

Company: Southern California Gas Company (U 904 G)  
Proceeding: 2024 General Rate Case  
Application: A.22-05-XXX  
Exhibit: (SCG-08-WP-S)

**PUBLIC**

**SUPPLEMENTAL WORKPAPERS TO**

**PREPARED DIRECT TESTIMONY**

**OF BILL KOSTELNIK**

**ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY**

**(PIPELINE SAFETY ENHANCEMENT PLAN)**

**VOLUME II OF VIII**

**BEFORE THE PUBLIC UTILITIES COMMISSION**

**OF THE STATE OF CALIFORNIA**

**MAY 2022**



## TABLE OF CONTENTS

VOLUME	WORKPAPER CHAPTER TITLE	PAGE NO.
<b>I.</b>	Introduction to Workpapers Supporting the Testimony of Bill Kostelnik	WP-1 – 24
	SCG Forecast Project Workpapers	WP-25 – 370
<b>II.</b>	SCG Reasonableness Review Pipeline Project Workpapers	WP-371 – 798
<b>III.</b> <b>IV.</b> <b>V.</b>	SCG Reasonableness Review Valve Enhancement Project Workpapers	WP-799 – 1917
<b>VI.</b>	Construction Miscellaneous Costs	WP-1918 – 1921
<b>VII.</b>	SCG Dairy Pilot Project Workpapers (non-PSEP)	WP-1922 – 1995
<b>VIII.</b>	<i>Appendix A</i> – Summary of Standard Planning and Construction Practices for Replacement, Hydrotest, Valve, and Abandonment Projects	WP-A1 – A26
	<i>Appendix B</i> – Glossary of Terms	WP-B1 – B15

## VOLUME II

**WP-371 – 798**

### **SCG Reasonableness Review Pipeline Project Workpapers**

## **WP-371 – 798**

# **SCG Reasonableness Review Pipeline Project Workpapers**

**REASONABLENESS REVIEW PIPELINE PROJECTS**

*Table 2 – Pipeline Hydrotest, Replacement and Abandonment Projects for the 2024 Reasonableness Review*

Pipeline Workpaper Title	Project Scope (miles, rounded)				Workpaper Page
	Hydrotest	Replace	Abandon	Derate	
30-18 Section 2 Replacement Project		0.619			WP-371
33-120 Section 1 Replacement Project		0.24			WP-392
36-1032 Section 4 Replacement Project		0.307			WP-411
36-9-09 North Section 5B-02 and 5C Replacement		0.894			WP-428
36-9-09 North Section 6B Replacement Project		1.732			WP-450
36-9-21 Replacement Project		0.464			WP-470
37-18-K Replacement Project		1.928			WP-488
38-101 Replacement Project		4.525			WP-507
41-6001-2 Replacement Project		0.005			WP-526
43-121 North Sections 2, 3, and 4 Replacement Project		1.054			WP-543
45-120 Section 2 Replacement Project		3.588			WP-572
404 Section 4A Replacement Project		0.831			WP-604
404-406 Somis Station Replacement Project		0.136			WP-624
2006 Replacement Project		0.094			WP-646
Storage - Goleta Project	0.286				WP-663
33-121 Hydrotest Project	0.478				WP-678
2000-D Hydrotest Project	3.184				WP-694
2001 West-C Desert Hydrotest Project	16.803				WP-716
2001 West-D Whitewater Hydrotest	4.36				WP-737
41-6000-2 Abandonment Project	0.189	0.239	24.033	3.652	WP-758
103 Derate and Replacement Project		0.001		9.303	WP-781

## Final Report for Supply Line 30-18 Section 2 Replacement Project

**I. SUPPLY LINE 30-18 SECTION 2 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 30-18 Section 2 is a predominantly [REDACTED] diameter transmission line that runs approximately 0.6 miles along the heavily trafficked 190<sup>th</sup> Street from Vermont to Victoria Street and South Avalon Boulevard, through residential neighborhoods and commercial areas within the City of Carson to the City of Torrance. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Supply Line 30-18 Section 2 Replacement Project that consists of the replacement of 0.619 miles of pipeline with approximately 0.250 miles of horizontal directional drill (HDD). The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$10,905,874.

SoCalGas separated the Supply Line 30-18 Project into three separate projects: Supply Line 30-18<sup>1</sup> Sections 1, 2, and 3 for constructability, coordination, and permitting requirements for certain portions along the replacement route.

---

<sup>1</sup> Supply Line 30-18 Sections 1 and 3 was filed for recovery in A.18-11-010 and authorized in D.20-08-034.

Final Report for Supply Line 30-18 Section 2 Replacement Project

Table 1: General Project Information

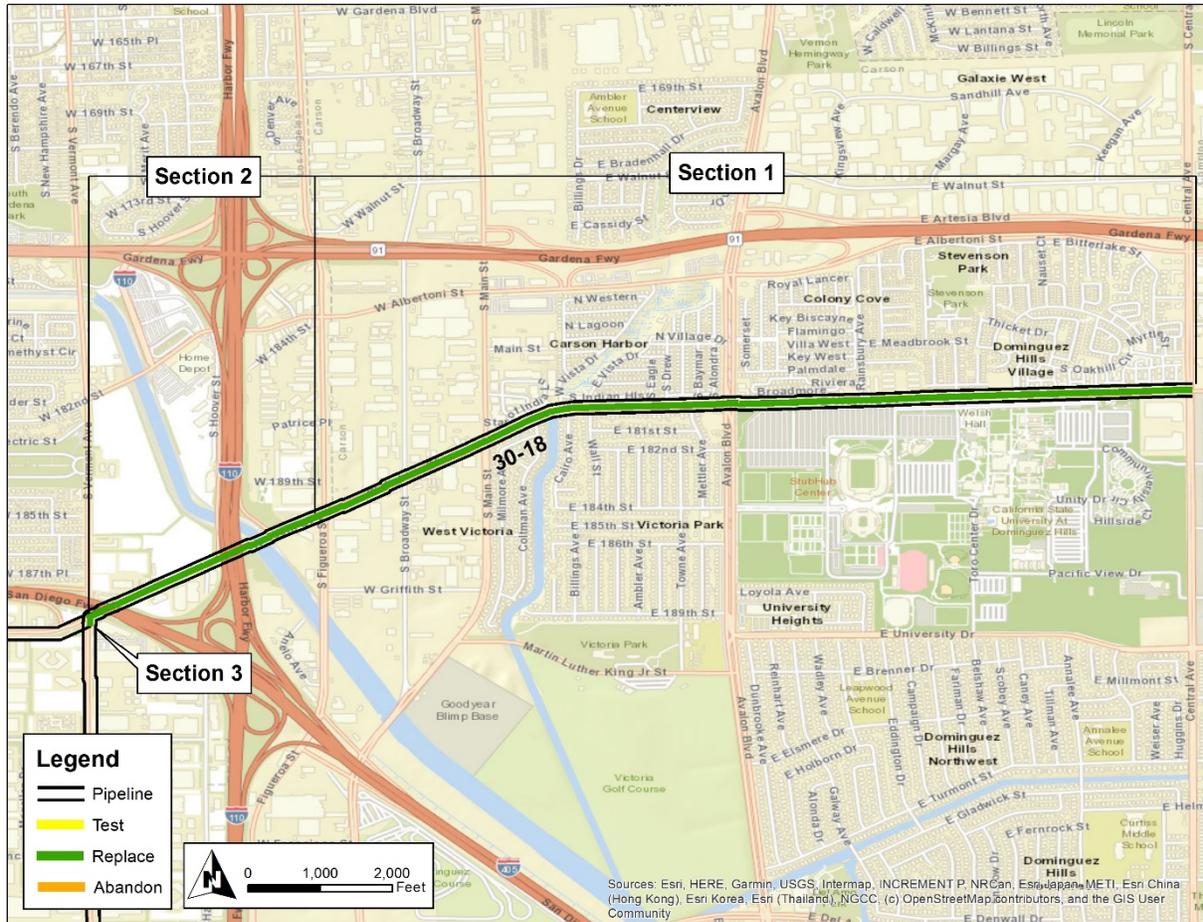
Project Name		Supply Line 30-18 Section 2		
Project Type	Replacement			
Length	0.619 miles			
Location	Carson			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1943			
Construction Start	01/16/2018			
Construction Finish	05/14/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	10,905,874	-	10,905,874	
Disallowed Costs	130,758	-	130,758	

