



Sweet Solutions.™



MERICHEM COMPANY



LO-CAT[®] II PROCESS H₂S OXIDATION SYSTEM FOR REFINERY DESULFURIZATION

The European Union has recently promulgated new directives reducing the amount of residual sulfur in diesel and gasoline. These directives are requiring European refineries to revise both their fuel production processes and their downstream desulfurization strategies. One affected refinery is Irish Refining plc near Whitegate Middleton, County Cork, Ireland which recently added a new atmospheric pipestill and expanded their existing gas oil hydrofiner. After the changes, the refinery could meet the new sulfur directives in the produced gasoline and diesel however, the off gas from the gas oil hydrofiner which is added to the refinery fuel gas, would contain too much H₂S to continue to be burned as a fuel.

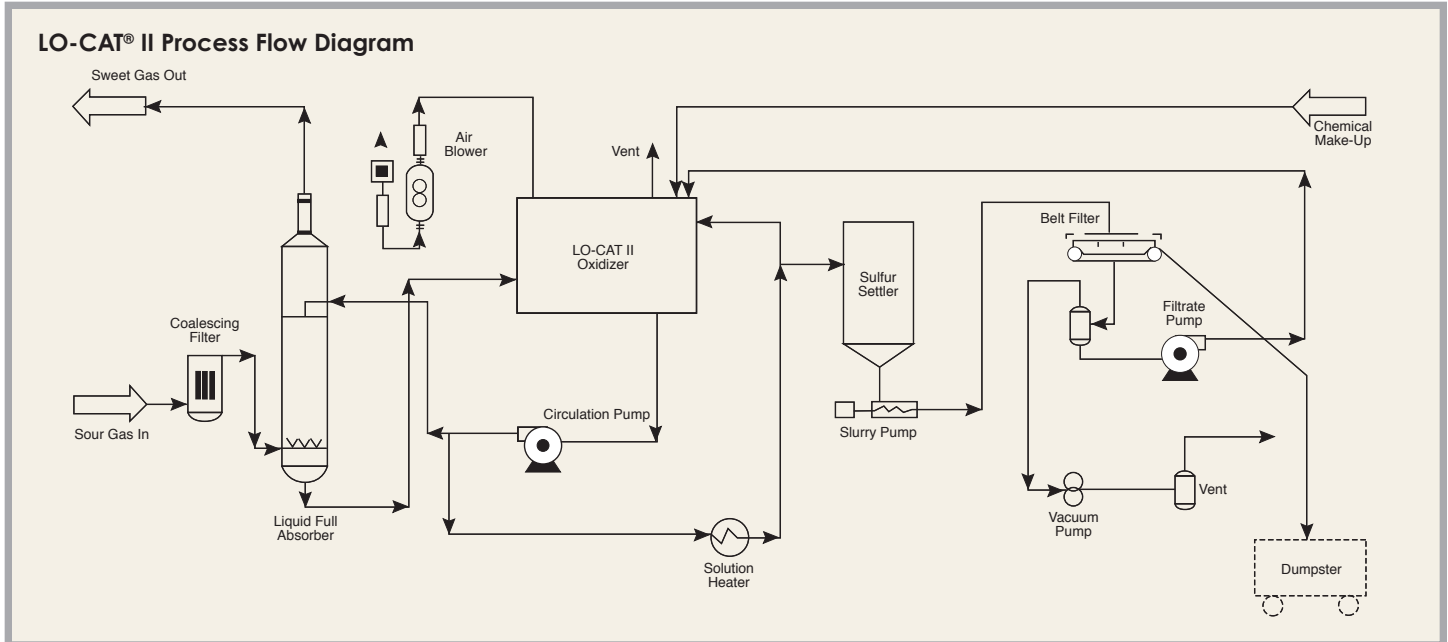
Irish Refining evaluated several sulfur recovery options based on the following criteria: 3 to 1 gas flowrate turndown, 3 to 1 H₂S concentration turndown, H₂S outlet concentration of ≤10 ppmv, minimal operator attention, sulfur product suitable for agricultural use, and a reliable, proven process.

Irish Refining selected the LO-CAT[®] II Hydrogen Sulfide Oxidation Process is designed and manufactured by Merichem.

LO-CAT[®] II PROCESS

H₂S OXIDATION SYSTEM FOR REFINERY DESULFURIZATION

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The LO-CAT[®] II unit was custom designed to sweeten 6,800 scfm of gas at 70 psig, containing 1.8 vol% H₂S and 80 vol% H₂. After initial training and start-up in June, 1996, the unit produced treated gas with a H₂S content significantly below the required outlet level of 10 ppmv. At these low H₂S concentrations, burning the offgas from the gas oil hydrofiner as a fuel does not put the refinery out of compliance with SO₂ emissions requirements and the refinery can produce low sulfur diesel. Operator attention during the initial operating period was less than two hours per day.

In the LO-CAT II process, the H₂S is converted to innocuous, elemental sulfur by an environmentally safe, chelated iron catalyst in accordance with the following equation:



The primary chemical consumptions are replacement of chelated iron lost in the sulfur removal process, replacement of chelating agents which oxidize over time, and a small caustic addition required to maintain the pH of the operating solution in the mildly alkaline range. The highly flexible, patented LO-CAT II Autocirculation design handles fluctuations in both H₂S concentrations and NCG flowrate with little or no operator attention.

Only the LO-CAT II process offers geothermal steam producers a desulfurization process with high efficiency, economical operating costs, and easy operations using an environmentally safe scrubbing solution.