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<b>Description:</b>	<p>This analysis of the two reports released jointly on April 5, 2016 by the CPUC, CEC, CAISO, the LADWP, and SoCalGas concludes that these entities fail to make a compelling case the continued operation of the SoCalGas Aliso Canyon natural gas storage field is necessary to guarantee a reliable gas supply to both ratepayers and wholesale customers. The "Aliso Canyon Action Plan to Preserve Gas and Electric Reliability for the Los Angeles Basin" and "Aliso Canyon Risk Assessment Technical Report" predict electrical blackouts during the summer without supply from the Aliso Canyon storage facility. However, such claims are based on inflated estimates of the demand for electric power, underestimates of the capacity of other SoCalGas gas storage facilities, and other unsubstantiated or flawed data.</p>
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# **Technical Assessment**

## **Is Aliso Canyon Needed to Assure Natural Gas Reliability in Southern California?**

Prepared for Food & Water Watch

by

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April 8, 2016

## **About the Author**

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## **About Food & Water Watch**

Food & Water Watch champions healthy food and clean water for all. We stand up to corporations that put profits before people, and advocate for a democracy that improves people's lives and protects our environment.

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## 1.0 Executive Summary

Two reports released jointly on April 5, 2016 by the California Public Utilities Commission (CPUC), California Energy Commission (CEC), California Independent System Operator (CAISO), the Los Angeles Department of Water and Power (LADWP), and Southern California Gas Company (SoCalGas)<sup>1</sup> fail to make a compelling case the continued operation of the SoCalGas Aliso Canyon natural gas storage field is necessary to guarantee a reliable gas supply to both ratepayers and wholesale customers. The “*Aliso Canyon Action Plan to Preserve Gas and Electric Reliability for the Los Angeles Basin*” and “*Aliso Canyon Risk Assessment Technical Report*” predict electrical blackouts during the summer without supply from the Aliso Canyon storage facility. However, such claims are based on inflated estimates of the demand for electric power, underestimates of the capacity of other SoCalGas gas storage facilities, and other unsubstantiated or flawed data.

For example, three additional natural gas storage fields operated by SoCalGas, Honor Rancho, La Goleta, and Playa del Rey, collectively store 50 billion cubic feet (Bcf) of natural gas and can supply up to 1.8 Bcf per day (Bcf/d). This storage field send-out capability complements 3.875 Bcf/d of firm pipeline capacity held by SoCalGas to assure flowing natural gas supplies to core customers. The total reliable natural gas supply, without considering the spot purchase of additional natural gas from unused interstate pipeline capacity, is approximately 5.7 Bcf/d.

In contrast, the highest SoCalGas peak summer natural gas demand over the last decade was 3.7 Bcf/d, less than the firm pipeline capacity of 3.875 Bcf/d held by the utility. The peak winter gas demand over the last decade was 4.9 Bcf/d, substantially below the reliable SoCalGas storage and pipeline capacity of 5.7 Bcf/d without Aliso Canyon.

Curtailed events (interruption of gas supply) when they occur are of short duration, typically 1 to 2 days. The important characteristic of storage to address curtailment events is maximum natural gas “send-out” capacity over a short period, not the volumetric capacity of the storage field. Over the course of the entire winter season, there will be many days when interruptible capacity is available to meet existing needs of core customers or to refill storage as necessary.

SoCalGas advertises to potential customers that storage can be used to take advantage of the swings in natural gas prices to generate profits or reduce costs. Storage can also help customers maintain non-core rate eligibility, eliminate the inconvenience that is associated with other back up fuel systems, and help keep plants running and delivery schedules on track. Storage is presented as a lower-cost alternative to firm capacity contracts or a back-up fuel supply, for

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<sup>1</sup> SoCalGas is listed as a co-author on the cover page of the “*Aliso Canyon Risk Assessment Technical Report*” but is not listed as a co-author on the cover page of the “*Aliso Canyon Action Plan to Preserve Gas and Electric Reliability for the Los Angeles Basin*”.

example, to wholesale customers like power plants, to avoid service disruptions due to natural gas curtailments.

Meanwhile neighboring states like Arizona and Nevada, that are heavily natural gas dependent, have no natural gas storage facilities. They assure natural gas supply by relying on firm capacity contracts with pipeline operators serving those states.

The high cost of operating the Aliso Canyon storage field, and the latent health and safety risks, are not addressed at all in either of the two documents. Maintenance and integrity management activities will cost approximately \$40 million per year over the next six years at Aliso Canyon. This is a \$240 million cost that will be borne by SoCalGas ratepayers. A substantial component of this cost will be to conduct fundamental well integrity testing and upgrades/replacement as necessary, activities that should have been happening all along at the storage field. Had they occurred, communities and regulators might have avoided the current controversy surrounding Aliso Canyon's continued operation.

There are numerous flaws with information presented as fact in the two documents to justify a conclusion that the Aliso Canyon storage field is necessary for the ongoing supply reliability in SoCalGas service territory:

- Incorrect statements about the ability of the Honor Rancho storage field, which is 10 miles from Aliso Canyon and located on the same Los Angeles pipeline loop, to serve as an effective substitute for Aliso Canyon to guarantee a reliable supply of natural gas.
- Unsupported claims that the SoCalGas firm pipeline capacity of 3.875 Bcfd and design storage send-out rate of 1.8 Bcfd from Honor Rancho, La Goleta, and Playa del Rey cannot be relied on at design flow rates.
- Use of inflated estimates of electric generation natural gas demand in the LA Basin during summer and winter peak events.
- Failure to acknowledge that firm capacity contracts can be utilized to assure reliability of supply and that major LA Basin non-core customers can use this mechanism to reduce dependence on storage.
- Failure to acknowledge that gas-fired generation should not be occurring above minimum levels at winter or summer peak in the LA Basin to avoid stressing the SoCalGas delivery system, and that CAISO has the authority to guarantee that this happens.
- Use of inappropriate model inputs in the risk assessment that: exclude the critical Playa del Rey storage field, underestimate reliably available storage and flowing pipeline supply, and overestimate electric generation gas demand.

The regulatory agencies and SoCalGas have failed to make their case that natural gas withdrawals from the Aliso Canyon storage facility are needed to prevent gas supply shortfalls to LA Basin power plants that could result in blackouts.

## 2.0 SoCalGas Demand and Supply

SoCalGas provides natural gas to core and non-core customers in Southern California. Core customers are homes and businesses for whom SoCalGas provides bundled service. Bundled service means SoCalGas purchases the gas and transports it to the customer. SoCalGas also maintains firm capacity contracts on interstate and in-state pipelines sufficient to cover the peak demand of its core customers. Non-core customers include industrial users, refineries, hospitals, and electric generators.<sup>2</sup> These customers contract for their own natural gas supply and are typically on interruptible service with SoCalGas to minimize their gas transportation costs. Non-core customers can purchase gas storage service with SoCalGas.<sup>3</sup> Non-core customers are curtailed first when gas supplies are short.<sup>4</sup> Curtailments periodically occur, due to weather, factors affecting gas supplies, or outages affecting pipeline capacity.<sup>5</sup>

### A. SoCalGas Demand

#### 1. Winter Peak

The SoCalGas winter peak natural gas demand trend for 2004 through 2014 is shown in Figure 1. The peak demand during this eleven-year period was in 2008 with a demand of 4,910 million cubic feet per day (MMcfd).<sup>6</sup> The average winter peak day demand during this period was less than 4,500 MMcfd. SoCalGas states that extreme low daily temperatures generally only occur for a few days, even during a cold winter.<sup>7</sup>

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<sup>2</sup> E. Randolph – CPUC, Aliso Canyon Reliability Briefing to the Porter Ranch Community Advisory Committee, PowerPoint, February 4, 2016, p. 5.

