Exhibit No. ___________
Date: January 31, 2006
Witness: Craig, Umenhofer, Eson, Mosher, Bears
and Boyer

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE

STATE OF CALIFORNIA

In the Matter of the Application of Southern California Gas Company to Establish Regulatory Authority Over the Access for Natural Gas Provided by California Gas Producers	A.04-08-018

PREPARED DIRECT TESTIMONY OF
BRUCE CRAIG, TOM UMENHOFER, ROD ESON, JAMES P. MOSHER, DEAN A. BEARS AND WILLIAM C. BOYER
ON BEHALF OF THE
INDICATED PRODUCERS,
THE CALIFORNIA INDEPENDENT PETROLEUM ASSOCIATION AND THE WESTERN STATES PETROLEUM ASSOCIATION

GAS QUALITY ENFORCEMENT PROTOCOLS

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GAS QUALITY ENFORCEMENT PROTOCOLS

Q PLEASE IDENTIFY THE MEMBERS OF THE PRODUCER PANEL SPONSORING THIS TESTIMONY.

A This testimony is sponsored by Dr. Bruce Craig, Tom Umenhofer, Rod Eson, James P. Mosher, Dean A. Bears and William C. Boyer. Dr. Craig is the President of the consulting firm MetCorr, a metallurgy and corrosion consulting firm. Mr. Umenhofer is a Principal and Technical Director of ENTRIX, Inc., serving as a Principal Investigator and Project Manager for major energy projects throughout the western U.S. Mr. Eson is President and CEO of Foothill Energy, LLC. Foothill Energy is an independent oil and gas producer with focused interests in California and the Mid-Continent. He also currently serves as the 2005-2006 Chairman of the Board for the California Independent Petroleum Association. Mr. Mosher is a Business Consultant at Aera Energy LLC and is responsible for monitoring and coordinating electricity and natural gas issues within the company. Mr. Boyer is the Gas Operations Leader for Occidental of Elk Hills, Inc.; Mr. Boyer is responsible for the general day-to-day operations and general business unit financial and safety performance for the gas gathering and processing facilities at Elk Hills. Mr. Bears is the Manager of California Customer Accounts for the Supply and Fuels Group of Chevron Natural Gas, responsible for the coordination of all natural gas fuel activities for Chevron’s operations in California including its oil and gas production, cogeneration and refining operations. A statement of qualifications for each panelist is presented as Attachment A to this testimony.

Q **ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

A This direct testimony is presented on behalf of the Indicated Producers, whose members include for the purpose of this proceeding Aera Energy LLC, Chevron U.S.A. Inc., and Occidental of Elk Hills, Inc., the California Independent Petroleum Association, and the Western States Petroleum Association.

Q **WHAT IS THE PURPOSE OF THIS TESTIMONY?**

A The purpose of this testimony is to address natural gas quality enforcement issues raised in Southern California Gas Company's (SoCalGas') Application 04-08-018. It is important to begin by noting what this testimony does ***not*** seek to do or address. First, this testimony does not propose to modify in any way the natural gas quality specifications applied to in-state, interstate or regasified liquefied natural gas (LNG) supplies. Quality specifications are left to be determined in R.04-01-025. Second, this testimony does not challenge SoCalGas' protocols for addressing hydrogen sulfide (H_2S) compliance. Third, this testimony does not challenge SoCalGas' use of its discretion in determining what type of monitoring equipment to install at each Producer point of receipt, as its protocol currently contemplates. Instead, the focus of this testimony is limited to two issues:

1. How should installed compliance equipment (such as gas chromatographs) and enforcement protocols (*e.g.*, time period over which gas quality is measured) be effectively employed to determine whether to accept or reject gas from a Producer's point of receipt based on quality compliance?

2. Pending final resolution in R.04-01-025, how should the California Air Resources Board (CARB) specifications for distribution of compressed natural gas (CNG) vehicle fuel be applied by SoCalGas?

Q **WHAT CONCLUSIONS AND RECOMMENDATIONS DO YOU OFFER?**

A This testimony offers several conclusions and recommendations.

- It is reasonable and necessary to maintain the current and proposed protocols for monitoring and enforcing compliance with H_2S standards. A single reading of noncompliance for H_2S merits rejection of flowing gas supplies until compliance can be obtained. **It is critical, however, that the reliability of H_2S monitoring equipment be assured by the utility.**

- SoCalGas' proposal to shut in flowing supplies in the event of limited and short-term excursions *for constituents other than* H_2S (*e.g.*, inerts) may lead to unnecessary and unreasonable restrictions on California produced natural gas for several reasons. First, limited excursions present no immediate risk to pipeline integrity or safety where the gas received is effectively blended in a utility pipeline stream before delivery to end-use customers. Second, shutting in supplies after two consecutive samples (two-hits) of several minute intervals does not provide a reasonable response time to producers. Third, both PG&E and SoCalGas have in the past successfully engaged in blending of in-state produced gas supplies on their pipeline systems to ensure the quality of natural gas delivered to end-users. Finally, brief and limited exceedances of non H_2S constituents, such as CO_2, O_2 or total inerts, do not raise material safety or system integrity issues. **For all of these reasons, we recommend a modified quality enforcement protocol as described in Attachment B.**

- SoCalGas currently does not apply its gas quality specifications to natural gas withdrawn from its regulated storage facilities. Simply because gas injected into storage meets the specifications does not ensure that gas withdrawn will comply with the standards, without necessitating some degree of treatment or blending. **Consequently, all gas quality specifications and enforcement standards applied by SoCalGas to in-state or interstate supplies should likewise be applied to gas storage withdrawals. Furthermore, if blending is permissible at storage facilities, it should also be permissible at all other supply points.**

- CARB CNG fuel specifications were designed to apply to the fuel dispensed by CNG stations, and these specifications have never been integrated into SoCalGas' natural gas quality tariff Rule 30. Nonetheless, a debate has occurred over time regarding the implications of these standards for SoCalGas' system. The debate has now been engaged in R.04-01-025, and a final determination is expected by the Commission in that proceeding. Likewise, the specification itself may undergo material change through CARB rulemaking. **Pending CARB review of its specifications and a final decision in R.04-01-025, the Commission should not apply CARB CNG fuel specifications as a receipt point quality specification for in-state natural gas Producers.**

QUALITY SPECIFICATIONS

Q WHAT QUALITY SPECIFICATIONS APPLY TO THE RECEIPT OF IN-STATE NATURAL GAS PRODUCTION?

