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Proceeding: 2019 General Rate Case
Application: A.17-10-___
Exhibit: SCG-11

SOCALGAS

DIRECT TESTIMONY OF DAVID L. BUCZKOWSKI

(ALISO CANYON TURBINE REPLACEMENT PROJECT)

October 6, 2017

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

SoCalGas
A Sempra Energy utility®

317161

TABLE OF CONTENTS

I. PURPOSE AND OVERVIEW 1

II. BACKGROUND 1

A. SOCALGAS APPLICATION FOR AND COMMISSION AUTHORIZATION OF THE PROJECT 1
1. The Purpose and Need for the Aliso Canyon Turbine Replacement Project 1
2. Procedural History 5
B. STANDARD OF REVIEWAND OTHER STATUTORY AND COMMISISON GUIDANCE 8
1. Preponderance of the Evidence Standard 8
2. Reasonable Manager Standard 8
3. Public Utilities Code Section 1005.5(b) 9
4. Operations and Maintenance Cost Savings and Other Benefits 9

III. MAJOR PROJECT COST ELEMENTS AND VARIANCE FROM THE ASSUMPTIONS AND PROJECTIONS IN THE 2009 APPLICATION 10

A. CENTRAL COMPRESSOR STATION 11
1. Preliminary Engineering 12
2. Engineering, Procurement and Construction (EPC) Contract 13
3. Owner's Engineer and Other Engineering Services 14
4. Other Compressor Station Costs 14
5. Variance to Plan 14
B. ENVIRONMENTAL 15
1. Commission Oversight 16
2. SoCalGas Compliance 17
3. Mitigation 18
C. EDISON SUBSTATION AND ELECTRICAL INFRASTRUCTURE 19
1. Substation 19
2. Site Preparation 20
3. Plant Powerline 21
D. BUILDINGS 21
1. New Office Building 22
2. Guard house Relocation 23
E. OTHER 23
1. Fill Sites 24
2. Other Construction 24
F. COMPANY LABOR 24
1. Application/PEA Development 25
2. CEQA/Environmental Impact Report 25
3. Project Execution 26
G. INDIRECTS 26
1. SoCalGas Overheads 27
2. Allowance for Funds Used During Construction (AFUDC) 27
3. Property Taxes 28

IV. PRUDENT PROJECT MANAGEMENT PROMOTES SAFETY, QUALITY OF PRODUCT AND WORKMANSHIP, AND REASONABLE PROJECT COSTS 28
A. PROJECT CONTROLS 28
B. QUALITY, RISK AND COMPLIANCE MANAGEMENT 29
C. SAFETY 29
D. PROCUREMENT OF SERVICES AND MATERIALS 30
V. PRICE ESCALATION, AN ADDITIONAL DRIVER OF COST VARIANCE 31
VI. O&M COST SAVINGS AND CAPITAL BENEFITS 32
VII. CONCLUSION 34
VIII. QUALIFICATIONS 35

LIST OF ACRONYMS

SOCALGAS DIRECT TESTIMONY OF DAVID L. BUCZKOWSKI
(ALISO CANYON TURBINE REPLACEMENT PROJECT)

I. PURPOSE AND OVERVIEW

The purpose of my testimony is to establish the reasonableness of $275.5 million in capital expenditures by SoCalGas to complete the Aliso Canyon Turbine Replacement Project (the Project), demonstrate the present and future public convenience and necessity require construction of the Project at the increased cost, and request authorization from the Commission to recover in rates $74.6 million in costs that exceed the previously-authorized cost of $200.9 million for the Project.

In the following Section, I provide an overview of the background and procedural history of the Project and Commission guidance regarding the standard of review for this Chapter. In Section III, I review the major cost elements of the Project and describe variances between the initial Project Cost Estimates in the initial application and actual Project costs incurred and the forecast of costs to complete and place the Project into service (Estimated Cost at Completion). In Section IV, I provide an overview of SoCalGas' project management activities to achieve the objective of successful execution of the Project on schedule and at reasonable cost, while meeting quality and safety targets, and complying with environmental and regulatory requirements. In Section V, I describe the impact that escalation had on Project costs, an additional driver of the variances described in Section III. In Section VI, I evaluate the projected cost savings and capital benefits of the Project, as directed by the Commission.

II. BACKGROUND

A. SOCALGAS APPLICATION FOR AND COMMISSION AUTHORIZATION OF THE PROJECT

1. The Purpose and Need for the Aliso Canyon Turbine Replacement Project

SoCalGas provides natural gas to approximately 21.6 million consumers in Southern California. Four underground natural gas storage fields, of which the Aliso Canyon Storage Field is the largest, play a critical role in the SoCalGas storage, transmission, and distribution system, enabling SoCalGas to reliably meet the peak hourly, daily, and seasonal demands of its customers at reasonable cost.

In September 2009, SoCalGas filed an application to amend the Certificate of Public Convenience and Necessity (CPCN) for the Aliso Canyon Storage Facility in order to obtain authorization to replace three obsolete natural gas turbine-driven compressors and associated equipment with a new compressor station and construct additional improvements at the Storage Field.[1] By approving the 2009 Application, the Commission authorized SoCalGas to meet its obligations under a Commission-approved settlement agreement with organizations representing SoCalGas customers by installing a new, more reliable and cleaner gas compression system at the Aliso Canyon Storage Field.

At the time SoCalGas filed the 2009 Application, the Storage Field had 84 billion cubic feet (Bcf) of working storage inventory, 1.875 billion cubic feet per day (Bcfd) of withdrawal capacity, and an end-of-cycle injection capacity of 300 million cubic feet per day (MMcfd). Approximately 45% of SoCalGas' total firm injection capacity was located at the Storage Field.[2]

Most of the injection capacity[3] at the Aliso Canyon Storage Field was provided by three gas turbine compressors that are rated to provide approximately 12,000 horsepower each. These units were developed in the late 1960s as a derivative of aircraft turbines . The industrial version was not completely interchangeable with the aircraft versions, and less than 20 industrial engines existed in the United States at the time SoCalGas filed the 2009 Application. Because several parts are not interchangeable with the aircraft engines and there were so few industrial turbines in existence, the original equipment manufacturer no longer produced parts for the engine. The only repair facility for the original manufacturer's equipment was in Fort St. John, Canada. To keep the obsolete turbines in service, SoCalGas was required to either rework or custom-build them per the original manufacturer's specifications. In sum, age and degradation of the machines impacted reliability and the scarcity of parts made repairs costlier and more time consuming.

[1] Application (A.) 09-09-020 (2009 Application).
[2] As discussed further below, the injection capacity has been reduced to increase the margin of safety at the Aliso Canyon Storage Field.
[3] In addition to the gas turbine compressors, Aliso Canyon has five 2,000 horsepower Ingersoll-Rand KVS reciprocating compressors providing injection capacity.

SoCalGas and organizations representing its customers recognized that continued use of the obsolete compressors was inconsistent with Southern California's need for a reliable and efficient natural gas supply to support power generation and serve the heating, cooking, and other energy needs of residential, commercial, and industrial users. To address this concern, in Phase I of SoCalGas' 2009 Biennial Cost Allocation proceeding,[4] SoCalGas entered into a settlement agreement with parties representing SoCalGas customers (residential, commercial, industrial, electric generation, and wholesale). The Settlement Agreement required SoCalGas to "make commercially reasonable efforts to replace the existing three obsolete LM-1500 turbines used to compress up to 300 MMcf per day," "expand overall injection capacity at Aliso Canyon to the extent feasible by approximately 145 MMcfd," and undertake this effort "as soon as possible."[5] The Settlement Agreement was adopted by the Commission in December 2008[6] and SoCalGas filed the 2009 Application nine months later.

The main objectives of the Project, as identified in the 2009 Application were to: (1) reduce the potential for interruptions in the ability to store gas in the Aliso Canyon Storage Field, by replacing the obsolete compressor station; (2) meet the terms of the Commission-approved Settlement Agreement by replacing the obsolete compressors and expanding the overall injection capacity at the field by approximately 145 MMcfd in a timely manner; (3) convert the compression units within the Storage Field from natural gas to electric power; (4) design and construct a new electric compressor station and all necessary related infrastructure to increase the injection capacity at the Storage Field by approximately 145 MMcfd; (5) provide improved vehicle access and security to the Storage Field to facilitate project construction and operation of the new compressor station by building a new guard house ; (6) relocate and replace existing office trailers in close proximity to the current compressor station and Storage Field facilities; (7) preserve other onsite facilities and minimize changes to Storage Field facilities, where feasible and practicable; (8) confirm successful conversion to electric compression prior to decommissioning the obsolete compressors to minimize the potential for gas supply service interruptions after construction of the Project; and (9) utilize recent engineering and technological advances.[7]

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[4] A.08-02-001.
[5] Decision (D.) 08-12-020, Attachment 1 (Settlement Agreement) ¶ 8.
[6] *Id.* at 35.
[7] A.09-09-020, Appendix A at 6.