<sup>3</sup> CPUC, CEC, CAISO, LADWP, Aliso Canyon Action Plan to Preserve Gas and Electric Reliability for the Los Angeles Basin, April 5, 2016, p. 12.

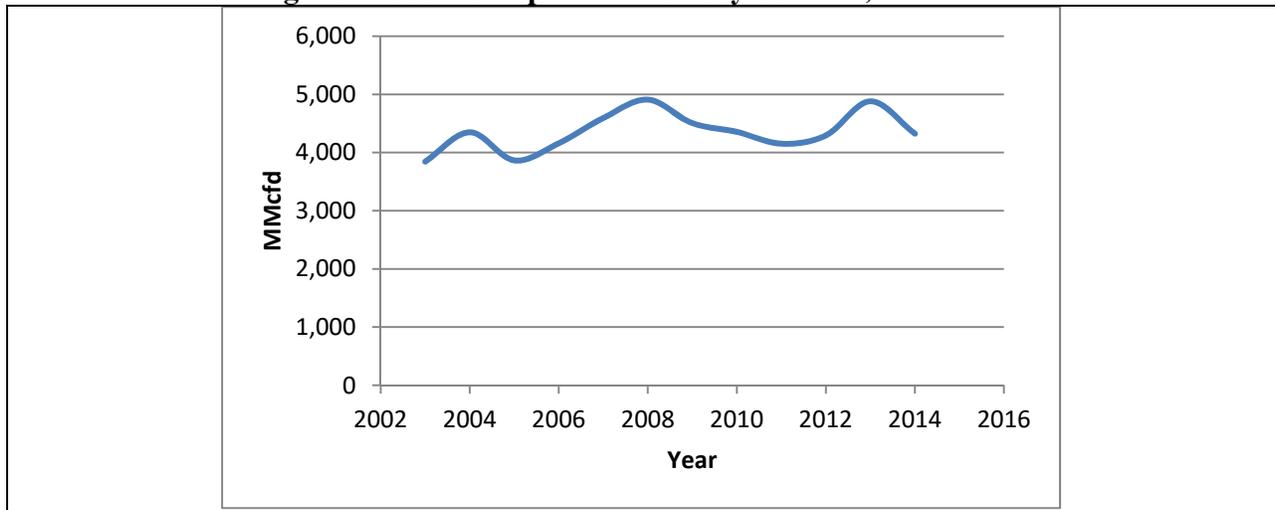
<sup>4</sup> *Ibid*, p. 5.

<sup>5</sup> *Ibid*, p. 5.

<sup>6</sup> 2011 DGR Supplement, p. 17. 1 Bcfd = 1,000 MMcfd.

<sup>7</sup> M. Murray – SoCalGas, SoCalGas/SDG&E Comments on CEC Draft Staff Paper: CEC-200-2009-004-SD, Natural Gas Infrastructure, May 14, 2009, by W. William Wood, Jr., June 5, 2009, p. 3.

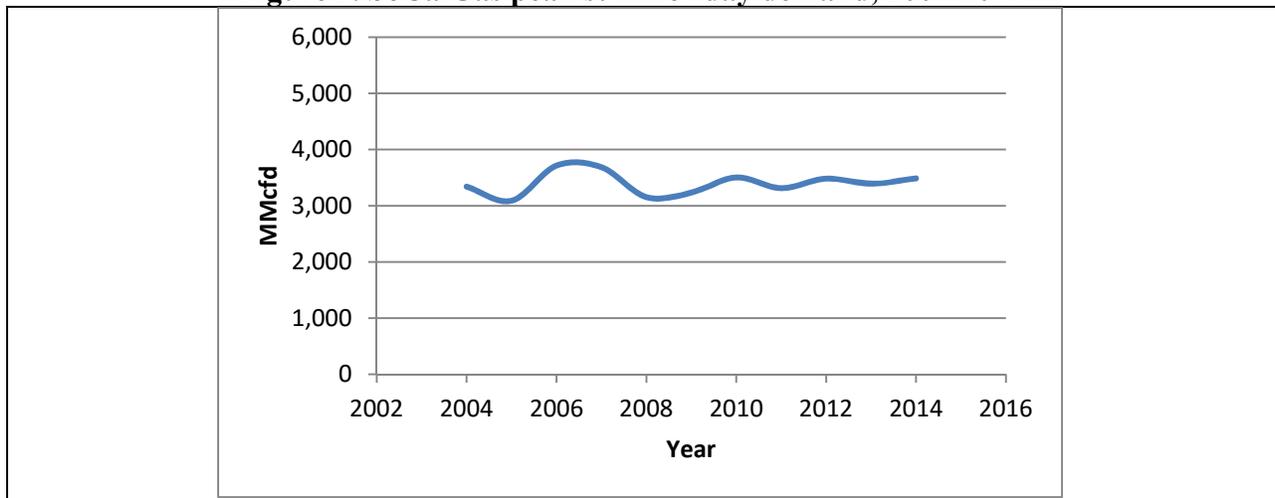
**Figure 1. SoCalGas peak winter day demand, 2004-2014<sup>8</sup>**



## **2. Summer Peak**

The SoCalGas summer peak natural gas demand trend for 2004 through 2014 is shown in Figure 2. The peak demand during this eleven-year period was in 2006 with a demand of 3,714 MMcfd.<sup>9</sup> The average summer peak day demand during this period was less than 3,500 MMcfd.

**Figure 2. SoCalGas peak summer day demand, 2004-2014<sup>10</sup>**



<sup>8</sup> 2009 California Gas Report (CGR) Supplement p. 15, 2011 CGR Supplement p. 17, 2015 CGR Supplement p. 19.

<sup>9</sup> 2011 DGR Supplement, p. 17.

<sup>10</sup> 2008 California Gas Report (CGR) Supplement p. 27, 2011 CGR Supplement p. 17, 2015 CGR Supplement p. 19.