A Historically, quality specifications for in-state natural gas producers have been embedded in their California Gas Producer Access Agreement(s). In the last *pro forma* agreement formally approved by the Commission, the *California Gas Producer Access Agreement between Chevron U.S.A. Production Company and Southern California Gas Company Effective October 1, 1995* (Chevron Agreement), quality specifications were stated in Article VI. The Chevron Agreement is attached to the Access Testimony as Attachment B.

Q DOES THIS TESTIMONY RECOMMEND ANY CHANGES IN THE STANDARDS TO BE APPLIED BY SOCALGAS UNDER CALIFORNIA PRODUCER ACCESS AGREEMENTS AS DETERMINED BY THE COMMISSION IN R.04-01-025?

A No. The Indicated Producers, WSPA and CIPA are active participants in R. 04-01-025 and have raised a few differences of opinion with SoCalGas concerning quality specifications for hearing in that proceeding. We propose that the specifications decided in that proceeding, as they apply to in-state production, should be carried into the *pro forma* agreement. Rather than restate each requirement in every contract, however, we have proposed to refer to Rule 30, as the Commission applies the rule to receipt of in-state production in Article VI.

COMPLIANCE AND ENFORCEMENT -- H_2S

Q HOW DOES SOCALGAS CURRENTLY MONITOR AND ENFORCE COMPLIANCE WITH ITS H_2S SPECIFICATION?

A SoCalGas currently maintains and enforces a "one-hit" rule for H_2S compliance. In other words, if SoCalGas detects a single instance of gas with H_2S beyond the stated standard of .25 grains per hundred cubic feet (4 parts per million), SoCalGas requires immediate remedial action. That immediate remedial action requires a shut-in of the Producer's flowing supplies. This is a "latching" shut-in, and the control system and shutdown valve must be re-set manually by SoCalGas personnel before deliveries can be resumed. This process can take from as little as 45 minutes to more than three hours.

Q IS THAT A REASONABLE ENFORCEMENT PROTOCOL?

A Yes, assuming that the measurement equipment is reliable and well maintained. H_2S is produced naturally by decaying organic matter and is also a by-product of many industrial processes and is toxic at certain concentrations.

Q HAS SOCALGAS HISTORICALLY INSTALLED AND MAINTAINED RELIABLE EQUIPMENT?

A H_2S monitoring and enforcement has been a difficult subject between Producers and the utility in the past. Most of the on-line H_2S analyzers employed at Producer points of receipt use a lead acetate tape detection mechanism. In 2004, SoCalGas had 93 H_2S-related call-outs to producing sites (Attachment C[1]). The proportion of Producer maintenance call-outs due to H_2S analyzer problems ranged from 50% to 75% each quarter, with an average of 62% for the entire year. Data from SoCalGas showed that in 2005, there were 50 H_2S related call-outs. All call-outs resulted in a shut-in of supplies and required a call-out to reset the latching valve.

Q WHAT CAN THE COMMISSION DO TO ENSURE CONTINUING EFFORTS BY SOCALGAS TO INSTALL AND MAINTAIN RELIABLE MONITORING EQUIPMENT?

A SoCalGas may shut-in production after one H_2S reading in excess of the 4 ppm Rule 30 specification for H_2S as it does today. If, however, there have been problems with the reliability of the detection equipment at the Producer's point of receipt during the preceding two years, SoCalGas should be required to contact the Producer to verify that

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1 Attachment C was presented by SoCalGas on January 26, 2005, in the context of a quarterly meeting with California Producers.

any Producer monitoring equipment or spot sampling also indicates readings above 4 ppm prior to shutting in flowing supplies.

COMPLIANCE PROTOCOLS AND ENFORCMENT – OTHER CONSTITUENTS

Q HOW DOES SOCALGAS MONITOR AND ENFORCE COMPLIANCE WITH QUALITY SPECIFICATIONS FOR CONSTITUENTS OTHER THAN H_2S?

A As Mr. Sasadeusz explains, as a baseline protocol, composite gas samplers are installed at all in-state Producer points of receipt to monitor the CO_2, total inerts, and high heating value (Btu). A small cylinder ("sample bottle") installed at the composite sampler collects a small volume of gas at either set intervals over the test period, or, at volumetric intervals dependent upon the flowrate of gas being delivered. The sample collection period is usually one calendar month. For example, a monthly sample bottle will be set to collect 4 cc every 15 minutes. Alternatively, a sample may be collected every 100,000 cubic feet delivered into SoCalGas' system. The sample bottle is then collected monthly and analyzed using a laboratory gas chromatograph. SoCalGas Transmission Department is notified by e-mail when the gas quality does not meet gas quality specifications and SoCalGas personnel will be dispatched to the Producer site to deny access manually. These composite samples are also used by SoCalGas to determine the heating value of the gas delivered during a given month, such that the Producer's imbalance can be accurately computed after the close of the month. For computing imbalances during the month of flow, SoCalGas uses current month volumetric data and the prior month's Btu value, and then re-states the imbalance after the close of the month after the Btu of the composite sample has been determined.

Q DOES THIS PROCEDURE APPLY UNIFORMLY TO ALL IN-STATE PRODUCERS?

