Application No: A.17-10-________
Exhibit No.: ____________
Witness: David Mercer

Application of Southern California Gas Company (U 904 G) and San Diego Gas & Electric Company (U 902 G) Regarding Feasibility of Incorporating of Advanced Meter Data Into the Core Balancing Process.	A.17-10-____ (Filed October 2, 2017)

PREPARED DIRECT TESTIMONY OF

DAVID MERCER

ON BEHALF OF

SOUTHERN CALIFORNIA GAS COMPANY

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

October 2, 2017

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PREPARED DIRECT TESTIMONY
OF DAVID MERCER

I. PURPOSE

The purpose of my prepared direct testimony on behalf of Southern California Gas Company ("SoCalGas") is to present an overview of SoCalGas' Advanced Meter Infrastructure ("AMI") technology, specifically the current timing and availability of AMI interval hourly gas usage data for core customers. My testimony further describes the minimum system enhancements and related estimated expenses that would be needed to make available "Hour Lag Data" (as that term is defined within this testimony) with the level of accuracy that could be allocated and aggregated to the respective core Balancing Agents.

II. CURRENT STATE OF AMI DATA AVAILABILITY

Pursuant to Commission Decision ("D.") 10-04-027, the current AMI technology was built to support a monthly billing process and next day, hourly customer energy presentment for SoCalGas' core customers. D.10-04-027 did not describe the advanced meter system as being designed and used to acquire same day, daily measurement quantities that could be allocated and aggregated to the respective core Balancing Agents for calculating OFO noncompliance charges.

A. AMI Overview

SoCalGas' AMI deployment pursuant to D.10-04-027 consists of three primary components: 1) Meter Transmission Units ("MTUs") installed on nearly 6 million gas meters; 2) nearly 4,600 Data Collector Units ("DCUs") constructed throughout the service territory; and 3) back-office systems that allow for the collection and management of automated meter readings for billing (e.g., HeadEnd and Meter Data Management System ("MDMS")). An MTU is a communication device that automatically and securely transmits hourly gas meter reads to the

DCUs, which in turn transmits the gas meter reads to SoCalGas' back-office systems and billing department, thereby eliminating the need for manual meter reading.

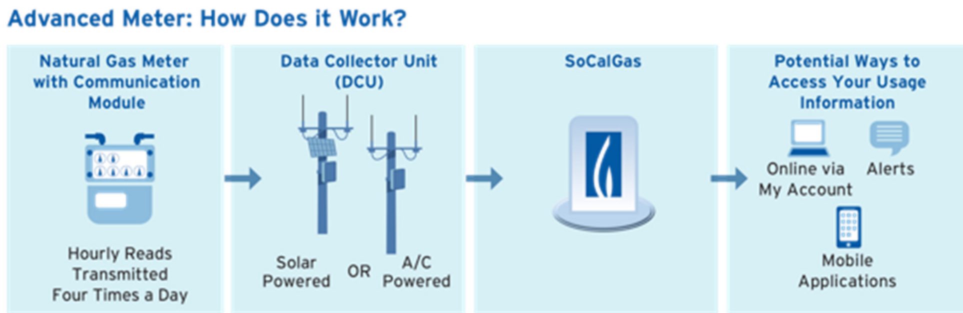
While gas usage is still measured by the analog meter as it was prior to adding the AMI technology, the MTU is applied (retrofitted) to the meter to securely transmit hourly meter reads wirelessly through SoCalGas' data communications network four times per day. While the MTU is battery powered, it is off for all but a fraction of a second per day (less than two minutes total per year). With this configuration, the MTU batteries are expected to last up to 20 years.

By 2019, it is expected that the AMI communication network will include nearly 4,600 DCUs across the SoCalGas service territory. The DCUs receive the meter read data from the MTUs installed on each meter (with the exception of Opt-Out customers).[1] The data is encrypted and transmitted wirelessly across a licensed frequency from the MTU to the DCU.

The third component of the infrastructure includes the AMI-Information Technology (IT) systems, including the Headend and MDMS. Meter read data from the MTUs is received by the DCUs and then transmitted to these systems. Core customer hourly and daily natural gas usage data is then made available on a next day basis via SoCalGas' My Account online customer portal and the SoCalGas Mobile App. These applications provide core customers the opportunity to manage their usage and to potentially conserve energy and reduce their monthly bills. This same usage information is also made available to SoCalGas customer service representatives in the Customer Contact Center to assist customers with billing and usage-related inquiries. Figure II-1 provides a visual depiction of the AMI data flow described in this section:

[1] Pursuant to SoCalGas Schedule G-AMOP, residential customers may opt-out of having an Advanced Meter installed.