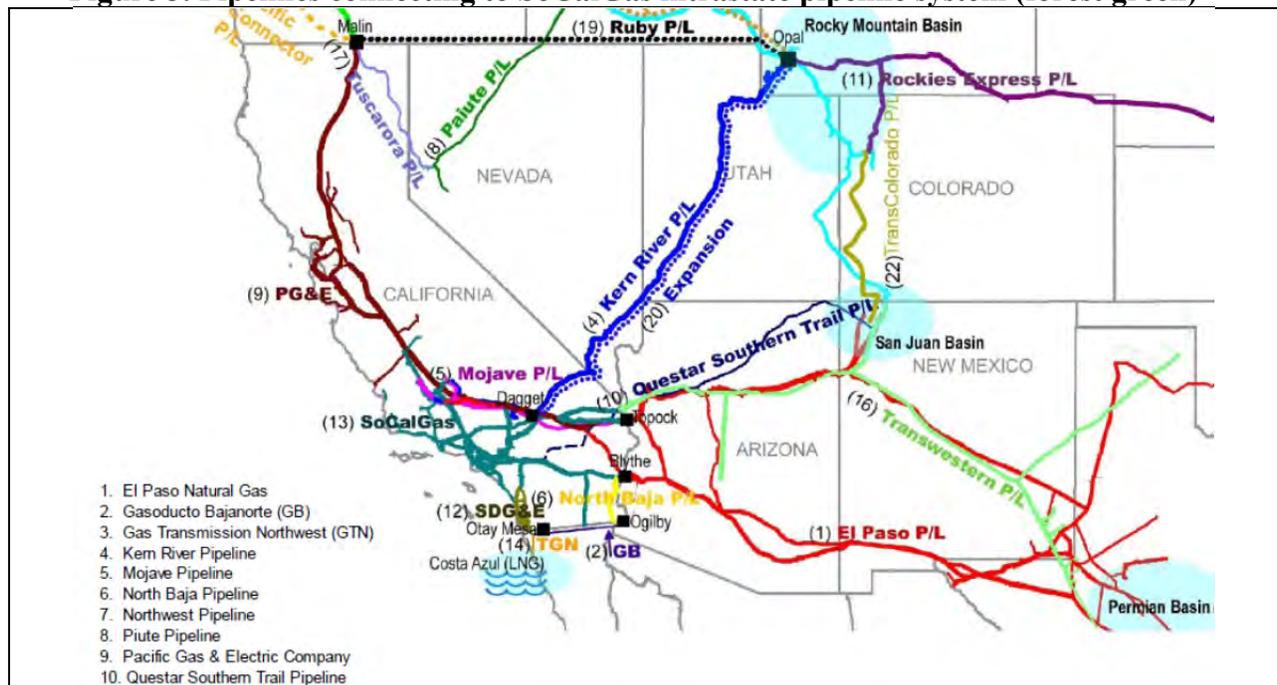
## B. SoCalGas Supply

SoCalGas serves approximately 22 million customers under 5.7 million accounts. About 11 million of these customers are in the LA Basin.<sup>11</sup> SoCalGas states that it has more than adequate storage and transmission (pipeline) capacities to meet 1-in-10 year peak day and cold year conditions for all customers, core and non-core.<sup>12</sup>

### 1. Pipelines

The multiple major interstate pipelines serving SoCalGas are shown in Figure 3. SoCalGas states that the possibility that natural gas consumption in other states upstream of California could restrict supplies to California is not a concern, as there is an open market for gas supplies and California utilities would be able to compete for those supplies along with the other states to assure that adequate supplies are available to meet California customer demand.<sup>13</sup>

**Figure 3. Pipelines connecting to SoCalGas intrastate pipeline system (forest green)<sup>14</sup>**



There is substantially more physical pipeline capacity connecting to the SoCalGas system than SoCalGas has under firm capacity contract to serve core customer load. 6,725 MMcfd of pipeline

<sup>11</sup> CPUC, CEC, CAISO, LADWP, Aliso Canyon Action Plan to Preserve Gas and Electric Reliability for the LA Basin, April 5, 2016, p. 7.

<sup>12</sup> M. Murray – SoCalGas, SoCalGas/SDG&E Comments on CEC Draft Staff Paper: CEC-200-2009-004-SD, Natural Gas Infrastructure, May 14, 2009, by W. William Wood, Jr., June 5, 2009, p. 3.

<sup>13</sup> Ibid, p. 2.

<sup>14</sup> 2014 CGR, p. 12.

physical capacity connects to the SoCalGas system.<sup>15</sup> 3,875 MMcfd of this 6,725 MMcf of physical pipeline capacity is under contract to SoCalGas as firm capacity to serve SoCalGas core customer demand.<sup>16</sup> A summary of the sources of physical pipeline capacity and capacity under contract to SoCalGas is shown in Table 1.

What this means in practical terms is that 2,875 MMcfd of physical pipeline capacity connected to the SoCalGas system is not obligated to SoCalGas under firm contract.<sup>17</sup> It is therefore available to be committed to firm contracts with third parties, such as electric generators or refineries in the LA Basin, or serve as a source of interruptible pipeline capacity to these same parties.

The SoCalGas flowing gas supply is not limited to its 3.875 Bcfd of firm pipeline capacity. SoCalGas can bring more gas in at the border itself using interruptible capacity.<sup>18</sup> Large non-core users can also contract for firm interstate pipeline capacity, as SoCalGas has considered requiring in the past to assure a portion of its pipeline system maintained adequate flows.<sup>19</sup>

**Table 1. 6,725 MMcfd of pipeline physical capacity connecting to SoCalGas and 3,875 MMcfd of firm capacity under contract to SoCalGas**

Physical capacity of pipelines serving connecting to the SoCalGas system		SoCalGas/SDG&E current firm receipt capacity to serve core customer demand		
Pipeline	Upstream Capacity (MMcf/d) <sup>(1)</sup>	Transmission Zone	Total Transmission Zone Firm Access (MMcf/d)	Specific Point of Access <sup>(1)</sup> (Limitations) <sup>(2)</sup> (MMcf/d)
El Paso at Blythe	1,210	Southern	1,210	EPN Ehrenberg (1,010)
El Paso at Topock	540			TGN Otay Mesa (400)
Transwestern at Needles	1,150	Northern	1,590	NBP Blythe (600)
PG&E at Kern River	650 <sup>(1)</sup>			EPN Topock (540)
Southern Trails at Needles	80			TW North Needles (800)
Kern/Mojave at Wheeler Ridge	885			QST North Needles (120)
Kern at Kramer Junction	750	Wheeler Ridge	765	KR Kramer Junction (550)
Occidental at Wheeler Ridge	150			KR/MP Wheeler Ridge (765)
California Production	310			PG&E Kern River Station (520)
TGN at Otay Mesa	400	Line 85	160	OEHI Gosford (150)
North Baja at Blythe	600	Coastal	150	California Supply
Total Potential Supplies	6,725	Other	N/A	California Supply
		Total	3,875	

<sup>15</sup> Ibid, p. 78.

<sup>16</sup> Ibid, p. 79.

<sup>17</sup> Available physical pipeline capacity – firm contracted capacity = 6,750 MMcfd – 3,875 MMcfd = 2,875 MMcfd.

<sup>18</sup> Southern California Edison Application A.06-08-026, Rebuttal Testimony of Dr. Michael Alexander, April 17, 2007, p. 8, lines 3-6.

<sup>19</sup> SoCalGas/SDG&E Application A.13-12-013, Reply Brief - Authority to Recover North-South Project Revenue Requirement in Customer Rates, October 12, 2015, p. 10.

## 2. *Storage*

SoCalGas advertises the benefits of holding natural gas storage in the following manner on its “Natural Gas Storage” webpage:<sup>20</sup>

Benefits of underground storage include imbalance protection, curtailment protection and price arbitrage. . . Storage can be used to take advantage of the swings in natural gas prices to generate profits or reduce costs. Storage can also help customers maintain non-core rate eligibility, eliminate the hassle that is associated with other back up fuel systems, and help keep plants running and delivery schedules on track.

In sum, in addition to providing a form of insurance to core customers by maintaining a stored supply of natural gas that is separate from flowing pipeline supplies, storage capacity allows large non-core customers to hedge the curtailment risk these non-core customers run by: 2) not entering into firm pipeline capacity contracts and 2) not maintaining a physical supply of back-up fuel to support operations.