When SoCalGas filed the 2009 Application for approval to recover the costs of the Project, SoCalGas explained that avoiding potential interruptions in the ability to inject gas (*e.g.*, due to breakdowns of equipment, such as the obsolete compressor engines) and increasing the ability to rapidly inject gas (*e.g.*, through increasing the injection capacity) provide significant benefits to SoCalGas' overall gas storage system, which in turn help keep rates affordable and protect customers from supply disruptions.[8]

This is even more true today than it was back in 2009. Today, the Commission has restricted the maximum capacity of the Aliso Canyon Storage Field and determined that SoCalGas "should manage the facility to target a working gas level of 23.6 Bcf and maintain a level above 14.8 Bcf at all times in order to maintain safe and reliable service."[9] Additionally, as intermittent renewable sources of electric generation play a greater and greater role in meeting California's energy needs, the hourly fluctuations in customer demand have become increasingly more pronounced[10]—necessitating greater energy flexibility to handle ramping electric generation resources. SoCalGas expects that it will be required to inject and withdraw natural gas from the Aliso Canyon Storage Field more frequently and rapidly than ever before to manage inventory within the Commission-ordered range of working gas and continue to safely and reliably meet the energy needs of Southern California.[11]

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[8] *Id.* at 5.

[9] *See* SB 380 Concurrence Letter from Timothy Sullivan, CPUC Executive Director, to Kenneth A. Harris, Jr., State Oil & Gas Supervisor 4 (July 19, 2017), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/7-19-17_CPUCLtrtoKenHarrisDOGGRreSB380Concurrence.pdf); *see also* the California Public Utilities Commission, *Aliso Canyon Working Gas Inventory, Production Capacity, Injection Capacity, and Well Availability for Reliability* 1 (July 19, 2017), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/ReportReliability.pdf ("[I]n this updated 715 report we find that the range of working gas necessary to maintain reliably is 14.8 billion cubic feet (Bcf) at the low end and 23.6 Bcf at the high end").

[10] *See* California Independent System Operator, *What the Duck Curve Tells Us About Managing a Green Grid* (2016), https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf.

[11] Note, however, withdrawal restrictions in place at the Aliso Canyon Storage Field currently limit the ability of SoCalGas to fully realize this potential for the benefit of customers. *See* Letter from Timothy Sullivan, CPUC Executive Director, to SoCalGas (June 2, 2016), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/Letter%20to%20Jimmy%20Cho%20on%20Aliso%20Canyon%20withdrawals.pdf; Letter from Timothy Sullivan, CPUC Executive Director, to SoCalGas (June 16, 2017), http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/61617TSltrreAlisoCanyonSummer2017Withdrawals.pdf (extending applicability of protocols to Summer 2017).

2. Procedural History

As discussed above, the Settlement Agreement between SoCalGas and organizations representing its customers approved by the Commission in D.08-12-020 required SoCalGas to make all "commercially reasonable efforts" to replace the obsolete compressors at the Aliso Canyon Storage Field and increase injection capacity at the field "as soon as possible." To fulfill this commitment, SoCalGas prepared an aggressive project completion schedule that would enable SoCalGas to complete construction as soon as possible. This planned schedule contemplated a six-month review process by the Commission and allotted 36 months for contractor selection, engineering, procurement, and construction. Based on this schedule, SoCalGas prepared an estimate of capital costs to be presented to the Commission in nominal dollars using a base year of 2009.

The expedited Commission review process built into the Project's planned schedule assumed the Commission would deem issuance of a Mitigated Negative Declaration appropriate under the California Environmental Quality Act (CEQA), and that because the Application for the Project implemented a prior settlement with organizations representing customers, minimal time would be required for discovery, hearings, etc.[12] Rule 2.4(b) of the Commission's Rules of Practice and Procedures requires that any application for authority to undertake a project that is not statutorily or categorically exempt from CEQA requirements include a Proponent's Environmental Assessment (PEA). SoCalGas retained a third-party environmental consultant to help prepare the PEA, which included information and studies required under the Commission's rules. The PEA included a detailed analysis of the Project's potential environmental impacts on 16 environmental resource areas, in addition to potential cumulative and growth-inducing impacts. The PEA determined there would be a less-than-significant impact in all but two environmental resource areas and further determined that in those two areas, the impacts could be mitigated to a level that is less than significant.[13] Based on this PEA analysis and a then-recent

[12] The Settlement Agreement contained a provision that "[t]he parties hereto agree to support expeditious approval of any CPCN application filed by SoCalGas with the Commission seeking authority to construct the storage injection facilities." D.08-12-020, Attachment 1, ¶ 8.
[13] *See* Aliso Canyon Turbine Replacement Project, *Proponent's Environmental Assessment* 5-2, (Sept. 2009), http://www.cpuc.ca.gov/Environment/info/ene/aliso_canyon/documents/aliso_canyon_pea.pdf.

Commission decision that approved a similar project and issued a Mitigated Negative Declaration,[14] SoCalGas assumed the Commission could adopt a Mitigated Negative Declaration for the Project.

In the 2009 Application, SoCalGas asked the Commission to adopt a Mitigated Negative Declaration and Notice of Determination under CEQA, and to confirm that the Commission, in granting a previous CPCN and the requested amendment thereto, has preemptory authority over potentially conflicting city and county zoning regulations, ordinances, codes, or requirements, under a finding that the Project serves the public interest. On April 27, 2010, the assigned Administrative Law Judge issued a ruling giving notice of intent to conduct a prehearing conference and public participation hearings and concurrent environmental review process. The ruling further indicated the Commission's Energy Division had determined that an Environmental Impact Report was required for the Project, as opposed to a determination that a Mitigated Negative Declaration would be sufficient to address environmental impacts of the Project, to meet the Commission's lead agency requirements under CEQA. To enable sufficient time for this detailed environmental impact assessment, the procedural timeline for the process of reviewing and approving the Project was much lengthier than had been assumed by SoCalGas in preparing its proposed schedule and cost estimates for the Project.

As discussed above, the Project assumed a timeline of six months for approval and 30 months for contractor selection, engineering, procurement and construction .[15] The Project was not approved until November 22, 2013, more than four years after the application was first filed and eight months after SoCalGas had assumed construction of the Project would be complete for purposes of preparing cost estimates for the Project.[16] In its decision approving the Project, the Commission granted SoCalGas' request to amend its CPCN for construction and operation of a new compressor station at the Storage Field and authorized SoCalGas to replace the obsolete gas turbine compressors and expand natural gas injection capacity at the Facility.[17] The Decision

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[14] *See* D.09-10-035, *Decision Addressing Gill Ranch Storage, LLC's and Pacific Gas and Electric Company's Applications for Authority to Construct and Operate a Gas Storage Facility*, Ordering Paragraph (OP) 26.
[15] A.09-09-020, Appendix A at 24.
[16] D.13-11-023.
[17] *Id.*, OP 1.

authorized recovery of SoCalGas' estimated total capital costs, which was $200.9 million at the time SoCalGas filed the 2009 Application.[18]

D.13-11-023 also adopted a final Environmental Impact Report and Mitigation Monitoring, Compliance, and Reporting Program.[19] In reaching this decision, the Commission determined that Public Utilities Code Section 1001 *et seq*., required "that before SoCalGas can construct the Project, the Commission must grant a CPCN on the grounds that the present or future public convenience and necessity require or will require construction of the Project."[20] The Commission further determined that Public Resources Code Section 21000 *et seq*., required the Commission, as lead agency for the Project, to "prepare an environmental impact report (EIR) assessing the environmental effects of the Project for the Commission's use in considering the request for a CPCN."[21]

The Decision acknowledged the Project schedule anticipated Commission approval of the Project by 2010 and Project completion by 2012,[22] and implemented a process for SoCalGas to seek recovery of any reasonably incurred costs that exceed the authorized amount of $200.9 million. The Commission directed SoCalGas to record in a memorandum account any costs exceeding this amount to track those costs for potential future recovery in rates. If Project costs exceed $200.9 million, a review of the reasonableness of the costs of the Project and consideration of increasing the authorized reasonable cost of the Project would be conducted in SoCalGas' general rate case (GRC) following project completion.[23]

The 2009 Application included cost escalation through the originally-forecasted Project completion date of March 2013. Because the Project estimates in the 2009 Application did not account for escalation beyond March 2013, SoCalGas filed a petition for modification of the decision requesting the Commission clarify the authorized cost of $200.9 million established in D.13-11-023 was to be adjusted to reflect escalation after March of 2013. On February 26, 2015,

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[18] *Id.*, OP 9.
[19] The Commission was required to adopt CEQA findings and a Mitigation Monitoring and Compliance Reporting Program to ensure that the mitigation measures identified in the Final EIR are implemented, consistent with CEQA Guidelines Section 15097.
[20] D.13-11-023 at 6-7.
[21] *Id*. at 7.
[22] *Id*. at 33, n.39 ("Capital costs are stated in nominal dollars using a base year of 2009. The Project Schedule anticipated Project approval by 2010 and Project completion by 2012.").
[23] *Id.* at 33.

the Commission denied SoCalGas' request for clarification, stating the decision approving the Project "already provides SoCalGas a procedure for requesting increases to the cost cap."[24]

B. STANDARD OF REVIEWAND OTHER STATUTORY AND COMMISISON GUIDANCE

As discussed above, in approving the Project, the Commission established a framework for SoCalGas to recover reasonably incurred costs of completing the Project, if those costs exceed the amount authorized by the Commission. Project costs in excess of $200.9 million are to be reviewed for reasonableness in SoCalGas' GRC following project completion. This section of my testimony summarizes the applicable standard of review and other applicable statutory and Commission guidance.

