



LP Amina Hybrid SNCR/SCR Technology Yixing Power Plant, Jiangsu, China

- > *NO_x reduced below 0.08 lbm/MMBtu, with slip <3.0 ppm*
- > *Achieved significant reduction potential, especially when combined with low NO_x burners*
- > *Significantly reduced initial investment and operational cost*
- > *Reduced amount of catalyst used*

Yixing Thermal Power Plant

Located in Yixing city, Jiangsu Province Yixing Thermal Power Plant is the biggest cogeneration enterprise in Jiangsu and is one of the major heat suppliers in the Yixing city. As a long-time partner of LP Amina, Yixing Thermal Power Plant was one of the early adopters of De-NOx technologies in Jiangsu province, implementing LP Amina's proprietary LNB technology on two of its units in early 2009-2010. In the latest projects with Yixing Thermal Power Plant, LP Amina proposed a completely new Hybrid solution that has high-efficiency NOx reduction rate and a small initial investment due to the significant reduction of catalyst dosage. This Hybrid De-NOx solution was successfully installed on Yixing Thermal Power Plant's three units and helped to achieve 82% reduction in a new innovative and economical way.

Customer & Location

Jiangsu Yixing Thermal Power Corporation Co., Ltd.
China, Jiangsu, Yixing

Plant Equipment

HG - 220/9.8 - YM10 boilers provided by Harbin Boiler Company in 2002
Natural circulation, single furnace, indirect tangentially fired coal boilers

Reagent

Urea diluted solution (40%)

Objectives

- NOx reduction from 0.41 lbm/MMBtu to below the level of 0.08 lbm/MMBtu
- SNCR De-NOx reduction guaranteed to reach 40%
- SCR system slip must be under 3 ppm, total system pressure drop must be less than 500 Pa, catalyst chemical life should be 16000 hrs. (> 1.8 years), SCR De-NOx efficiency should reach 50%

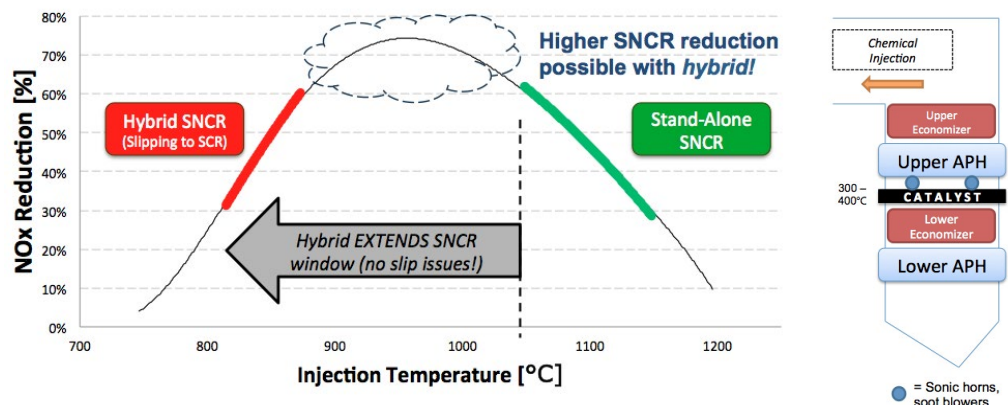
Challenges

- Since there is no urea injection grid (only two levels of SNCR injectors), the urea distribution going into the catalyst was very important for minimizing slip
- The system required very customized and accurate nozzle design and layout to ensure even distribution of the reagent in the flue gas
- SCR system reagent applied in-duct arrangement, thus catalyst installation in limited space would require rigid structure design

LPA Solution

LP Amina provided complete engineering and procurement, as well as worked closely with Yixing for construction. LP Amina installed urea solution spray nozzles respectively on the elevation of 18m, 21m, 23m and 27.5m, total number of 28 on four layers. The bottom three layers urea solution mainly served for SNCR system, the top spray nozzle primarily supplied reagent to serve for the subsequent SCR system. By applying new type of direct urea injection spray nozzle, LP Amina removed the need for a vaporizer outside of the furnace. Haldor-Topsoe corrugated catalyst was installed in rear duct cavity (about 1.5m high between economizer and air pre-heater).

Furthermore, ammonia unit system comprised a urea solution storage tank for 3 days urea consumption and aqueous urea pump which transported reagent for system. LP Amina designed the control logic and guided owners to perform automatic control on PLC, which ultimately achieved a relatively high level of automation for SNCR & SCR hybrid system. As the enough dose of reagent was sprayed one-time, the De-NOx efficiency in SNCR area could be increased and the following dose of SCR catalyst could be decreased. This avoided the problems of large flue gas resistance and high power consumption brought by the construction of a traditional SCR which needs additional ducting and structural support.



Results

Based on the continuous and stable running, NOx was reduced to below 0.08 lbm/MMBtu, with slip less than 3ppm and the pressure drop across the catalyst below 500 Pa.