The four natural gas storage facilities operated by SoCalGas, Aliso Canyon, La Goleta, Honor Rancho (Santa Clarita), and Playa del Rey, have all been in operation for many years and have a combined storage capacity of 136 Bcf. Storage gas is usually withdrawn and delivered to SoCalGas customers through the transmission and distribution system when gas consumption is seasonally high during winter months.<sup>21</sup> At the beginning of the withdrawal season in November, the combined storage capacity of the four storage fields is enough to supply all SoCalGas customers for approximately six weeks, assuming an average daily consumption rate.<sup>22</sup> Without Aliso Canyon, the three remaining storage fields have a combined capacity of approximately 50 Bcf and could supply all SoCalGas customers at the average daily consumption rate for approximately two weeks.<sup>23</sup>

However, over the course of the entire winter season, there will be many days when interruptible capacity is available to meet existing needs of core customers or to refill storage as necessary.<sup>24</sup> What matters for core customers of SoCalGas is not the storage inventory on an individual peak day, but the available storage withdrawal capacity.<sup>25</sup> In other words, the critical issue on a peak day is how quickly a storage field can send gas into the pipeline system and not the volume of gas contained in the storage field.

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<sup>20</sup> See: <https://www.socalgas.com/for-your-business/energy-market-services/natural-gas-storage>

<sup>21</sup> Application A.14-11-004, SoCalGas 2016 General Rate Case, Direct Testimony of Phillip E. Baker - Underground Storage, November 2014, p. PEB-2.

<sup>22</sup> Ibid, PEB-2.

<sup>23</sup>  $[(21.5 \text{ Bcf} + 26.0 \text{ Bcf} + 2.4 \text{ Bcf}) / 136.1 \text{ Bcf}] \times 6 \text{ weeks} = 2.2 \text{ weeks}$ .

<sup>24</sup> Southern California Edison Application No. 06-08-026, Rebuttal Testimony of Dr. Michael Alexander, April 17, 2007, p. 9, lines 6-8.

<sup>25</sup> Ibid, p. 9, lines 1-3.

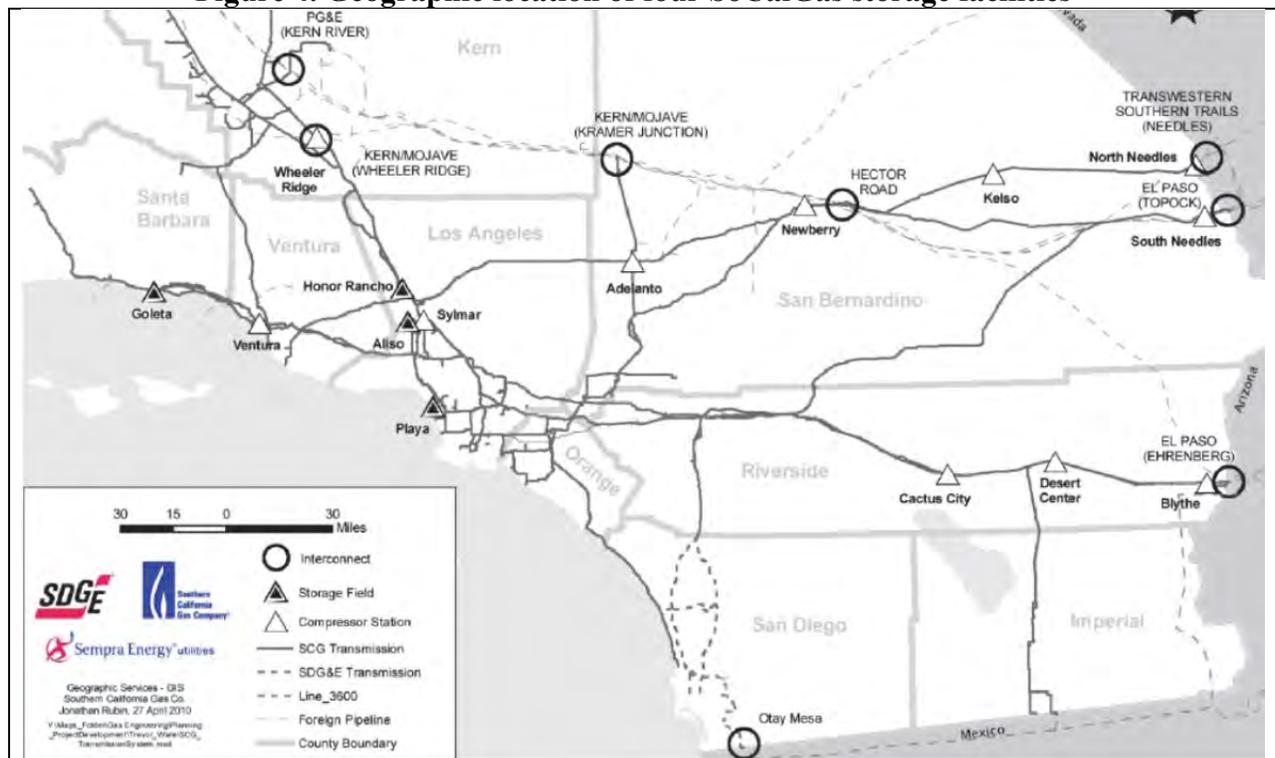
The principal characteristics of each of these storage facilities are described in Table 2.

**Table 2. Characteristics of SoCalGas four natural gas storage facilities<sup>26</sup>**

Descriptive Statistic	Aliso Canyon	La Goleta	Honor Rancho	Playa del Rey	Total All Fields
Year Field Placed in Service	1973	1941	1975	1942	-
Injection/Withdrawal/Observation Wells (number)	115	20	40	54	229
Gas Compressor Units (number)	8	8	5	3	24
Compression Horsepower (bhp)	42,000	5,700	27,500	6,000	81,000
Maximum Reservoir Pressure (psig)	3,600	2,050	4,400	1,700	-
Working Gas (Bcf)	86.2	21.5	26.0	2.4	136.1
Maximum Withdrawal Rate (MMcfd)	1,860	420	1,000	400	3,760
Maximum Injection Rate (MMcfd)	600	140	300	75	1,115
Maximum Well Depth (feet)	10,691	6,912	13,300	6,575	-
Minimum Well Depth (feet)	6,997	4,247	9,165	6,049	-
Average Well Depth (feet)	8,146	4,886	9,959	6,339	-

The locations of these four SoCalGas storage facilities are shown in Figure 4.

**Figure 4. Geographic location of four SoCalGas storage facilities<sup>27</sup>**



Aliso Canyon is the largest of the four gas storage fields, with a working capacity of approximately 86 Bcf and deliveries to the Los Angeles pipeline loop.<sup>28</sup> Many of the Aliso

<sup>26</sup> Ibid, Table PEB-3, p. PEB-5.

<sup>27</sup> Ibid, PEB-3.

Canyon wells date back to the 1940s. The storage field has 115 injection/withdrawal/observation wells and is designed for a maximum withdrawal rate of approximately 1.8 Bcf per day.

Honor Rancho is located approximately ten miles north of Aliso Canyon, with a working capacity of approximately 26 Bcf and deliveries to the Los Angeles pipeline loop.<sup>29</sup> Many of the Honor Rancho wells date back to the 1940s. The field has 40 gas injection/withdrawal wells and is designed for a maximum withdrawal capability of 1.0 Bcf per day. The California Public Utilities Commission authorized SoCalGas to increase the capacity of Honor Rancho to 28 Bcf in a 2010 decision.<sup>30</sup>

La Goleta is located in Santa Barbara County and provides service to the northern coastal area of the SoCalGas territory.<sup>31</sup> La Goleta has a working capacity of approximately 21 Bcf. Most of the La Goleta wells date back to the 1940s. La Goleta has 20 gas injection/withdrawal/ observation wells and is designed for a maximum withdrawal capability of 0.4 Bcf per day.