1. Preponderance of the Evidence Standard

The standard of proof to be applied by the Commission in an after-the-fact reasonableness review is preponderance of the evidence.[25] Preponderance of the evidence is defined "in terms of probability of truth, e.g., 'such evidence as, when weighed with that opposed to it, has more convincing force and the greater probability of truth.'"[26] Meaning, SoCalGas "must present more evidence that supports the requested result than would support an alternative outcome."[27]

2. Reasonable Manager Standard

To assess the reasonableness of incurred costs, the Commission applies the reasonable manager standard.[28] To meet this standard, "[t]he act of the utility should comport with what a reasonable manager of sufficient education, training, experience and skills using the tools and knowledge at his disposal would do when faced with a need to make a decision and act."[29] As explained by the Commission, "reasonable and prudent acts do not require perfect foresight or optimum outcomes, but may fall within a spectrum of possible acts consistent with utility needs,

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[24] D.15-02-032 at 1.
[25] *Assigned Commissioner and Administrative Law Judges' Scoping Memo and Ruling*, A.14-12-016 (Apr. 1, 2015) at 5; *see also* D.14-06-007 at 13.
[26] D.14-06-007 at 13; D.08-12-058 (citing Witkin, Calif. Evidence, 4th Edition, Vol. 1, 184).
[27] D.14-06-007 at 13.
[28] *Assigned Commissioner and Administrative Law Judges' Scoping Memo and Ruling*, A.14-12-016 (Apr. 1, 2015) at 5.
[29] D.90-09-088 at 16.

ratepayer interests, and regulatory requirements."[30] Under this standard, the Commission holds utilities to "a standard of reasonableness based upon the facts that are known or should have been known at the time."[31] In so doing, the Commission looks to the decision-making process and information available to the manager to assess whether the course of action was within the "bounds of reasonableness, even if it turns out not to have led to the best possible outcome."[32] As explained by the Commission, this is to "avoid the application of hindsight in reviewing the reasonableness of a utility decision."[33]

3. Public Utilities Code Section 1005.5(b)

After a CPCN has been issued by the Commission, Public Utilities Code section 1005.5(b) specifically authorizes a utility to apply to the Commission for an increase in the maximum costs of the certificate. The Commission may authorize an increase in the specified maximum cost if "it finds and determines that the cost has in fact increased and that the present or future public convenience and necessity require construction of the project at the increased cost."[34]

4. Operations and Maintenance Cost Savings and Other Benefits

In D.13-11-023, the Commission issued guidance as to the information to be provided in forthcoming after-the-fact reasonableness reviews, explaining that "SoCalGas based the revenue requirement associated with the Project on the estimated capitalized costs of the new electric compressor station, other related facilities, and estimates for capital benefits related to the replacement of the old gas compressor station."[35] Consistent with section 1005.5(b), the Commission ordered "a review of the reasonableness of all Project costs should be conducted in SoCalGas' GRC following project completion if Project costs exceed $200.9 million" and "SoCalGas's efforts to maximize the O&M cost savings and capital benefits should be included in this review."[36] The Commission further elaborated that "[b]ecause the cost savings SoCalGas asserted ratepayers will realize from the new electric compressors were an important factor in

[30] D.97-08-055 at 54.
[31] D.90-09-088 (*cited in* D.11-10-002 at 11, n.2).
[32] D.89-02-074, Conclusion of Law (COL) 3, at 169.
[33] D.90-09-088 at 15.
[34] Cal. Pub. Util. Code § 1005.5(b).
[35] D.13-11-023 at 44.
[36] *Id.*, COL 37 at 65.

approving the Project, [the Commission] will also review SoCalGas' efforts to maximize these cost savings in this reasonableness review."[37]

Accordingly, the scope of this reasonableness review includes review of SoCalGas' efforts to maximize the operations and maintenance cost savings and capital benefits of the Project.

III. MAJOR PROJECT COST ELEMENTS AND VARIANCE FROM THE ASSUMPTIONS AND PROJECTIONS IN THE 2009 APPLICATION

To develop the total cost of $ 200.9 million authorized by the Commission in its decision approving the 2009 Application, SoCalGas utilized multiple sources of information to identify the scope and estimate the anticipated costs of the Project. The major project cost elements identified in the 2009 Application are: (1) Central Compressor Station; (2) Substation and Electrical Infrastructure; (3) Environmental; (4) Buildings; (5) Other; (6) Company Labor; and (7) Indirects. In this section of my testimony, I discuss the underlying assumptions that went into the 2009 cost estimates for the Project in each of these areas, how the actual activities and costs vary from the initial estimates, and why these variances reflect prudent and reasonable decision-making.

Table DLB-1 shows the major cost components for the Project and differences between the estimated costs presented in the 2009 Application versus the actual costs incurred and the forecast of costs to complete and place the Project into service (Estimated Cost at Completion or EAC).[38]

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[37] *Id.* at 47-48.

[38] The Estimated Costs at Completion presented in this Application are predominately comprised of previously incurred costs and include estimated costs for remaining months until final Project completion. The final costs will be trued up when the GRC forecast is updated.

Table DLB-1
Planned versus Estimate at Completion (EAC) Cost Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Central Compressor Station	$166.0	$146.6	-$19.4
Environmental	$1.0	$13.0	$12.0
Substation & Electrical Infrastructure	$10.2	$23.9	$13.7
Buildings	$0.9	$13.5	$12.6
Other	$0.2	$8.4	$8.2
Company Labor	$0.0	$7.2	$7.2
Indirects	$22.6	$62.9	$40.3
Total	**$200.9**	**$275.5**	**$74.6**

A. CENTRAL COMPRESSOR STATION

The Central Compressor Station is the largest component of the overall Project and accounts for approximately 70% of the direct costs of the entire Project. The Central Compressor Station is on a 2.21-acre site and consists of a 26,500 square foot prefabricated enclosure housing three new electric-driven, variable-speed compressors, along with scrubbers, piping, coolers, and electrical equipment. The scope of work under the Central Compressor Station category includes construction of a 500-foot aboveground pipeline to connect the existing blow down header and an 18-inch pipeline to connect to an existing discharge header for moving compressed gas into the storage field. Construction activities for the Central Compressor Station include clearing and grading; construction of building and equipment foundations; ground surface preparation at access points within the equipment area; erection of steel structures to house the compressors, associated control equipment, and air cooled heat exchangers; installation of equipment and piping; and cleanup and restoration of the site.

The costs of the Central Compressor Station are summarized in Table DLB-2 below. As discussed further below, SoCalGas' efforts to optimize the scope of Central Compressor Station activities to minimize the costs of the Project reduced the overall costs of the Central Compressor Station by approximately $19.4 million below the initial estimate of $166.0 million in the 2009 Application.

Table DLB-2
Central Compressor Station: Planned versus Actual Cost Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Preliminary Engineering	$1.7	$1.7	$0.0
EPC Contract	$163.9	$134.2	-$29.7
Owner's Engineer & Other Engineering Services	$0.0	$6.4	$6.4
Other Compressor Station Costs	$0.4	$4.3	$3.9
Total	**$166.0**	**$146.6**	**-$19.4**

As indicated above, SoCalGas recognized that continued use of the three existing turbines was inconsistent with Southern California's need for a reliable and efficient natural gas supply to support power generation and serve the heating, cooking, and other energy needs of residential, commercial, and industrial users. SoCalGas initially bid out a contract and retained the services of a third-party engineering firm, Washington Group International, in 2006 to complete a Pre-Engineering Study that evaluated alternatives and identified the compressor/turbine configuration to replace the three turbine-driven compressors. The study included a preliminary cost estimate to replace the gas turbine driven compressors.

In 2008, SoCalGas directed Washington Group to update the study and this updated study formed the basis for the cost estimate, along with supporting information for the compressor station provided in the 2009 Application, as required by CPUC Rule 3.1.

