

Stack Gas Reheaters Minimize Vapor Plume And Help Disperse Moisture

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PLATECOIL® Prime Surface Heat Exchanger bank raises gas temperature by 40°F

The Pacific Power and Light facility in Colstrip, Montana, operates four coal-fired generating units capable of producing a total of up to 2,094 MW of electricity. This makes the Colstrip power station the second-largest coal-fired generating facility west of the Mississippi River. The power station lies adjacent to the Rosebud coal mine, which supplies Colstrip's low-sulfur, sub-bituminous coal.

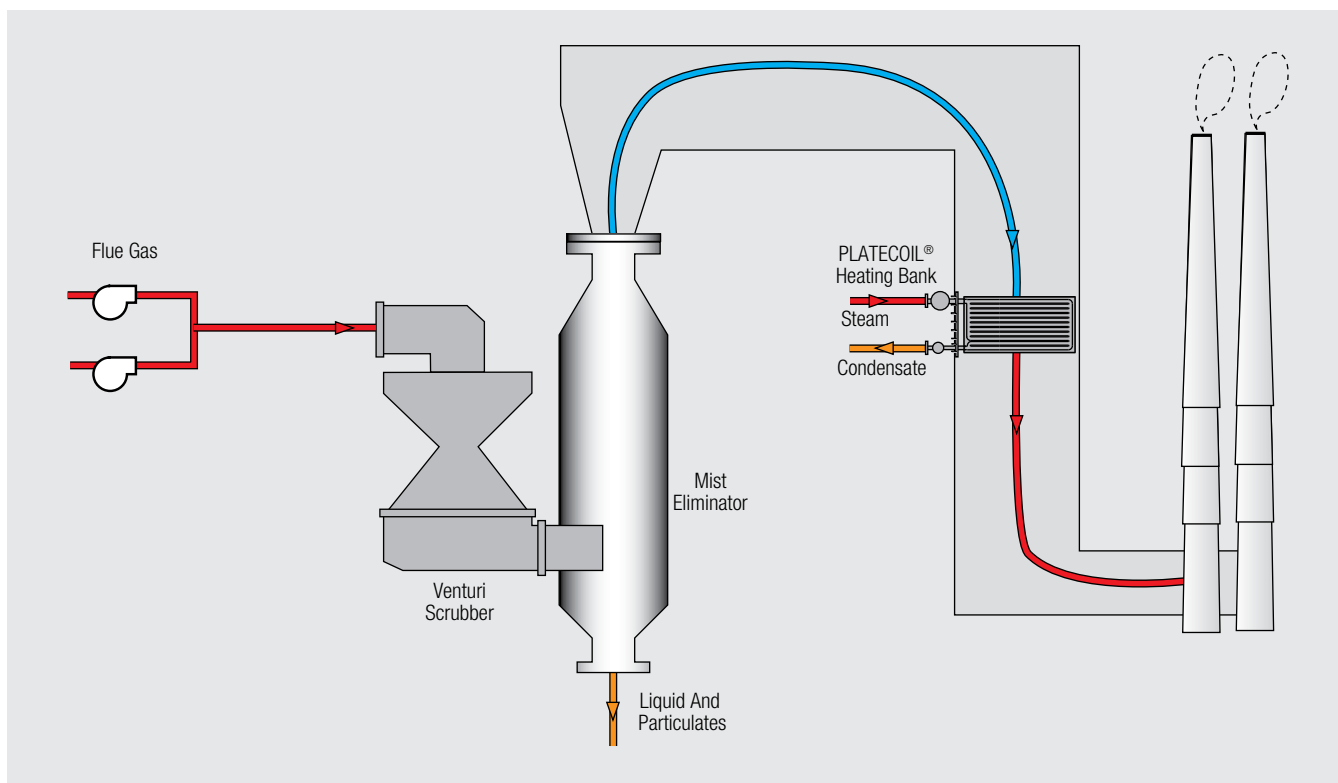
Emissions control

The low-sulfur coal and state-of-the-art scrubbers reduce Colstrip's sulfur-dioxide emissions below the limits set by Phase One and Phase Two of the Clean Air Act. The plant also has added equipment to reduce nitrogen-oxide emissions and fully meets standards of the Environmental Protection Agency and state of Montana, including Montana's strict mercury control rule.

Wet venturi scrubbers are used for particulate and sulfur dioxide removal. The scrubbing medium is lime, either high calcium or dolomitic. Scrubbing efficiency for SO₂ is 95% and for particulate 99.5%.



PLATECOIL® banks mounted downstream of the scrubber outlet raise gas temperature for better dispersion.



System layout of the stack gas reheating solution.

The scrubbed gas has a high moisture content and thus a relatively low dew point, resulting in condensation shortly after leaving the stack. This results in a significant vapor plume at lower ambient temperatures and formation of mildly acidic mist in the vicinity of the stack.

Banks reheat stack gas

To prevent this local misting effect, the Colstrip facility has installed stack gas reheaters. These units heat 900,000 SCFM of flue gas from 125°F to 170°F using 50 psi steam. Flue gas reheating delays condensation until the gases rise higher into the atmosphere before they condense for better dilution and dispersion of the trace acidity and particulates from the scrubber.

The stack gas reheaters are a specially designed Tranter PLATECOIL® Prime Surface Heat Exchanger Bank composed of seven Style 73D

panels. These “boiler header” panels have 17 parallel passes with 2 return passes. This pass design promotes good steam flow and heat transfer without blocking and stalling. The banked panel configuration presents a multiple corrugated surface to the gas flow for good heat transfer without excessive pressure drop that could degrade the performance of upstream components. The banked panel design is also easier to clean and maintain than either tubular or finned tube exchangers would be.

The panels, headers and piping are made from 317L SS to withstand the long-term corrosive effects of the hot, moist flue gas. Depending on the application, other materials are available. The design includes a mounting plate and rails to aid installation, removal and maintenance.



North America
 Tranter, Inc.
 Wichita Falls, TX USA
 Tel: (940) 723-7125
 Fax: (940) 723-5131
 E-mail: sales@tranter.com

Mexico
 Tranter LA de CV
 Querétaro, México 76154
 Tel: +52 (442) 217 44 98
 Fax: +52 (442) 210 11 27
 E-mail: gscully@tranter.com

Europe
 Tranter International AB
 Vänersborg, Sweden
 Tel: +46 521 799 800
 Fax: +46 521-673 93
 E-mail: info@se.tranter.com

Mid-East/Africa/Asia
 Tranter India Pvt. Ltd.
 Pune, India
 Tel: +91 20-30519300
 Fax: +91 20-30519350
 E-mail: sales@in.tranter.com

South America
 Tranter Ind e Com de Equip. Ltda
 Osasco, Brazil
 Tel: +55 11 36084154
 E-mail: vendas@tranter.com

China/Southeast Asia
 Tranter China
 Beijing, China
 Tel: +86 10 6554 4920/21
 E-mail: paulyang@tranter.com.cn
 Support: tina@tranter.com.cn