A No. There are 25 Producer connections with an on-line gas chromatograph. Another 20 connections use the practice of collecting the samples on a monthly basis. On some Producer points of receipt, SoCalGas has required the installation of on-line gas chromatographs to continuously monitor the quality of the gas and automatically shut-in the gas. As Mr. Sasadeusz points out, a Danalyzer gas chromatograph (GC) is installed at the producer meter if one of the following criteria is met:

- *Producer has had historical compliance problems, that has exceeded the gas quality limits 3 times in 3 years,*
- *New Producer point of receipt where SoCalGas believes the supply could potentially exceed gas quality limits based on raw gas analysis and planned gas processing, or*
- *New Producer point of receipt that delivers directly to SoCalGas' distribution system.*

Q HOW DOES GC INSTALLATION AFFECT GAS QUALITY MEASUREMENT AND ENFORCEMENT?

A GC installation allows SoCalGas to measure gas quality almost instantaneously, thus enabling near-instantaneous enforcement of its standards. Mr. Sasadeusz explains that generally the GC analysis time is 4 minutes for analysis up to C6+. If O_2 is also analyzed by the GC, then the GC analysis time is 8 minutes.

Q WHAT OCCURS IF THE GC DETECTS EXCEEDANCES OF ANY CONSTITUENT?

A Mr. Sasadeusz explains that, in most cases, the GC is set to "alarm" (*i.e.*, shut-in production) when two consecutive analyses exceed the gas quality limits. He states that the GC alarm limits are 3% CO_2 maximum, 4% total inerts maximum, 1150 Btu/cf maximum, and 970 Btu/cf minimum. After the alarm occurs, the GC automatically shuts in production. Except for H_2S, the GC-induced shut-ins are "non-latching," which means that the GC will re-establish access once two consecutive samples comply with or are measured at or below the limits.

Q WHAT ARE THE IMPACTS OF THESE SHUT-INS ON PRODUCTION OPERATIONS?

A Shutting in natural gas production has material consequences. First, shutting in natural gas production limits the amount of natural gas moving into the California market.

Second, because natural gas is "associated" or a byproduct of oil production in southern California, shutting in natural gas also means shutting in oil production. In both cases, shutting in production results in suboptimal operation of the Producer's fields. Third, shutting in natural gas may result in the flaring of gas by the Producer, assuming both that the Producer has a permitted flare and that its air quality permit limits will not be exceeded.

Q BY WHAT MEANS CAN A PRODUCER ADDRESS THESE CIRCUMSTANCES?

A In order to enable SoCalGas' GC to address the possibility of occasional off-spec conditions, a Producer has two primary options. First, the Producer can install a duplicative GC to shut-in production at a level **below** the SoCalGas specification to ensure that gas that might trigger a SoCalGas shut-in does not fill the line. For example, if the SoCalGas GC shuts in at 4% total inerts, the producer can set its own GC to shut in below that point at 3.9% and send the entire gas stream to flare to avoid automatic shut-in by the SoCalGas GC. Alternatively, if time permits, the Producer may be able to shut-in certain sources of gas in an effort to stay at or below the 3.9% self-imposed shut-in limit. The consequence of these alternatives, however, is to waste gas resources or to curtail oil and gas production. Second, if a Producer decides not to shut-in at a level below the specification (*e.g.,* 3.9%) but to let the gas continue flowing to the SoCalGas receipt point, it risks a shut-in by SoCalGas. In order to enable the SoCalGas to reestablish access to the utility system, the Producer would have to de-pressure the pipeline by flaring its contents (non-spec gas). Flaring may not be possible in all circumstances, however, due to equipment or air permit restrictions. None of these approaches is optimal, or even reasonable, when the exceedance is limited and short-term.

Q DOES SOCALGAS PERFORM OTHER TESTING OF GAS QUALITY?

A Mr. Sasadeusz explains that SoCalGas personnel perform spot tests at all Producer meters once a month to monitor supplies for liquids and other contaminants. Water and hydrocarbon dew point testing is performed using a chilled mirror test. Trace contaminants are detected using length-of-stain indicator tubes. A portable oxygen analyzer for O_2 is used if there is an indication the O_2 level is high, that is, the N_2/O_2 analysis from the composite gas analysis is high. Also, to control the liquids, there is generally a separator vessel at the Producer point of receipt which is set to collect any free liquids and alarm at high liquid levels. If the O_2, water or hydrocarbon dew point exceeds the gas quality specification, SoCalGas Transmission Department will give verbal notification to the Producer and then deny access.

Q DO SOCALGAS' CURRENT AND PROPOSED PROTOCOLS RESULT IN MORE STRINGENT ENFORCEMENT PROTOCOL FOR SOME PRODUCERS WHEN COMPARED WITH OTHERS?

A Yes. One producer may be tested for CO_2, total inerts, and heating value (Btu) based on a monthly composite sample of all gas flowing through the receipt point, while another Producer may be denied access based on two near-instantaneous samples of gas composition measured every 4 to 8 minutes. The impact on Producer operations can vary materially between these two scenarios.

Q DO YOU OBJECT TO SOCALGAS APPLYING DIFFERING PROTOCOLS AMONG PRODUCERS?

A Generally, some differences among Producers are justifiable depending upon size of the Producer's gas stream and recent enforcement history. SoCalGas' protocols for enforcement of its standards using GCs, however, go too far and create an unjustifiable difference in the treatment among Producers.

Q WHAT ARE YOUR CONCERNS WITH SOCALGAS' ENFORCEMENT PROTOCOLS FOR PRODUCERS WITH GCs INSTALLED?

A SoCalGas' "two-hit" rule for non-H_2S constituents goes beyond what is reasonably necessary. First, SoCalGas' strident protocol is not necessary to guard against corrosivity or to ensure pipeline integrity. As Dr. Craig testified in R.04-01-025, corrosion does not occur in the absence of liquid water. If the gas is dry (above the water dew point) entering the pipeline and the temperature of the gas does not decrease to below the dewpoint during pipeline transport, no water will condense from the gas, so there will be no corrosion. Corrosion requires the presence of an electrolyte (water) to proceed. Therefore, if there is no water present in the pipelines, there will be no corrosion even if CO_2 or O_2 levels for example, are temporarily elevated. Even if there is water present, the risk of limited, temporary excursions is minimal as explained below. Second, the proposed "two-hit" rule fails to account in any way for the materiality of an exceedance. A 100% exceedance would be treated the same as a 0.1% exceedance of any quality specification. Third, in-state natural gas production, unlike the blended, high-volume interstate pipeline streams, may vary in quality over the course of any given hour.

