

# MOUNTAINGATE MEDIUM-BTU GAS PLANT OVER TWENTY YEARS OF SUCCESSFUL OPERATION

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## BACKGROUND

The Mountaingate Gas Plant began operation in the mid-1980's as one of the first medium-Btu projects in the United States. The project was developed by GSF Energy (GSF). It delivered a peak of 5 mmscfd (3,500 scfm) through a dedicated 4.5-mile pipeline from the Mountaingate Landfill to the University of California at Los Angeles (UCLA).

UCLA originally used the processed landfill gas as a substitute for natural gas in their boilers. In the early 1990's, UCLA installed a combined cycle power plant. Since that time, UCLA has co-fired processed landfill gas with natural gas in the power plant's two 14.5 MW combustion turbines. The combustion turbines are equipped with post-combustion catalytic converters, and the power plant has operated successfully for over 10 years on processed landfill gas. The gas plant removes virtually 100 percent of all potentially deleterious compounds from the raw landfill gas. The gas plant is classified as a medium-Btu plant because it does not remove carbon dioxide to enhance the Btu content of the landfill gas. The processed landfill gas delivered to UCLA typically has an energy value of 470 to 490 Btu/ft<sup>3</sup>.

The source of the landfill gas is the former Mission Canyon Landfill, also known as the Mountaingate Landfill. The Mission Canyon Landfill was operated on leased land by the Los Angeles County Sanitation District until the early 1980's. The landfill consisted of eight canyons. Canyons 4, 5, 6 and 7 are currently overlain by two golf courses owned and maintained by the Mountaingate Country Club. A landfill gas collection system in Canyons 4, 5, 6, 7 and 8 supplies landfill gas to the gas plant. The landfill gas collection

system in Canyons 4, 5, 6 and 7 is below-grade, and the system in Canyon 8 is below-grade. Operation and maintenance of a landfill gas collection system on one of Los Angeles' most prestigious golf courses presents a unique set of challenges.

Over the years, landfill gas recovery has gradually declined to about 1.9 mmscfd (1,300 scfm).

## PROCESS CHAIN

The following process chain is currently in use at the Mountaingate Gas Plant:

- Compression to 100 psig using two, two-stage reciprocating compressors (one online and one standby);
- Moisture removal through air-to-gas and chilled water-to-gas heat exchangers;
- Hydrogen sulfide, non-methane organic compound (NMOC) and siloxane removal in a scrubber tower;
- Regeneration of the scrubber tower's Selexol by air stripping;
- Destruction of air-stripped compounds in a small thermal oxidizer;
- Final polishing of the product gas with two-stage, non-regenerative activated carbon; and
- Wastewater treatment by oil/water separation and pH adjustment.

## PROJECT RESTRUCTURE

The Section 29 tax credit for the landfill gas produced by the project's wellfield expired on December 31,

2002. GSF made a decision to shut down the gas plant, effective December 31, 2002. GSF made this decision, not only because of the expiration of the tax credit, but also because landfill gas recovery was declining and because operating costs were high. SCS Energy (SCS) felt that given the proper circumstances, the gas plant could continue to operate at a profit. SCS acquired ownership of the Mountaingate Gas Plant in May 2003.

The landfill gas rights lease agreement and the product gas sale agreement expired on December 31, 2002. SCS was able to renegotiate these agreements. Ownership of the wellfield was transferred to the landfill owners, with the expiration of the landfill gas rights lease.

As a result, the landfill owners assumed the cost of operation/maintenance of the wellfield and flare station. SCS negotiated a landfill gas purchase agreement with the landfill owners which calls for a royalty percentage which is relatively low when product gas prices are low, but which increases significantly as product gas prices increase. The product gas sale agreement prices product gas at a percentage of the price of natural gas as purchased by UCLA on a month-to-month basis. UCLA receives the benefits of reduced fuel cost plus the production of about 4 MW of green power.

The restructuring of the underlying agreements acknowledged that with the loss of the tax credit, there was little margin to spread between the project participants. The restructuring allowed the project to be reactivated to the benefit of all parties. The landfill owners receive monthly royalty payments which partially or completely offset their wellfield operation/maintenance costs, depending on the price of natural gas in a given month, and they largely avoid the cost of power to operate the flare station. Electric power in Los Angeles costs about 12¢/kWh, and the savings in power cost is a significant benefit.

SCS was able to make modifications to the way the gas plant was operated to reduce power consumption by about 40 percent.

