AGREED
General Director
SPA Vympel CJSC
*/Signature/*_____ A.M. Derevyagin

_____, 2013

APPROVED
Deputy General Director
Gazprom Transgaz Belarus OJSC
*/Signature/*_____ A.N. Shaban

September 10, 2013

REPORT

on the Results of Pilot Operation of
CONG Prima-2M Dew Point Transducer on Zapadnaya Gas Distribution Station of
Minsk Main Gas Pipeline Department, a Subsidiary of Gazprom Transgaz Belarus OJSC

Minsk 2013

1 introduction

1.1 As agreed by Gazprom Transgaz Belarus OJSC and SPA Vympel LLC, a pilot operation of CONG Prima-2M Dew Point Transducer (hereinafter DPT) was conducted on Zapadnaya Gas Distribution Station of Minsk Main Gas Pipeline Department, a Subsidiary of Gazprom Transgaz Belarus OJSC.

The pilot operation was conducted in accordance with the program agreed by the Parties.

2 Purpose of Pilot Operation

2.1 The purpose of pilot operation was to test the possibility for practical use of DPT for automatic measurement of water dew point in gas distribution stations of Gazprom Transgaz Belarus OJSC.

3 Object of the Pilot Operation

3.1 The object of the pilot operation is the device below - a serial production specimen of CONG Prima-2M Dew Point Transducer manufactured by SPA Vympel LLC in accordance with the technical specifications KRAU 2.848.015. The transducer package did not include the recording device.

DPT is designed for automatic measurement of water dew point or hydrocarbon dew point in natural gas at operating pressure.

3.2 DPT is included in the State Registers of Measurement Instruments of the Republic of Belarus (Register Number RB 03 09 511613).

3.3 DPT Specifications:

- Range of water dew point measurement: from -30 °C to + 30 °C; for hydrocarbons: from -30 °C to + 30 °C, at excess gas pressure of up to 16 MPa and temperature ranging from -20 °C to +50 °C;
- Dew point absolute measurement error: ± 1°C;
- Duration of dew point temperature measurement cycle: from 10 to 30 minutes

3.4 The pilot operation involved a serial production specimen of DPT, factory number D13030017, manufactured by SPA Vympel LLC in accordance with the technical specifications KRAU2.848.015TU, including:

- Software version 1.02, software check sum FCD4. - Trassa-2 recording device, version 6.21
- Trassa terminal program, version 2.5;

Check sum of Trassa.exe =1318521300

Check sum of ncil.ffd = 1822222735

Check sum of nci2.ffd = 1043124486

- Certificate of Validation of DPT No. 1513-19, valid until March 25, 2014issued by Federal State Unitary Enterprise All-Russian Scientific Research Institute of Physicotechnical and Radiotechnical Measurements;

– Exploitation documentation.

3.5 The reference moisture analyzer used in the pilot operation was Hygrovision-BL Dew Point Analyzer, factory number 11120060, Certificate of Validation valid until December 6, 2013 and issued by Federal State Unitary Enterprise All-Russian Scientific Research Institute of Physicotechnical and Radiotechnical Measurements.

4 Results of Pilot Operation

4.1 The pilot operation of DPT was conducted on Zapadnaya Gas Distribution Station of Minsk Main Gas Pipeline Department, a Subsidiary of Gazprom Transgaz Belarus OJSC, in the period from August 1 to August 23, 2013.

4.2 The dew point temperature measurements were performed in accordance with the following technical regulatory legal acts:

- KRAU 2.848.015 RE "Operational Manual of CONG Prima-2M Dew Point Transducer";
- KRAU 2.844.007 RE. "Operational Manual of Hygrovision-BL Dew Point Analyzer".

4.3 The operation of CONG Prima-2M DPT involves a condensation method in accordance with GOST R 53763-2009 "Combustible Natural Gases. Determining the Water Dew Point Temperature".

4.4 The measurements of water dew point at operating pressure were performed by DPT and were transmitted to the Trassa-2 recording device and the Local Telemechanics System of Gazprom Transgaz Belarus OJSC.

4.5 The data were captured in a personal computer on a daily basis during working days and a report from Trassa-2 recording device for the past contracted day was printed out.

4.6 The analysis of daily DPT reports showed the following:

- No sharp differences between adjacent hourly mean values for water dew point temperature, which indicates stability in the operation of DPT.
- No failures detected.