Playa Del Rey, due to its location, is considered a critical asset by SoCalGas with a design working capacity of approximately 2.4 Bcf.<sup>32</sup> Playa Del Rey is designed for a maximum withdrawal rate of 0.4 Bcf per day to meet residential, commercial and industrial loads throughout the western part of Los Angeles, including oil refineries and power generators.<sup>33</sup>

If the Aliso Canyon storage field were permanently retired, the maximum withdrawal rate of the remaining three storage fields, Honor Rancho, La Goleta, and Playa del Rey, would be 1.8 MMcfd.<sup>34</sup>

### **C. Seasonal Natural Gas Commodity Price Benefits of Storage No Longer Assured**

The economic justification for natural gas storage is that storage facility operators can purchase natural gas at lower commodity prices in summer when demand is lower and utilize the gas in

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<sup>28</sup> Ibid, PEB-4.

<sup>29</sup> Ibid, PEB-4.

<sup>30</sup> Ibid, p. PEB-14, CPUC Decision (D) 10-04-034.

<sup>31</sup> Ibid, PEB-4.

<sup>32</sup> Ibid, p. PEB-4.

<sup>33</sup> Ibid, PEB-4.

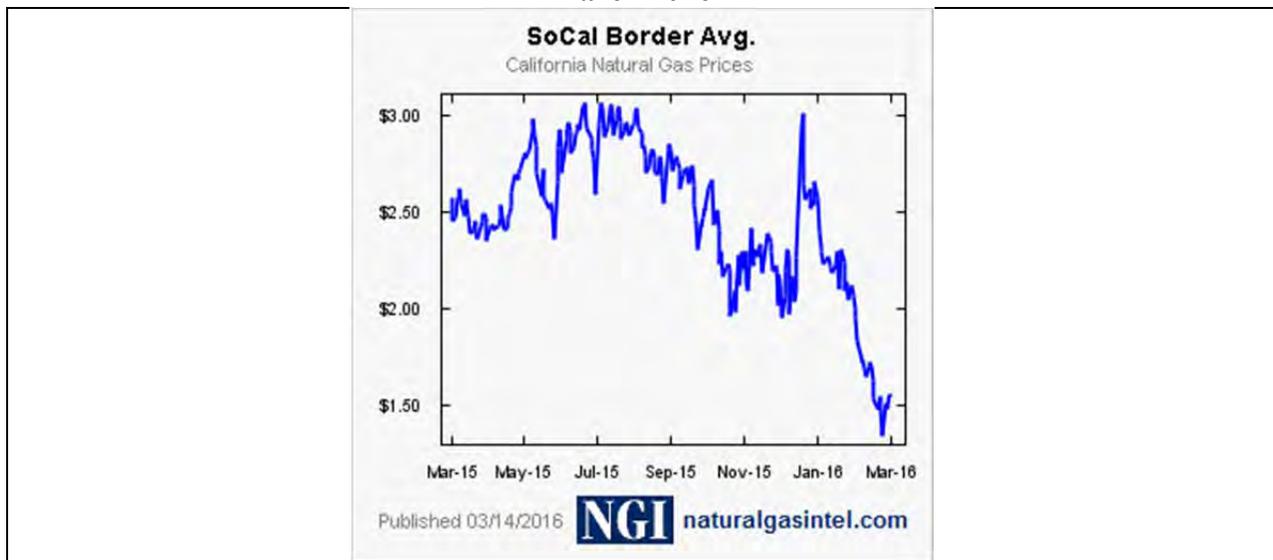
<sup>34</sup> A minimum amount of natural gas in storage is needed to assure this withdrawal rate. SCG states that 45 Bcf must be in storage of 136 Bcf total, about 33 percent full of capacity, to sustain the maximum 3,760 MMcfd withdrawal rate with all four storage fields, including Aliso Canyon, available. At 25 Bcf, about 20 percent of the maximum withdrawal rate with Aliso Canyon, the maximum withdrawal rate declines to 85 percent of maximum, to 3,195 MMcfd [See M. Murray, SoCalGas comment letter to CEC, June 2009, p. 1]. Pro-rating the maximum withdrawal rate without Aliso Canyon and storage at about 20 percent of capacity gives a maximum withdrawal rate of the remaining three storage facilities of: 1.82 MMcfd x 0.85 = 1.55 MMcfd.

the winter peak season when prices are higher due to higher demand.<sup>35</sup> Natural gas is typically injected underground into the storage field reservoirs during seasonal periods when gas consumption is low and supplies are ample.<sup>36</sup> Storage gas is usually withdrawn and delivered to customers through the pipeline transmission and distribution system when gas consumption is seasonally high during winter months.<sup>37</sup> As a result, in the summer storage fields like Aliso Canyon typically impose a substantial demand on the pipeline system as these storage fields are replenished for the next winter high demand season.

However, that traditional seasonal price relationship has been overwhelmed by the availability of large quantities of shale gas in the U.S. natural gas market. The growth of gas production in the Midcontinent and eastern shale gas production areas has had the effect of pushing larger volumes of Canadian, Rockies, San Juan, and Permian natural gas supplies to California, as those supplies are crowded out of markets to the east.<sup>38</sup>

The price effect of this phenomenon is illustrated in Figure 5 for the natural gas spot price at the California border receipt point from March 2015 to March 2016. The natural gas commodity price at the Southern California border was substantially higher in the summer of 2015, averaging around \$2.75 per million British thermal units (million Btu) than in the winter of 2015/2016, when it averaged about \$2.00 per million Btu.

**Figure 5. Southern California border receipt point natural gas spot price, March 2015 to March 2016<sup>39</sup>**



<sup>35</sup> CPUC, CEC, CAISO, LADWP, Aliso Canyon Risk Assessment Technical Report, April 5, 2016, p. 8. “In the winter season, when interstate pipeline gas supplies become more expensive and even less available due to well freeze-offs, customers often elect to deliver as little as possible to the SoCalGas system.”

<sup>36</sup> Baker Direct Testimony, PEB-2.

<sup>37</sup> Ibid, PEB-2.

<sup>38</sup> 2014 CGR, p. 42.

<sup>39</sup> [www.naturalgasintel.com](http://www.naturalgasintel.com) webpage, SoCal Border average natural gas price, March 14, 2016.

## **D. Frequency and Duration of Natural Gas Curtailments on SoCalGas System**

Recent curtailments on the SoCalGas system have been brief, lasting one or two days and affecting a portion of the non-core customers on interruptible supplies of natural gas. These curtailment events are described in the following paragraphs.

### **1. Recent Summer Peak Curtailments**

Winters are generally identified as the periods in which possible curtailments may occur on the SoCalGas system.<sup>40</sup> However, a summer curtailment event occurred on June 30 and July 1, 2015, when SoCalGas issued a general curtailment watch to noncore customers in the Los Angeles Basin.<sup>41</sup> Curtailments of natural gas service for five to six hours on each of the two days affected certain power plants in the Los Angeles Basin.<sup>42</sup> A review of So Cal Gas's maintenance schedule showed a storage inventory of 108 billion cubic feet (Bcf) and withdrawals on those two days of as much as 1.3 Bcfd. According to a California Energy Commission staff report, SoCalGas would not expect to pull such high volumes (1.3 Bcfd) from storage in the summer.<sup>43</sup> The SoCalGas maintenance schedule showed various summer maintenance activities occurring at the SoCalGas gas storage facilities, which would have precluded large withdrawals.<sup>44</sup>

### **2. Recent Winter Peak Curtailments**

The winter of 2013 – 2014 resulted in localized curtailments or near-curtailments in which SoCalGas did not receive sufficient gas supply at Ehrenberg natural gas receipt point on the California-Arizona border. The first occurred in early December 2013, when a winter storm caused very high natural gas demand on the West Coast that spread eastward to cause gas prices to not only rise in general, but to rise to relatively higher levels as areas east of California experienced even colder temperatures.<sup>45</sup>

On December 6, 2013, So Cal Gas and SDG&E curtailed standby service due to the reduced flows of gas into the SoCalGas system. On the following Monday, it issued a curtailment watch to customers in the Rainbow Corridor and SDG&E service area. It also curtailed off-system service and later issued a curtailment watch for the area from El Segundo south to Huntington Beach.<sup>46</sup>

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<sup>40</sup> CEC, AB 1257 Natural Gas Act Report: Strategies to Maximize the Benefits Obtained from Natural Gas as an Energy Source – Final Staff Report, November 2015, p. 22.

