RETROFIT OF DUAL FUEL POWER GENERATING STATION TO MEET NOX AND CO EMISSIONS

BOILER CASE STUDY

Saguaro Power Company

Henderson, Nevada

Burner Retrofit and CO Catalyst

CUSTOMER APPLICATION AND KEY CHALLENGES

The Saguaro Power Company is a subsidiary of NRG Energy, Inc. that operates a power generating station in Henderson, Nevada and provides electricity to the surrounding Las Vegas Area. The company was using an auxiliary Volcano O-Type Watertube Boiler with dual fuel capability to burn natural gas or a combination of natural gas and hydrogen fuels at 249 million BTU per hour. The auxiliary boiler keeps the steam system in a hot standby mode to quickly bring the power plant back online if the main system goes down.

New emission regulations imposed by the Clark County Air District, required reducing the level of NOx emissions to 12 ppm and the CO stack emissions to less than 1 ppm and would require Saguaro Power Company to make changes to their existing equipment. While Saguaro Power Company was faced with the challenge of meeting these tight emission requirements, they were also concerned with minimizing any loss in boiler capacity.

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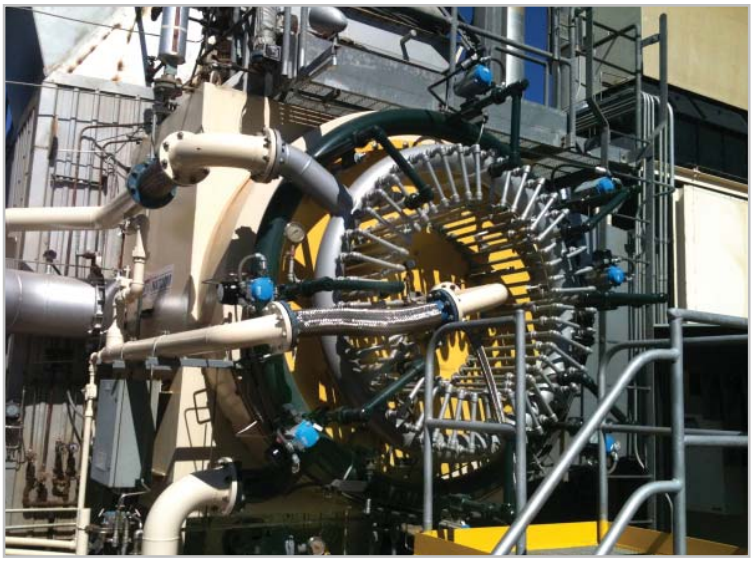
The Saguaro Power Company in Henderson, Nevada

THE R.F. MACDONALD CO. ANALYSIS & SOLUTION

The existing burner was unable to meet the more stringent emission requirements, so R.F. MacDonald Co. replaced it with a Cleaver-Brooks NATCOM burner. Additionally, large sized boilers are required to be continuously monitored to ensure that the NOx, CO, and stack O2 emissions are kept within acceptable Air District limits at all times. This was accomplished with a Fisher Rosemount CEMS package. The most difficult challenge was designing a dual fuel system with varying inputs that could meet the 1 ppm CO emission limit.

The hydrogen fuel used at Saguaro Power Company is an off-gas from the production of a neighbored processing plant. Because this hydrogen fuel source is dependent on external factors, its availability is constantly in a state of flux. In order to maintain a consistent output on the boiler, the amount of natural gas supplied to the burner must be adjusted to compensate for the changing level of hydrogen



The new NATCOM burner installed

CORPORATE
25920 Eden Landing Road
Hayward, CA 94545
510.784.0110

BAKERSFIELD
P.O. Box 71528
Bakersfield, CA 93387
661.363.6225

FRESNO
88 N. Hughes Avenue
Fresno, CA 93706
559.498.6949

LAS VEGAS
3111 S. Valley View Blvd., Ste. E120
Las Vegas, NV 89102
702.220.6680

LOS ANGELES
10261 Matern Place
Santa Fe Springs, CA 90670
714.257.0900

MODESTO
1549 Cummins Drive
Modesto, CA 95358
209.576.0726

RENO
8565 White Fir Street, Unit B2
Reno, NV 89523
775.356.0300

SONOMA/NAPA
642 Martin Avenue, Suite B
Rohnert Park, CA 94928
707.586.9234

SAN DIEGO
P.O. Box 1867
Poway, CA 92064
858.538.5877

www.rfmacdonald.com

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fuel. This complicated the control requirements substantially, but R.F. MacDonald Co. took the time upfront to design a solution that combined the upgraded burner equipment with the proper CO catalyst to satisfy all the complex requirements.

PROJECT RESULTS

The installation of the new NATCOM burner went smoothly, and implementing the CO catalyst for oxidization worked to achieve the low emission target of 1 ppm. Saguaro Power Company was able to meet all of the Air District requirements while maintaining full boiler capacity.

R.F. MacDonald Co. has arranged to continue providing ongoing service and maintenance to the equipment and CEMS package, ensuring Saguaro Power Company stays in compliance.

"R.F. MacDonald Co. provided a turn-key solution to a design problem which required both project administration and engineering, as well as construction of mechanical, electrical, and instrumentation and control equipment. The stringent emission levels for both NOx and CO were achieved in this dual fuel system."

The control system panel on the final installation