particles and residual organic compounds from the incineration process, including sulphate resp. sulphuric acid and sulphurous acid and numerous heavy metals, such as lead, zinc, nickel, copper, cadmium, arsenic, mercury etc.

All these substances are environmental pollutants and have to be reduced below the very strict Danish limits before the treated waste water is discharged into the sea.

Outcome

The FGWWT is designed as a multi-stage treatment consisting of hydroxide-precipitation, sulphide-precipitation, multi-media-filtration and selective ion exchange. The nominal flow rate of the FGWWT is 30m³/h and the plant has to be able to operate in the range of 5-30 m³/h.

The very low limit for heavy metals is especially challenging. Due to the incineration of biomass (straw pellets) the circulating flue gas washing water contains high concentrations of cadmium. The toxic heavy metal cadmium has to be reduced in the outlet of the FGWWT down to <3 µg/l. Compared to that the limit for cadmium in drinking water is according to the EC-Guideline <5 µg/l. Those strict limit values can only be reached by adding a selective ion exchange stage.



View from ground floor



View from top floor

The sludge is collected in a sludge storage tank is dewatered by a decanter to be disposed of. The clarified water is neutralised in a final neutralisation stage and, after an automatic sample station, is discharged into the Baltic Sea.

Parameter	Unit	Method	Value	Limit
Arsenic	µg/l	DS/EN ISO 15586 (GF-AAS)	<5,0	13
Cadmium	µg/l	DS/EN ISO 15586 (GF-AAS)	<1,0	3
Copper	µg/l	DS/EN 1483 (CV-AAS)	<5,0	500
Mercury	µg/l	DS/EN 1483 (CV-AAS)	1,9	3
pH-value		DS 287	8,1	7,0–9,0
Chloride	mg/l	DS/EN ISO 10304-2 (IC)	3.096	25.000
Sulphate	mg/l	DS/EN ISO 10304-2 (IC)	3.277	15.000
Suspended Solids	mg/l	mg/L DS/EN 872	2,0	500

Operation parameters of the FGWWT-plant