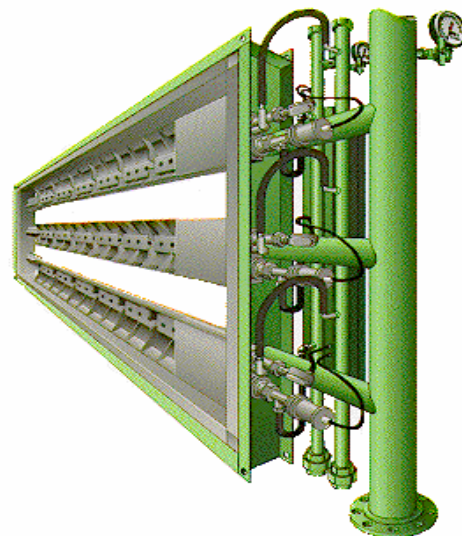




COGENERATION PLANT USES WASTE GAS

SITUATION

The electricity company EPZ built a co-generation plant on the premises of DSM. The plant will produce 233 MW electricity and 300 tons/hr of steam. The steam is generated on various pressure levels and supplied to DSM. A part of the electric power is supplied to DSM as well, and the remainder is available for the public grid. The plant comprises one (1) gas turbine and two (2) waste heat boilers each with a **duct burner for supplementary firing natural gas and/or waste gases of DSM**. The system is designed that on failure of one of the components the steam production can be continued (n-1 principle). The burner systems are designed for **automatically changeover to forced draft fan operation on gas turbine trip and vice versa (flying change over)**.



Gas Fired Duct Burner

De Jong-Coen supplied the duct burners, the fuel gas trains, the flame detection system and assisted in the design of the logics for the fail safe PLC system, which is integrated in the DCS system, supplied by others.

Name:	Swentibold
Location:	Geleen, the Netherlands
Turbine:	Siemens V94.2
HRSG's:	Two (2) Standard Fasel-Lentjes
Capacity:	300 tons/hr total
Burners:	Two (2) De Jong-Coen Duct burners with 14 elements each
Heat release:	166 MW (LHV) per burner
Fuels:	Natural gas (NG) DSM waste gas

Emission Limits:

	TEG mode, mg/MJ (LHV)		FD mode, mg/MJ (LHV)	
	NG	DSM gas	NG	DSM gas
<u>NO_x</u> :	45	65	75	95
<u>CO</u> :	30	30	25	25

SOLUTION

The burner system had to be designed for a turndown of 10 to 1 during all operation conditions, i.e during TEG as well as during fresh air (FD) operation. De Jong-Coen designed the piping system to allow operation of the burner elements in groups in order to obtain the necessary turndown of approximately 80 to 1 based on the maximum design capacity of the duct burner. To avoid coking when firing DSM gas, which contains unsaturated heavy hydrocarbons, **a special design with insulated and air cooled elements was provided**.

RESULTS

- ✓ **Low NO_x** — at TEG as well as FD operation the NO_x remained well below the guaranteed figures throughout the firing range.
- ✓ **Low CO** — at TEG as well as FD operation the CO remained well below the guaranteed figures throughout the firing range.
- ✓ **Clean combustion** — no coking on the elements when firing DSM gas with heavy hydrocarbon fractions.