Application No: A.11-11-002
Exhibit No.:
Witness: Joel Mumford and Todd R. Van de Putte

In the Matter of the Application of San Diego Gas & Electric Company (U 902 G) and Southern California Gas Company (U 904 G) for Authority to Revise Their Rates Effective January 1, 2013, in Their Triennial Cost Allocation Proceeding	A.11-11-002 (Filed November 1, 2011)

UPDATED PREPARED DIRECT TESTIMONY

OF JOEL MUMFORD AND TODD VAN DE PUTTE

SAN DIEGO GAS & ELECTRIC COMPANY

AND

SOUTHERN CALIFORNIA GAS COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

September 18, 2012

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UPDATED PREPARED DIRECT TESTIMONY

OF JOEL MUMFORD AND TODD R. VAN DE PUTTE

I. QUALIFICATIONS

A. JOEL MUMFORD

My name is Joel Mumford. My business address is 25205 West Rye Canyon Road, Valencia, California 91355. I am employed by Southern California Gas Company (SoCalGas) as the Storage Operations Manager at the Honor Rancho Storage Field. I am currently responsible for all operational activities at the Honor Rancho storage facility including general project management oversight for capital projects. I have general oversight responsibility for the Honor Rancho inventory expansion project (HR Expansion Project).

I graduated with a Bachelor of Science degree in Engineering from California State University at Northridge and a Master of Science degree in Petroleum Engineering from the University of Southern California. I have been employed by SoCalGas for 30 years, and have held positions of increasing responsibility in the Engineering, Transmissions Operations, Strategic Planning, Capacity Planning, and Storage Operations departments. I have been in the Storage Operations Department since 2000.

I have previously testified before the California Public Utilities Commission (Commission).

B. TODD VAN de PUTTE

My name is Todd R. Van de Putte. I am employed by SoCalGas as a Senior Storage Field Engineer. My business address is 9400 Oakdale Ave, Chatsworth, California 91313. My current responsibilities include new well drilling design and program writing, storage well drilling, completions, repair and abandonment operations at SoCalGas' four underground storage fields. I am responsible for well drilling activities for the HR Expansion Project.

I have been employed with SoCalGas since January 5, 2005. Prior to my employment with SoCalGas, I was a Senior Drilling Engineer and Reservoir Engineer for the CalEnergy Operating Company from 1996 through 2004. Prior to that, I worked for UNOCAL Corporation as a Petroleum Engineer.

I received a Bachelors of Science degree in Petroleum Engineering from the University of Southern California in May 1990. I also have a California EIT Certificate as well as a current IADC WellCap Certification.

II. PURPOSE

Purpose of this testimony is to:

- Describe all facility and well construction activity that took place at the Honor Rancho storage field in association with the HR Expansion Project.
- Describe the related costs incurred for all facility and well construction activity that took place at the Honor Rancho storage field in association with the HR Expansion Project.
- Request the Commission confirm that the additional costs incurred for the project above those cited in D.10-04-034 were appropriately incurred, are prudent and reasonable, and should be recovered in customers' rates.

III. PROJECT BACKGROUND

On July 13, 2009, SoCalGas filed Application (A.) 09-07-014 (Application) requesting that the Commission amend SoCalGas' Certificate of Public Convenience and Necessity (CPCN) in order to authorize the construction and operation of the facilities necessary to further expand the Honor Rancho natural gas storage facility. The HR Expansion Project will increase storage capacity at the Honor Rancho natural gas storage facility by five billion cubic feet (Bcf), from

23.0 Bcf to 28.0 Bcf. This increase in inventory capacity will be accomplished through increased liquid production from the main storage reservoir which provides additional space to be used for the storage of natural gas. The project also requires the purchase and injection of cushion gas in order to maintain the withdrawal capacity from the storage field.