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 30-18 Section 2 Replacement Project

B. Maps and Images

Figure 1: Overview Map of the Supply Line 30-18 Sections 1, 2, and 3 Replacement Projects



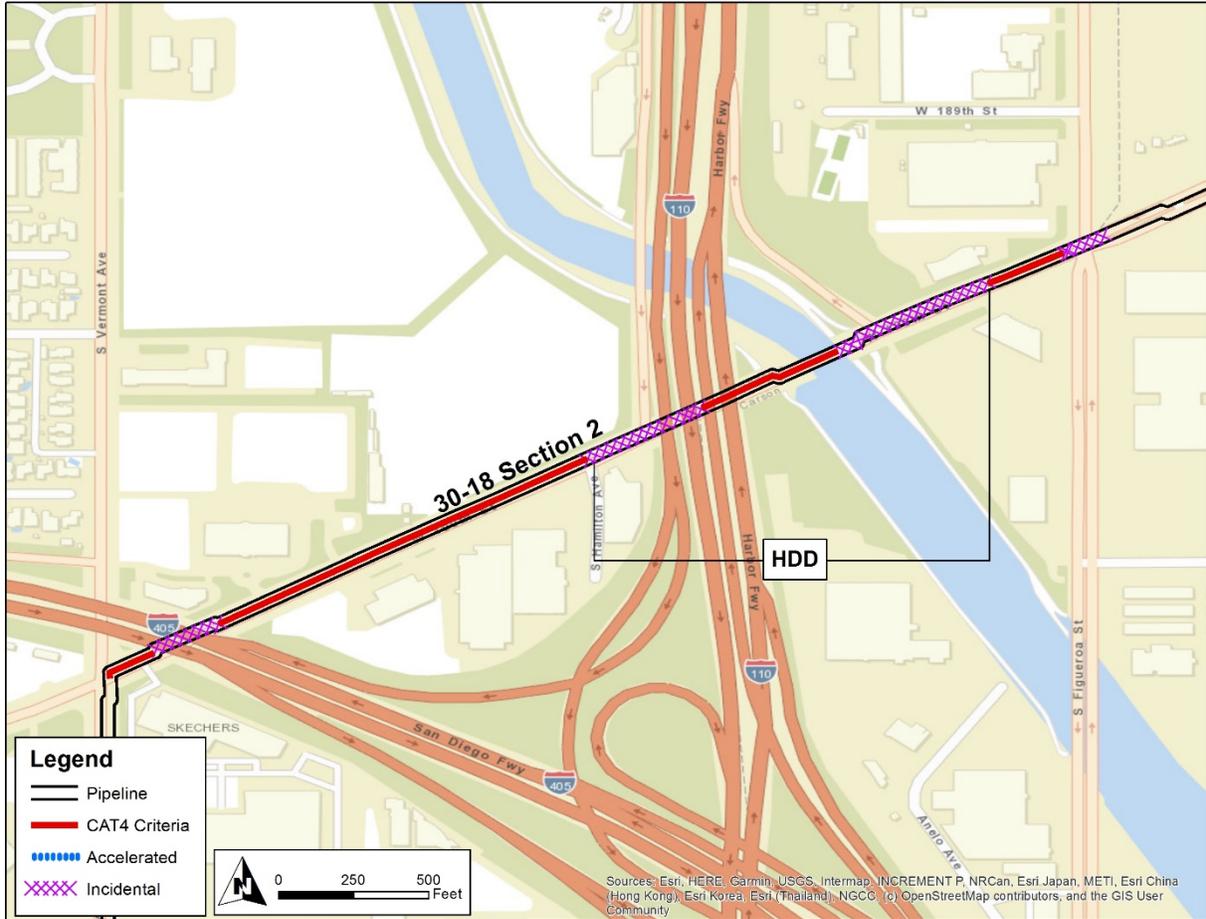
Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 2: Satellite Image of Supply Line 30-18 Section 2 Replacement Project



Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 3: Overview Map of Supply Line 30-18 Section 2 Replacement Project



Final Report for Supply Line 30-18 Section 2 Replacement Project

**II. Engineering, Design, and Planning**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated	Incidental	New	Total <sup>3</sup>
Final Mileage	0.370 mi.	0 mi.	0.226 mi.	0.023 mi.	0.619 mi.
	1,951 ft.	0 ft.	1,192 ft.	123 ft.	3,266 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2018, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 30-18 as a Phase 1A Replacement Project comprised of 2.139 miles of Category 4 Criteria pipe and 0.445 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 0.077 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team planned Section 2 to occur last due to the more detailed permitting and approval process required for crossing the Dominguez Channel and Caltrans Interstate 110.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 30-18 Section 2 Replacement Project

