

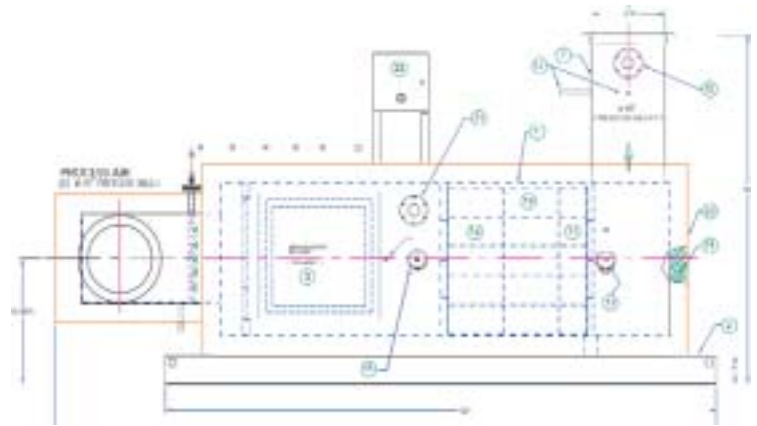
## San Joaquin Valley 2.0 MW COGEN Project Distributed Generation Power Project

### The Problem...

A major manufacturer in the San Joaquin Valley of California needed reliable and economical electric and steam power as a utility to their plastics grinding facility. Located in California's San Joaquin Valley Unified Air Pollution Control District, a district known for among the most stringent environmental regulations in the state, the COGEN facility was required to meet the BACT guideline for the district including rigorous air emission limits for NO<sub>x</sub>, CO & VOC. The problem of abating all three from the exhaust of two (2) Guascor 560GLD, 1.0 MW, natural gas fired, reciprocating engines for this 2.0 MW COGEN facility was solved by CSM Worldwide, Inc.

### The Solution...

The solution employed was the design, manufacture and installation of a custom CSM Model 42B-SCR/CO catalytic abatement system including Selective Catalytic Reduction (SCR) for the removal of NO<sub>x</sub> and catalytic oxidation for the destruction of CO and VOC. The uniquely designed catalytic



system simultaneously treats the exhaust from two lean burn Guascor 560GLD 1.0 MW, natural gas fired, reciprocating engines.

Utilizing CSM's proprietary Real Time Ammonia Control System, the injection of ammonia is regulated to achieve a precise ratio of ammonia to NO<sub>x</sub> prior to the SCR catalyst. With this implementation of sophisticated technology, CSM Worldwide achieved NO<sub>x</sub> levels well below the regulated limit of 9 ppm, while maintaining an ammonia slip level well below 5 ppm.

CSM's custom Ammonia Injection Grid (AIG) was used for this "first of a kind" application; the engine exhaust is injected with anhydrous ammonia which is used as the reductant for the SCR reaction, where NO<sub>x</sub> and NH<sub>3</sub> react across the SCR catalyst bed, converting to harmless N<sub>2</sub> and H<sub>2</sub>O.

Applying technology that here-to-fore was available only in the largest and most sophisticated SCR systems employed in power utilities and chemical plant, CSM uniquely provides this technology for small scale COGEN and Distributed Generation (DG) facilities.

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# Technical Specifications

**Application:** COGEN System

**Location:** San Joaquin Valley, California

**Power Production:** 2.0 MEGAWATT (MW)

**Prime Mover:** Two (2) Natural Gas Fired  
Lean Burn Reciprocating Engines

**Engine(s):** Two (2) Guascor  
560 GLD Engine

**Controlled Emissions:** NO<sub>x</sub>, CO & VOC

**Performance:** < 9 ppm NO<sub>x</sub>  
< 30 ppm CO  
BACT for VOC

**Technology:** CSM's Catalytic Abatement System  
Selective Catalytic Reduction (SCR)  
with Catalytic Oxidation for CO

**Details:** 1. Real Time Ammonia (NH<sub>3</sub>) Control  
2. Dual Engine Catalytic System  
3. Engelhard SCR Catalyst (NO<sub>x</sub>)  
4. Engelhard Oxidation Catalyst  
(CO & Ammonia)

## The Result...

CSM achieves a "first of a kind" solution by integrating a single, custom catalytic emission abatement system with two independent, lean burn, natural gas fired, reciprocating engines used within a highly efficient COGEN system including multiple types of heat recovery.

The highest of performance standards were met by achieving less than 9 ppm of NO<sub>x</sub>, less than 30 ppm of CO and below BACT emission levels in the combined exhaust of both engines. By providing a "seamless solution" to the complex problem of integrating emission control and air permit compliance with the necessity of waste heat recovery through a single highly efficient steam boiler, CSM Worldwide helped this facility to exceed all expectations.

COGEN system designers then focused on implementing other significant, energy recovery features resulting in an overall COGEN design which includes "Tri-Generation" or the concurrent production of electric power, steam and hot water for use at the site.

## For More Information:

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