



February 14, 1977

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GL 1141-57/A164

SPECIAL APPROVAL

Granted to: Alberta Gas Trunk Line Company Limited  
Calgary, Alberta  
T2P 2N6

Attention: Mr. W. L. Rutherford  
Measurement Technical Supervisor.

Subject: Use of Chromatograph<sup>ic System</sup> for Determination  
of Heating Value and Specific Gravity  
of Natural Gas.

Special approval has been granted by the Standards Branch  
for use of the following two systems at the locations specified:

1. Temperature programmable model 2800 Varian  
Chromatograph with Infotronics CRS-104 Integrator,  
Telex Teleprinter, model 703 Wang tape reader  
and model 700 Wang programmable calculator.

Operating Parameters are as follows:

Column: 6 foot by 1/4 inch stainless steel with a  
60/80 mesh Porapak Q packing.

Temperatures:

- (a) Column oven temperature program rate,  
30°C per minute from + 50°C to + 225°C.
- (b) Detector oven, 275°C.

Carrier gas:

Helium at a flowrate of 60 cubic  
centimeters per minute.

Sample Loop

Volume: One half cubic centimeter.

Detector type: Thermal conductivity

The system determines and prints the composition, heating  
value and specific gravity of the sample analysed.

Location: 7210 Blackfoot Trail, Calgary, Alberta.

2. Model 5786 Hewlett-Packard Chromatograph  
(Natural Gas Analyzer) with Model 3352  
Hewlett Packard Computer.

Operating Parameters are as follows:

- Column: (a) 5 foot by 1/8 inch stainless steel,  
30 percent DC 200/500 silicone oil;  
80/100 P-AW.
- (b) 24 foot by 1/8 inch stainless steel,  
30 percent DC 200/500 silicone oil;  
80/100 P-AW.
- (c) 10 foot by 1/8 inch stainless steel  
molecular sieve 13X; 60/80 mesh.

- Temperatures: (a) Column oven, 110° C.
- (b) Detector oven, 150° C.

Carrier gas: Helium at a flowrate of 28.5 cubic centimeters  
per minute.

Sample Loop Volume: One half cubic centimeter.

Detector Type: Thermal conductivity.

The system determines and prints the composition, heating  
value and specific gravity of the sample analysed.

Location: 15810-114 Avenue, Edmonton, Alberta.

- Notes: (1) The expected range of heating values and  
specific gravity values of samples to be  
analysed by the above systems is 890 to  
1240 BTU and 0.565 to 0.730, respectively.
- (2) Heating values determined in terms of  
British Thermal Units are those referenced  
to the BTU's evolved by the complete combustion  
at constant pressure of one standard cubic foot  
of gas with air, both saturated with water  
vapour, the products of combustion being at  
60° F, and the water formed by the combustion  
reaction being condensed to the liquid state.  
The standard conditions refer to 60° F and  
30 inches of mercury, at 32° F, absolute pressure.
- (3) The specific gravity value determined is to  
be relative to air = 1, under standard  
conditions of 60° F and 30 inches of 32° F  
mercury absolute pressure.

A. Sampling and Calculations

- (1) The method of sampling at each sampling station shall conform to that outlined in the AGA Gas Measurement Manual, 1963 edition or later. The samples shall be properly identified and indicate sample location, sampling date and sample pressure.
- (2) In a case where discrepancies in results between the Utility and Standards Branch cannot be resolved, the District Inspector has the right to examine the sampling procedure at the metering station involved.

B. Calibration Requirements

- (1) Since response factors for components vary with concentration, it is suggested that the Utility retain two cylinders of standard reference gas for calibration purposes. The standard gases should reflect, as closely as possible, the range of component concentrations which can be expected from pipe line sampling stations (i.e. one for high BTU and S.G., and one for low BTU and S.G.).

The appropriate response factors would be used in calculations for samples of high or low BTU gas.

- (2) The utility should perform recalibration tests, using the standard reference gases, at least once each week. This is important since response factors tend to change with time due to changing column conditions.

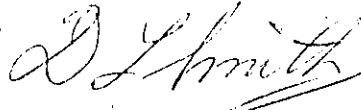
C. Initial Verification

- (1) The District Offices concerned shall verify the system using the standard reference gas supplied by the Standards Branch. Copies of results (i.e. data sheets, chromatograms and calculations) shall be forwarded to the Standards Branch.
- (2) Standards Branch shall provide cylinders of standard reference gas which contain, as close as possible, the range of component concentrations to be obtained from the sampling stations. These cylinders of gas shall be certified by the Standards Branch as to component concentration (Mol %), heating value and specific gravity.

D. Interchange of Samples with Standards Branch

- (1) Twice yearly, at regular six month intervals, the utility shall submit a sample of gas, which has been analysed for component composition, heating value and specific gravity for each of the approved chromatographic systems, to the Standards Branch via the District Office. Successive samples should be obtained from the different test stations, on a rotational basis.

All samples of gas submitted to Standards Branch shall be identified to indicate sample station location, sampling date, sample pressure and analytical system used for the analysis. The samples should have a minimum volume of one (1) cu. ft. at standard conditions.



D. L. Smith  
Chief  
Electricity & Gas Division

cc Mr. L. Hewitt, D.I. Calgary, Alberta.  
Mr. F. W. Nash, D.I. Edmonton, Alberta.