- b. The Project Team utilized HDD to cross under the Dominguez Channel and Interstate 110. This crossing required extensive Caltrans permit reviews and two geotechnical investigations.
  - c. Incidental mileage was included for constructability purposes related to the HDD Dominguez Channel crossing and associated Caltrans permitting requirements.
4. Final Project Scope: The final project scope consists of a 0.619 mile Replacement that included 0.250 miles of HDD.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 30-18 Section 2 and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas have already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for in-line inspection, likely have non-state-of-the-art welds, and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission's directive in D.11-06-017 to "address retrofitting pipeline to allow for inline inspection tools," the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Final Report for Supply Line 30-18 Section 2 Replacement Project

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas’ determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in with no system impact.
2. Customer Impacts: The Project Team identified one customer that would need to be transferred to an adjacent medium pressure system prior to construction.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1943.
5. Existing Pipe Attributes: Multiple diameters, non-piggable taps, and pressure control fittings (PCFs).
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the line could be shut-in without impact to service.
2. Customer Impact: The Project Team identified one customer that would be transferred to an adjacent medium pressure system prior to construction.
3. Community Impact:

## Final Report for Supply Line 30-18 Section 2 Replacement Project

- a. In order to improve efficiency and safety, the pipeline was constructed within a k-rail island. Temporary full street closures were coordinated with the city in order to install and remove the k-rails.
- b. A full street closure of 190<sup>th</sup> Street was also required for the HDD pullback.
4. Diameter Changes: The Project Team replaced the existing [REDACTED] line with a [REDACTED] line to standardize the pipeline for future piggability purposes, also taking advantage of cost savings from favorable pricing of bulk purchased pipe.
5. Substructures:
  - a. A bore pit was relocated due to overhead electrical wires near the proposed drill location.
  - b. Bore depth was increased to maintain the structural integrity of a pillar within the freeway.
  - c. The bore length was extended to avoid interference during the pull back due to overhead electrical lines.
6. Permit Conditions:
  - a. Caltrans required a permit to install pipe inside Caltrans ROW and to alternate traffic flow for the highway on-ramp and off-ramp.
  - b. City of Carson Encroachment required a permit to excavate within City of Carson roads.
  - c. City of Los Angeles required a noise variance for potential non-peak hour work that included extended hours and HDD activities and a peak hour exemption to extend work hours in order to reduce project duration.
  - d. Los Angeles Bureau of Engineering Utility required a permit for the approval of the HDD and encroachment into the public ROW.
  - e. Los Angeles Board of Public Works required approval for the street closure permit.
  - f. Los Angeles Department of Transportation required a permit to close traffic lanes during construction.
  - g. Los Angeles County Flood Control required a permit to HDD under the Dominguez Channel.

### Final Report for Supply Line 30-18 Section 2 Replacement Project

- h. Los Angeles County Traffic and Lighting Division required a permit to alter traffic signals during construction.
- 7. Land Use: Laydown yard was shared with the PSEP Supply Line 37-07 and Supply Line 37-18 Projects.
- 8. Environmental: The Project Team planned for typical abatement activities when removing existing pipe for tie-ins.

#### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 30-18 Section 2 Replacement Project

**III. Construction**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	01/16/2018
Construction Completion Date	05/14/2018
NOP Date	03/29/2018

**C. Changes During Construction**

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 4: Cranes Positioning Pipe for Horizontal Directional Drill Pullback



Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 5: Preparing for Horizontal Directional Drill Pullback



Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 6: Installing Offset at the Intersection of Figueroa Street and Victoria Street



Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 7: Lowering New [REDACTED] Pipe into Trench



Final Report for Supply Line 30-18 Section 2 Replacement Project

Figure 8: Hoses and Connections for Seasoning of New Pipeline



## Final Report for Supply Line 30-18 Section 2 Replacement Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 30-18 Section 2 Replacement Project

## IV. Project Costs

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. A specific example of a cost avoidance action taken on this Project was utilizing bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$13,306,535. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$10,905,874.

Final Report for Supply Line 30-18 Section 2 Replacement Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals <sup>6</sup>	Delta Over/(Under)
Company Labor	593,620	340,405	(253,215)
Materials	411,724	325,769	(85,955)
Construction Contractor	6,554,264	4,368,706	(2,185,558)
Construction Management & Support	534,107	420,997	(113,110)
Environmental	261,146	142,186	(118,960)
Engineering & Design	678,339	2,046,159	1,367,820
Project Management & Services	2,218,435	562,348	(1,656,087)
ROW & Permits	302,992	85,707	(217,285)
GMA	1,751,908	945,894	(806,014)
<b>Total Direct Costs</b>	<b>13,306,535</b>	<b>9,238,171</b>	<b>(4,068,364)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>7</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	881,013	866,640	(14,373)
AFUDC	2,891,877	708,304	(2,183,573)
Property Taxes	631,075	92,759	(538,316)
<b>Total Indirect Costs</b>	<b>4,403,965</b>	<b>1,667,703</b>	<b>(2,736,262)</b>
<b>Total Direct Costs</b>	<b>13,306,535</b>	<b>9,238,171</b>	<b>(4,068,364)</b>
<b>Total Loaded Costs</b>	<b>17,710,500</b>	<b>10,905,874</b>	<b>(6,804,626)</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Actual Material and Construction Contractor costs exclude the cost of upsizing the pipe.

<sup>7</sup> Values may not add to total due to rounding.

## Final Report for Supply Line 30-18 Section 2 Replacement Project

**D. Disallowance**

For this replacement project, SoCalGas identified 404 feet of pipe as being installed after 1955 and lacking records that provide the minimum information necessary to demonstrate compliance with then-applicable industry standards or regulatory strength testing and recordkeeping requirements. Of the pipeline that was replaced, 404 feet of Phase 1A pipe is disallowed. Therefore, a \$130,758 reduction to ratebase was calculated by multiplying 0.0765 miles of pipe by \$1,709,257 per mile, which was SoCalGas and SDG&E's system average cost of pressure testing at the time the pipeline was returned to service.

## Final Report for Supply Line 30-18 Section 2 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 30-18 Section 2 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.619 miles of pipeline and utilized HDD for approximately 0.250 miles along 190<sup>th</sup> Street, from Vermont to Victoria Street and South Avalon Boulevard in the City of Carson. The total loaded cost of the Project is \$10,905,874.

SoCalGas executed this project prudently through the use of a HDD and open trench construction methods.

