



LP Amina proprietary gas SCR technology Caoqiao Power Plant, Beijing

- > *Greenfield project located in Beijing's urban center*
- > *87% NOx emission reduction*
- > *Ammonia slip under 3.0ppm*
- > *Total system pressure drop under 520Pa*

Caoqiao Power Plant, Beijing

Within Beijing's 4th ring road, operating in the eastern half of the capital's urban core, Caoqiao Power Plant was facing a modern energy dilemma. The BEIH-owned plant needed to supply affordable power to fuel economic growth while complying with tighter emission regulations. To achieve both objectives, BEIH chose LP Amina to implement our proprietary SCR solution on the Beijing 2x350 MW combined power cycle system.

Customer & Location

Beijing Energy
China, Beijing, Dongcheng District

Plant Equipment

2x2-on-1 combined cycle plant built in 2013, total output of 750 MW
Combustion turbines (CTs) – Siemens SCC5-400F gas turbines
Heat recovery steam generators (HRSGs) – Wuxi Huaguang Boiler, vertical
New build Power Plant (Greenfield)

Reagent

Industrial-grade aqueous ammonia (20% chemical)

Objectives

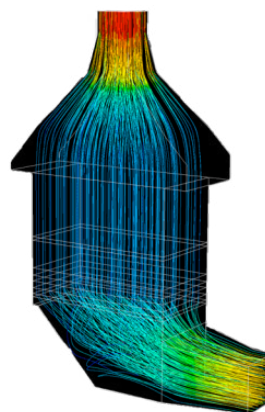
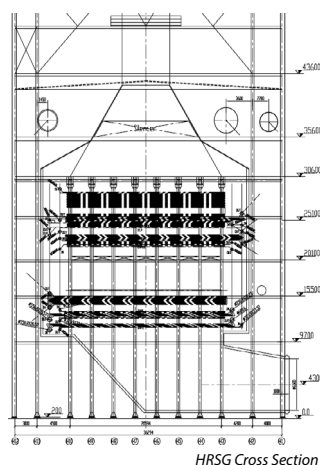
- NOx reduction of 85% or more required (15% O₂, dry) from (est) 0.041 lbm/MMbtu
- SCR availability should be 98% or greater, with a mechanical life of 25 years.
- Slip must be under 3.0 ppm
- Total system pressure drop must be less than 520 Pa over catalyst life

Challenges

- Greenfield project.
- Very good ammonia distribution required to achieve NOx guarantee.
- Plant required traditional ammonia vaporization solution.

LPA Solution

LP Amina performed CFD modeling and provided complete engineering and procurement, as well as worked closely with Wuxi for construction. A horizontal catalyst layer utilizing Haldor-Topsoe corrugated catalyst (DNX-929) was installed in the HRSG between tube banks (340°C gas temperature), and an ammonia injection grid (AIG) was installed upstream. Flue gas was used to vaporize and dilute aqueous ammonia. Additionally, an ammonia "skid" was built to facilitate unloading and injecting of the reagent, utilizing tanks with a week's storage capacity and metering pumps. LP Amina designed the control logic and guided the implementation of the automatic control at the customer's DCS to achieve the optimal performance of the SCR system.



Results

LP Amina was able to reduce NOx by over 87% to groundbreaking 0.006 lbm/MMbtu, while slip stayed within contract limits. This makes Caoqiao one of the lowest NOx producing power plant in the world, and truly a landmark project in the global energy field.