Q WHY DOES THE QUALITY OF NATURAL GAS PRODUCTION VARY?

A First, as noted above, in-state production is not highly blended through transportation with a diversity of supplies before arriving at the SoCalGas receipt point. An interstate pipeline delivering gas into the SoCalGas system carries a high volume of highly blended gas from numerous producers and sources. By the time the stream reaches the SoCalGas system, quality variations in the stream have been minimized. In comparison, in-state points of receipt typically receive gas from only a single Producer or producing field, many of which contain multiple oil and gas reservoirs or zones within a reservoir. While there may be differences in quality among the reservoirs, zones and wells upstream of the point of receipt, those quality differences cannot be blended away with other gas sources before reaching the SoCalGas system due to the remoteness of most Producer points of receipt.

Second, it is critical to keep in mind that natural gas in southern California is "associated" or a byproduct of oil production. The production process used for enhanced oil recovery in southern California may lead to variability. Some Producers utilize gas-lift systems for lifting the crude oil to the surface in certain reservoirs. In other words, crude is lifted from the reservoir by injecting high pressure gas to the bottom of the well bore. When the gas returns to the surface along with the oil production, its quality may have been modified. In addition, with gas lift systems, the production rate of both gas and oil can be highly variable. Depending on the volume and composition of the gas associated with these reservoirs, the composition of the gas at the point of receipt can vary significantly. Third, a single receipt point will draw from a number of wells in a producing area. The wells may have differing quality compositions, and each well may be on- or offline during certain periods. Thus, depending upon which wells are online at any particular time, the quality of the gas delivered to the SoCalGas receipt point may vary.

Q GIVEN THESE VARIATIONS, DOES THE "TWO-HIT" PROTOCOL PRESENT A CHALLENGE TO THE OIL FIELD OPERATOR?

A Yes. In some cases the two-hit protocol does not provide a Producer a reasonably sufficient time to respond to an exceedance. In cases in which GCs are set at 4 minute intervals, a Producer has only 8 minutes to respond to an exceedance condition; where the GCs are set at 8 minute intervals, the producer may have 16 minutes. And while a Producer may have indications of gas quality before it arrives at the receipt point, there are cases in which 8-16 minutes even with the advance knowledge is not sufficient to get the system adjusted. Compared with the monthly averaging once employed to determine exceedances, the windows provided today to address quality variations are extremely tight.

Q DOES THE TWO-HIT PROTOCOL SEEM NECESSARY FOR NON-H2S CONSTITUENTS?

A No. Past and even current utility practices suggest that the stringent enforcement scheme employed by SoCalGas is unnecessary for CO_2, total inerts and Btu. SoCalGas has received in-state natural gas production for decades and redelivered a blended gas supply to end-use consumers. During the vast majority of that period, SoCalGas employed ***monthly*** composite sampling for monitoring CO_2, total inerts and Btu. Moreover, PG&E observed in its testimony in R.04-01-025 that it continues to receive gas beyond its existing quality specifications when it can do so through blending. Indeed, PG&E has declined at this point even to adopt a total inerts limit. As PG&E's witness Joseph W. Bonner stated in his August 12, 2005 testimony: *"PG&E is hesitant to embrace any standard that would result in turning away previously acceptable gas, or unnecessarily driving up treatment costs*." Imposing a strict "two-hit" rule at 4 or 8 minute intervals without any room for minor variations may unnecessarily limit the production and delivery of in-state natural gas and the crude oil, resulting in the flaring of gas that is only momentarily or minimally out of compliance with the gas quality limits. Blending in the utility pipeline, as SoCalGas did historically and PG&E continues to do, offers a better solution in most cases of limited exceedances.

Q IS SOCALGAS' "TWO-HIT" ENFORCEMENT PROTOCOL NECESSARY TO GUARD AGAINST CORROSIVITY AND TO ENSURE PIPELINE INTEGRITY?

A No. Excursions of CO_2 for short periods of time will not materially increase the corrosion rate of steel pipelines nor adversely impact the pipeline integrity. First and foremost, at the same time as there is an excursion of CO_2 there would have to be a corresponding dewpoint problem such that liquid water was also present since corrosion requires liquid water. If the CO_2 content exceeded the 3% limit but there was no free water present then there is no corrosion issue or any risk to pipeline integrity. However, for discussion purposes and to get a sense of the magnitude of the potential corrosion, let us assume that water is present and that the CO_2 content rises is 3% in a pipeline operating at 500 psig and 60^oF; the total wall thickness loss on the pipeline for one day if the CO_2 content of the gas is 3% is 0.000002 inch and for the case of 2% CO_2 the wall loss for a day would be 0.000002 inch. A similar analysis for 4% CO_2 would produce essentially the same scale of wall loss – virtually zero. These corrosion losses are insignificant in themselves let alone trying to distinguish some difference in corrosion rate between two CO_2 contents over a short period of time. Even several days out of compliance with the 3% CO_2 maximum will have no measurable effect on the corrosion or the integrity of the pipelines.

The corrosion rate for steel exposed to water containing dissolved oxygen cannot be calculated; however, from laboratory data, the corrosion rate would be about 20 mils/year (0.020 inch/year) for oxygen contents up to 0.2%. Thus for an entire day exposed to excess O_2 the pipeline wall would only lose 0.00005 inch, hardly a serious corrosion event and definitely not a threat to pipeline integrity. Exposure to higher O_2 contents for one day would likewise not measurably increase the corrosion rate over that for the 0.2% case. In conclusion, there would be no corrosion problem or pipeline integrity issues with short term CO_2 and O_2 excursions.

Q CAN CALIFORNIA PRODUCERS BLEND THEIR OWN GAS BEFORE IT ENTERS THE SOCALGAS SYTSEM?