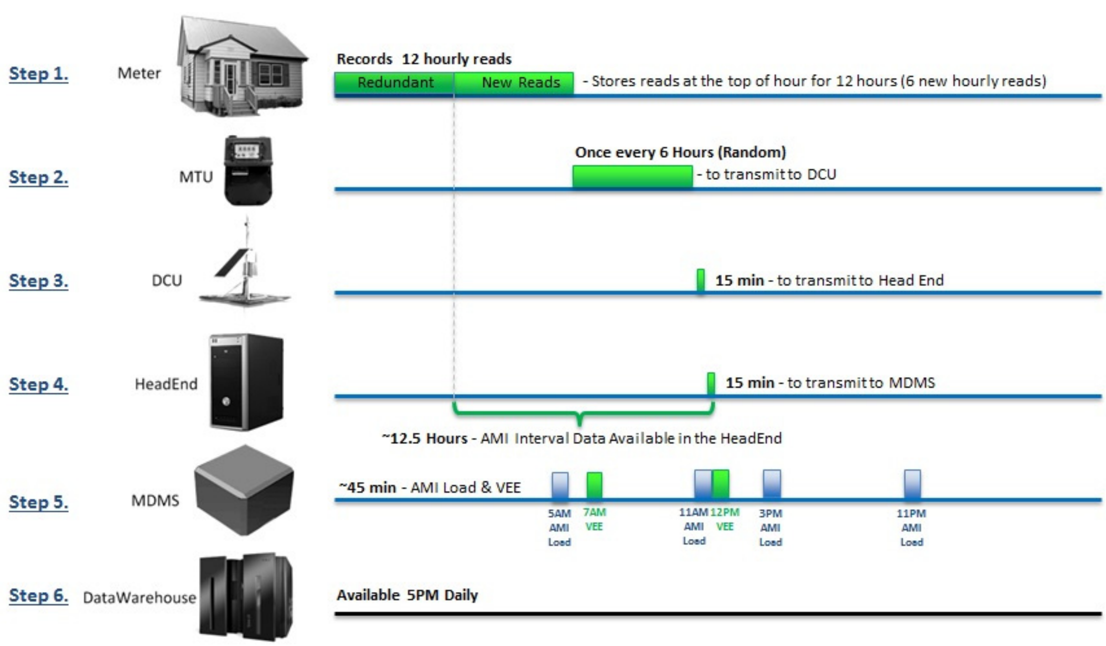
Figure II-1 – AMI Data Flow Overview



B. System Overview for Timing of Data Availability

Figure II-2 below provides an AMI System Overview, including a graphical depiction of the AMI data collection steps and a description of each of the data-availability steps. This System Overview applies to core customers only.

Figure II-2 – System Overview



Step 1. The MTU reads the meter at the top of the hour and stores the meter read. The MTU has memory available to store up to 12 of the most recent hourly reads. Every 6 hours, the MTU collects the 12 reads, encrypts, and prepares a data transmission package for delivery in

Step 2. The data package therefore consists of 6 redundant reads and 6 new reads, relative to the last transmission.

Step 2. The MTU schedules a data transmission to the DCU randomly over the next 6 hours. This ensures an even network radio utilization because the 6 million MTU transmissions are spread out over 6 hours. During this 6-hour time period, the MTU is continuing to collect the next 6 hours of meter reads.

Step 3. The DCU continuously collects data from all MTUs within range. In general, the DCU will batch the MTU data to transmit to the HeadEnd every 15 minutes.