The Commission approved in D.10-04-034, SoCalGas' request to construct and operate the facilities necessary to increase storage inventory capacity at the Honor Rancho Facility. In D.10-04-034, the Commission established an initial cost limit of $37.4 million for the facilities and well costs associated with the HR Expansion Project. The $37.4 million was determined to be prudent, reasonable and approved as recoverable costs in rates for the project. The Commission also explained that if SoCalGas seeks recovery of any HR Expansion Project capital costs above $37.4 million, it must establish the reasonableness of such costs in a general rate case or other proceeding.[1]

The revenue requirement related to the HR Expansion Project facility and well capital costs are tracked for inclusion into customers' rates through establishment of a regulatory memorandum account; i.e., the Honor Rancho Memorandum Account (HRSMA). The revenue requirement for the purchased costs of the cushion gas needed to support the project was also allowed to be tracked through the account with no defined limit as to whether actual costs of the gas purchased were deemed to be reasonable and recoverable. Incremental O&M costs were also tracked into the account on an actual cost basis for recovery in customer rates.

As a result of these approvals, SoCalGas proceeded with the modifications needed to increase the inventory capacity of the Honor Rancho facility. As of this filing all the surface

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[1] D.10-04-034, Ordering Paragraph 8.

facilities have been installed and the final well needed for the project will be completed in 2011. SoCalGas is on schedule to increase the inventory capacities as outlined in the Commission's decision.

IV. OVERALL PROJECT FACILITIES

The HR Expansion Project included drilling, completion and connection of new wells, modification of the liquid processing system, and installation of new piping, pumps, controls, and electrical equipment. The plant and field facilities and new wells allow for liquids to be produced, processed and re-injected over the next few years to create space in the underground reservoir, thereby, increasing the working storage inventory capacity.

The following tables show estimated costs by asset classification submitted in the Application, and current updated costs by asset classification. The updated values in Table 2 include actual costs incurred to complete the facilities required for this project and estimates of the incremental costs needed to purchase the required cushion gas. These two tables provide a comparison between the cost estimates provided in the Application and the installed costs by FERC Account for the wells, plant and field surface facilities, and the estimated cost for cushion gas.

The total estimated cost for the project provided in the Application was $48.98 million as shown in Table 1. The updated total estimated cost for the project is $60.14 million as shown in Table 2.

Table 1
Original Estimated HR Expansion Project Cost Breakdown
(As Filed in SoCalGas' CPCN Application)

FERC Account	Plant* (356)	Cushion Gas (117)	Inj/Prod (353)	Wells (352)	Totals
Company Labor	$86,947	$0	$48,400	$210,000	$345,347
Contract Costs	$1,196,557	$0	$844,000	$0	$2,040,557
Material	$351,929	$0	$1,351,000	$6,705,000	$8,407,929
Other Direct Charges	$0	$11,535,183	$0	$24,465,000	$36,000,183
Total Direct Cost	$1,635,433	$11,535,183	$2,243,400	$31,380,000	$46,794,016
Labor Indirects	$299,686	$0	$195,024	$265,755	$760,465
Material Indirects	$17,344	$0	$154,994	$0	$172,338
Other Indirects	$47,059	$0	$47,298	$702,804	$797,161
AFUDC	$41,695	$0	$79,335	$335,151	$456,181
Total Indirect Cost	$405,784	$0	$476,650	$1,303,707	$2,186,141
Gross Expenditures	$2,041,217	$11,535,183	$2,720,050	$32,683,707	$48,980,157

* Note that the corresponding table in SoCalGas' A.09-07-014 was missing costs in the "plant" column yet the totals were correct. The table above includes the additional information on those plant (FERC account 356) costs.

Table 2
Current Estimated HR Expansion Project Cost Breakdown

FERC Account	Plant (356)	Cushion Gas (117)	Inj/Prod (353/357)	Wells (352)	Totals
Company Labor	$559,797	$0	$362,085	$255,613	$1,177,455
Contract Costs	$1,489,739	$0	$746,278	$64,625	$2,300,642
Material	$1,547,634	$6,500,000	$660,190	$9,450,934	$18,158,758
Other Direct Charges	$1,393,259	$0	$968,105	$29,829,382	$32,190,746
Total Direct Cost	$4,990,389	$6,500,000	$2,736,658	$39,600,554	$53,827,601
Labor Indirects	$796,332	$0	$461,464	$1,527,096	$2,784,892
Material Indirects	$72,783	$0	$30,564	$394,576	$497,923
Other Indirects	$148,473	$0	$73,865	$696,600	$918,938
AFUDC	$333,408	$0	$143,902	$1,636,573	$2,113,883
Total Indirect Cost	$1,350,996	$0	$709,795	$4,254,845	$6,315,636
Gross Expenditures	$6,341,385	$6,500,000	$3,446,453	$43,855,399	$60,143,237