SoCalGas engaged in prudent cost avoidance efforts by sharing a laydown yard and sequencing with adjacent PSEP Projects to reduce mobilization cost, descope additional landscaping, and utilizing bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

**End of Supply Line 30-18 Section 2 Replacement Project Final Report**

## Final Report for Supply Line 33-120 Section 1 Replacement Project

**I. SUPPLY LINE 33-120 SECTION 1 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 33-120 is a predominantly [REDACTED] diameter transmission line that runs approximately 13 miles from Sylmar to Encino. The pipeline is primarily routed across a Class 3 location and traverses some Class 1 and Class 2 locations. This report describes the activities associated with Supply Line 33-120 Section 1 Replacement Project that consists of the replacement and reroute of 0.240 miles of pipeline and one mainline valve (MLV) near San Fernando Road, through commercial areas west of Interstate 5 and adjacent to the Metropolitan Water District (MWD) facility in the City of Los Angeles. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$12,477,334.

SoCalGas separated the Supply Line 33-120 Project into three separate projects: Supply Line 33-120 Sections 1, 2<sup>1</sup>, and 3<sup>2</sup> for project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline. Supply Line 33-120 Section 1 was coordinated with the PSEP Supply Line 45-120 Section 2 Replacement Project as an overall reroute since they are geographically and operationally connected sections that were designed in conjunction with one another in order to avoid conflicts in construction and system interruptions.

---

<sup>1</sup> Supply Line 33-120 Section 2 Replacement Project was filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004.

<sup>2</sup> Supply Line 33-120 Section 3 Replacement Project was filed for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

Final Report for Supply Line 33-120 Section 1 Replacement Project

Table 1: General Project Information

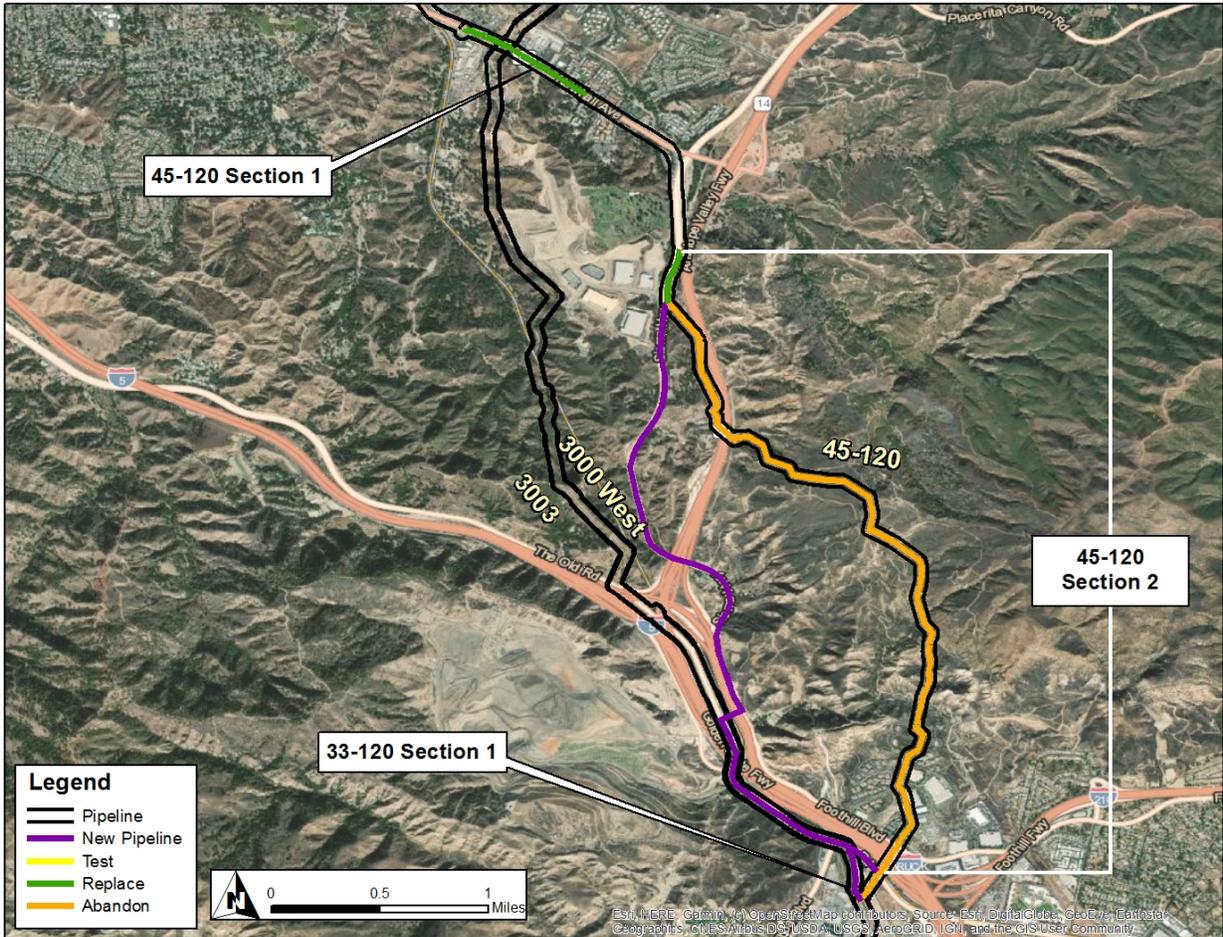
Project Name		Supply Line 33-120 Section 1		
Project Type	Replacement			
Length	0.240 miles			
Location	Los Angeles			
Class	2			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1930			
Construction Start	09/18/2017			
Construction Finish	07/19/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>3</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	12,477,334	-	12,477,334	
Disallowed Costs	-	-	-	

<sup>3</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 33-120 Section 1 Replacement Project

