

October 3, 1977

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G-6635-S513

SPECIAL APPROVAL

Granted to: Saskatchewan Power Corporation
 2025 Victoria Avenue
 Regina, Saskatchewan

Attention: Mr. D.C. Grant
 Technical Services Superintendent

Subject: Use of Chromatograph 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 system at the location specified:

Model 5840A Hewlett-Packard Chromatograph
Serial No. 1712A91359
With integrator terminal, having readout in mole percent.

Operating Parameters are as follows:

Reference Column: 20 inch 10% UCW-982 silicone on 80/100
 mesh chromosorb W-HP

Analytical Columns: (a) 5 foot by 1/8 inch stainless steel,
 30 percent DC 200 silicone oil on
 80/100 mesh chromosorb P-AW.

 (b) 6 foot by 1/8 inch stainless steel,
 Porapak Q 80/100 mesh.

 (c) 10 foot by 1/8 inch stainless steel
 molecular sieve
 5A 60/80 mesh.

Temperatures: (a) Column oven, 70°C.

 (b) Detector oven, 100°C.

Carrier gas: Helium at a flowrate of 24.0 cubic
 centimetres per minute.

Sample Loop Volume: One quarter cubic centimetre.

Detector Type: Thermal conductivity.

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

Location: Saskatchewan Power Corporation, Gas Laboratory
Fifth and Lorne Street
Regina, Saskatchewan.

- Notes:
- (1) The expected range of heating values and specific gravity values of samples to be analysed by the above systems is 930 to 1180 BTU and 0.568 to 0.705, 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, having a molecular weight of 28.966.

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.

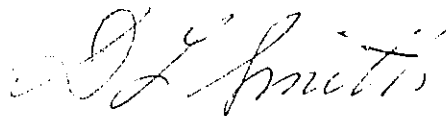
C. Initial Verification

- (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

c.c. Mr. J. Duff, D.I., Regina, Saskatchewan