The Central Compressor Station designed by Washington Group included three 22,000 horsepower electric compressor motors, capable of increasing injection capacity by approximately 145 mmscf/d, to meet the terms of the Settlement Agreement approved by the Commission in Phase One of SoCalGas' 2009 Biennial Cost Allocation.[39]

1. Preliminary Engineering

Preliminary Engineering costs are comprised of the costs for the Washington Group's initial Pre-Engineering Study that evaluated alternatives to replace the three turbine-driven compressors and the update to that study to support the estimated costs and schedule for the 2009 Application.

[39] D.08-12-020, Attachment 1 (Settlement Agreement) ¶ 8.

2. Engineering, Procurement and Construction (EPC) Contract

SoCalGas utilized a turnkey Engineering, Procurement and Construction (EPC) contracting strategy for the design, procurement, and construction of the Central Compressor Station. Under this approach, the EPC contractor is responsible for all activities relating to the engineering, design, material and equipment procurement, construction, and commissioning of the Central Compressor Station, including mechanical equipment, utility system, instrument and control systems, electrical components, civil, architectural, structural, and piping for the Central Compressor Station. This contracting approach was used for several reasons including good scope definition, prudent risk allocation to the EPC contractor, single point responsibility, and schedule benefits.

SoCalGas retained the services of Power Advocate to assist in a competitive solicitation process to ensure quality technical and economic proposals during the competitive bid process.

SoCalGas issued a Request for Information to 19 potentially-qualified contractors. The Request for Information described the Project and requested information that would enable SoCalGas to evaluate the contractors' qualifications. SoCalGas received responses to the Request for Information from twelve contractors and evaluated those contractors based on eight criteria, including: (1) the capabilities of the firm to function as an EPC; (2) the job safety record of the firm; (3) the contractor's experience executing storage compression jobs; (4) key personnel; (5) experience with Air Quality Management District regulation; (6) financial strength of the firm; (7) whether the firm is a Diverse Business Enterprise (DBE); and (8) if the firm is not a DBE, whether the firm has a DBE program in place. Based on this evaluation, SoCalGas released Request for Proposal packages to eight contractors and four of those contractors submitted formal proposals.

SoCalGas received complete bid packages for the Project from three qualified contractors and evaluated the three complete bid packages based on the following criteria, as described in the Request for Proposal:

- Quality of the plot layout, grading, drainage, and surfacing plans and sections;
- Accessibility to the facility, equipment, valves, instruments, and other components for routine and major operation and maintenance efforts;
- Access around main units to allow for routine and major operation and maintenance efforts;

- Conformance to the terms and conditions;
- Compressor efficiency and energy usage;
- Total pricing; and
- Plan to support the Company's DBE goals

3. Owner's Engineer and Other Engineering Services

SoCalGas retained the services of a third-party engineering firm, SPEC Services, Inc., to act as the "Owner's Engineer," to support SoCalGas' EPC selection efforts and oversight of overall engineering, procurement and construction activities. In fulfilling this role, the Owner's Engineer assisted in the review of the submittals by the EPC contractors during the bidding and procurement process for the Central Compressor Station. The Owner's Engineer provided expertise and assistance to the SoCalGas project team in evaluating and negotiating contracts and change orders for the entire Project.

The Owner's Engineer provided principal engineers in the disciplines of Mechanical, Electrical, Civil, Chemical, Instrumentation, and Controls to support SoCalGas review of drawings, calculations, specifications, datasheets, and other materials produced and submitted by the EPC Contractor. The Owner's Engineer participated in design review meetings, process hazard reviews, and other meetings/discussions on technical topics related to the project.

Additional third-party engineering firms were retained, as needed, to support other engineering activities, such as geotechnical evaluations and preparing permit packages.

4. Other Compressor Station Costs

Costs for Central Compressor Station activities that did not fall within the EPC contractor's scope of work or Pre-Engineering and Owner's Engineer activities were recorded as Other Compressor Station Costs. These costs include costs for the services provided by Power Advocate to support selection of an EPC contractor, inspection services utilized to maintain quality control, quality reports, and testing services of the installed components, and other minor project components that were not included in the EPC contractor's scope, such as gas tie-ins, minor electrical work, and other miscellaneous scope.

5. Variance to Plan

SoCalGas' efforts to optimize the scope of Central Compressor Station activities to minimize the costs of the Project reduced the direct EPC Contract costs of the Central

Compressor Station by approximately $29.7 million below the initial estimate of $163.9 million in the 2009 Application.

Following the submittal of the 2009 Application, during the detailed design phase, the Project team identified savings opportunities through optimization of the design of the Project. For example, a significant cost saving was achieved by selecting mechanical variable speed drives instead of electronic variable frequency drives, which reduced both the equipment capital cost and Compressor Station footprint. This reduction of the footprint reduced the civil scope of work.

Another cost saving was achieved by drilling piles for the foundations, as opposed to over-excavating down to bedrock and placing engineered/compacted soil. This design change reduced the amount of earthwork required to complete the Central Compressor Station and the need to remove and haul away 100,000 cubic yards of soil from the Central Compressor Station site and bring back 50,000 cubic yards of soil for compaction, as initially planned in the 2009 Application. As a result, the Project achieved a reduction in costs. In addition, this modification reduced truck emissions related to hauling the soil and avoided the need to develop additional fill site locations. Development of additional fill sites would have resulted in additional environmental costs and fill site development costs.

To further reduce Project costs, SoCalGas implemented the use of a soil nail wall instead of a poured-in-place cantilevered concrete wall, as contemplated in the 2009 Application based on the preliminary design. This wall supports the slope above the new compressor station. The soil nail wall is drilled into the existing terrain rather than having to excavate the slope and dig a large foundation and footing to support a poured-in-place cantilevered concrete wall. This design change resulted in a reduction from the estimated costs, reduced truck emissions, and avoided costs to haul away soil from the excavation work.

Collectively, the overall costs of the Central Compressor Station were reduced by approximately $19.4 million below the initial estimate of $166.0 million in the 2009 Application.

B. ENVIRONMENTAL

The Environmental cost category primarily includes costs incurred by the Commission and SoCalGas to retain the services of consultants to comply with CEQA requirements. These services include: (1) the preparation of a PEA and EIR; and (2) surveying, monitoring and reporting during project execution for the compressor station site, substation site and access road, office building and guard house, multiple fill sites, parking areas, temporary office sites, and staging areas. In addition, Environmental costs include mitigation required to offset unmitigable environmental impacts associated with coastal sage scrub habitat, oak trees, and air emissions.

In preparing the Environmental cost estimates for the 2009 Application, SoCalGas retained the services of a third-party consultant to prepare a PEA and the PEA identified only a few environmental impacts and determined those impacts could be mitigated to a less-than-significant level. Following a more detailed review and assessment of the potential environmental impacts of the Project, the EIR issued by the Commission identified additional and more significant potential environmental impacts and mitigation of those impacts required more time and cost than the environmental activities contemplated under the 2009 Application estimate.

Environmental scope, project schedule and monitoring costs increased accordingly from the original estimates, as reflected in the Environmental cost category, comprised of Commission Oversight,[40] SoCalGas Compliance, and Mitigation cost categories, as reflected in Table DLB-3 below.

Table DLB-3
Environmental: Planned versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Commission Oversight	$0.2	$2.3	$2.1
SoCalGas Compliance	$0.7	$9.9	$9.2
Mitigation	$0.1	$0.8	$0.7
Total	**$1.0**	**$13.0**	**$12.0**

1. Commission Oversight

The Commission's Oversight costs are expected to total about $2.3 million upon completion. These costs were incurred by the Commission and its consultant during development and completion of the detailed EIR under CEQA, and for compliance oversight,

[40] *See* D.13-11-023, COL 32 at 64 ("The Energy Division should supervise and oversee the construction of the Project as it relates to monitoring and enforcement of the mitigation measures described in the EIR.").

monitoring, and reporting during project execution. Commission Rule 2.5 requires a project proponent to pay a fee to recover the Commission's actual cost of preparing an EIR or Mitigated Negative Declaration. As such, in its decision approving the 2009 Application, the Commission determined SoCalGas should be required to pay all associated costs for outside staff designated by the Energy Division to perform on-site monitoring tasks.[41] Because the estimate submitted in the 2009 Application contemplated fewer environmental impacts and a smaller scope of environmental mitigation activities than did the Environmental Impact Report, the costs for this category are significantly higher than anticipated.