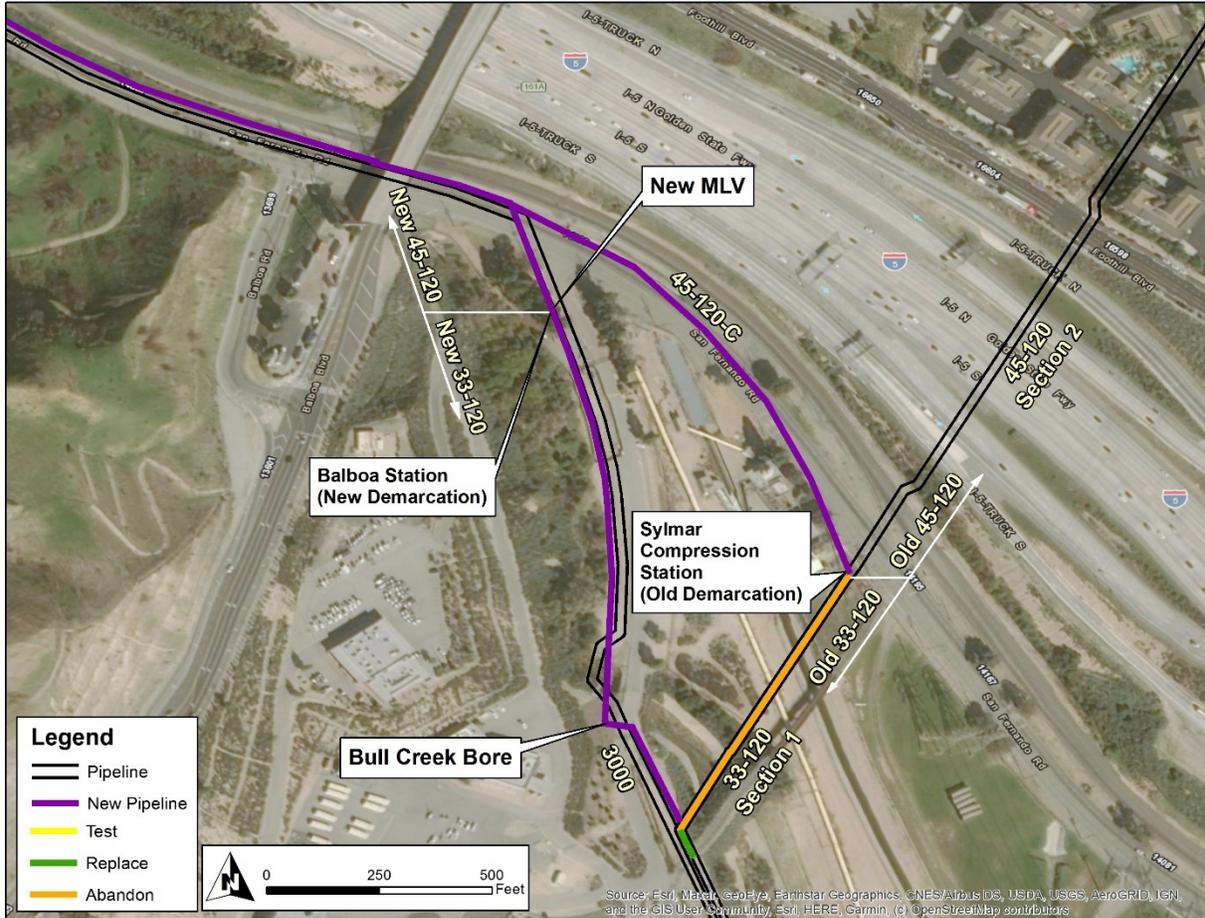
B. Maps and Images

Figure 1: Satellite Image of Supply Line 45-120 Sections 1, Supply Line 45-120 Sections 2, and Supply Line 33-120 Section 1 Replacement Projects



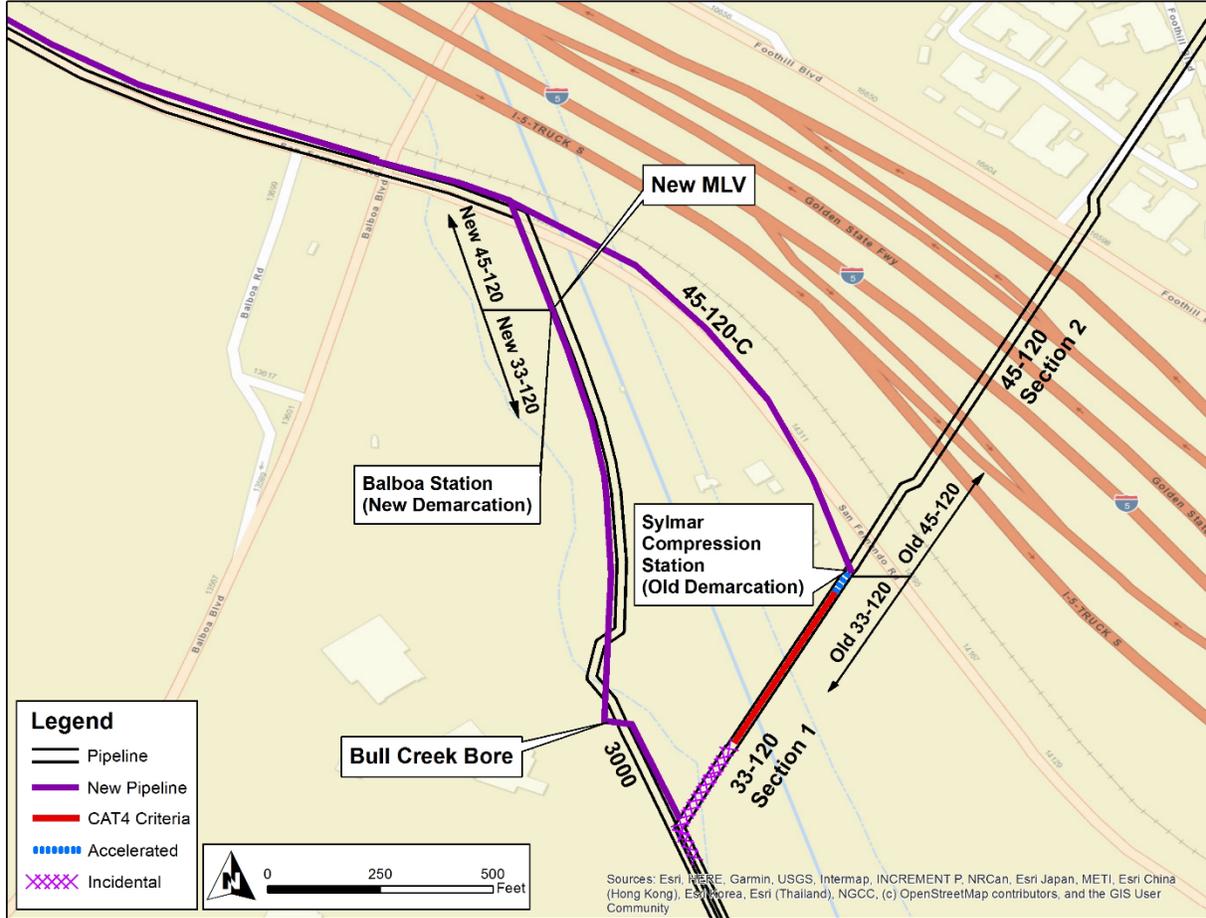
## Final Report for Supply Line 33-120 Section 1 Replacement Project

Figure 2: Satellite Image of Supply Line 33-120 Section 1 Replacement Project



Final Report for Supply Line 33-120 Section 1 Replacement Project

Figure 3: Overview Map of Supply Line 33-120 Section 1 Replacement Project



Final Report for Supply Line 33-120 Section 1 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>4</sup>	Incidental	New	Total <sup>5</sup>
Final Mileage	0.071 mi.	0.008 mi.	0.044 mi.	0.117 mi.	0.240 mi.
	374 ft.	41 ft.	232 ft.	620 ft.	1,267 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>6</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 33-120 as a Phase 1A Replacement Project comprised of 0.387 miles of Category 4 Criteria pipe and 0.865 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 0.316 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project starts near San Fernando Road and ties into the existing Supply Line 33-120 within a MWD facility.
  - b. The rerouted pipeline design utilized a jack and bore to cross under Bull Creek within a MWD facility.