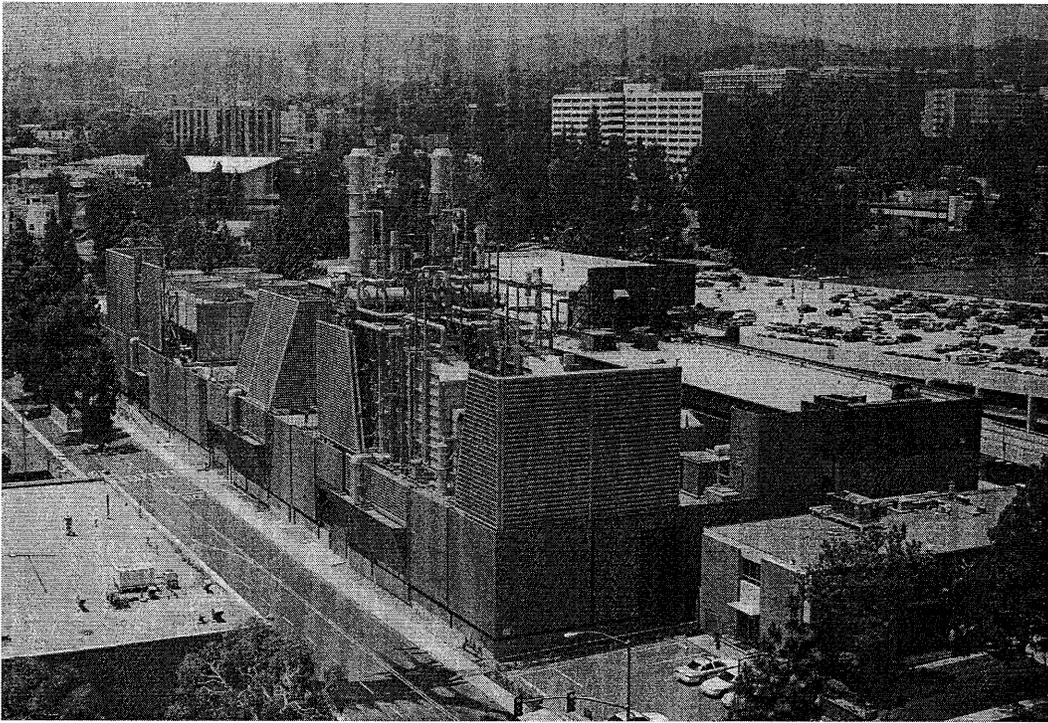
#### **WELLFIELD IMPROVEMENTS**

SCS has been able to arrest the decline in landfill gas recovery over the last four years through precisely targeted, relatively low cost, wellfield investments in Canyons 6 and 7. An investment in Canyon 5 is planned for later this year. After this investment, SCS feels that additional investments in the wellfield will have a limited return on investment.

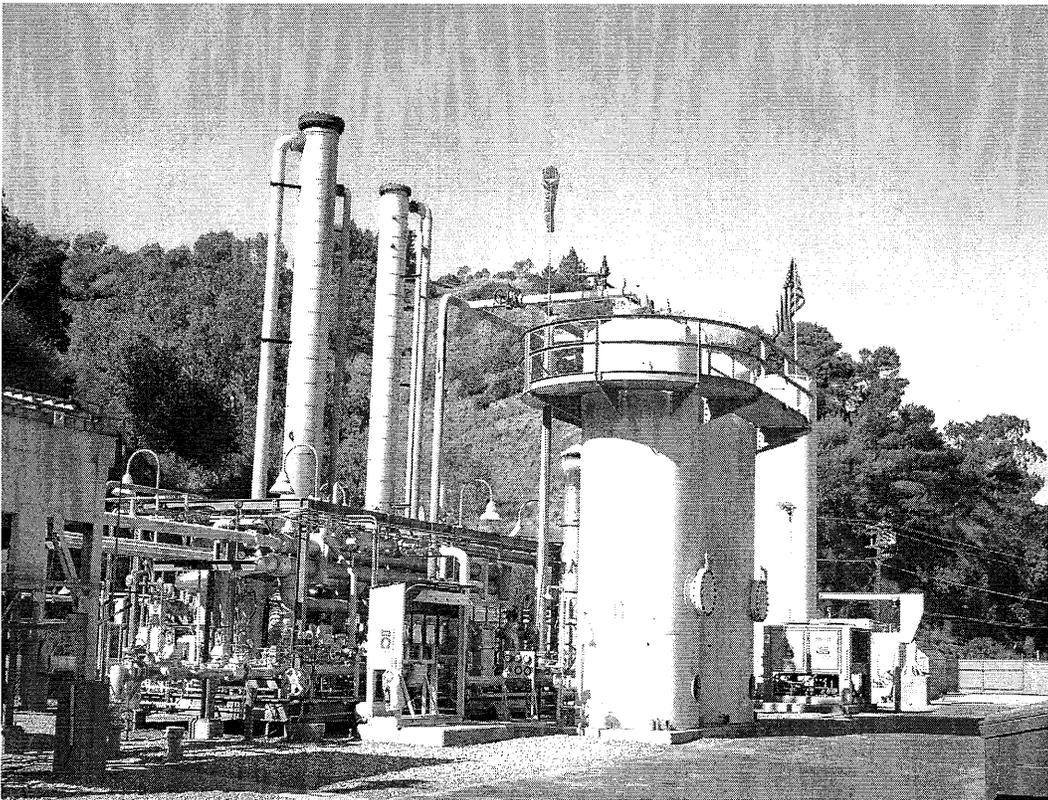
#### **FUTURE**

Under current conditions, SCS feels that the gas plant can operate economically for another three to five years. At that point, it may be possible to develop a small (1.6 MW) power plant as a replacement for the gas plant.

Regardless of future developments, it has been possible to extend the life of one of the landfill-gas-to-energy industry's original facilities for more than four years. In the process, it has supported the generation of over 130,000 MWhs of green energy.



UCLA COMBINED CYCLE POWER PLANT



MOUNTAINGATE GAS PLANT