2. SoCalGas Compliance

SoCalGas engaged AECOM, through a competitive solicitation process, as the primary environmental consultant to perform initial environmental support for the Project, including development of the PEA. Following issuance of the Commission's decision approving the Project, which included a Mitigation Monitoring, Compliance, and Reporting Program that was much more extensive than contemplated by the initial scope of work and estimates submitted by SoCalGas in the 2009 Application, SoCalGas renegotiated and extended its contract with AECOM to cover mitigation, monitoring, and reporting for the Project execution phase. In renegotiating this contract extension, SoCalGas successfully maintained the original contract rates, which kept costs down. AECOM provided the services of environmental compliance specialists, avian biologists, and qualified storm water practitioners. Several additional environmental firms with expertise in areas such as stormwater management, paleontology/archaeology, oak tree restoration and assessment, and construction monitoring were also engaged to comply with requirements of the Mitigation Monitoring, Compliance, and Reporting Program, as well as the Commission staff and consultant's ongoing recommendations during Project execution.

The building permits for the Central Compressor Station, Substation, Guard house, and Office Building, which were obtained after the 2009 Application was filed, required Fuel Modification Plans. A Fuel Modification Plan identifies areas on a property where vegetation will need to be thinned or removed to create a defensible space in the event of fire. This necessitated weed clearing, oak tree relocations, and oak tree trimmings, with oversight by a

[41] *Id.*, COL 34 at 65.

certified arborist, California Department of Fish and Wildlife Lake and Streambed Alteration permit preparation, and other measures that increased costs beyond those contemplated in the 2009 Application. Other significant drivers of additional Environmental costs included the expansion of the Natural Substation access road impact area due to Los Angeles County Fire Department review and coordination, and the development and utilization of additional fill sites.

SoCalGas, with support from AECOM, coordinated with and reported to the Commission's staff and consultant to a far greater extent than contemplated under the estimates prepared for the 2009 Application. The level of effort required under the Mitigation Monitoring, Compliance, and Reporting Program involved submittal of weekly construction schedules with compliance summaries, deliverables such as maps and tracking spreadsheets, and monthly compliance reports. Minor changes in project scope required preparation of Minor Project Refinements (MPRs), each of which included an analysis of impacts not considered in the Environmental Impact Report. To date, eleven MPRs have been submitted to and approved by the Commission, one of which was amended three times. In total, SoCalGas Environmental Consulting, Monitoring, and Compliance costs increased more than tenfold from an estimate of approximately $700 thousand to $9.9 million.

3. Mitigation

The costs of Mitigation, as required by government agencies, increased significantly because certain environmental resources (*e.g*. Venturan coastal sage scrub habitat and oak trees), were impacted because of unanticipated construction activities, such as construction of the Natural Substation access road, modification of the fuel supply for the office building, and construction of various fill sites. Due to EIR requirements, impacts to Venturan coastal sage scrub habitat were offset through the purchase of credits from the Santa Paula Creek Mitigation Bank, while oak trees were replaced at an onsite location at a 5:1 ratio. Neither the Venturan coastal sage scrub habitat nor oak tree mitigation activities were accounted for in the PEA or associated environmental cost estimate. SoCalGas also purchased oxides of nitrogen (NOx) emission offsets for operation of construction vehicles and equipment.[42]

[42] Aliso Canyon Turbine Replacement Project Final Environmental Impact Report 4-4, 4-5 (June 2013), http://www.cpuc.ca.gov/Environment/info/ene/aliso_canyon/FEIR/Aliso_Final_EIR_Volume_I.pdf.

C. EDISON SUBSTATION AND ELECTRICAL INFRASTRUCTURE

The replacement of the obsolete gas turbines with electrically-driven compressors required SoCalGas to contract with Southern California Edison Company for the construction and operation of a new electric substation to provide electric service at the Aliso Canyon Storage Field. Under this contract, Edison was responsible for the substation, and SoCalGas was responsible for the site preparation and the power plant line. SoCalGas was responsible for reimbursing Edison for all costs associated with design, engineering, and construction of the substation.[43] The substation is designed, constructed, owned, and operated by Edison and located on SoCalGas property.

This section covers the substation, site preparation, and plant powerline costs that comprise the Substation and Electrical Infrastructure costs summarized in Table DLB-4 below.

Table DLB-4
Substation & Electrical Infrastructure: Planned versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Substation	$7.0	$13.3	$6.3
Site Preparation	$0.0	$5.2	$5.2
Plant Powerline	$3.2	$5.3	$2.1
Total	**$10.2**	**$23.9**	**$13.7**

1. Substation

SoCalGas contracted with Edison in 2007 for a Method of Service Study (MoS) to power the new electric-driven compressors. The requirements for a new substation and the estimated cost were initially presented by Edison in 2008. An update provided by Edison in 2009 was used for the substation cost estimate in the 2009 Application. SoCalGas and Edison continued to evaluate multiple alternatives of the substation after the application was filed—with estimated costs ranging from $10.5 to $24.5 million—to meet the design requirements for the Central Compressor Station. Edison and SoCalGas ultimately agreed on a design approach and Edison updated its cost estimate to $12.2 million in 2014, based on the final design.

[43] Southern California Edison, Rule 2, Section H - Added Facilities, at 9.

2. Site Preparation

The substation and access road cover 4.28 acres that had to be cleared, grubbed, excavated, and graded, and the access road had to be paved. Approximately 55,000 cubic yards of soil were removed in the grading process and placed in approved fill sites. In accordance with Los Angeles County Low Impact Development Standard requirements adopted in November of 2013,[44] a biofiltration system was installed at the substation site to manage storm water run-off. The preliminary site preparation cost estimate was based on an Edison assessment of requirements for the footprint of the substation and expectation that the existing access road would be adequate for construction and long term access for maintenance activities. Preliminary discussions with local fire department officials also indicated the access road would be adequate.

Final site preparation costs are higher than anticipated due to the footprint for the substation required by Edison, requirements for better access to the site by Edison and the City of Los Angeles Fire Department, and installation of a biofiltration system. The grading of the road was limited to a maximum of 20% and an average of 17% road grade.[45] SoCalGas did not anticipate the new ordinance requirement to install a biofiltration in the original cost estimate.

Additional land requirements for both the access road and the substation footprint resulted in costs related to additional soil removal from the substation site, additional environmental monitoring per the EIR requirements, and additional soil export to the designated fill site. The total cost impact to the project of these unanticipated changes in scope was approximately $5.2 million.

As these changes were identified, evaluated, and implemented, SoCalGas collaborated internally and externally to prudently manage the project scopes. For example, through ongoing discussions with Edison and the Owner's Engineers, SoCalGas de-scoped Edison of the site preparation of the Electrical infrastructure and SoCalGas took on the responsibility to manage and coordinate requirements to grade and import/export cut/fill along, with the three other project sites in conjunction with the development of new fill sites.

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[44] Ordinance No. 2013-00444, Ordinance to Amend Chapter 12.84 of Title 12-Environmental Protection of the Los Angeles County Code (Nov. 5, 2013), http://dpw.lacounty.gov/ldd/lib/pdf/Certified%20Revised%20LID%20Ordinance.pdf.

[45] *See* Letter from Frank Vidales, the Acting Chief of the Forestry Division, County of Los Angeles Fire Department to CPUC 3-16 (Apr. 25, 2012), Aliso Canyon Turbine Replacement Project Final Environmental Impact Report, http://www.cpuc.ca.gov/Environment/info/ene/aliso_canyon/FEIR/Aliso_Final_EIR_Volume_I.pdf .

3. Plant Powerline

The Plant Powerline is an approximately 1,800-foot-long 12-kV power line strung across five tubular steel poles between the Edison substation and the Central Compressor station and provides electrical service from the Substation to the Central Compressor Station. The tubular steel poles range in height from 55 feet above the ground to 165 feet above the ground.

SoCalGas retained an electrical engineering firm to prepared the estimate of the Plant Powerline costs for the 2009 Application. SoCalGas subsequently retained a second electrical engineering firm to prepare the detailed engineering and design for this scope of work. SoCalGas then conducted a competitive solicitation for the procurement and construction of the Powerline and selected the most-qualified proposal.[46] Once a geotechnical assessment was completed and detailed engineering commenced, SoCalGas determined that the requirements for the height and diameter of the tubular steel poles, foundations of the steel poles, and the size and number of conductors were greater than anticipated by the preliminary design, resulting in increased costs for the Plant Powerline.

D. BUILD INGS

The Buildings cost component includes relocation of the Aliso Canyon Storage Field guard house and replacement of office buildings. The existing administrative office buildings/trailers were removed to clear the site for the new Central Compressor Station. As a replacement to the office trailers, new office buildings were constructed to house Aliso Canyon Storage Field staff and provide a suitable meeting space for SoCalGas employees and visitors.

This section covers the New Office Buildings and Guard house Relocation components of the Buildings cost category, as summarized in Table DLB-5 below.

