

# CASE STUDY 4

## CALPINE GEOTHERMAL POWER PLANTS



### PURAFIL REMOVES CORROSIVE EMISSIONS 4 CALPINE GEOTHERMAL POWER PLANTS



#### ABOUT CALPINE CORPORATION

Calpine Corporation is a fully-integrated power generation company consisting of 46 geothermal and natural gas-fired plants with an aggregate capacity of 5,479 megawatts. During the past several years, Calpine has been actively engaged in the acquisition of power plant facilities, including 19 plants located in The Geysers, California, one of the world's largest sources of geothermal power. The Geysers generate enough electricity to meet the needs of a city the size of San Francisco.

#### THE PROBLEM

"Green power", also known as geothermal power, is a term for electricity that is generated from a renewable source in a non-polluting way. Geothermal power plants utilize very hot water and steam, trapped in underground reservoirs, to turn turbines that drive electricity generators. Because they do not require the use of combustion fuels, such as gas, oil, or coal, geothermal power plants are growing in popularity as a clean alternative to conventional power generation technologies.

Despite the environmental benefits of green power, geothermal power generation is not without limitations. The geothermal fluid at The Geysers contains high concentrations of hydrogen sulfide and sulfur dioxide, which causes the characteristic rotten-egg odor evident near hot springs. These gases are not only odorous, but highly corrosive to the electronic components of process controls.

California's energy crisis required that power generation facilities operate at maximum efficiency. Production downtime due to corroded circuitry was a risk that Calpine Corporation was not willing to take.

#### PURAFIL PROVIDES THE SOLUTION

Purafil, the leading manufacturer of dry scrubbing media and gas-phase air filtration systems, met with Calpine engineers to begin an environmental assessment.

As part of the assessment, representatives from Purafil placed Corrosion Classification Coupons (CCCs) in a variety of locations, including switch gear rooms, relay rooms, motor control centers, fire pump houses, and other areas where corrosion was of concern. CCCs are a crucial component of Purafil's Environmental Monitoring Service and are used to determine the overall corrosive potential of an environment before control measures are implemented.

Composed of copper and silver strips, CCCs are left in the environment for 30 to 90 days. During this time, films will form on the coupon. Purafil's in-house laboratory analyzes these films to determine the type and concentration of gases present in the local environment. The results can be directly correlated to ISA Standard S71.05-1985, which defines an environment as G1, G2, G3, or GX based on the corrosion severity level and potential effects on equipment reliability.

The analysis provided an effective, cost-effective method of identifying the areas in greatest need of filtration. As a result of this analysis, Purafil Side Access Systems were installed in various switch gear rooms, relay rooms, and fire pump houses; Purafil Positive Pressurization Units and Corrosive-Aire Systems in Motor Control Centers; Electronic Cabinet Units on cabinets housing circuitry for switch yards; and Compressor Intake Filters for internal compressors. Purafil filters, the first pleated, chemical filter to offer potassium permanganate, were installed in the air handling units serving administrative offices.

At the heart of Purafil's gas-phase air filtration systems are dry scrubbing media. Purafil offers a wide variety of adsorptive and chemisorptive media for the control of corrosive, toxic, and odorous gases.



PURAFIL® SIDE ACCESS SYSTEM (PSA)

PURAFIL® POSITIVE PRESSURIZATION UNIT (PPU)

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