A Theoretically, yes, but the practice would serve no purpose. Normally, the only source of gas available to Producers is from the SoCalGas system into which the Producer is delivering. It does not make sense for a Producer to establish an end-use customer delivery point to purchase utility system gas solely to blend with its produced gas, and then deliver the blended stream into the same utility system from which the blend gas originated. Capacity constraints on the Line 85 and North Coastal systems may completely preclude this as an option. The same result can be effectuated by blending the produced gas stream at the point of receipt, and by implementing a reasonable gas quality monitoring protocol to ensure downstream gas quality.

Q MIGHT YOUR VIEWS BE DIFFERENT IN THE CASE OF PRODUCTION DIRECTLY DISTRIBUTED TO CUSTOMER LOAD WITHOUT ANY OPPORTUNITY FOR PIPELINE BLENDING?

A Yes. More strident enforcement protocols could be justified in these circumstances. If SoCalGas can identify a specific risk to end-users of gas quality variation from a particular producer receipt point, the circumstances and potential solutions should be explored with Commission oversight.

Q SHOULD THE COMMISSION ADOPT THE MOST STRINGENT QUALITY ENFORCEMENT PROTOCOLS MADE AVAILABLE BY CHANGING TECHNOLOGY?

A No, not necessarily. The Commission has an obligation to balance the interests of safety and integrity with the statutory goal stated in Public Utilities Code §785 of encouraging California production as a first priority. To the extent that *reasonable* flexibility can be provided in monitoring and enforcing gas quality specifications without threatening the utility system or its customers, that flexibility should be provided.

Q HOW WOULD YOU PROPOSE THAT THE COMMISSION MODIFY SOCALGAS' QUALITY ENFORCEMENT PROPOSAL?

A The Commission should bring a greater level of clarity, predictability and transparency to SoCalGas' quality enforcement protocols. This is necessary to ensure that a discriminatory or unreasonable exercise of discretion does not foreclose the flow of California natural gas supplies or increase the flaring of gas that could otherwise have been satisfactorily blended into the system. The proposed enforcement protocol, to the extent it deviates from SoCalGas' current and proposed practices, is outlined in Attachment B to this testimony. Most notably, the Commission should address the frequency of measurement for non-H_2S constituent compliance.

Q WHAT MEASUREMENT FREQUENCY SHOULD BE ESTABLISHED FOR PRODUCERS WITH GCS FOR NON-H_2S CONSTITUENTS?

A There is no single or obvious answer here. One approach would be a “one-hit” rule – in other words any exceedance is intolerable, whether .001% or 5%. That approach, however, would unreasonably limit the flow of California production without any discernible safety benefit. It also suggests that there should be no judgment applied, but that as technology enables tighter measurement periods, measurement should become stricter and stricter. Finally, this approach fails to recognize that each constituent affects the system differently, and a simple, universal rule may not be the best policy to maximize production.

The answer, therefore, lies somewhere between the 8-16 minute tolerance employed by SoCalGas and the historical monthly average tolerance. The California Producers propose a 24 hour averaging tolerance for non-H_2S constituents. First, a 24 hour average is substantially tighter than the previous monthly (720 hour) averaging. Second, 24 hours allows a greater period for a Producer to respond to temporary exceedances in the most efficient manner. Finally, an 8 or 16 minute frequency may not provide a fair and adequate assessment of the overall impact of a Producer’s gas quality on the system.

Q WHY WOULDN’T AN 8 OR 16 MINUTE FREQUENCY PROVIDE A FAIR AND ADEQUATE ASSESSMENT OF THE OVERALL IMPACT OF A PRODUCER’S GAS QUALITY ON THE SOCALGAS SYSTEM?

Perhaps the simplest way to think about this is graphically. For illustrative purposes, Attachment D plots a hypothetical group of over 4500 consecutive 4-8 minute GC samples for a non-H_2S constituent against compliance with SoCalGas’ Rule 30. The “blue line” at 100% is the actual Rule 30 gas quality specification. As demonstrated on this graph, the gas delivered by Producers can be well below SoCalGas’ gas quality specification on average over the course of days or weeks, but temporarily exceed the spec on a limited basis. Under the *status quo*, a Producer delivering gas with a rolling average that is 25% **below** the Rule 30 quality specification could be forced to flare its entire gas stream for temporary exceedances of a mere 0.1%. For non-H_2S constituents, where temporary and limited exceedances do not present a risk to system integrity, this extreme result fails to maximize California production without providing any detectable benefit to SoCalGas or its system.

Q HOW SHOULD A PRODUCER ENFORCEMENT PROTOCOL BE FORMALIZED?

A The California Producers urge the Commission to formalize the protocol proposed in Attachment B for quality enforcement in a tariff provision to provide greater clarity and certainty for producing operations. To the extent SoCalGas wishes to modify the protocol or provide deviations from the protocol under specified circumstances, the Commission and Producers would have an opportunity to review and consider the impact of the modifications before their implementation.

COMPLIANCE AND ENFORCEMENT – STORAGE WITHDRAWALS

Q DOES SOCALGAS APPLY RULE 30 OR OTHER QUALITY STANDARDS TO GAS WITHDRAWN FROM STORAGE?

A No. SoCalGas has asserted that quality specifications do not apply to storage gas withdrawals because Rule 30 applies only to "transportation of customer-owned gas."

Q DOES GAS WITHDRAWN FROM STORAGE PRESENT ANY RISK OF INTRODUCTION OF GAS INTO THE SOCALGAS SYSTEM THAT DOES NOT COMPLY WITH RULE 30?

A Yes. Simply because gas is compliant when it enters the storage facility does not mean that it will be compliant upon withdrawal. Most California storage reservoirs are depleted oil and gas reservoirs. It is normally not technologically feasible nor cost effective to remove 100% of the original hydrocarbons in-place. Consequently, residual hydrocarbons, water and other gaseous constituents such as H_2S and CO_2 may be present when the reservoir is converted to storage service. When processed, pipeline-quality natural gas is injected into the storage reservoir, the gas, residual hydrocarbons, residual water, and other constituents come into equilibrium with the introduced gas. At equilibrium, the gas will usually have become more water and hydrocarbon laden, and when it is withdrawn, some free water and liquid hydrocarbons may be withdrawn as well. The gas must be separated from these liquids, and then dehydrated to remove the water.