V. SURFACE FACILITY SUMMARY (FERC Asset Accounts 353.25, 356.25 and 357.25)

In order to expand the inventory of the Honor Rancho Storage Field, fluid is being removed from the storage reservoir. Once the fluid is produced, it must be processed and filtered before the brine is injected into a separate disposal zone. Modifications to the existing plant were required to process and filter the increased volume of liquid. SoCalGas made several modifications and improvements to its existing liquid processing system to accommodate the increased fluid production including: internal and external modifications to four vessels and three tanks; the installation of several larger pumps and filters; new plant piping; and, new process control equipment. In addition to the modifications to the plant equipment, additional surface facilities were required including: field piping modifications; new well piping laterals; and the installation of electrical power to the new down-hole pumps. Since the new production wells have electrically operated down-hole pumps to produce the high volumes of fluid, an expansion of the existing electric service was also required. The direct cost of all surface facilities is $7.7 million. The total cost of the surface facilities including overheads and AFUDC is $9.8 million.

A. PROCESS PLANT MODIFICATIONS

When the fluid from the storage reservoir is produced, it is routed from the wells, through well lateral and field piping and into the processing plant where gas, oil, and brine are separated. The fluid processing plant modifications include internal and external changes to two primary and two secondary oil and gas separation vessels, two skimming tanks, one holding tank, and the installation of new process piping, new pumps, new filters, and new process controls and instrumentation. The modifications to the primary oil, water, and gas separators included the relocation of an internal weir to provide a larger chamber to allow oil to separate from the brine, the installation of a new internal inlet baffle to evenly distribute flow through the vessel, the installation of larger nozzles and piping, and the installation of new process control instrumentation. The changes to the skimming tanks include the installation of cyclone inlet separators, larger nozzles and piping, new interface level controls, a new discharge header system, new filters and new transfer pumps with variable frequency drive controls. The changes to the processing plant discussed above were made over a very short duration between the time the CPCN was approved and the start of the withdrawal season in November 2010. Due to the compressed time frame and time of year, only half of the plant was taken out of service at a given time to allow for the required plant modifications while maintaining continued withdrawal capacity. The required construction schedule led to higher Company and contract labor costs than originally estimated.

Once the fluid has been processed, the brine water moves through the transfer pumps into two large brine settling tanks. The inlet nozzle and inlet header to these tanks were modified to improve internal flow within the tanks. The final stage in the process included the installation of new brine disposal pumps and new larger capacity particle filters. At this point, the brine is pumped into the brine disposal piping system and into the brine disposal wells. The purpose for all the plant process equipment upgrades is to provide the capacity and efficiency required to process, filter and inject the increased volume of brine water.

B. WELL LATERALS AND FIELD PIPING

In order to move the produced fluid from the new production wells to the processing plant, new well piping laterals and field piping were required. The laterals at the fluid production well sites include tubing and casing production piping, several valves to control and direct flow, a well test connection, temperature and pressure gauges and transmitters, well kill laterals to both the well tubing and well casing wing valves, and an emergency shutdown system. The lateral piping is designed and tested to meet the design pressure of the storage field. The safety systems include devices to automatically shut-in the well, and a remote safety shutdown that can be activated by an operator. New field piping was required and installed to connect the piping laterals to existing field piping systems. The piping system required for the new brine disposal wells is less complex; new piping laterals were installed to connect the new brine disposal wells to the existing brine disposal piping system. Existing piping systems were used in several locations to reduce the overall cost of the project.

