



## Informational Letter IL-OG 76-24

TO: All Operators of Gas Processing Plants

### **STACK EXIT TEMPERATURES FOR ACID GAS INCINERATORS ASSOCIATED WITH GAS PROCESSING PLANTS**

The Department of the Environment (hereinafter called Alberta Environment) and the Energy Resources Conservation Board (hereinafter called the Board) have prepared this Informational Letter which outlines the criteria of the Board and Alberta Environment with respect to the reduction of sulphur plant stack exit temperatures for the purposes of fuel/energy conservation.

Appendix 1 of this document is of importance to all operators of sulphur gas incinerator stacks. It provides for significant fuel savings by allowing operators to maintain stack exit temperatures closer to the prescribed minimum. During a one year trial period the criteria for determining whether a temperature violation has occurred will be relaxed in the manner described in the appendix.

It has been demonstrated that in particular cases the prescribed minimum stack exit temperature may be reduced without causing environmental problems. Appendix 2 describes the information required in applications for obtaining approval for reduced minimum stack exit temperature.

ISSUED at Calgary, Alberta on December 15, 1976.

*<signed by>*

DEPARTMENT OF THE ENVIRONMENT  
W. Solodzuk, Deputy Minister

ENERGY RESOURCES CONSERVATION BOARD  
D. R. Craig, Vice Chairman

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#### **APPENDIX I REVISED INCINERATOR STACK EXIT TEMPERATURE CRITERIA FOR ALL PLANTS PROCESSING SOUR GAS**

It has been noted that, in an effort to ensure against violation of their approved minimum stack exit temperature, most sour gas plant operators have established long-term averages ranging from 25°F to 150°F above their approved minimums.

Further, it has been demonstrated that by revising the stack exit temperature criteria as indicated below and with appropriate changes in operating conditions, a fuel gas saving in the order of 5 to 10 per cent may be safely obtained.

The revised criteria are as follows:

- (a) For a trial period ending 31 December 1977, stack exit temperatures which are below the approved minimum by less than 25 F for less than 15 minutes will not be considered as being in violation and need not be reported.
- (b) As part of the trial, the plant operator shall record the total time per month that the stack top temperature falls within the above conditions and where it exceeds sixty minutes per week the operating control point shall be increased until the sixty minute limit is not exceeded. (Plant shutdowns and operational upsets exceeding the above individual temperature and duration conditions would not be included in the time summation as they would be reported in the usual manner.)
- (c) To encourage fuel/energy conservation by better stack temperature control, the plant operator will be given the opportunity to reduce the temperature control point if a reduction in dip frequency below sixty minutes per week can be demonstrated.

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## **APPENDIX 2 CRITERIA FOR PREPARATION OF SUBMISSIONS REGARDING REDUCTION OF STACK EXIT TEMPERATURE**

It has been demonstrated by a study conducted for Alberta Environment that substantial savings in fuel gas may be achieved by reducing the incinerator stack exit temperature. For example, a plant with an existing approval for a minimum stack exit temperature of 1 000°F could theoretically expect a fuel gas saving in the order of 25 per cent by obtaining approval for a minimum stack exit temperature of 900°F.

In order that an application for stack temperature reduction be acceptable, the application must demonstrate that the following requirements will be satisfied:

- (1) maintenance of satisfactory oxidation of sulphur compounds in the incinerator and stack; and,
- (2) maintenance of the maximum calculated ground level concentration of SO<sub>2</sub> below 0.2 ppm.

As the first step, the applicant must demonstrate that the particular incinerator and stack configuration achieves satisfactory oxidation of all sulphur compounds at the proposed temperature. For the purpose of this type of study, it may be assumed that satisfactory oxidation consists of maintaining the H<sub>2</sub>S, COS, and CS<sub>2</sub> levels below a maximum combined level of 300 ppm, which is an approximation calculated by accounting for normal dilution rates which occur with most high temperature stack emissions. It should also be noted that the studies performed to demonstrate satisfactory oxidation should assume an oxygen content similar to that which would be realized at the

proposed stack gas exit temperature.

The next step should be to demonstrate that the maximum ground level concentration of  $\text{SO}_2$  is equal to or less than 0.2 ppm under the proposed operating conditions using the standard calculation method or an acceptable alternative. The latter may be used only if validated by actual field testing.

In establishing such an acceptable alternative the diffusion characteristics of the area should be evaluated for typical conditions in each season of the year. Wind and temperature profiles should be obtained and the trajectory of the plume determined. Ideally several locations along the general path of the plume would be used for wind and temperature soundings. Tethersonde, minisonde, instrumented aircraft, pilot balloons and other techniques exist for obtaining this type of information. Turbulence measurements from aircraft, towers, or no-lift balloons may provide valuable data. All of the above information should be related to long-term statistics in order to estimate the frequency distributions. Measurements of sulphur dioxide concentrations in the plume at ground level or in the air will also be required for purposes of verification. During the periods of sulphur dioxide concentration measurements, the stack effluent must be maintained at the proposed operating conditions.

Prior to making a formal application for reduction of stack gas exit temperature, the applicant should discuss the matter with Alberta Environment in order to ensure that the implications of these guidelines are fully understood.

It should be noted that the applicant may not proceed with field studies until a temporary waiver of the approved minimum stack gas exit temperature has been obtained from Alberta Environment and the Board for the duration of each of the field studies.