Q DO YOU BELIEVE THAT SOCALGAS' QUALITY ENFORCEMENT PROTOCOL SHOULD BE MODIFIED TO ENSURE THAT GAS WITHDRAWN FROM STORAGE MEETS APPLICABLE QUALITY SPECIFICATIONS.

A Absolutely. It would be unreasonable and discriminatory to allow one source of gas to escape quality specifications entirely while imposing a stringent enforcement protocol on all other sources of gas supply.

<u>CARB CNG FUEL SPECIFICATIONS</u>

Q WHAT WOULD BE THE IMPACT OF APPLYING CURRENT CARB NATURAL GAS VEHICLE SPECIFICATIONS TO ALL GAS RECEIVED FROM CALIFORNIA PRODUCTION?

A Applying this vehicle fuel specification as a receipt point specification would bring an immediate and marked effect on California oil and gas production**.** According to SoCalGas, only 5% of today's California production meets the current CARB vehicle fuel specification. While CARB has granted time-limited exemptions for CNG fuel dispensed in specific areas, those exemptions provide a Methane Number (MN 80) standard. SoCalGas has testified before this Commission that approximately one-half of the California Producers (representing approximately three-fourths of the volume) transporting on SDG&E's and SoCalGas' systems cannot currently meet MN 80.

Q WHAT HAS SOCALGAS PROPOSED IN THIS PROCEEDING REGARDING THE APPLICATION OF CARB CNG VEHICLE FUEL SPECIFICATIONS TO THE RECEIPT OF IN-STATE GAS ON ITS SYSTEM?

A While its position is not entirely clear on the face of its testimony, SoCalGas appears to be suggesting a more moderate approach. SoCalGas suggests that the CARB CNG vehicle fuel specification be applied to gas received from in-state production points of interconnection on an "interruptible" basis. In addition, SoCalGas in the past has required that in-state Producers incorporate the CARB CNG vehicle fuel specification into their Access Agreements, although enforcement generally has been waived.

Q WOULD IT BE PRACTICABLE TO APPLY THE CARB STANDARDS ONLY TO "INTERRUPTIBLE" VOLUMES?

A In concept, if the interruptible volumes were delivered at a new receipt point, this would make sense; it still may not be the best policy decision, however. But for receipt points for which deliveries are predominantly firm, applying the CARB specifications to only a percentage – and likely a very small percentage – of deliveries would be difficult to administer from a Producer standpoint.

Q HOW SHOULD THE COMMISSION ADDRESS THIS ISSUE IN THIS PROCEEDING?

A The Commission should not adopt the CARB CNG vehicle fuel specification as a receipt point quality standard for in-state natural gas in this proceeding. The question of whether and how CARB's CNG vehicle fuel specification should apply has been placed at issue in R.04-01-025. Moreover, the specification itself will undoubtedly undergo material change over the next several months as a result of discussions through the ongoing CARB rulemaking. The current direction of CARB as documented in a draft proposal is to amend the existing specification with a Methane Number used as motor vehicle engine performance criteria and a Wobbe index range used as emissions-related criteria. Discussions continue around this draft proposal in a constructive manner through an established stakeholder process. Unless and until the treatment of the CARB CNG vehicle fuel specification is resolved in these forums, imposing this requirement only on in-state production Access Agreements would be discriminatory and would disadvantage California Producers.

Q **DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

A Yes, it does.

ATTACHMENT A

STATEMENT OF QUALIFICATIONS

Dean Bears
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Mr. Bears is currently the Manager of California Customer Accounts for the Supply and Fuels Group of Chevron Natural Gas. Responsibilities include coordination for all natural gas fuel activities for Chevron's operations in California including its oil and gas production, cogeneration and refining operations. Mr. Bears has over 30 years experience with Chevron Corp. and Texaco Inc.

Mr. Bears initial experience included engineering assignments of increasing responsibility in both operational and reservoir positions covering both onshore and offshore operations in Louisiana, Mississippi and Alabama. This included providing testimony before the Mississippi and Louisiana Oil and Gas Boards. Following various staff assignments at the corporate level in Houston, he served as manager for Enhanced Oil Recovery (EOR) operations in the Texas Permian Basin. He has had articles on EOR Project Management and CO_2 Flooding published in the "Oil and Gas Journal" and "Journal of Petroleum Technology". In 1994, Mr. Bears assumed responsibility for facility and maintenance operations in Texaco's Bakersfield Division and has also served in several senior engineer roles including advising on energy matters.

Mr. Bears serves as Vice Chairman on the Board of Directors of the Conservation Committee of California Oil and Gas Producers.

Mr. Bears received a B.S. in Chemical Engineering from the University of Notre Dame in South Bend, Indiana.

William C. Boyer
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Mr. Boyer is the Gas Operations Leader for Occidental of Elk Hills, Inc. (OEHI), with operations near Bakersfield, California in the Southern San Joaquin Valley, a position he has held since December, 2003. Mr. Boyer has been employed by Occidental Petroleum in one of their affiliate or subsidiary companies for 28 years. He has spent eight years in various gas operations assignments, including manager of gas processing facilities and pipeline systems in Attica, Kansas, Graham, Texas, Hutchinson, Kansas, and most recently at the Elk Hills operations near Bakersfield, California. In those assignments, Mr. Boyer has had operations and maintenance responsibility for gas processing and compression facilities, along with underground LPG storage and several intrastate and interstate gas and LPG pipelines which were DOT regulated. Mr. Boyer spent approximately 20 years in the Corporate Engineering groups for Occidental's gas operations and chemicals affiliates, in various project engineering and process engineering assignments in Tulsa, Oklahoma and Houston, Texas. The most recent Project Engineering position held was Director – Project Management for Occidental Chemical Corporation, in the Corporate Engineering Headquarters office in Houston, Texas. Mr. Boyer was the Project Manager responsible for the conceptual development of several potential domestic LNG import projects, including one near Corpus Christi, in Ingleside, Texas, which recently received FERC approval (Ingleside Energy Center).