Table DLB-5
Buildings: Planned versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Replace Office Trailers	$0.5	$0.0	-$0.5
New Office Building	$0.0	$11.6	$11.6
Guard house Relocation	$0.4	$1.9	$1.5
Total	**$0.9**	**$13.5**	**$12.6**

[46] See Section IV.D below for further discussion of SoCalGas' procurement of services and materials.

1. New Office Building

Flat space is extremely limited at the Aliso Canyon Storage Field due to steep mountainous terrain. The original Project design provided for flattening and paving the plateau to the west of the existing compressor plant and placement of new office trailers. As the Project progressed and further evaluation occurred, SoCalGas determined construction of a permanent office solution was a more prudent alternative for several reasons.

First, as a result of changes in applicable building code requirements,[47] SoCalGas determined that conditions were likely to be imposed by permitting agencies to facilitate fire department access, installation of fire hydrants and sprinklers, and adherence to more stringent fire resistance ratings. Access at the small existing site was limited, and increasing defensible space around trailers would have been difficult. Because the location has only one exit road, SoCalGas determined it was prudent to construct buildings that enhance fire safety.

Second, SoCalGas determined it was prudent to establish a design wind speed for the office installation of 100 mph to account for high wind gust potential and enhance the safety of SoCalGas employees and visitors at the facility. The area is classified by the Structural Engineers Association of Southern California as one of the few High Wind Velocity Areas (potentially greater than 85 miles-per-hour) in Los Angeles due to the typical wind direction during Santa Ana wind conditions. Wind speeds are increased further due to the mountainous terrain typical at the Field.

Third, the physical size and orientation of the site to existing facilities, such as roads and pipe racks, supported construction of permanent steel buildings, rather than the use of modular buildings, to shelter Project personnel. Steel buildings provide the flexibility needed for a site of such small size, provide appropriate fire protection, provide needed wind stability, simplifying the permitting process and providing a lower installed cost than masonry or tilt-up type construction.

Finally, a second floor was added to the office buildings because increasing the footprint was not feasible without moving the location to a new site, which would have required additional extensive engineering, environmental assessment, and site preparation activities.

[47] 2014 Los Angeles County Building Code – Chapter 6.

The major cost increase of about $11.6 million in the Buildings category is attributable to this decision to replace the existing office trailers with a steel building instead of using office trailers, as initially contemplated in the cost estimate for the 2009 Application.

2. Guard house Relocation

The Project scope of work approved by the Commission included construction of a new guard house and access gate 200 feet north of the existing guard house. The entry road into Aliso Canyon was widened twelve feet for approximately 200 feet leading up to the new guard house. Relocation of the guard house enhanced the security of the Storage Field and alleviated potential congestion at the facility entrance due to the construction activities (materials delivery, equipment delivery, construction workforce, etc.)

The guard house cost increase of $1.5 million was primarily driven by changes in building code requirements that occurred between the time the 2009 Application was submitted and when the Project was ultimately approved in 2013, and the installation of a new security system. In addition, during construction, subsurface conditions differed from the conditions identified in the geotechnical study that formed the basis for cost estimates in the 2009 Application. Underground utilities and a sewer line providing service to the Aliso Canyon Storage Field run under the entry road and were initially expected to remain in place. Under the approved permit, however, these facilities were required by the County inspector to be relocated, which increased construction costs.

E. OTHER

The Other cost category is comprised of Fill Site and Other Construction activities associated with fill sites, temporary office trailers, project controls support, and increased site security enhancements verify. The drivers of these cost increases are, in part, due to the need to develop new fill sites, miscellaneous construction activities and augmentation of SoCalGas project management staff to enhance project management and controls.

Table DLB-6 below summarizes the estimated versus estimate of costs at completion reflected in the Other cost category.

Table DLB-6
Fill Sites & Other: Planned versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Fill Sites	$0.2	$5.4	$5.2
Other Construction	$0.0	$3.0	$3.0
Total	**$0.2**	**$8.4**	**$8.2**

1. Fill Sites

The cost estimate prepared for the 2009 Application assumed a fill site already developed and located at the Aliso Canyon Storage Field would be available for use by the Project and this fill site could accommodate more than 100,000 cubic yards of capacity for exported soil from the Project with minimal additional cost. Between 2009 and when the Project was approved in 2013, however, the fill site contemplated in the 2009 estimate was utilized to complete other work at the Storage Field and therefore, was no longer available for use by the Project. As a result, four new fill sites needed to be developed for the Project. The cost to develop the new fill sites was significant due to requirements under the Environmental Impact Report. The fill sites required installation of a v-ditch,[48] corrugated metal drains, slope stabilization, and native plant restoration. Although the unanticipated fill site costs were significant, through SoCalGas efforts, the amount of soil exported to fill sites was significantly reduced, which avoided even greater costs.

2. Other Construction

Other Construction costs include installation of temporary workspaces for Aliso staff while construction was ongoing, project controls support, and other miscellaneous costs.

F. COMPANY LABOR

SoCalGas engaged a team of qualified and experienced employees to provide internal support and oversight of the Project. The Project team included technical and management personnel at the construction site including a project manager, engineering manager, construction manager, environmental compliance manager, and safety advisor as well as support from the

[48] A v-ditch is a vee-shaped concrete ditch/open drainage-way used to drain excess surface water or stormwater runoff from roads, fields, and in this case, the fill areas.

home office working on the design, procurement for services and material, contract management, project controls, and closeout activities.

SoCalGas initially anticipated that a small core team of company employees would provide management and oversight over third-party contractors tasked with executing project activities. In the development of the actual project execution plan, the Project team subsequently determined that it would be more prudent to use company employees to perform project management activities initially anticipated to be assigned to third-party contractors, such as construction management and project controls. These circumstances, along with the overall increased project duration as compared to the basis of the 2009 Application, contributed to higher company labor costs than initially estimated.

Table DLB-7 below provides planned versus actual cost comparison and identifies the amount of Company labor spent during the CPCN Application/PEA, CEQA, and execution phases of the project.

Table DLB-7
Company Labor by Phase: Planned versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
Application/PEA Development	$0.0	$0.2	$0.2
CEQA/EIR	$0.0	$1.2	$1.2
Project Execution	$0.0	$5.8	$5.8
Total	**$0.0**	**$7.2**	**$7.2**

1. Application/PEA Development

The Project team was responsible for the planning and development of the 2009 Application and PEA, including the development of estimated costs, schedules, and preliminary engineering required to support the application. The Project team was also responsible for selection of the environmental contractor.

2. CEQA/Environmental Impact Report

Once the Commission determined an EIR was required for the Project, the Project Team supported the Commission's assessment of the potential environmental impacts of the Project and development of the EIR.

During the four years between SoCalGas' filing of the 2009 Application and the Commission's issuance of its decision, SoCalGas personnel refined the Project Execution and Governance Plan, established processes and procedures to support prudent execution of the Project, and worked to refine the Project scope to reduce Project costs for customers.

The Project team also developed and issued Requests for Proposal for the EPC contractor and initiated detail negotiations to expedite the procurement process, which can take up to one year or more for a competitive solicitation of this size, so that SoCalGas could promptly enter into the EPC contract upon receipt of Commission authorization to proceed.

3. Project Execution

The Project team was responsible for detailed planning, the establishment of project objectives, schedules, and budgets, and the application of proper monitoring and controls techniques to guide project execution, and field operations and construction activities associated with the Central Compressor Station, Substation, Plant Power Line, Buildings and Guard House Relocation, and fill sites. In addition, the Project Team coordinated construction activities with the daily operations of the storage field. The Project team was responsible for ensuring construction work was executed in accordance with agreed upon contract terms, scope, schedule, and specifications while maintaining compliance with Company and project safety plans.

In addition to the Project team, other Company labor during the execution phase includes Storage Operations personnel who participated in the design process and attended meetings related to design of the various components of the Project and two process hazard analyses for the compressor station. Most Aliso Canyon operations, maintenance, and management employees attended three weeks of classroom training on the operation and maintenance of the new compressor station. Operations employees supported project construction by issuing daily hot-work permits for project work sites and performing stand-by duty when construction occurred near existing gas infrastructure.

G. INDIRECTS

The Indirects cost category includes SoCalGas overheads, Allowance for Funds Used During Construction (AFUDC), and Property Taxes. The Indirects costs estimated in the 2009 Application were based on the Project scope, schedule and duration proposed at the time. As explained earlier in this testimony, the schedule and duration of the Project changed significantly. The same changed conditions that drove increases in the direct cost categories discussed above, drove increases in the Indirects cost category as well.

Table DLB-8 below summarizes planned versus the estimate of costs at completion in the Indirects cost category.

