All sulphur recovery units (SRUs) in the Province of Alberta employ thermal incinerators to treat the tail gas effluent from the SRUs prior to emitting the waste gas to the atmosphere. The purpose of the thermal incinerator is to facilitate the oxidation of all of the common reduced sulphur compounds (H2S, COS, CS2 and sulphur vapour) to SO2 prior to release to the atmosphere. Currently in the province there is a informal guideline which requires that the maximum Total Reduced Sulphur (TRS) content of the stack effluent be maintained at 300 ppmv or less.

The thermal incinerator also provides significant thermal energy to the SRU tail gas in order to raise the waste gas temperature sufficiently to ensure that the stack plume rises in the atmosphere. This facilitates the effective dispersion of the plume and ensures that the ground level concentration of the SO2 from the plume does not exceed the Alberta Environment guidelines for this pollutant (450 µg/m3).

Due to the very large volumes of SRU tail gas that are treated in these thermal incinerators and the process temperatures required for successful operation, there is a significant amount of plant “fuel gas” consumed in these incinerators.

In previous work it was determined that there was/is a significant opportunity to reduce the consumption of fuel gas in these systems by optimizing the operation of the incinerators. This “Incinerator Optimization” program has been implemented at many plants in the province and significant fuel gas savings have been realized as a result.

However, in the current climate of high energy costs and increasing concern over CO2 emissions from natural gas fired systems, it appears that there are significant, incremental opportunities to further optimize these systems.

In order to assess this opportunity, PTAC has contracted Sulphur Experts to investigate these opportunities. This report provides detailed background information on the current operating practices for thermal incinerators in the industry and identifies potential methods for further optimizing these systems.