In his present position as Gas Operations Leader at Elk Hills, Mr. Boyer is responsible for the general day-to-day operations and general business unit financial and safety performance for the gas gathering and processing facilities at Elk Hills, which includes three large gas processing plants, more than 100 compressors, several thousand miles of gas gathering pipelines, 2 DOT-regulated gas pipelines and 2 DOT-regulated LPG pipelines, a 46 MW cogeneration facility, and an LPG storage and loading system with a capacity of almost 2 million gallons. Elk Hills' gas processing capacity of more than 400 MMcfd is the largest concentration of capacity at one location in all of California and several surrounding states.

In February, 2005, Mr. Boyer presented information on gas quality and interchangeability issues before representatives of the CPUC, CEC, and CPUC, and coordinated several presentations by Bevilaqua Knight, Inc (BKI) and Gas Technology Institute (GTI).

Mr. Boyer has co-authored an article for the Hydrocarbon Processing magazine on LPG Fractionation. Mr. Boyer has been an active participant in the Gas Processors Association, and served on the editorial committee for the Engineering Data Book – 10th edition. Mr. Boyer is actively involved with other producers on natural gas issues in California through OEHI's affiliation with the Western States Petroleum Association (WSPA), and the California Independent Producers Association (CIPA). Since May, 2005, Mr. Boyer has co-chaired the Gas Quality Technical committee with Mr. Kevin Shea of SoCalGas, in an effort to address technical and air quality concerns related to gas composition.

Mr. Boyer has a Bachelor's degree in Chemical Engineering from the University of Oklahoma and is a registered Professional Engineer in Oklahoma and Texas.

Dr. Bruce Craig
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Dr. Craig is President of MetCorr, a metallurgy and corrosion consulting firm. Dr. Craig established his own company in 1997 to continue consulting in corrosion and materials selection in the same areas of his previous experience. At MetCorr, Dr. Craig has provided consulting services to Mobil Oil and ExxonMobil for Mobile Bay field developments including all high pressure flowlines; to Duke Energy Field Services on pipeline construction and corrosion, including failure analysis of their existing systems; to Rocky Mountain Pipeline System on direct assessment of internal corrosion of pipelines and has consulted on materials; and construction of the Gaviota Terminal for Texaco and the Pacific pipeline for Anschutz Corp.

While at MetCorr, Dr. Craig has contributed to the latest most comprehensive software model for CO_2 corrosion prediction of steel pipelines developed by DeWaard (the basis of almost all worldwide models for CO_2 corrosion). Currently, this model is in use for predicting corrosion in pipelines for ExxonMobil USA, BHP Billiton in the Gulf of Mexico, Amerada Hess in West Africa, Unocal in Indonesia and many others worldwide.

From 1983 to 1997, Dr. Craig was a Senior Consultant with Metallurgical Consultants, Inc., writing line pipe specifications for many companies for gas gathering and transport. He frequently performed failure analysis on pipelines and other equipment and was the Principal Investigator for industry contract research, especially on stress corrosion cracking and sulfide stress cracking of steels and corrosion resistant alloys.

From 1973 to 1983, Dr. Craig was a Research Engineer with Marathon Oil Company at the Denver Research Center, consulting with field operations (Drilling, Production and Pipeline) on corrosion problems and metallurgy. His responsibilities included corrosion inhibitor selection, corrosion monitoring and selection of coatings. Dr. Craig was a member of the team involved with the planning and construction of the LOOP (Louisiana Offshore Oil Port) and all associated pipelines, the Marathon Brae field in the North Sea and subsea pipeline construction and corrosion control, and construction and corrosion control of many other pipelines for Marathon Pipeline Co.

Dr. Craig graduated from the Colorado School of Mines with a B.S. in Metallurgical Engineering. Dr. Craig obtained a M.S. in Metallurgical Engineering and a Ph.D. in Metallurgical Engineering, also from the Colorado School of Mines.

Dr. Craig is a Registered Professional Engineer in Colorado and Texas. He is a member of ASM International; National Association of Corrosion Engineers (NACE International); Society of Petroleum Engineers (SPE); ASM, National Committee, Academy for Metals (1983); ASM, National Committee, International Materials Reviews (1985 –1988); and Chairman, Rocky Mountain Chapter ASM International (1987 – 1988).

Dr. Craig has presented several keynote lectures, invited talks and plenary lectures and has been an Adjunct Professor for the Colorado School of Mines, Department of Petroleum Engineering, from 1987 to the present. Dr. Craig frequently instructs industry short courses on corrosion and metallurgy. Dr. Craig has authored numerous books, provided assistance as a contributing author and edited more than 80 publications.

Dr. Craig recently provided testimony in R.04-01-025 on gas quality issues.

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Mr. Eson is Founder and Chief Executive Officer of Foothill Energy and is responsible for managing the growth of this newly formed energy company. Foothill Energy has oil and gas operations in several counties throughout Texas. Prior to forming Foothill Energy in June 2004, Mr. Eson was President and Chief Executive Officer of Venoco Inc., a California-based independent oil and gas company he co-founded in 1992. Prior to his founding Venoco, Mr. Eson owned and managed Enhanced Petroleum Technology, a service company specializing in the field application of various enhanced oil recovery technologies for 17 years.

Mr. Eson is currently serving as Chairman of the Board of the California Independent Petroleum Association, a 400 member trade association providing support and advocacy for nearly all of the independent oil and gas operators in California. He has been a member of the Society of Petroleum Engineers and American Petroleum Institute for more than three decades.

Mr. Eson serves as the Chairman of the Board of Directors of Ridgeway Petroleum Corporation, a natural resource company based in Houston, Texas with holdings in Arizona, New Mexico and Alberta.

