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January 29, 2010

British Columbia Utilities Commission  
6<sup>th</sup> Floor, 900 Howe Street  
Vancouver, B.C.  
V6Z 2N3

Attention: Ms. Erica Hamilton, Commission Secretary

Dear Ms. Hamilton:

**RE: Terasen Gas Inc. ("TGI" or the "Company")  
Vancouver Low Pressure Gas Distribution System Replacement and Upgrade  
British Columbia Utilities Commission (the "Commission") Order No. C-2-06  
Compliance Filing - Final Completion Report – as at December 31, 2009**

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On May 11, 2006, TGI filed an application with the Commission requesting approval of a Certificate of Public Convenience and Necessity ("CPCN") for the replacement and upgrading of the Vancouver Low Pressure Gas Distribution System (the "LP System CPCN"). In its LP System CPCN Application, TGI stated its intention to commence with the replacement and upgrading of 95 kilometers of gas mains and 7,100 gas services in 2006 with completion before the end of 2008 (the "Project") at an estimated total cost of \$23.7 million (including AFUDC).

On June 26, 2006, the Commission approved the LP System CPCN by Order No. C-2-06 (the "CPCN Order") in which the Commission directed TGI to file a final report upon project completion. This constitutes the Final Completion Report for the Project.

TGI is pleased to report that the final Project costs were \$18.3 million or 23% lower than the \$23.7 million estimate approved in the CPCN Order, and replacements and upgrades were completed slightly ahead of schedule. The mains and services installation contractor Canadian Utilities Construction Corporation worked effectively with the Company to achieve better than expected results. TGI believes that the Project delivered improved Vancouver distribution system safety, reliability and integrity along with reduced operating and maintenance activities.

If there are any questions regarding this Final Completion Report, please contact the undersigned.

Yours very truly,

**TERASEN GAS INC.**

***Original signed by: Ilva Bevacqua***

**For:** Tom Loski

Attachments



# **TERASEN GAS INC.**

## **Replacement and Upgrading of the Vancouver Low Pressure Gas Distribution System to Distribution Pressure**

### **Final Completion Report**

**Submitted to the  
BRITISH COLUMBIA UTILITIES COMMISSION**

**Compliance Filing in Accordance with  
Commission Order C-2-06**

**January 29, 2010**

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## 1. Executive Summary

The Project upgraded and replaced 93 kilometers of low pressure (“LP”) gas mains to distribution pressure (“DP”) standards by inserting high density polyethylene (“HDPE”) pipe into the existing steel pipe. In addition a total of 6,981 LP services were upgraded to DP and 24 LP regulating stations were removed as the LP distribution system was integrated into supply from the existing DP regulating stations.

The Commission approved the LP System CPCN cost estimate of \$23.7 million for the Project. TGI is pleased that the actual total project cost was \$18.3 million, \$5.4 million (23%) under budget. TGI believes that the Project delivered improved Vancouver distribution system safety, reliability and integrity along with reduced operating and maintenance activities.

Service replacement work began in the third quarter of 2006 and concluded in September 2008, a few weeks prior to the projected completion date. The last LP regulating stations were removed by the end of 2008, and final paving was completed by the City of Vancouver in 2009.

## 2. Scope of Work

The scope of the work in the LP System CPCN was as follows:

- Insertion and connection of HDPE piping within the exiting steel mains and services, (approximately 95 kilometres of main and 7100 services);
- Relocation of approximately 710 meter sets; and
- Removal and reclamation activities associated with 24 LP regulating stations.

The scope and methodology for the replacement of the Vancouver LP gas distribution system consisted of replacing all of the remaining steel LP gas system with DP HDPE mains and services using an “insertion” method. DP piping on the TGI distribution system operates at pressures of 700kPa or less, but generally no higher than 420 kPa. The construction methodology involved inserting into the existing, larger diameter steel LP pipe new smaller diameter HDPE DP pipe. The insertion method significantly reduced the cost of underground installation by minimizing total excavation required. Project photographs in Appendix 1 show before and after Project examples of replacements and upgrades to the Vancouver LP gas distribution system.

