IVITAS realizes first ever SCR (Selective Catalytic Reduction) reactor in the Czech Republic

IVITAS recently utilized their extensive knowledge and expertise in power generation to implement an SCR reactor in a coal fired power plant. Located at the Detmarovice facility, which is operated by CEZ (the largest electricity producer in the Czech Republic), it is the first of its kind in the Czech Republic.

Since 1996, IVITAS has been strictly focused on design, construction and consulting services for the power generation industry. They constantly and consistently gain knowledge on cutting edge technology around the world and develop their own technology and processes to achieve efficient, cost optimized projects for steam and hot water boilers, electric power plant boilers, heating plants and industrial facilities.

Upcoming EU emission regulations affect companies of all sizes

New NOx emission regulations recently approved by the EU will come into effect on 1 January 2016. These changes will affect many companies throughout the Czech Republic, including the largest power plant in the Silesian region, Elektrarna Detmarovice. The Silesian power plant produces electricity through the burning of coal and has an installed capacity of 800 MWe (4 x 200 MWe). For close to 40 years, improvements in its production processes had been carried out to reduce emissions, but the new EU guidelines made a radical renovation necessary.

The right solution for Elektrarna Detmarovice

The EPC contractor selected IVITAS as the preferred designer for this project due to its well-known technical expertise in regard to boilers and boiler plants. Design work began in late 2013 with IVITAS contributing its know-how in the same capacity as it had done during the earlier comprehensive renewal of the Tusimice II and Prunerov II power plants. It was given the task of designing and implementing primary combustion measures for the realization of denitrification of the K3 and K4 blocks with a total output of 400 MWe. IVITAS was also asked to provide a conceptual solution for flue gas ducts and implementation of the SCR reactor for the project.

IVITAS takes part in introducing SCR technology to the Czech Republic

To achieve the maximum reduction of NOx emissions, SCR technology was chosen as the most appropriate supplement to the proposed primary combustion measures. This technology delivers a mixture of NH3 and H2O into the flue gas, which causes subsequent reactions on the catalyst layers in the reactor enclosure to maximize reduction of NOx emissions. The system is located behind the second pass of the boiler. Ducts and the reactor housing were
designed to reside outside the boiler room and were positioned above the Ljungström type regenerative air preheater.

The uniquely designed, independent SCR reactor housing is 18 meters high and operates as a reactor exhaust pipe with an inside diameter of 14 x 7 meters. The housing is supported by a specially designed girder grid system. The flue gas mixture from the reactor housing is delivered via a split channel to a Ljungström type regenerative air pre-heater. Each individual part is connected by a woven expansion joint, which enables thermal movements.

After raising the height of the channel, three additional girder grids were realized to support the catalytic layers, suspended economizer section and air heater. An under slung overhead crane was located below the second and third girder grid for manipulating the catalytic converter modules.

The total weight of the steel structure is 200 tons and the SCR technology weighs approximately 380 tons. Both are located on each 200 MWe unit.

Computer modelling of the SCR Reactor

The structure was comprehensively stress tested using unsteady temperature loads and results were implemented into the construction of the reactor housing. Testing included temperatures and temperature gradients experienced during normal operation, start-up and shutdown of the unit. The finite element method (FEM) was used for global structural analysis of the SCR reactor and duct.

IVITAS validates its industry-leading expertise in power generation

IVITAS has once again proven its experience, knowledge and versatility in the design and implementation of energy generation processes and facilities. EPC contractors, power generation and heating companies can all place their trust in IVITAS thanks to its focus on optimization of combustion projects and development of specialized technologies for energy and civil construction. From design to basic structural analysis to realization of workshop documentation, IVITAS provides comprehensive, professional services for both domestic and international clients.

To receive an initial consultation for your next power generation project, contact the IVITAS professionals at + 420 597 317 317 or ivitas@ivitas.cz.

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