Table DLB-8
Indirects: Planned Versus EAC Comparison
(*In Millions*)

Scope	Application (2009 $)	EAC	Variance
SoCalGas Overheads	$0.9	$11.2	$10.3
AFUDC	$21.7	$45.9	$24.3
Property Taxes	$0.0	$5.7	$5.7
Total	**$22.6**	**$62.9**	**$40.3**

1. SoCalGas Overheads

The total Project costs include overhead allocations based on direct capital costs, consistent with their classification as Company Labor, Contract Labor, or Purchased Services and Materials. Overhead allocations are those activities and services that are associated with direct costs and benefits, such as payroll taxes and pension and benefits, or costs that cannot be economically direct-charged, such as Administrative and General overheads. The overhead allocations adhere to the methodology established by the Federal Energy Regulatory Commission and were derived using the same methodology approved in SoCalGas' most recent GRC Application. Increases in overhead costs are due to the increases in direct capital costs described above.

2. Allowance for Funds Used During Construction (AFUDC)

The total project costs authorized by the Commission include an estimate of AFUDC and were based on the estimated direct capital cost, estimated overhead costs and proposed project schedule. Direct capital costs were $34.3 million higher than projected in the 2009 application, as discussed above, and overhead costs increased by $10.3 million. As previously discussed, the regulatory approval process was about 30 months longer than anticipated under the initial Project estimate. The higher direct capital costs and extended project schedule resulted in an increase to AFUDC.

3. Property Taxes

The Code of Federal Regulations specifies that ad valorem taxes on physical property during a period of construction shall be included in the capital construction costs. The estimate prepared for the 2009 Application did not include an estimate for Property Tax because it was not SoCalGas' practice to capitalize property tax at the time of filing. Subsequently, SoCalGas revised its practice, as explained in its 2012 GRC Application.[49]

IV. PRUDENT PROJECT MANAGEMENT PROMOTES SAFETY, QUALITY OF PRODUCT AND WORKMANSHIP, AND REASONABLE PROJECT COSTS

SoCalGas' primary Project objective was to successfully execute the Project safely, reliably, on schedule and at reasonable cost, while meeting quality standards, and complying with environmental and regulatory requirements. To achieve this objective, SoCalGas formed a well-trained and qualified team comprised of Project Management, Engineering, Construction Management, Project Control, Quality Risk and Compliance, Safety, and Procurement personnel to oversee compliance with applicable regulatory and quality assurance requirements and continuously improve project controls to validate that design, material procurement, construction, and closeout were performed safely, and cost effectively. The Project team developed and implemented a Project Execution and Governance Plan to outline the project execution and governance principles utilized by the Project team to conduct and manage the Project. Compliance with this Plan supported achievement of project schedule, cost, quality, stakeholder engagement, compliance, and safety goals.

A. PROJECT CONTROLS

The Project team established project controls and management practices that enabled the Project team to execute the Project and achieve the Project's objectives. The Project team tracked and reported performance indicators and metrics to facilitate communication and evaluation of Project health among the Project team and key stakeholders, with the goal of risk mitigation and continuous improvement. SoCalGas established Project cost and schedule controls to assist the Project teams in identifying changes compared to established plans and project adjustment options as early as possible.

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[49] Test Year 2012 GRC, Prepared Direct Testimony of Randall G. Rose, Exhibit SCG-28, at 3.

B. QUALITY, RISK AND COMPLIANCE MANAGEMENT

Quality Management for the Project focused on implementation oversight and review of project components with the goals of: (1) conducting quality reviews and/or audits, (2) reporting on corrective actions and closure, and (3) continuous improvement through quality review metrics, feedback and/or lessons learned. This function was managed by the Project Construction Manager, with assistance from the Quality Risk and Compliance group, other Company personnel, qualified independent consultants, outside inspection agencies, and testing laboratories, as required.

Risk Management identified and managed potential risks to allow for the early preparation of mitigation or avoidance responses to minimize impacts on Project costs and schedules. Although the Project Manager had overall responsibility for managing project risks, each identified risk was assigned a risk owner responsible for managing that risk and mitigation plan. A Project Risk Register was developed and maintained throughout the duration of the Project.

Document Control facilitated the process of gathering, organizing, reviewing, storing, and sharing documents, making it easier to collaborate, retrieve, and share information across the Project team. Project Document Control also addressed version control, document review and approvals, document quality reviews, and generation of a compliance record for the life of each asset. The Project Engineer and a Document Control Specialist were assigned these responsibilities.

Environmental stewardship and compliance with federal, state, and local regulatory requirements and ordinances are of key importance to SoCalGas and the Project team. Environmental Compliance incorporated and considered best practices, mitigation measures, and permit conditions. The Environmental Compliance Manager provided environmental oversight and guidance for the project. Environmental reviews, permitting, agency consultations, training of onsite personnel, and any regulatory updates or interpretations were coordinated through the Environmental Compliance Manager.

C. SAFETY

SoCalGas' commitment to safe implementation of the Project and the effectiveness of Project team's management of the execution of the Project is reflected in the safety statistics for the Project. Since the inception of construction, over 1,800 SoCalGas and contractor personnel have worked over 600,000 hours and completed 1,130 days without a single OSHA-recordable incident. Indeed, the Project completed construction with zero OSHA-recordable incidents, as reflected in Table DLB-9 below.

Table DLB-9
Project Safety Record

Incident Type	2014	2015	2016	2017	Total
Controllable Motor Vehicle Incident (CMVI)	0	0	0	0	0
OSHA - Lost Time Injury	0	0	0	0	0
OSHA - Fatalities	0	0	0	0	0
OSHA - Illnesses	0	0	0	0	0

D. PROCUREMENT OF SERVICES AND MATERIALS

Procurement of services and materials is the largest component of Project expenditures—approximately 77% of the Project's direct costs are for purchased services and materials. As such, an important aspect of prudent Project execution is the evaluation, selection, and retention of qualified suppliers and contractors at reasonable rates. An overall objective of the Project execution team was to utilize competition to obtain materials and services at market-based rates. This is reflected in the fact that over 85% of the Project's direct costs for purchased services and materials were competitively bid.[50] Supply management techniques and practices utilized by the Project team to acquire materials and services at market rates include implementation of available procurement processes and cost control measures for the preparation, solicitation, evaluation, award, and administration of qualified and best value contractors, subcontractors, and suppliers.

There are circumstances when it is not possible or prudent to acquire goods or services through a competitive solicitation process. For example, a competitive solicitation may not be feasible or practicable when: (1) there are a limited number of vendors that can perform the

[50] This figure excludes costs associated with the Commission, the Commission's environmental consultants, mitigation fees, Edison substation costs, and other miscellaneous permitting/agency fees.

desired work; (2) the service or materials are required under an expedited timeline that does not permit a lengthy bidding process; or (3) a vendor with knowledge or experience with a project is preferred to maintain continuity or maximize efficiencies. In such instances, single source procurement options may be reasonable to realize efficiencies, reduce administrative costs, and promote the safe and efficient completion of the Project. For example, SoCalGas expanded the scope of an existing competitively solicited contract with AECOM to include additional environmental assessment and mitigation measure compliance support. SoCalGas successfully renegotiated to have the rates remain unchanged from the prior negotiated terms and this extension of an existing contract allowed for continuity and avoided loss of institutional knowledge and potential increased costs by changing contractors "mid-project."

The procurement process for competitively bidding contracts involves soliciting bids from potential contractors and suppliers based on the scope, specifications, and terms and conditions of the proposed contract. While pricing is a major factor used in the selection process, other factors such as safety, supplier performance, experience, key personnel, life-cycle cost analyses, DBE participation,[51] and history, among others, are also considered.

V. PRICE ESCALATION, AN ADDITIONAL DRIVER OF COST VARIANCE

Despite prudent and reasonable efforts to avoid and reduce costs, external factors can impact project scope, cost, and schedule. Thus, early project estimates based on conceptual or preliminary project planning and engineering design may not reflect the reasonable costs ultimately incurred to complete the work. Escalation is an additional external factor, not already discussed above, that impacted the schedule and cost of the Project.

For large capital projects with multi-year development and execution horizons, baseline cost estimates are adjusted by forecasted escalation factors obtained from relevant industry and economic data resources. Escalation factors are used to adjust labor, equipment, materials, and service costs to reflect anticipated increases over static base year estimates.

In the 2009 Application, SoCalGas requested a total of $200.9 million, including direct and indirect costs, to complete the Project. SoCalGas' estimate used Base Year 2009 nominal dollars, with forecasted escalation factors applied to the months following the Base Year to complete the Project, per the assumed Project schedule. Escalation costs were calculated using

[51] The Project had a DBE participation target commitment of 33% and achieved DBE participation rate of 35% of the total procurement cost for the Project by utilizing 161 DBE companies.

the IHS Global Insight *JUG@PCF, Total Gas Plant – Pacific Region*, consistent with SoCalGas' methodology, as detailed in Cost Escalation testimony of Scott Wilder (Exhibit SCG-40).

