

Operation Experience of Nakoso 250MW Air-blown IGCC Demonstration Plant

Tetsuji Asano*

Clean Coal Power R&D Co., Japan

(t-asano@ccpower.co.jp*)

Clean Coal Power(CCP)'s Nakoso IGCC demonstration plant was constructed in 2007, and has been operated with the air-blown entrained-bed coal gasifier. The plant consumes ca. 1,700 ton-coal/day to produce 250 MW-gross electricity. Syngas is treated by wet MDEA+ gypsum recovery process. Employed gas turbine was 1,200C C-class 50 Hz turbine. Reliability was confirmed by 2,039 hours of continuous operation, and the resulting net thermal efficiency was 42.9% (LHV basis). Carbon conversion reached >99.9% and the environmental performance was SO_x 1.0 ppm, NO_x 3.4 ppm, and the dust <0.1 mg/Nm³. Startup time of 15 hr was sufficient to operate, and the minimum load was able to reduce to 36%. Slag hole blockage has never happened during operating test. The flow of molten slag was constant, which means that the gasifier is operating in a very stable condition. Load change rate of 3%/min which is compatible with conventional PCF in Japan, was realized by adjusting the operation parameters. Because of nitrogen-containing coal gas, air-blown IGCC is not exactly suitable for chemical production or poly-generation compared with oxygen-blown IGCC.