<sup>41</sup> Ibid, p. 22.

<sup>42</sup> Ibid, p. 22.

<sup>43</sup> Ibid, p. 22.

<sup>44</sup> Ibid, p. 22.

<sup>45</sup> Ibid, pp. 23-24.

<sup>46</sup> Ibid, pp. 23-24.

On February 6, 2014, a similar set of circumstances occurred. SoCalGas and SDG&E first curtailed standby service and then moved to emergency curtailment of electricity generation. This curtailment initially affected only the southern zone but was later extended to cover its entire system, citing continued low system receipts and high electric generation demand. All generators were “instructed to hold their current load,” meaning they could not increase their gas consumption.<sup>47</sup>

## **E. Natural Gas Supply in Neighboring States – Arizona and Nevada**

Arizona and Nevada are heavily dependent on natural gas-fired generation, have only one or two interstate pipelines from which to draw natural gas, and have no in-state storage facilities. Both of these states rely on firm delivery contracts to assure reliable natural gas supply to core customers and utility-owned electric generators. The Arizona and Nevada experiences demonstrate that a dependable natural gas supply can be maintained by reliance on firm delivery contracts, without storage, and with fewer in-state and interstate pipelines than SoCalGas has access to.

### **1. Arizona**

Arizona’s natural gas needs are met via deliveries on the El Paso Natural Gas and Transwestern interstate pipeline systems providing natural gas from the San Juan supply basin in New Mexico and the Permian supply basin in west Texas.<sup>48</sup> Arizona has no natural gas storage and relies on interstate pipeline line pack to meet the fluctuating demand for natural gas.<sup>49</sup> Arizona entities are key participants in the Desert Southwest Pipeline Stakeholders group that made a number of proposals to provide greater operational flexibility for natural gas generators who hold firm pipeline capacity rights on interstate pipelines.<sup>50</sup>

### **2. Nevada**

Nevada Power, the primary electricity provider in the state, holds contracts for firm gas transportation on Kern River Pipeline to serve the majority of its overall daily natural gas needs.<sup>51</sup> Nevada has no in-state natural gas storage facilities.<sup>52</sup>

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<sup>47</sup> Ibid, p. 24.

<sup>48</sup> Docket No. EPA-HQ-OAR-2013-0602, Comments of Arizona Corporation Commission re proposed Carbon Pollution Emission Guidelines for Existing Sources - Electric Utility Generating Units, Exhibit 9, December 1, 2014, p. 1.

<sup>49</sup> Ibid, p. 6.

<sup>50</sup> Ibid, p. 8.

<sup>51</sup> Application of Nevada Power Company d/b/a NV Energy Seeking Acceptance of the First Amendment to its 2013-2032 integrated resource plan and its Energy Supply Plan Update for 2015, Volume 13 of 15, Energy Supply Plan Update - Narrative and Testimony, May 2014, p. 26.

### 3.0 Reliability of SoCalGas Aging Natural Gas Storage Facilities

SoCalGas identified a rising rate of leaks in its storage facility wells in testimony before the CPUC in November 2014. SoCalGas describes its routine operation and maintenance (O&M) program as reactive, with safety-related issues increasing in recent years.<sup>53</sup> This trend is shown in Table 1. SoCalGas states the increasing number of safety and integrity conditions is primarily due to the frequency of use, exposure to the environment, and length of time the wells have been in service. In addition to the leaks quantified in Table 3, ultrasonic surveys conducted by SoCalGas in storage wells as part of well repair work from 2008 to 2013 identified internal/external casing corrosion, or mechanical damage in 15 wells.<sup>54</sup>

**Table 3. Increasing well leakage trend at SoCalGas storage facilities, 2008-2013**

Well Integrity Category	Year					
	2008	2009	2010	2011	2012	2013
Casing Leak	-	-	-	2	3	2
Tubing Leak	1	1	5	3	3	4
Wellhead Leak	-	-	1	2	-	2
Casing Shoe Leak	-	1	-	1	-	-
Sub-surface Safety Valve	2	-	-	-	2	1
Total	3	2	6	8	8	9

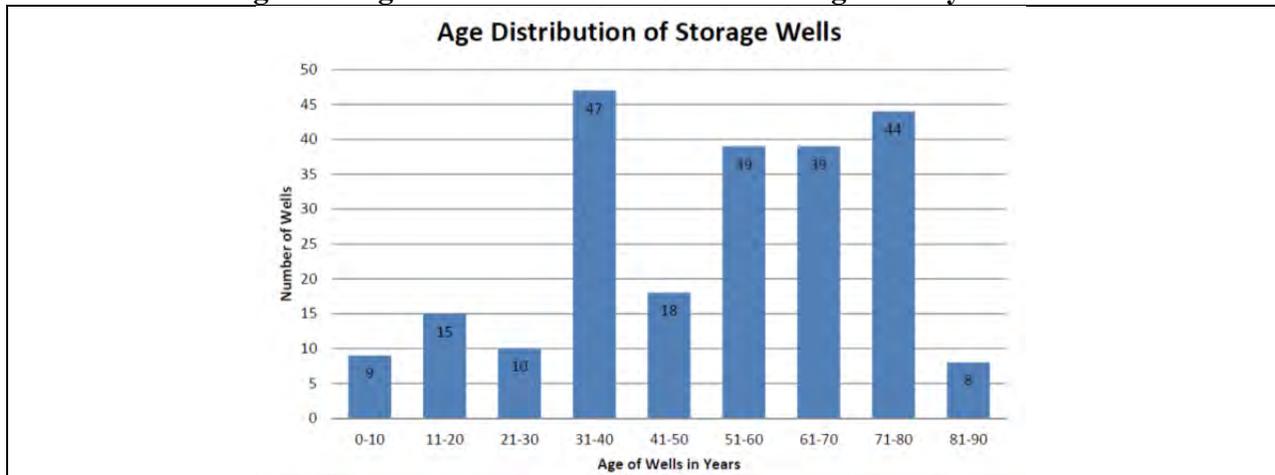
SoCalGas has 52 storage wells in service that are more than 70 years old. Half of the 229 storage wells are more than 57 years old as of July 2014. The age distribution of these wells is shown in Figure 6.

<sup>52</sup> EIA, U.S. Underground Natural Gas Storage Facilities, by Type (December 31, 2015): [http://www.eia.gov/cfapps/nggs/images/storage\\_2015.png](http://www.eia.gov/cfapps/nggs/images/storage_2015.png).

<sup>53</sup> Baker Direct Testimony, p. PEB-19.

<sup>54</sup> Ibid, p. PEB-19.