<sup>4</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

### Final Report for Supply Line 33-120 Section 1 Replacement Project

- c. Supply Line 33-120 Section 1 was designed with the PSEP Supply Line 45-120 Section 2 Replacement Project as an overall reroute since they are geographically and operationally connected sections.
  - d. The Project Team included Accelerated and Incidental mileage to accommodate the rerouted alignment.
4. Final Project Scope: The final project scope consists of a 0.240 mile Replacement and one mainline valve. The Accelerated mileage consists of 41 feet of Phase 1B pipe and 232 feet of Incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 33-120 Section 1 and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas has already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for in-line inspection, likely have non-state-of-the-art welds, and would require significant investment for retrofitting to accommodate in-line inspection tools.

Accordingly, consistent with the Commission's directive in D.11-06-017 to "address retrofitting pipeline to allow for inline inspection tools," the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost

## Final Report for Supply Line 33-120 Section 1 Replacement Project

effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut in.
2. Customer Impacts: Customer service was maintained utilizing a stopple fitting and compressed natural gas (CNG).
3. Community Impacts: Project work completed within the Metropolitan Water District property required additional security review prior to entrance. The Project Team coordinated with the MWD during construction to maintain uninterrupted access for shipments of chemicals critical for MWD operations.
4. Piggability: Non-piggable.
5. Pipe Vintage: 1930.
6. Existing Pipe Attributes: Multiple diameters and an unbarred tee.
7. Longseam Type: Unknown.
8. Longseam Repair History: No identified issues.
9. Condition of Coating: No identified issues.
10. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

## Final Report for Supply Line 33-120 Section 1 Replacement Project

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the line could be shut in.
2. Customer Impact: Per the RER, customer service was maintained utilizing a stopple fitting and CNG.
3. Community Impact: Project work completed within MWD property required additional security review prior to entrance. The Project Team coordinated with the MWD during construction to maintain uninterrupted access for shipments of chemicals critical for MWD operations.
4. Diameter Changes: The Project Team replaced the existing [REDACTED] line with a [REDACTED] line to standardize the pipeline for future piggability purposes taking advantage of cost savings from favorable pricing of bulk purchased pipe.
5. Constructability: The rerouted pipeline design utilized a jack and bore to cross under Bull Creek within a MWD facility.
6. Schedule Coordination: The Project Team coordinated design and construction with the adjacent PSEP Supply Line 45-120 Section 2 Replacement Project since Supply Line 33-120 and Supply Line 45-120 are geographically and operationally connected sections.
7. Known Substructures: Potholing information during design did not identify any unknown substructures.
8. Permit Conditions: The Project Team identified multiple jurisdictional agencies that included:
  - a. MWD.
  - b. City of Los Angeles Department of Water and Power.
  - c. Regional Water Quality Control Board.
  - d. Los Angeles County Fire Department.
  - e. California Department of Fish and Wildlife (CDFW).
  - f. Los Angeles Bureau of Engineering (LA BOE).
9. Land Use: A laydown yard was shared with the Supply Line 45-120 Section 2 Replacement Project.

## Final Report for Supply Line 33-120 Section 1 Replacement Project

10. Environmental: The Project is located near an environmentally sensitive area and the Project Team identified multiple environmental requirements.
- CDFW permit for debris, waste, or any other material that could pass into Bull Creek.
  - Storm Water Pollution Prevention Plan (SWPPP).
  - Typical abatement activities for tie-in pipe removal.
11. Valves: One [REDACTED] MLV and bridle assembly was replaced.
12. Tie-In: The Project Team relocated the demarcation of Supply Line 45-120 and Supply Line 33-120 from Sylmar Compressor Station to Balboa Station in order to abandon an existing span over a creek.

### D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the preliminary cost estimate does not fully reflect the final scope. As part of the pigability enhancements for this Project, the Project Team added a new [REDACTED] valve to accommodate future In-Line Inspection.

Final Report for Supply Line 33-120 Section 1 Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package, which included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	09/18/2017
Construction Completion Date	07/19/2018
NOP Date	12/21/2017

**C. Changes During Construction**

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 33-120 Section 1 Replacement Project

Figure 4: Driving Sheet Piling



Final Report for Supply Line 33-120 Section 1 Replacement Project

Figure 5: Welding Support Beams for Entry Bore Pit



Final Report for Supply Line 33-120 Section 1 Replacement Project

Figure 6: New Pipe Lowered into Trench



## Final Report for Supply Line 33-120 Section 1 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 33-120 Section 1 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.
2. Land Use: A laydown yard was shared with the Supply Line 45-120 Section 2 Project.
3. Construction Execution:
  - a. The Project Team changed the excavation plan to remove the use of shoring in some locations.
  - b. The Project Team combined tie-in and post completion Hydrotest activities with the adjacent Supply Line 45-120 Section 2 Replacement Project. This reduced the inspection and Project Field Team personnel, provided shared logistics, and consolidated communication with the local jurisdiction inspection representatives.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$12,513,922. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Supply Line 33-120 Section 1 Replacement Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$12,477,334.

Table 4: Estimated and Actual Direct Costs and Variances<sup>7</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	910,226	470,566	(439,660)
Materials	519,727	500,299	(19,428)
Construction Contractor	5,580,533	4,527,327	(1,053,206)
Construction Management & Support	513,894	705,195	191,301
Environmental	781,238	424,602	(356,636)
Engineering & Design	1,555,304	1,894,136	338,833
Project Management & Services	816,047	569,935	(246,112)
ROW & Permits	146,739	181,529	34,790
GMA	1,690,215	1,175,790	(514,425)
<b>Total Direct Costs</b>	<b>12,513,922</b>	<b>10,449,380</b>	<b>(2,064,542)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>8</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,309,104	1,132,131	(176,973)
AFUDC	741,259	791,575	50,316
Property Taxes	16,795	104,248	87,453
<b>Total Indirect Costs</b>	<b>2,067,158</b>	<b>2,027,954</b>	<b>(39,204)</b>
<b>Total Direct Costs</b>	<b>12,513,922</b>	<b>10,449,380</b>	<b>(2,064,542)</b>
<b>Total Loaded Costs</b>	<b>14,581,080</b>	<b>12,477,334</b>	<b>(2,103,746)</b>

<sup>7</sup> Values may not add to total due to rounding.