C. ELECTRICAL SYSTEM

In order to provide electrical power to the new down hole pumps that are installed in the new production wells, the existing electrical service from Southern California Edison Company (SCE) had to be expanded and a new electrical system from the plant to the well sites had to be installed. SCE provided and installed a new service drop, new transformer and a new meter near the existing generator building. SoCalGas then installed a new electrical distribution panel and motor control center (MCC) for the down hole pumps. SoCalGas also installed new conduit and wire from the MCC panel to the new down hole pump control panels. The total cost of this electrical system upgrade was $1.38 million and is included in the surface facility total. This cost was inadvertently not included in the estimate for plant modifications provided in the Application, but the equipment is needed to provide power for the new down hole pumps installed in the new production wells.

VI. WELL DRILLING SUMMARY (FERC Asset Account 352.25)

The location and targeting of the new wells drilled for the HR Expansion Project were based on drilling deep, long radius horizontal, down-dip wells in order to accelerate the liquids production from the Honor Rancho natural gas storage reservoir, thus creating more storage space by the removal of these liquids from the storage reservoir's pore space. The brine production from these new liquid production wells will be disposed of into additional brine disposal wells. This disposal will be performed in the same brine disposal interval as the existing operations brine disposal operations.

The liquid production well targeting was designed such that the horizontal lateral of a given production well would capture an east-west trending direction along the storage zone structure. This design will minimize the possibility of gas breakthrough to the well and will maximize the liquid production from the well for the duration of the project. In addition, the long radius horizontal well course design was used to mitigate excessive torque and drag issues with the drilling tools and also to mitigate production casing running issues related to dogleg severity from erratic well courses while directionally drilling the well.

The brine disposal well targeting was designed so that the wellbores captured the maximum amount of the brine disposal zone as well as to maximize the high performance disposal capacity for a given well. The disposal well target locations also increased the spacing between existing disposal well wellbores to more underutilized areas of the disposal zone in order to capture the maximum incremental disposal capacity required.

SoCalGas has drilled, completed, and placed into service two new liquid production wells and two new brine disposal wells. The total cost of the first production well was $15.5 million and the second production well was $17.3 million. The total cost of the two disposal wells was $11 million. The total cost for the new wells including overheads and AFUDC is $43.9 million.

The following are specific summaries of the total of the well drilling costs for the four new wells drilled during the duration of the project. Based on the preliminary results of the first production and first two disposal wells completed, it was deemed unnecessary to drill the third planned liquid production well and the third brine disposal well. The total cost estimates provided in the original application for each well were based on 2008 dollars and pricing. With large increases in crude oil prices, the demand for well services and drilling services has increased dramatically. Since the original application was filed, those price increases alone have been 30%. Evidence of this rapid escalation in well services costs is exhibited by the actual costs for the brine disposal wells. For those wells, the time required for completion was shorter than estimated in the Application, but the actual direct costs were 30% higher as shown below.

A. LIQUID PRODUCTION WELL #1: WEZU C2C

The first liquid production well, WEZU C2C, was successfully drilled to the planned geologic target and a measured depth of 12,530 feet. The upper 9,000 feet of the 14” production well-hole section encountered minor drilling difficulties related to drilling equipment abrasive wear. The remaining 2,300 feet of the 14” production well-hole section encountered unforeseen drilling difficulties in achieving the planned well course/target during the drilling of the long radius build section due to unforeseen geological formation stress issues related to the east-west trending horizontal well lateral. Wellbore stability (formation sloughing) was not an issue during the drilling operations of this well; however, a total of four drilling tool failures occurred during the drilling process of the remaining 2,300 feet of this long radius build section due to the high drilling tool stresses encountered during the directional drilling phase of the well. A total of four various drilling bottomhole assemblies were lost in the well during this phase of drilling the well. After the production casing well-hole section was completed and the production casing cemented in place, the subsequent horizontal lateral section from the depth range of 11,300 feet -12,520 feet measured depth was drilled as planned with little or no difficulties.