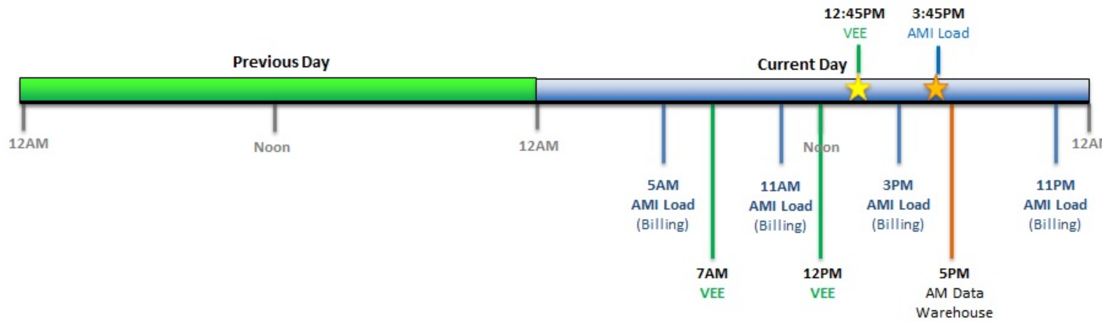
Step 4. The HeadEnd decrypts, consolidates and removes duplicate MTU data from the DCU transmissions for delivery to MDMS every 15 minutes.

Step 5. MDMS loads the hourly interval data and performs the Validation, Estimation and Editing ("VEE") process. Through the AMI Load process, the MDMS receives and stores the raw reads for billing purposes. The AMI Load Process and the VEE Process are batch processes that are currently scheduled as shown in Figure II-3. Each process can take up to approximately 45 minutes to complete. Customer billing is performed using original volume data which is measured in hundreds of cubic feet ("CCF") and has not been through the VEE process. Energy Presentment uses data that has been through the VEE process and is presented in therms.

Step 6. Both original volume data and VEE AM Interval (Hourly) data is stored in the Data Warehouse for internal business unit access as appropriate. The data warehouse load process starts at 5:00 PM and stores data from the previous calendar day.

Figure II-3 below provides the timing for the AMI Load and VEE processes.

Figure II-3 – System Overview with AMI Load and VEE



The AMI Load process loads the working data from the HeadEnd system into the MDMS. MDMS data is used for monthly billing activities. The AMI Load processes all data, including the current day's data, that has been received up to the process run point. The 5 AM AMI Load process ensures that approximately 40% (~2.4 million) customers have 100% of their data for the previous day. The 11 AM AMI Load process ensures that approximately 90% (~5.4 million) customers have 100% of their data for the previous day. SoCalGas has all the data for the previous day available for processing after the 3 PM AMI Load process is complete.

The VEE process validates the previous calendar day hourly usage data, estimates missing or erroneous values and fills gaps in consumption data for on-line energy presentment purposes. The 7 AM VEE job processes 40% (~2.4 million meters) of data for the previous day, while the 12 PM VEE job processes 90% (~5.4 million meters) of data for the previous day.

III. MINIMUM SYSTEM REQUIREMENTS TO ENABLE HOURLY DELIVERY OF AMI DATA

A. Providing Hour Lag Data

The existing AMI system cannot provide real-time usage information. SoCalGas' AMI system receives approximately 144 million reads each day. The current read data is transmitted four times per day, which results in 24 million data transmissions, and then batch loaded into existing systems. In his direct testimony, Mr. Paul Borkovich describes that a limiting factor requiring the SoCalGas Gas Acquisition department to balance to a forecast of usage rather than actual usage is access to real-time usage information, and therefore, Mr. Borkovich states that SoCalGas and SDG&E are not proposing to modify the current procedure. As described in this testimony, the AMI system does not provide SoCalGas with real-time usage information. However, it may be technically achievable, with significant, additional investments, to redesign and replace the existing AMI system to make data taken at the top of each hour available to balancing agents at the top of the following hour ("Hour Lag Data"). Achieving this would require SoCalGas' systems to receive and process 144 million data transmissions per day, a six-fold increase.

B. Minimum Necessary System Requirements

1. The HeadEnd, MDMS, and related system interfaces necessary for Hour Lag Data collection and aggregation do not currently exist. These systems would need to be redesigned to manage the increased data transmissions/volumes and process Hour Lag Data. Until the system replacement is complete, SoCalGas would need two parallel instances of the HeadEnd system; one for the new system and the other for the legacy system.
2. A new data aggregation platform would need to be developed which can accommodate parallel processing in support of Hour Lag Data.
3. The AMI Network would need to increase the storage and radio frequency ("RF") capacity in the DCUs during a field visit in order to manage 6 million MTU hourly transmissions.

4. Currently installed Series 3000 MTUs, which have a 7-year battery life when configured to hourly transmission, would need to be replaced with new Series 3400 MTU's which could have a 12-year battery life when configured to hourly transmissions.