**Figure 6. Age distribution of SoCalGas storage facility wells<sup>55</sup>**



The company identified in November 2014 testimony a rising trend in leaks from storage wells as the basis for a proposed Storage Integrity Improvement Program (SIMP) costing \$115 million in the first three years.<sup>56</sup> SoCalGas anticipates that SIMP will be a six-year program.<sup>57</sup> This project would be in addition to routine operations and maintenance (O&M) costs of approximately \$40 million per year, or \$120 million over three years.<sup>58</sup>

Assuming the storage O&M costs are proportional to the number of wells at each storage facility, Aliso Canyon would account for approximately 50 percent of the SoCalGas storage O&M budget.<sup>59</sup> Therefore, the cost of operating Aliso Canyon over a three-year period would be approximately \$120 million.<sup>60</sup>

#### **4.0 Inaccurate or Unsupported Assertions in State’s Reliability Assessment of the Need for Aliso Canyon**

Table 4 and Table 5 in the following two sections assess the accuracy of statements made in the April 5, 2016 Aliso Canyon Action Plan and the April 5, 2016 Aliso Canyon Risk Assessment Technical Report.

<sup>55</sup> Ibid, p. PEB-20.

<sup>56</sup> Ibid, Figure PEB-6, p. PEB-25.

<sup>57</sup> Ibid, p. PEB-7.

<sup>58</sup> Ibid, Figure PEB-6, p. PEB-25.

<sup>59</sup> 115 wells/229 wells = 0.50 (50 percent)

<sup>60</sup> (\$115 million + \$120 million) x 0.50 = \$117.5 million

**A. April 5, 2016 Aliso Canyon Action Plan**

**Table 4. April 4, 2016 Aliso Canyon Action Plan – inaccurate or unsupported assertions**

Page	Unsupported assertion	Response
7	Table 1 – Honor Rancho connects to SoCalGas “Backbone North” pipeline system.	This statement is incorrect based on the reference cited, SCG’s Phillip Baker November 2014 direct testimony in the 2016 General Rate Case. At p. 4 Mr. Baker states Honor Rancho is on the L.A. Loop pipeline network.
8	Aliso Canyon and Playa del Rey are the only two fields inside the L.A. Basin and are on the lower pressure local transmission system (sometimes referred to as the “L.A. Loop”).	SCG’s Phillip Baker November 2014 direct testimony (p. 3) in 2016 General Rate Case proceeding states that Honor Rancho field is also on the L.A. Loop.
8	Honor Rancho is several hours of flow farther away (from Aliso Canyon).	Honor Rancho is 10 miles from Aliso Canyon (Baker, p. 3). This is 20 to 30 minutes flow time from Aliso Canyon using the report’s assumed “speed of gas flow” of 20 to 30 miles per hour.
8	Aliso Canyon is the only storage field available to support hourly operating changes within the LA Basin.	Honor Rancho and Playa del Rey are also on the L.A. Loop and can support hourly operating changes in the LA Basin.
9	Southern California cannot count on 3.875 Bcf per day of gas supply flowing in from upstream sources (on cold winter day) and SoCalGas must withdraw gas from storage to meet demand.	SCG’s M. Murray June 2009 comment letter to CEC (p. 3) states there is an open market for gas supplies and California utilities would be able to compete for those supplies along with the other states to assure that adequate (pipeline) supplies are available to meet California customer demand.
9	The lower pressure gas pipeline system within the L.A. Basin does not have enough of what is known as “pack and draft” capability to match supply with demand each hour. Storage gas inside the L.A. Basin is the only way, today, to match supply with demand.	Both Honor Rancho and Playa del Rey storage is feeds the “L.A. Loop” pipeline network. Approximately 30 Bcf of storage is available from these two fields for balancing and gas supply.
10	Aliso Canyon is the only source that can provide immediate gas supply in time to prevent collapse of operating pressures (to power plants) within the Basin.	SoCalGas summer peak system demand, both core and non-core (including power plants) has not exceeded SoCalGas firm pipeline capacity of 3.875 Bcfd in last decade (if ever). Use of storage to meet this demand is optional from a reliability standpoint. Power plant gas usage at winter peak is much lower than at summer peak.
10-11	Noncore customers are not required to balance their demand and delivery of	Balancing shippers may need to adjust to less flexibility without Aliso Canyon by use of firm

	gas each day. . . The flexibility balancing shippers enjoy were made possible by the large amount of gas storage available in southern Cal.	contracts. The permanent shutdown of Aliso Canyon would relieve SoCalGas ratepayers of a \$40 million/yr O&M expense and risk of exposure to future well leaks.
12	When customers did not bring enough flowing supply to the receipt points, SoCalGas used storage to provide make-up supply.	Customers will need to better match flowing supply to customer demand without Aliso Canyon to reduce SoCalGas reliance on storage to “cover” customers who fail to schedule sufficient flowing supply.
13	Those (electric) generators don’t bid into the California ISO’s day-ahead electricity market until 10:00 a.m. They then won’t learn which of them are dispatched by the California ISO until the California ISO announces awards at 1:00 pm.	Gas-fired generation should not be occurring above minimum levels at winter or summer peak in the LA Basin to avoid stressing the SoCalGas delivery system. FERC has no minimum local generation requirement. CAISO has a 25 percent local generation guideline (not federally enforceable). CAISO was fined \$200,000 by FERC in December 2012 for causing an unnecessary blackout in SDG&E territory because it adhered to its 25 percent local generation requirement. CAISO has the authority to minimize generation in the LA Basin during peak and needs to use the authority it has.
15	1.031 Bcf of demand comes from electric generation plants on peak winter day.	The level of winter electric generation demand is half what is assumed if LA Basin generation is limit to 25 percent of demand per CAISO. $0.25 \times 9,000 \text{ MW} = 2,250 \text{ MW}$ . Assuming an average base load heat rate of 8,500 Btu/kWh, the 24-hr gas non-LADWP demand would be: $2,250 \text{ MW} \times 0.0085 \text{ MMcf/MWh} \times 24 \text{ hr/day} = 459 \text{ MMcfd}$ (0.459 Bcf). This is less than half the electric power winter peak gas demand assumed in the Plan. Assuming LADWP’s average winter demand is 0.07 Bcfd, half its average summer demand of 0.141 Bcfd (Risk Assessment, p. 17), The total electric generation demand in the LA Basin served by SoCalGas would be 0.53 MMcfd.
15	1.943 Bcf of demand comes from electric generation plants on peak summer day.	See previous comment. Non-LADWP peak summer in LA Basin is $\sim 17,000 \text{ MW}$ . $0.25 \times 17,000 \text{ MW} = 4,250 \text{ MW}$ . Assuming an average base load heat rate of 8,500 Btu/kWh, the 24-hr gas demand would be: $4,250 \text{ MW} \times 0.0085 \text{ MMcf/MWh} \times 24 \text{ hr/day} = 867 \text{ MMcfd}$ (0.867 Bcf). Assuming LADWP average summer demand of 0.141 MMcfd (Risk Assessment, p. 17), the total electric generation