WEZU C2C was originally planned for 60 days to drill and complete at an estimated total direct well cost of $6.6 million. The actual time to drill and complete the well was 138 days at an actual total direct well cost of $14.2 million ($15.5 million including overheads and AFUDC). The completion work was planned for 10 days and took 15 working days to complete. The cost overages were attributed to the total of four failed drilling assemblies in the well-hole (approximately $1.3 million total) and the associated extra drilling project days (at $75,000/day average, $6.4 million total) to drill around the failed tools in order to complete the well. As a result of these multiple directional drilling tool failures and the poor directional drilling equipment performance, the directional drilling contractor was released from the project and negotiations ensued with the directional drilling contractor to cost share the tool failures in order to mitigate the project cost overruns.

B. BRINE DISPOSAL WELL #1: WEZU BD-3

The first brine disposal well, WEZU BD-3 was successfully directionally drilled to the planned target and a measured depth of 6,006 feet. The 14” production well-hole section encountered minor drilling difficulties related to drilling equipment abrasive wear; however those issues were addressed during the drilling process.

WEZU BD-3 was originally planned for 45 days to drill and complete at an estimated total direct well cost of $3.8 million. The actual number of days to drill and complete the well was 39 days at an actual direct well cost of $5.0 million ($5.5 million including overheads and

AFUDC). The well cost overage was primarily attributed to the overall higher per day well services cost and different directional drilling tool technology that was required as a result of the WEZU C2C directional drilling difficulties. The new directional drilling contractor that was hired as a result of the contractor change after the WEZU C2C well resulted in an approximate $20,000/day increase in daily drilling costs (over the original drilling cost estimate) during the directional drilling phase of the well drilling operation. The change in directional drilling contractor did reduce the number of drilling days for each subsequent well.

C. BRINE DISPOSAL WELL #2: WEZU BD-4

The second brine disposal well, WEZU BD-4 was successfully directionally drilled to the planned target and a measured depth of 7,610 feet. The 14" production well hole section encountered minor drilling difficulties related to slower drilling rates in the lower section of the 14" hole, however those issues were addressed during the drilling process.

WEZU BD-4 was originally planned for 45 days to drill and complete at an estimated total direct well cost of $3.8 million. The actual number of days to drill and complete the well was 44 days at an actual direct well cost of $5.1 million ($5.6 million including overheads and AFUDC). The well cost overage was primarily attributed to the higher per day well services cost and the different directional drilling tool technology that was used.

D. LIQUID PRODUCTION WELL #2: WEZU C7

The second liquid production well, WEZU C7, was successfully drilled to the planned geologic target and a measured depth of 13,300 feet. The upper 10,000 feet of the 14" production well-hole section encountered minor drilling difficulties related to drilling equipment abrasive wear. The remaining 1,200 feet of the production well-hole section encountered unforeseen drilling difficulties in the long radius build section of the well due to unforeseen geological formation instability issues related to the east-west trending horizontal well lateral target. The production hole section was successfully drilled to the geologic target location and target measured depth of 11,300 feet; however, during the subsequent required drilling operations prior to running the production casing the lower 500 feet of the 14" hole section became unstable and caused major operational and production casing installation problems. This wellbore stability problem was unforeseen and was a much different problem than was experienced drilling the first liquid production well WEZU C2C. A total of three various drilling assemblies were lost in the hole during the process of preparing and sidetracking the last 800 feet of the production hole section after the initial production casing hole section was completed. After the production casing well-hole section was finally completed and the production casing cemented in place, the subsequent horizontal lateral section from the depth range of 11,200 feet - 13,300 feet measured depth was successfully drilled as planned with little or no difficulties.

WEZU C7 was originally planned for 60 days to drill and complete at an estimated total direct well cost of $6.6 million. The actual time to drill the well was 134 days at a final direct well cost of $15.3 million ($17.3 million including overheads and AFUDC). The well cost overages were attributed to the total of three lost drilling assemblies in the hole (approximately $450,000 total) and the associated extra drilling project days (at $95,000/day average, $6 million total) to drill around the stuck cleanout tools in order to complete the well. This well also utilized the new directional drilling contractor at the additional daily drilling cost of $20,000/day. The well completion work was initially estimated to take approximately 15-20 working days, but actually required 38 days to complete. The additional time and associated costs to complete the WEZU C7 well were required to repair drilling damage to the 7" drilling liner and to reconfigure the slotted liner completion in the open hole section of the well. The 5" slotted liner became stuck approximately halfway into horizontal open hole section of the wellbore during the initial installation attempt, thus a smaller 2-7/8" diameter slotted liner was installed from the 5" slotted liner shoe at a measured depth of 12,450 feet to the total depth of the well at 13,300 feet. The smaller, 2-7/8" slotted liner was required to maintain the long term mechanical integrity of the wellbore. This additional work was required to prepare the well for the pump installation and was the primary reason for the additional completion costs for the well.