C. Summary of Potential Costs

SoCalGas has developed an illustrative cost to implement these minimum system requirements based on the information provided by Aclara, SoCalGas' AMI vendor, and related advanced meter implementation activities for informational purposes only. These illustrative costs do not constitute a business-plan level, implementable cost forecast, do not include formal bids from any suppliers, may not include all potential costs, and are not being presented as a request to the CPUC for authorization of funds. Rather, these illustrative costs are presented to provide a sense of the magnitude of the project that would need to be undertaken to provide Hour Lag Data. If any modifications to the AMI system were deemed to be necessary in this proceeding, SoCalGas would need to submit a separate business plan application for approval.

1. MTU and Installation

The costs of Series 3400 MTUs is based upon information obtained by SoCalGas in reponse to a request to Aclara. SoCalGas would install approximately 6.0 million gas modules during the deployment period. SoCalGas is using Advanced Meter's Mass Installation actual expenditures as a proxy to estimate these costs. By using these costs, this estimate includes wharehousing, material storage, customer contact, installation software costs, hard to access meters, broken screws, etc. The costs of installing approximately 6.0 million gas modules including those for new business growth meters is estimated to be $640 million.

2. Network

SoCalGas would need to replace the DCU network hardware that is currently installed throughout the service territory. The cost of this effort is based upon information obtained by SoCalGas in response to a request to Aclara. These costs include only the hardware replacement costs of the data collector itself, not the associated installation costs. The hardware cost of replacing approximately 4,600 DCUs is estimated to be $18 million.

Bandwidth requirements for the LAN and Backhaul portion of the AMI communications network is likely to be insufficient. These costs have not been estimated.

3. Software and Related Hardware

SoCalGas would need to replace the HeadEnd, MDMS and other existing interfaces, including those described in Section III.B.1 above, prior to the deployment period. SoCalGas is using Advanced Meter's Software Development actual expenditures as a proxy to estimate these costs. Within the software and hardware costs, this estimate includes HeadEnd and MDMS replacement, enhancements to SAP, Customer Information System ("CIS"), SoCalGas' Electronic Bulletin Board and field mobile applications. The estimate does not include incremental costs for software licensing, maintenance and professional services. The IT costs are estimated to be $42 million.

4. Project Management Office ("PMO")

The PMO would be responsible for overall program integration, execution of scope, schedule, budget performance monitoring and reporting, contract administration, program and financial controls, benefits realization as well as corporate and regulatory compliance. The PMO would also provide the overall program governance structure and framework to ensure timely and effective decision-making risk management and issue resolution. The PMO would be responsible for effective communication among external and internal stakeholders to help them achieve an understanding of the new SoCalGas AMI program. This is expected to facilitate achievement of program objectives throughout the deployment period. PMO responsibilities would include, at a minimum, the following: Project Management, Financial Controls, Contract Administration, Regulatory Support and Compliance, and Communication. SoCalGas is using Advanced Meter's PMO actual expenditures as a proxy to estimate these costs. The estimated costs for the SoCalGas PMO operation including the necessary facilities is $33 million.

D. Associated Technical Issues

The technical challenges of providing interval hourly gas usage data on an hourly basis are significant. Some of the major challenges that would need to be considered include: delivery schedule of hardware, product and software, product warehousing availability, skilled resources to re-program or replace all SoCalGas MTUs, customers enrolled into the Opt-Out Program, overall performance stability of the advanced meter network and applications, complexity of integration between multiple systems, potential security vulnerabilities at integration points, establishing new Service Level Agreements and enhancing existing applications.

This concludes my prepared direct testimony.

IV. QUALIFICATIONS

My name is David Mercer and I am employed by Southern California Gas Company. My business address is 555 Fifth Street, Los Angeles, CA 90013.

My present position is Network, Technology and Operations Manager for SoCalGas' Advanced Meter system within the Customer Service organization. I have been affiliated with various roles within Advanced Meter from 2010 to the present. As a member of the project team, I was responsible for the vendor selection and contract negotiation processes; I managed the field and hardware engineering and design process; and I oversaw the DCU network buildout. I currently manage the operational aspects of the Advanced Meter system, including system (MTU and DCU) monitoring, triage and exception managment, RF Engineering, new business development expansions, field network inspection and maintenace activities, system performance, operational analytics and revenue protection coordination. Prior to my current position, I have served the Company in various capacities with Transmission and Storage, Information Technology, Distribution Operations, and most recently within Customer Services. I received Bachelor of Science degree in Engineering from Harvey Mudd College in 1991.