To assess the impact of cost escalation resulting from the delayed start of construction, SoCalGas adjusted the forecasted 2009 Application to the actual Project approval date and replaced the forecasted escalation factors with the actual escalation rates. This analysis indicates that the 2009 Application estimate of $200.9 million would compare to approximately $232 million today. This indicates that a significant portion of the cost variances described above are attributable to cost escalation.

VI. O&M COST SAVINGS AND CAPITAL BENEFITS

As discussed by the Commission in its decision approving the Project, the revenue requirement includes cost savings associated with eliminating capitalized maintenance cost savings related to the obsolete gas compressors, and reflects O&M costs and benefits associated with increased charges from third-parties, reduction in internal labor costs, and other associated fees, including new savings to ratepayers of $443 thousand per year.[52]

Table DLB-10 below summarizes the O&M benefits with updated amounts utilizing four-year averages and Table DLB-11 below summarizes the O&M air emissions benefits using updated estimated costs/savings projected in 2019.

Table DLB-10
O&M Cost Savings: Projected Cost Savings
(*In Millions*)

Scope	Application (2009 $)	Estimated Savings	Variance
Third-Party O&M	$0.4	$0.3	$0.1
Direct Labor O&M	$0.2	$0.2	$0.1
Air Emission Fees	$0.1	$0.2	$0.1
O&M Savings Subtotal	**$0.7**	**$0.7**	**$0.0**
SoCalGas AFA Cost Increase	$0.3	$0.3	$0.1
Total Net O&M Savings	**$0.4**	**$0.3**	**$0.1**

The historic direct third-party operations and maintenance expenses incurred to maintain the original turbines are expected to decline from approximately $317,000 per year, based on the

[52] *See* D.13-11-023 at 44.

average third-party direct operations and maintenance expenses incurred from 2011 through 2014.

The decommissioning of the obsolete gas turbines, SoCalGas anticipates a reduction in Storage[53] direct labor expenses of approximately $155,100 per year. This reduction is primarily driven by the ability to reassign of two Full Time Equivalent resources required to maintain and keep the existing gas turbines in compliance with air quality regulations.

Another area of cost savings is the elimination of approximately $209,000 in annual air emission fees paid to the South Coast Air Quality Management District to allow continued operation of the original turbines.

The annual capitalized maintenance costs savings is $1.8 million per year based on the average annual capital expenditures from 2011 to 2014 and is significantly greater than the cost saving estimates in the application for maintaining the old gas compressors of approximately $500,000 per year.

Table DLB-11
Air Emissions Cost Savings: Projected Cost Savings
(*In Millions*)

Air Emissions Savings	Application (2009 $)	Projected Savings	Variance
Reclaim NOx RTC	$0.7	$0.7	$0.0
GHG	$0.0	$0.9	$0.9
Air Emissions Total Savings	**$0.7**	**$1.5**	**$0.9**

The Project will reduce SoCalGas' demand for Regional Clean Air Incentives Market Trading Credits (RTCs) to offset the emission of NOx . SoCalGas estimates that the projected increase in miscellaneous revenue[54] from the sales of RTC is $656,000 in 2019 based on a price per NOx ton of $5,897.[55] The market value of the RTCs in the future will be determined based

[53] For further discussion, please refer to the Underground Storage testimony of Neil Navin (Exhibit SCG-10).
[54] For further discussion, please refer to the Miscellaneous Revenues testimony of Annette Steffen (Exhibit SCG-41).
[55] Based on most recent RTC sale prices published by the South Coast Air Quality Management District (April 2017) for Single-Year Basis RTCs of $5,897 per ton of NOx (three-month rolling average price). available at http://www.aqmd.gov/docs/default-source/reclaim/nox-rolling-average-reports/nox-and-sox-rtcs-rolling-avg-price-cy-2016-17---april-2017.pdf?sfvrsn=6.

on the average price per ton of RTCs that SoCalGas has either bought or sold in the marketplace during the year.

The Project also results in a large reduction of Greenhouse Gas (GHG) emissions and resulting expense, which was not contemplated when the 2009 Application was filed. GHG emissions are reported for combustion, vented, and fugitive sources, but only combustion and vented emissions are subject to State Cap and Trade regulations that became effective January 2012. The projected savings from purchasing less GHG allowances due to lower emissions is about $861,000 per year. Customers will receive a reduction in GHG Emissions expense that is charged to customers at the weighted average cost of allowance instruments held in inventory and is balanced in the GHG Balancing Account (GHGBA).

The realization of these cost savings estimates is predicated on the successful commissioning of the Project's electric-drive compressors and the concomitant decommissioning of the obsolete turbine-driven compressors. SoCalGas anticipates a full-season trial period during which time both the existing compressors and the new compressors will be utilized to proof-test the new installation. That period is expected to end early in 2019, at which time the obsolete compressors will be retired and decommissioned.

The Added Facilities charges increased due to additional electrical infrastructure requirements, as discussed in the Edison Substation and Electrical Infrastructure section above.[56]

VII. CONCLUSION

My testimony demonstrates the reasonableness of $275.5 million in capital expenditures by SoCalGas to complete the Aliso Canyon Turbine Replacement Project, confirms the present and future public convenience and necessity require construction of the Project at the increased cost, and supports SoCalGas' request for authorization to recover in rates $74.6 million in costs that exceed the previously-authorized cost of $200.9 million for the Project.

[56] The 2009 Application estimated approximately $266,000 per year for the added facilities charges and the Project results in an annual cost of approximately $347,000—based on a January 1, 2017 to February 1, 2017 invoice for $28,892.

VIII. QUALIFICATIONS

My name is David L. Buczkowski. As of October 7, 2017, I am Vice President of Gas Engineering & System Integrity for SoCalGas and San Diego Gas & Electric Company. My business address is 555 West Fifth Street, Los Angeles, California 90013-1011. In my role, I am responsible for leading the Gas Engineering organization that is responsible for engineering policies, procedures, and oversight; the System Integrity organization that is responsible for system integrity policies and programs; and, the Major Projects organization that is responsible for the development, project management and construction of large, complex gas infrastructure projects for both SoCalGas and SDG&E.

I first joined SoCalGas as the Director of Major Projects in May of 2011. I was promoted to Senior Director of Major Projects in 2014, and then promoted to Vice President of Gas Engineering and Major Projects in June of 2016. In these positions, my responsibilities included overseeing the project management and project execution of major capital and expense gas infrastructure projects for SoCalGas and SDG&E. The scope of my responsibilities increased through my promotion from Director to Vice President.

Prior to joining SoCalGas, I served as a project director on several multi-billion dollar mega-projects. Throughout my career my roles have included project management, engineering management, start-up, and O&M engineering for projects in refineries, oil and gas processing facilities, biofuels, and petrochemical plants. Project scopes included conceptual engineering, basic engineering, front-end engineering, program management, and detailed engineering and design, procurement and construction efforts. From 2001 to 2011, I worked for Fluor in various project management positions of increasing responsibility, ultimately serving in the role of Project Director. In that role, I had overall responsibility for project cost, schedule, and execution, including engineering/design, procurement, contracts, and construction of large capital energy infrastructure projects.

From 1997 to 2001, I was employed by Parsons Corporation, first as a Project Engineer, then in various project management positions of increasing responsibility. From 1990 to 1995, I was employed by Shell Oil Company, first as an Operations Support Engineer and subsequently in various roles of increasing responsibility, including project management of major refinery projects and ultimately ascended to the position of Start-Up Engineer for the Shell Refinery Expansion and Clean Fuels megaproject.

I graduated from the University of Illinois in 1989 with a Bachelor of Science degree in Mechanical Engineering. I have over 27 years of domestic and international experience in various energy industries. I have previously testified before the California Public Utilities Commission.

This concludes my prepared direct testimony.

LIST OF ACRONYMS

EAC	Estimated Cost at Completion
CPCN	Certificate of Public Convenience and Necessity
Bcfd	Billion cubic feet per day
MMcfd	Million cubic feet per day
Bcf	Billion cubic feet
MMcf	Million cubic feet
CEQA	California Environmental Quality Act
PEA	Proponent’s Environmental Assessment
EIR	Environmental Impact Report
GRC	General Rate Case
O&M	Operations and Maintenance
CPUC	California Public Utilities Commission
mmscf/d	Million standard cubic feet per day
EPC	Engineering, Procurement and Construction
DBE	Diverse Business Enterprise
MPRs	Minor Project Refinements
NOx	Oxides of Nitrogen
MoS	Method of Service Study
kV	Kilovolt
Mph	Miles-per-hour
AFUDC	Allowance for Funds Used During Construction
OSHA	Occupational Safety and Health Administration
CMVI	Controllable Motor Vehicle Incident
AFA	Added Facilities Agreement
RTCs	Regional Clean Air Incentives Market Trading Credits
GHG	Greenhouse Gas
GHGBA	Greenhouse Gas Balancing Account