VII. CUSHION GAS COSTS (FERC Asset Account 117)

D.10-04-034 provided for the purchase of 1.5 Bcf of cushion gas in yearly increments to support each additional Bcf of inventory capacity developed. As of this filing, SoCalGas was in the process of purchasing the first installment of cushion gas to support the HR Expansion Project. The first 0.3 Bcf of cushion gas is estimated to cost approximately $1.1 million dollars with the remaining 1.2 Bcf is projected to cost an additional $5.4 million (assuming an average purchase price of $4.50 per Mcf over the next 4 years).[2] Therefore, the cost of cushion gas for the project is estimated to total $6.5 million dollars.[3]

VIII. CONCLUSION

The final cost for the facility portion of the HR Expansion Project exceeded the limit of $37.4 million defined in D.10-04-034 by $16.2 million dollars. As defined earlier in this testimony, the additional costs were due to: difficulties in drilling the production wells; rising drilling and well services costs since the initial estimate; electrical facility costs that were unintentionally omitted from the original project scope and cost estimate; the acceleration of the construction schedule to complete the plant work prior to the winter withdrawal season; and, the

[2] Note that this estimate assumes purchases during only short time period in any given year, and therefore is different than the annual average estimate provided by Mr. Emmrich.
[3] Please refer to the testimony of Ms. Fung for explanation of rate recovery for cushion gas costs.

indirect impacts caused by the extended length of time to complete the project due to drilling related problems.

SoCalGas took reasonable and prudent steps within its control during the management of this project to minimize the cost, such as, utilizing existing equipment and piping systems, removing two wells associated with the project (one production and one disposal) and changing the directional drilling service company after difficulties with drilling the first production well occurred. In addition, SoCalGas' management and oversight of the construction of the surface facilities occurred daily to ensure that the facility could continue to operate throughout the construction and be fully operational for the 2010-2011 winter withdrawal season. The oversight also ensured that the project's main objective would be achieved.

The main objective of the project was to install facilities to achieve increased liquid production, be able to process and dispose of the brine produced, minimize the overall costs of the project, and place in service an additional 5 Bcf of inventory capacity. These objectives will be met and the inventory increases outlined in D.10-04-034 will occur, even without drilling all the wells first thought to be needed in the project description of the Application. Electing to not drill the additional two wells is part of the evidence that SoCalGas took all reasonable and prudent action to ensure the total cost of the project was close to the original estimate while meeting its objective. Had SoCalGas not incurred the incremental costs outlined in this testimony, the main objective of the project to expand inventory by 5 Bcf would not be achievable.

With respect to the overall total project costs, SoCalGas originally estimated $48.98 million dollars to achieve the 5 Bcf inventory increase in the Application. The overall total project costs is now estimated to be 60.14 million or 23% over the total estimated cost, which is reasonable considering the escalation of well services costs, difficulties experienced during the drilling, addition for electrical service costs to provide power to the new production wells, and higher plant costs due to higher construction costs and acceleration of the work due to approaching winter season.

Overall, ratepayers will not experience a significant increase in rates based on these additional costs that were required to complete this project as outlined in D.10-04-034. Unforeseen difficulties and market forces outside the control of SoCalGas' management of this project were significant drivers that led to the additional facility costs. The Commission should approve that the costs were appropriately incurred and SoCalGas' actions in managing the project are reasonable and prudent and provide for recovery of the additional $16.2 million dollars of facility costs above the $37.4 million previously adopted as reasonable.

This concludes our updated prepared direct testimony.