TGI believes that the Project delivered the following benefits:

- Improved safety, reliability and integrity of the Vancouver gas distribution system as a result of the installation of HDPE DP pipe and fittings;
- Reduced ongoing operating and maintenance activities related to the operation of the many LP regulating stations associated with the Vancouver LP gas distribution system; and
- Reduced ongoing maintenance activities related to water removal, leak repair and break repair in the Vancouver LP gas distribution system.

### 3. Cost Analysis

Table 1 provides an overview of total project costs as at December 31, 2008, actual costs incurred during 2009, final Project costs as at December 31, 2009, and the Project budget. All LP replacement work has been completed and all paving restoration invoices have now been received.

**Table 1 – Low-Pressure Replacement Project Costs (\$ thousand)**

	<b>Project Costs to Dec 31/08</b>	<b>2009 Actual Costs</b>	<b>Final Project Costs to Dec 31/09</b>	<b>Project Budget</b>
Project Management	\$223	\$0	\$223	\$356
Mains and Services	\$17,151	\$103	\$17,254	\$22,369
Stations	\$258	\$2	\$260	\$376
AFUDC	\$564	\$0	\$564	\$645
<b>Total</b>	<b>\$18,196</b>	<b>\$105</b>	<b>\$18,301</b>	<b>\$23,747</b>

TGI is pleased to report that the project was completed under budget with cost savings resulting from the following factors:

- New technology in regulators and HDPE electrofusion fittings led to a reduction in construction costs.
- Over Pressure Cut Off pressure regulators reduced meter set clearance requirements eliminating the need to relocate many gas services and meters.
- Electrofusion fittings increased the control of HDPE fusion quality. Electrofusion fittings and equipment minimized human error, thus reducing training costs.
- The Company's mains and services installation contractor Canadian Utilities Construction Corporation proved to be an effective partner by deploying its resources in a scalable and efficient manner to perform the work on time and under budget.
- A majority of the work occurred in boulevards rather than in road right of ways as initially anticipated. This resulted in cost savings for materials and paving.
- The number of services and length of main replaced was slightly less than initially anticipated. The original estimate included the replacement of 7,100 services and 95 km of Low Pressure main. In comparison, 6,981 services and 93 km of main were replaced.

### 4. Schedule

Table 2 provides an overview of the number of services upgraded each quarter during the Project.

**Table 2 - Number of Services Upgraded each Quarter**

<b>Services Upgraded</b>	<b>Q4 2006</b>	<b>Q1 2007</b>	<b>Q2 2007</b>	<b>Q3 2007</b>	<b>Q4 2007</b>	<b>Q1 2008</b>	<b>Q2 2008</b>	<b>Q3 2008</b>
<b>Quarterly</b>	1240	640	756	916	525	939	1032	933
<b>Cumulative</b>	1240	1880	2636	3552	4077	5016	6048	6981

The installation schedule was revised from the proposed schedule in the LP System CPCN application in order to minimize inconvenience and disruption to customers and the neighborhoods.

Despite various challenges encountered during the project that included a labour disruption with the City of Vancouver, a TGI labour action in 2007, and worse than normal winter weather conditions, the project was still completed a few weeks ahead of schedule.

## **5. Conclusion**

TGI is pleased that the replacement and upgrading of the Vancouver low pressure gas distribution system was completed under budget and slightly ahead of schedule. By completing this Project, TGI has enhanced the safety and reliability of its Vancouver distribution system to better serve its customers.

**Replacement and Upgrading of the Vancouver Low Pressure Gas  
Distribution System to Distribution Pressure**

**Appendix 1**

**Project Photographs**

**Low Pressure Construction Site along East King Edward Ave.**



**Exposed Low Pressure Gas Main along SW Marine Drive**





**Completed Lane with Temporary Pavement Repair**



**Typical Low Pressure Gas Meter Set**



**Upgraded Gas Meter Set**



**Upgraded Gas Meter Set with Over Pressure Cut Off (OPCO) Regulator**



**Typical Low Pressure Regulator Station**



**Low Pressure Regulator Station Removed From Boulevard along  
West King Edward Ave. and Cambie St.**