4.7 DPT tracks the value of dew point temperature in accordance with the dynamic processes in the gas pipeline. The comparative data on water dew point temperature at a pressure of 3.92 MPa for August 2013 are presented in Annex No. 2.

4.8 The water dew point was measured on a daily basis during working days by reference hygrometer and compared with the readings of CONG-Prima-2M for the period of measurements. The results of the test measurements of the water dew point temperature are presented in the table below.

Table

Results of the Test Measurements of Water Dew Point Temperature

Date and Time of Measurement	Type of Measuring Instrument	Results of Measurements			
		Gas Pressure, MPa	Gas Temperature, °C	Water Dew Point Temperature, °C	Discrepancy between the values of water dew point temperature, °C
01/08/2013 13:00	CONG-Prima-2M	4.19	16.6	-13.4	2.2
	Hygrovision-BL			-11.2	
02/08/2013 12:15	CONG-Prima-2M	4.01	14.8	-12.4	2.4
	Hygrovision-BL			-10.0	
05/08/2013 10:25	CONG-Prima-2M	4.46	16.7	-13.8	2.1
	Hygrovision-BL			-11.7	
06/08/2013 12:00	CONG-Prima-2M	4.30	14.8	-13.9	2.5
	Hygrovision-BL			-11.4	

Table continued

07.08.2013 11:55	CONG-Prima-2M	4.30	16.9	-14.5	2.5
	Hygrovision-BL			-12.0	
08/08/2013 10:50	CONG-Prima-2M	4.15	15.0	-15.1	3.1
	Hygrovision-BL			-12.0	
09/08/2013 12:05	CONG-Prima-2M	4.43	16.9	-13.8	1.4
	Hygrovision-BL			-12.4	
12/08/2013 11:55	CONG-Prima-2M	4.42	15.4	-15.3	3.1
	Hygrovision-BL			-12.2	
13/08/2013 10:10	CONG-Prima-2M	4.38	15.4	-16.3	2.6
	Hygrovision-BL			-13.7	
14/08/2013 11:55	CONG-Prima-2M	4.24	15.4	-13.8	1.7
	Hygrovision-BL			-12.1	
15/08/2013 10:35	CONG-Prima-2M	4.38	17.1	-13.7	2.5
	Hygrovision-BL			-11.2	
16/08/2013 11:40	CONG-Prima-2M	4.35	17.0	-14.8	1.5
	Hygrovision-BL			-13.3	
19/08/2013 10:30	CONG-Prima-2M	4.40	15.1	-16.8	3.5
	Hygrovision-BL			-13.3	
20/08/2013 14:30	CONG-Prima-2M	4.40	17.3	-17.1	2.9
	Hygrovision-BL			-14.2	
21/08/2013 9:45	CONG-Prima-2M	4.39	15.1	-18.6	3.9
	Hygrovision-BL			-14.7	
22/08/2013 10:15	CONG-Prima-2M	4.28	16.8	-18.6	2.0
	Hygrovision-BL			-16.6	
23/08/2013 10:30	CONG-Prima-2M	4.24	16.6	-18.8	2.8
	Hygrovision-BL			-16.0	

4.8 The following pattern was identified during the pilot operation: in automatic measurement mode below 15 °C, the discrepancy between the reference hygrometer and DPT was about 3 °C or more, which indicates the unreliability of the values provided by DPT measurements.

In 4 out of 17 test measurements, the discrepancy in the results exceeded the allowed value, which amounted to 23.5%.

5. Conclusion

5.1 During the entire period of testing, CONG-Prima-2M DPT operated without failure and did not require any maintenance.

5.2 When the dew point was measured in automatic mode, the discrepancy with respect to the values obtained from the reference hygrometer exceeded the allowed value in 23.5% of measurements.

5.3 The practical use of CONG-Prima-2M DPT for automatic measurements of the water dew point temperature at the facilities of Gazprom Transgaz Belarus OJSC can be permitted eventually after the reworking of the DPT software and the operational trials.

Annexes

1. Comparative data for the water dew point temperature at P=3.92 MPa for August 2013 on 1 sheet.

Deputy Head of the Production Department for Metrological Support — */Signature/* N.V. Shaban (signed: illegible)

Lead Engineer of the Production Department for Metrological Support — */Signature/* A.V. Sakovich (signed: illegible)

Annex No. 1

(Note: The text on the ordinate is: Water Dew Point Temperature, °C

Comparative data of water dew point temperature at P=3.92 MPa for August 2013