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MERICHEM COMPANY

# LO-CAT® II PROCESS

## FOR CONTROLLING $H_2S$ EMISSIONS FROM LANDFILL GAS FOR POWER PRODUCTION

A major US waste handling company operates a large landfill in Florida, and in 1992, when Hurricane Andrew struck southern Florida, the landfill saw a huge increase in the amount of C&D waste. Shortly after this, the levels of $H_2S$ started dramatically rising. This company evaluated several technologies for the removal of $H_2S$, which was estimated to be as high as 5,000 ppmv, with up to 2–3 tons/day $H_2S$ being removed with the landfill gas. This presented a problem, since the landfill planned to generate up to 11 MW power from 3–5 turbine powerplants by burning this landfill gas. All combustion equipment has a certain tolerance for $H_2S$ and its corrosive combustion products, but turbines have the lowest tolerance. The equipment at the facility could only tolerate 100 ppmv inlet $H_2S$, well below the current levels in the landfill gas.

Short project completion was essential in the decision, and the project was awarded to Merichem's LO-CAT® Process. The LO-CAT Process is a proprietary, chelated iron liquid redox process that removes the $H_2S$ from landfill gas, converting it to solid elemental sulfur, that can be used as an additive for fertilizer. There are 150 licensed LO-CAT Units worldwide. A LO-CAT $H_2S$ Oxidation System, was designed and delivered in only 22 weeks. The unit was commissioned in 1994, and has been operating since, producing gas with less than 100 ppmv $H_2S$.

Recent changes to the waste being accepted at the site, in addition to the planned opening of additional C&D waste sites, were projected to increase the gas flow and $H_2S$ levels considerably over what the unit was

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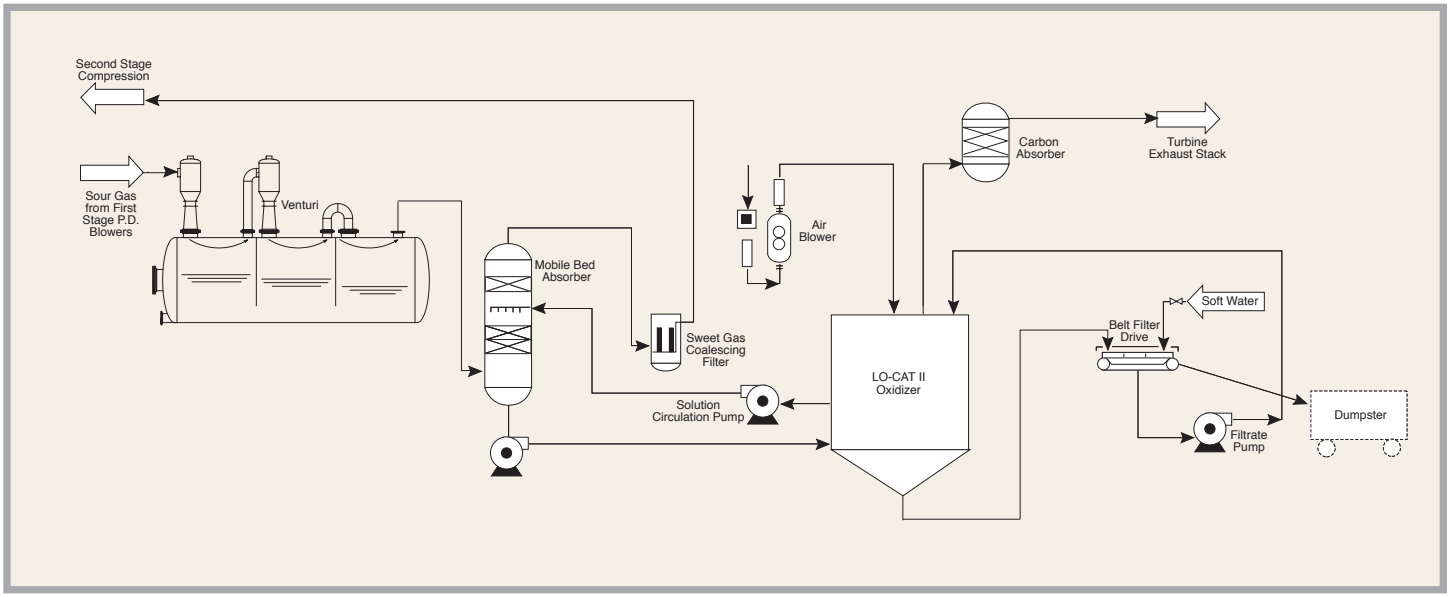


currently treating, and would require expansion of the capacity of the LO-CAT $H_2S$ Oxidation System.

Early in 2001, the client began evaluating options for expanding their capacity. These options included:

- Sending gas offsite for treatment and use.
- Other technology for $H_2S$ Removal to replace the existing LO-CAT $H_2S$ Oxidation System.
- Expansion of existing LO-CAT System to handle higher load.

The client discussed with Merichem a plan to expand their unit capacity to treat this sour C&D waste gas, as well as proposed future expansion capacity. After spending considerable time modeling the gas production and expected $H_2S$ production, based on current and future expected waste types and amounts, a design basis that took into account current trends and the expected expansion of the landfill was set.

Near the client's site is a large trash to energy facility that has the capability of burning sour gas and scrubbing the flue gas. Part of their investigation included studying the economics of shutting down their power generation plant and sending the sour landfill gas to this facility. The loss of revenue, the capital costs spent on upgrades to the facility, as well as the charges for sending the gas offsite made this option completely unsuitable.

The client looked at other $H_2S$ removal technologies that had emerged since the LO-CAT System was installed nearly 10 years ago, including:

- Solvent-phase liquid redox processes
- Biological processes
- Direct Oxidation (modified Claus, sub-dewpoint DO processes, etc.)

None of the processes reviewed could offer the combination of a cost competitive system, with the experience, and guarantees that compared to their operating experience with their existing LO-CAT Unit.

The client finalized discussions with Merichem, and in early 2002 began construction of a LO-CAT expansion system that would increase the sulfur handling capacity of the LO-CAT unit from 3.5 long tons/day up to 10.8 long tons/day, allowing the unit to treat gas containing up to 33,350 ppmv $H_2S$, reducing it to less than 50 ppmv $H_2S$.

The expansion project required careful coordination to time the tie-ins to the existing unit and gas lines with a planned plantwide maintenance turnaround. The tie-ins were completed successfully, and the unit was started in January 2003, resulting in $H_2S$ emissions below the expected outlet conditions.