		demand in the LA Basin served by SoCalGas would be 1.008 Bcf/d. This is about half the electric power summer peak gas demand assumed in the Plan.
16	Some of these noncore customers are oil refineries, which are also key to California's economy.	Refineries should be required to hold some firm pipeline capacity if there is any concern they will be curtailed, if a curtailment lasting a few days could negatively impact supplies of reasonably-price fuel. Refiners are taking a small risk, to minimize gas cost, by relying exclusively on interruptible gas supply. If all refineries hold similar proportions of firm pipeline capacity, no competitive advantage would be gained by individual refiners in the regional fuel market.
16	The combined withdrawal capacity from Honor Rancho, La Goleta, and Playa del Ray is 1.7 Bcf/day. Adding the storage withdrawal ability to SoCalGas' pipeline design capacity of 3.875 Bcf SoCalGas appears able to meet its winter peak demand of 5.077 Bcf/day, with a reserve margin of 0.5 Bcf.	This calculation is accurate. SoCalGas can meet the winter peak without Aliso Canyon and without requiring that some major non-core gas users, specifically electric generators and refineries, hold some minimum level of firm capacity.
16	SoCalGas's daily operating data show, that 3.4 Bcf per day has been the highest flowing supply coming into its system at any time in the last five years, and, most often, it is 3.0 Bcf per day or less. Using this experience, SoCalGas would not be able to serve all the forecasted winter peak day demand without some contribution of withdrawals from Aliso Canyon.	This experience is misleading. Most of the time the total demand on the SoCalGas system is less than 3.0 Bcf/d (2015 CGR, average SoCalGas demand). The fact that SoCalGas has operated its system in the last 5 years such that maximum flowing supply has been 3.4 Bcf/d says nothing about whether SoCalGas can fully utilize its firm capacity of 3.875 Bcf/d if it chooses to, and potentially more if its non-core customers, like electric generators and refineries, schedule flowing supply on the same day.
23	There should be no doubt that winter reliability will be threatened if all or part of the 15 Bcf now held at Aliso is withdrawn and cannot be replaced before winter.	This is an unsupported conclusion as no alternative to a supply paradigm that does not include Aliso Canyon was studied. The modeling used to support this statement has not been independently verified and includes assumptions that make Aliso necessary, such as 1) assuming Playa del Rey storage is not used at all during a peak event (driven by electric generators near Playa del Rey), 2) firm capacity deliveries from CA producers and other suppliers far below contracted firm capacity of 3.875 Bcf/d, and 3) unnecessarily high electric generation. Use of

		these assumptions appears to be driven by a need to demonstrate that Aliso is necessary and not to encounter a paradigm that allows reliable operation of the SoCalGas system without Aliso.
26	As discussed in this Action Plan, the storage on the rest of SoCalGas' system is mostly irrelevant to providing balancing service within the L.A. Basin.	Honor Rancho storage (26 Bcf) and Playa del Rey storage (2.4 Bcf) are on the Los Angeles pipeline loop and directly relevant to providing balancing service within the LA Basin.
29-30	LADWP has implemented three actions designed to maximize its operational flexibility this summer: Curtail Physical Gas Hedging, Stop Economic Dispatch, Curtail Block Energy and Capacity Sales.	LADWP is appropriately adapting to condition with less available storage. LADWP also uses Hyperion Wastewater Treatment Plant digester gas as the primary fuel at its 830 MW Scattergood power plant, providing some level of natural gas curtailment resilience. <sup>61</sup>
33	A more detailed analysis consisting of an engineering assessment confirmed Aliso Canyon to be an integral part of the southern California energy system, both for reliable natural gas service and reliable electricity service.	No methodical analysis of alternative cost-benefit scenarios that did not include Aliso Canyon was conducted. The failure to include any gas withdrawal from Playa del Rey storage in the modeling compromises the validity of the exercise, as does the assume of far more operational electric generation than necessary to meet the CAISO 25 percent local generation minimum guideline. Aliso Canyon projected O&M is \$40 million per year over next 6 years, in addition to ever-present potential for major leaks. No effort is made to determine whether increased costs to non-core customers who lose access to Aliso Canyon storage is offset by reduced costs to core customers who no longer must pay to maintain Aliso Canyon or run the risk of impacts from future leaks.
33	The limited current operations of the facility create a possibility of electricity service interruptions in the coming summer months. Without any gas supply from Aliso Canyon, there are days this coming summer during which gas curtailments could be high enough to cause electricity service interruptions to millions of utility customers.	This statement applies to modeled scenarios that include assumptions that result in a demonstration of need for Aliso Canyon. See the response to the modeling assumptions used in the April 5, 2016 Aliso Canyon risk assessment in the following section.

<sup>61</sup> LADWP Resolution No. 008-242, Delegation of Authority to the Board of Water and Power Commissioners to amend and extend the Master Services Contract, LADWP No. 47498-6, with SoCalGas, May 20, 2008, pdf p. 11. The Scattergood power plant is on interruptible natural gas supply with SoCalGas because natural gas is the secondary fuel serving the facility.

## B. April 5, 2016 Aliso Canyon Risk Assessment Technical Report

**Table 5. April 5, 2016 Aliso Canyon Risk Assessment Technical Report – inaccurate or unsupported assertions**

Page	Assertion	Response
8	In the winter season, when interstate pipeline gas supplies become more expensive and even less available due to well freeze-offs, customers often elect to deliver as little as possible to the SoCalGas system.	Winter natural gas price is now lower than summer price (see Chapter 2), summer-winter price differential is no longer economic justification for storage. SoCalGas has confirmed there is a competitive market for gas supplies (Murray, June 2009, CEC letter) and that SoCalGas can and will bid a price necessary to assure supplies as needed.
21	<p>MODELING ASSUMPTIONS:</p> <ul style="list-style-type: none"> <li>a. 1,697 MMcfd from firm pipeline capacity</li> <li>b. 1,807 MMcfd EG summer demand</li> <li>c. 60 MMcfd from California producers</li> <li>d. 0 MMcfd from Playa del Rey storage field</li> </ul>	<ul style="list-style-type: none"> <li>a. Firm SoCalGas capacity is 3,875 MMcfd</li> <li>b. EG summer demand is 717 MMcfd w/CAISO minimum generation in LA Basin (p. 45, lines 5 &amp; 10), assuming average heat rate of 8,500 Btu/kWh for 3,515 MW of generation.<sup>62,63</sup></li> <li>c. SoCalGas has firm capacity rights to 310 MMcfd from California producers.</li> <li>d. Full Playa del Rey send-out capacity of 400 MMcfd should be utilized.</li> </ul> <p>Inappropriate modeling assumptions create an artificial gas deficit that state agencies conclude must be met by Aliso Canyon storage, when appropriate supply/demand assumptions would show no deficit and no need for additional storage supply from Aliso Canyon storage.</p>
21	Modeled scenarios evaluate past actual business-as-usual seasonal scenarios only, with no scenarios that look at improved scheduling accuracy to address supply issues.	The minimum LA Basin generation level described on p. 45, with less than half the gas demand as the two peak summer scenarios on p. 21, is not evaluated. There is no discussion of equipping “must run” electric generators with clean backup fuel, like Amber 363™ used at Orange County Government Center and UC Irvine dual-fuel cogeneration plants. Numerous

<sup>62</sup> 8,500 Btu/kWh heat rate represents a composite heat rate for a mix of combined cycle, advanced simple cycle (LMS100), and base load steam boiler capacity in the LA Basin.

<sup>63</sup> 3,515 MW x 0.0085 MMcf/MWh x 24 hr = 717 MMcfd.

		LA Basin hospitals also use this fuel for back-up emergency engines.
22	Pipeline supplies could have been somewhat larger than assumed, reducing the need for Honor Rancho and La Goleta supplies, but such an assumption would increase those pipeline supplies beyond that which has been historically delivered under similar conditions.	No effort made to analysis more than one set of assumptions that lead to a conclusion that Aliso Canyon supply is necessary to assure reliability, while acknowledging different assumptions will produce different outcomes.
38-39	Potential curtailments for four 2016 natural gas demand scenarios	These potential curtailment duration estimates are based on flawed modeling inputs as detailed earlier in this table under “MODELING ASSUMPTIONS.”