<sup>8</sup> Ibid.

## Final Report for Supply Line 33-120 Section 1 Replacement Project

### D. Disallowance

The scope of the Line 33-120 Section 1 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 33-120 Section 1 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 33-120 Section 1 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.240 miles of pipeline and one mainline valve in the City of Los Angeles. The total loaded cost of the Project is \$12,477,334.

SoCalGas executed this project prudently by completing the design with the PSEP Supply Line 45-120 Section 2 Replacement Project as an overall reroute since they are geographically and operationally connected sections.

SoCalGas engaged in prudent cost avoidance efforts by utilizing bulk ordered pipe that provided volume pricing for the [REDACTED] pipe, coordinating with a customer outage to avoid the need of providing CNG support, and sharing a laydown yard with the PSEP Supply Line 45-120 Section 2 Replacement Project.

---

**End of Supply Line 33-120 Section 1 Replacement Project Final Report**

## Final Report for Supply Line 36-1032 Section 4 Replacement Project

**I. SUPPLY LINE 36-1032 SECTION 4 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 36-1032 Section 4 is a [REDACTED] diameter pipeline that runs approximately 0.3 miles along Highway 1 near the Lompoc Airport and across the Santa Ynez River. The pipeline is primarily routed across a Class 3 location and traverses some Class 1 locations. This report describes the activities associated with Supply Line 36-1032 Section 4 Replacement Project which consists of the replacement of 0.307 miles of pipeline using horizontal directional drill (HDD) across the Santa Ynez River. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$6,105,956.

SoCalGas separated the Supply Line 36-1032 Project into four separate projects: Supply Line 36-1032<sup>1</sup> Sections 1, 2, 3, and 4 for project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline.

---

<sup>1</sup> Supply Line 36-1032 Replacement Project was submitted for reasonableness review in A.16-09-005 and were approved in D.19-02-004.

Final Report for Supply Line 36-1032 Section 4 Replacement Project

Table 1: General Project Information

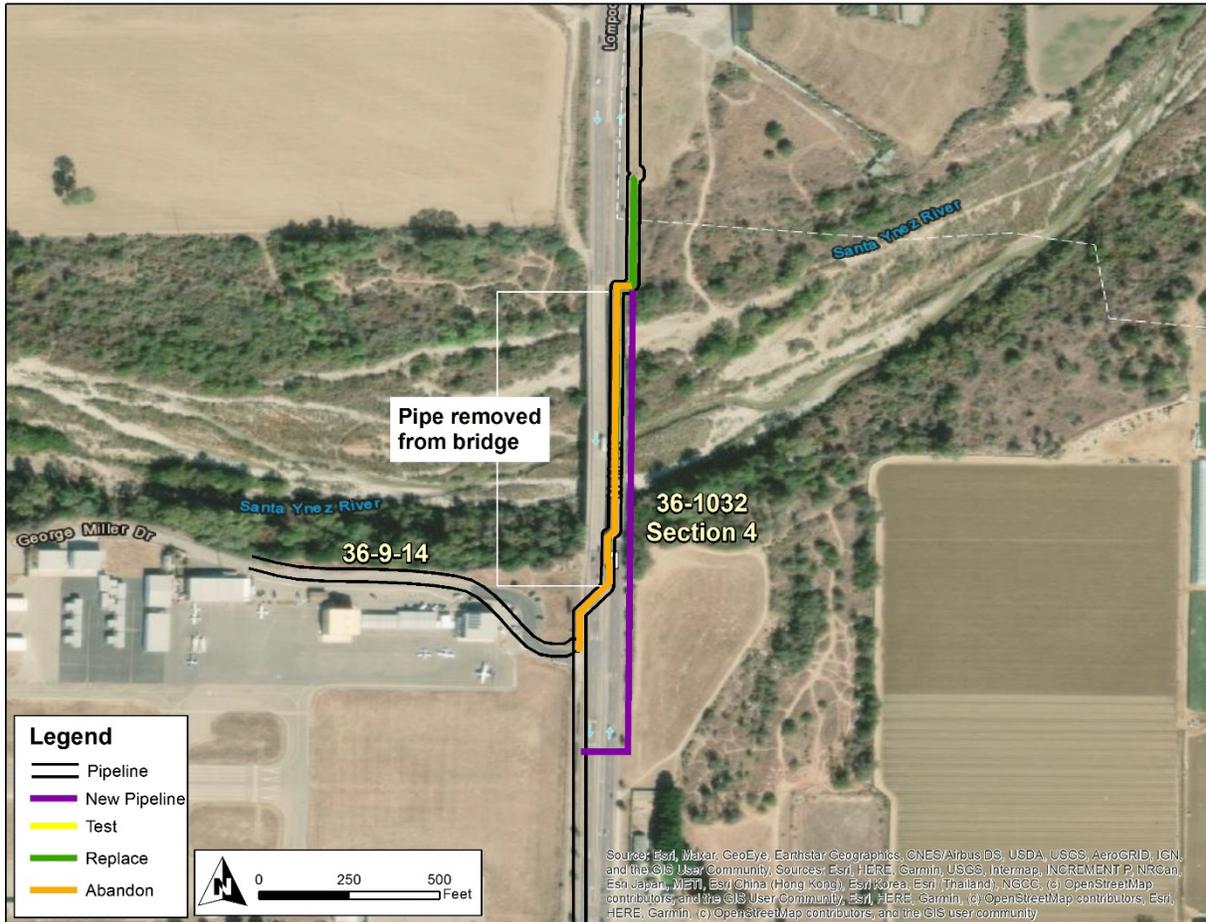
Project Name	Supply Line 36-1032 Section 4		
Project Type	Replacement		
Length	0.307 miles		
Location	Lompoc		
Class	3		
MAOP ( <i>confidential</i> )	[REDACTED]		
Pipe Vintage	1953		
Construction Start	07/10/2017		
Construction Finish	09/28/2017		
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]		
New Diameter ( <i>confidential</i> )	[REDACTED]		
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]		
New SMYS ( <i>confidential</i> )	[REDACTED]		
Project Costs (\$)	Capital	O&M	Total
Loaded Project Costs	6,105,956	-	6,105,956
Disallowed Costs	-	-	-

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Supply Line 36-1032 Section 4 Replacement Project

