P.S.C.U. Docket No. 04-057-04 & 04-057-09
Data Request No. 7.6
Requested by Division of Public Utilities
Date of QGC Response February 4, 2005

7.6 This Data Request is an attempt to understand the flexibility that QGC has in shifting volumes delivered to or from the Payson Gate by increasing or decreasing deliveries from other QGC gates. Please provide any studies or analysis that QGC has done on this subject. Specifically, during summer months could QGC get by without deliveries from the Payson Gate by bringing supplies down from the north? What level of daily demand in Utah County, etc. could be met in this way? Consider the reverse situation of increasing demand at Payson by moving more volumes into the Salt Lake Valley for both summer or winter days. By what amounts could deliveries to the Payson Gate be increased to address gas quality problems? What flexibilities would be available on a typical winter day? Any flexibilities on a peak winter day? What flexibilities are available at the Indianola Gate? For example are there periods when all needs could be met from Kern River taps? Provide all studies that QGC has made addressing these types of flexibility that have not already been provided.

Answer: The operational shifting of delivery volumes between Payson and Little Mountain is a very complex issue that requires the use of a transient simulation model to simulate the time varying impact of responding to a potential interchangeability event by closing the Payson gate. In an attempt to quantify the maximum demand level under which QGC could shut-in Payson gate and still provide reliable service to the Wasatch Front by moving volumes south and increasing northern gate deliveries, two daily periods during the 2004 fall season were selected for detailed evaluation. The two days selected were October 18 and 29. Both of these days reflect relatively high usage events during the shoulder months (April through June and September through October). The October 18, 2004, day corresponded to a total Wasatch Front demand of 262,000 Dth/d and a mean Salt Lake City temperature of 51º F. The October 29, 2004, day corresponded to a total Wasatch Front demand of 430,000 Dth/d and a mean Salt Lake City Temperature of 40º F.

For each of the two days, transient simulations were prepared to model QGC's system based on the actual daily Wasatch Front loads. Total daily loads were distributed over the Wasatch Front based on QGC's peak-day load forecast. Individual loads were then distributed over each hour of the 24 hour period based on the actual hourly total QGC deliveries for the two days in question. It was assumed that QGC would shut-in Payson Gate at 12:00 a.m. on each of the days. Actual average hourly data for the 12:00 to 1:00 a.m. period were used to establish the initial conditions for Wasatch Front gate pressures and volumes. The model assumed that the loss of Payson volumes would be made up by

increasing volumes through the Little Mountain gate. The model was run for a 24 hour period to predict pressures in QGC's high-pressure feeder line near Provo. Attached are the results of the analysis for October 18 and 29. Shown on the attachments in the second and third columns are actual hourly-average Payson volumes and Provo pressures. Shown in the fourth and fifth columns are the simulated Payson volumes (set to zero because the gate is shut in) and Provo pressures. Also included as attachments are snapshots for each hour from the October 29 transient simulation. These snapshots show the simulated operating conditions in QGC's Wasatch Front high-pressure system.

Please note that on October 18 the pressure in the Provo area bottoms out at just over 200 psig in the 7:00 to 8:00 a.m. timeframe. The 200 psig pressure is as low as QGC could operate this portion of its high-pressure distribution system and still maintain a minimum safety margin. This minimum pressure is determined by the capacity of pressure regulators that tie the high pressure system into the IHP system. The simulation for October 29 shows Provo pressures dropping to just over 83 psig during the 5:00 p.m. hour. This pressure level would likely result in loss of service to many customers with high-pressure feeds in the Utah County area.

Again, the October 18, 2004, simulation appears to represent the maximum Wasatch Front gas load that QGC could safely meet and still shut-in the Payson gate. The Salt Lake mean temperature for this day was 51º F. Historical temperature data for Salt Lake City were evaluated to estimate how many months during the year one could reasonably expect that a day with a mean temperature of less the 51º F would occur. Attached is a graph prepared by the National Weather Service showing daily historical temperatures for Salt Lake City. Shown on the graph are actual daily temperatures for 2004 along with historical average daily high and low temperatures for 2004 along with historical average daily high and low temperatures and absolute high and low temperatures. Superimposed on the graph is a line corresponding to the 51º F mean temperature limit. Months during which the 51º F limit line was at or below the average temperature band were assumed to have a low probability of a day with an average temperature of 51º F or less. On the basis of this assumption, it appears that during the months of June through September, QGC could employ the option of shutting in Payson gate to manage interchangeability.

This analysis was predicated on 2004 demand data. As demand increases over time along the Wasatch Front, the mean temperature corresponding to the gas load QGC can handle and still safely shut-in the Payson gate will increase. This increase will further reduce the number of months QGC can call upon this option to help manage gas interchangeability without north to south high pressure pipeline reinforcement. The transient simulations also assume that QPC has the capacity and operational flexibility to shift deliveries from Payson to Little Mountain on a near-instantaneous basis. This flexibility will need to be reviewed

annually with QPC as loads and operations on QPC and QGC's mainline systems change.

QPC's ability to deliver gas to the Payson gate is influenced by demand in the Utah County area; the higher the demand the more gas QGC can physically receive at Payson. The connection between Utah County gas load and Payson delivery volumes naturally limits the amount of gas that can be delivered to Payson off of QPC. For this reason, any expansion of QPC capacity to Payson gate will yield little if any incremental volumes.

Also attached are simulated results for QGC's Southern pipeline assuming the Indianola gate is shut at 12:00 a.m. on October 29, 2004. The hourly results for the simulation are summarized in the attachment. The lowest pressure achieved during the simulation period was 187 psig at 11:00 p.m. Actual deliveries off of Kern into the Southern pipeline on this day were about 3,500 Dth (from Central tap) and this value was assumed for the simulation. The simulation shows that without an increase in Kern deliveries for much more than a 24 hour period, customers served by the Southern pipeline would likely experience interruption – possibly including residential customers.

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