Mr. Eson received a B.S. in Mechanical Engineering from California State Polytechnic University in Pomona, California.

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Mr. Mosher is a Business Consultant at Aera Energy LLC and is responsible for monitoring and coordinating electricity and natural gas issues within the company. Aera is a California oil and gas producer with headquarters located in Bakersfield, California. Aera's oil and gas producing operations are primarily located in the San Joaquin Valley and in Ventura, California. Prior to joining Aera, Mr. Mosher was employed by CalResources LLC, the predecessor company to Aera.

Mr. Mosher serves as Aera's member representative for the Energy Producers and Users Coalition and the Indicated Producers, both of which are *ad hoc* industry associations that participate in California natural gas and electricity regulatory matters. He also serves as Aera's representative for the Kern River and Southwest trial groups that participate in natural gas proceedings at the Federal Energy Regulatory Commission. Mr. Mosher has not testified before the Public Utilities Commission or other agencies.

Mr. Mosher received a B.S. in Electrical Engineering from Michigan Technological University and an M.B.A. from Pepperdine University. He is also a member of the California Bar.

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Mr. Umenhofer is a Principal and Technical Director of ENTRIX, Inc. In this capacity, he serves as a Principal Investigator and Project Manager for major energy projects throughout the western U.S. ENTRIX is an international environmental consulting firm with California offices in Walnut Creek, Sacramento, Ventura, and South Lake Tahoe. Mr. Umenhofer was formerly President and Chief Executive Officer of Sierra-Pacific Environmental, Inc., a California-based environmental engineering firm until 1999 when the firm merged into ENTRIX.

Mr. Umenhofer serves on the Board of Directors for the Ventura County Economic Development Association, is a member of the University of California - Santa Barbara Bren School Dean's Council, and serves on the Advisory Committee for the Ventura County Regional Energy Alliance. For over a decade, he served as a Commissioner on the Santa Barbara County Local Agency Formation Commission including three terms as its Chair.

Mr. Umenhofer received a B.S. in Geography from Western Illinois University, M.S. in

Meteorology from Northern Illinois University, and M.S. in Environmental Engineering from Illinois Institute of Technology. He is a Certified Consulting Meteorologist and a California Registered Environmental Assessor.

Mr. Umenhofer has testified before the CPUC during the February 17-18, 2005 public meeting on the Natural Gas Quality issue. Historically, Mr. Umenhofer has testified before the CEC, CARB, and State legislative committees on a variety of energy and non-energy issues.

ATTACHMENT B

GAS QUALITY ENFORCEMENT PROTOCOL

LARGE PRODUCERS

Measurement Devices.

- Gas chromatographs (GCs) would be installed on all gas sources entering the Utility system, including storage withdrawals by the Utility on behalf of any customer or customer class, where the gas source at peak deliverability under annual low-flow conditions exceeds 1 MMcfd or constitutes 5% or more of the total gas flowing on the directly interconnected local Utility system. All large producers, interstate receipt points, LNG injection points, and Utility storage facilities would have GCs.

- No other changes in the current quality measurement equipment.

Shut-in Trigger

- SoCalGas may shut-in production after one H_2S reading in excess of the 4 ppm Rule 30 specification for H_2S; provided that if problems with the detection equipment have been identified during the preceding two years, SoCalGas will contact the Producer to verify that any Producer monitoring equipment also indicates readings above 4 ppm prior to shutting in flowing supplies.

- For all contaminants other than H_2S that are monitored with GCs or other on-line detection equipment, including without limitation inerts, Btu and CO_2, SoCalGas may shut-in production based on a rolling 24-hour average of the contaminant that demonstrates noncompliance with Rule 30. Before shutting in any production in the case of noncompliance, and in order to minimize disruption of supply, the utility shall weigh the risk of continued noncompliant gas flows to system integrity and the health and safety of SoCalGas personnel and end-use customers, the potential for timely and effective correction of the problem causing noncompliance, and the safety, environmental and financial impacts of shut-in. If utility shuts in production based upon blending calculations, such calculations shall be made available to Producer for inspection upon request.

SMALL PRODUCERS

Measurement Devices

Quality compliance for all gas sources that do not meet the Large Producer threshold would be determined utilizing monthly composite sampling except in cases in which the Producer's gas is delivered directly into a Utility distribution system without commingling with other gas sources. The utility may, however, undertake the following deviations from this practice to ensure safety and pipeline integrity.

- Utility may install, annually or as reasonably necessary in light of safety concerns, a temporary gas chromatograph (GC) to verify compliance for these sources.

- Utility may install a permanent GC and subject the source to the limits identified for Large Producers in the event of not fewer than three monthly averages or temporary GC tests in three years demonstrating sustained noncompliance.

Shut-in Trigger

- SoCalGas may shut-in production after one H_2S reading in excess of the 4 ppm Rule 30 specification for H_2S; provided that if problems with the detection equipment have been identified during the preceding two years, SoCalGas will contact the Producer to verify that any Producer monitoring equipment also indicates readings above 4 ppm prior to shutting in flowing supplies.

- For all contaminants other than H_2S that are monitored with GCs or other on-line detection equipment, including without limitation inerts, Btu and $CO_{2,}$ SoCalGas may shut-in production if a monthly composite sample demonstrates that the deliveries at the receipt point are materially out of compliance for any constituent. Before shutting in any production in the case of noncompliance, and in order to minimize disruption of supply, the utility shall weigh the risk of continued noncompliant gas flows to system integrity and the health and safety of SoCalGas personnel and end-use customers, the potential for timely and effective correction of the problem causing noncompliance, and the safety, environmental and financial impacts of shut-in. If utility shuts in production based upon blending calculations, such calculations shall be made available to Producer for inspection upon request.

ATTACHMENT C

SOCALGAS 01-26-05 PRESENTATION

ON H_2S DETECTOR CALL-OUT STATISTICS

ATTACHMENT D

CHART OF NON-H_2S CONSTITUENT AS PERCENTAGE OF RULE 30 LIMITS