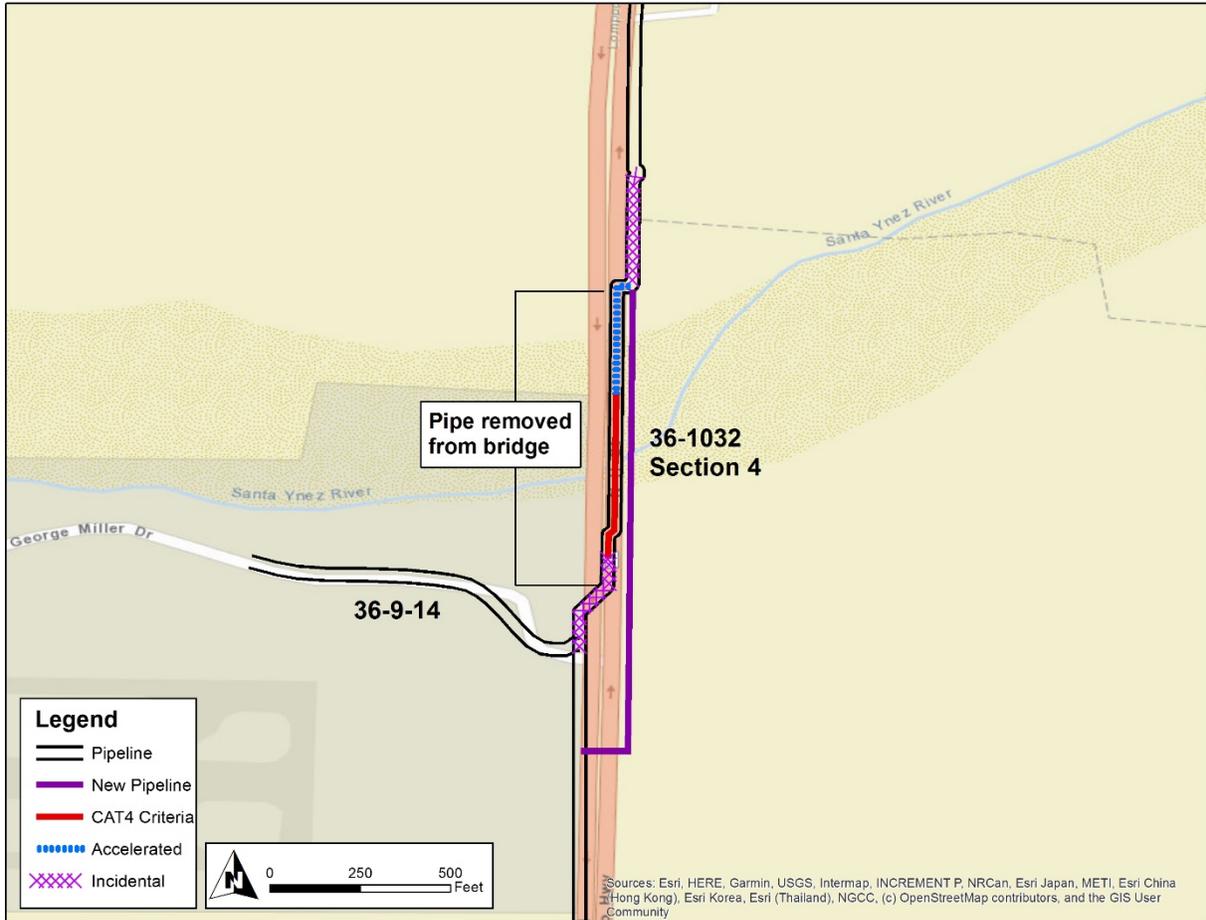
### B. Maps and Images

Figure 1: Satellite Image of Supply Line 36-1032 Section 4 Replacement Project



## Final Report for Supply Line 36-1032 Section 4 Replacement Project

### Figure 2: Overview Map of Supply Line 36-1032 Section 4 Replacement Project



Final Report for Supply Line 36-1032 Section 4 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Final Mileage	0.093 mi.	0.057 mi.	0.094 mi.	0.064 mi.	0.307 mi.
	489 ft.	299 ft.	495 ft.	337 ft.	1,620 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>5</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 36-1032 as a Phase 1A Hydrotest Project comprised of 1.165 miles of Category 4 Criteria pipe and 0.390 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 1.072 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team utilized HDD to cross the Santa Ynez River.
  - b. The Project Team utilized a slick bore to cross Highway 1 adjacent to the Lompoc Airport.

<sup>3</sup> Accelerated mileage includes Phase 2A. Phase 2A includes pipelines without sufficient record of a pressure test in less populated areas. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 36-1032 Section 4 Replacement Project

- c. Caltrans required the removal of approximately 778 feet of existing pipeline hanging under the Highway 1 bridge crossing the Santa Ynez River.
  - d. Accelerated mileage and Incidental mileage was included for constructability purposes related to the HDD to cross the Santa Ynez River.
4. Final Project Scope: The final project scope consists of a 0.307 mile Replacement. The Accelerated mileage consists of 299 feet of Phase 2A pipe and 495 feet of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 36-1032 Section 4 and confirmed the project design should commence as a Replacement Project.

Segments of less than 1,000 feet are identified for replacement under the approved PSEP Decision Tree because, for short segments of pipe, the logistical costs associated with pressure testing (for example, permitting, construction, water handling, and service disruptions for a non-looped system) can approach or exceed the cost of replacement. In such circumstances, replacement affords a more cost-effective approach to achieving compliance with D.11-06-017 while providing equal safety enhancement benefits. Moreover, installation of the new segment can usually be performed while the existing service is maintained to customers, thereby avoiding service disruptions that may otherwise occur during pressure testing.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis that concluded the line could not be shut in and that customer service would need to be maintained utilizing CNG and pressure control fittings (PCFs).

Final Report for Supply Line 36-1032 Section 4 Replacement Project

2. Customer Impact: Pressure control fittings were utilized to maintain uninterrupted service on Supply Line 36-1032. CNG was utilized to maintain service on Supply Line 36-9-14 for the airport customer tap.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1953.
5. Existing Pipe Attributes: Multiple diameters.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.
10. Constructability: Caltrans required the removal of approximately 778 feet of existing pipeline hanging under the Highway 1 bridge crossing the Santa Ynez River.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review analysis that concluded the line could not be shut in and that customer service would need to be maintained utilizing CNG and PCFs.
2. Customer Impact: Pressure control fittings were utilized to maintain uninterrupted service on Supply Line 36-1032. CNG was utilized to maintain service on Supply Line 36-9-14 for the airport customer tap.
3. Community Impact: Lane closures along Highway 1 were required to complete the HDD across the Santa Ynez River, slick bore across Highway 1, and tie-in.
4. Substructures: No substructures were identified within the excavation areas.
5. Permit Conditions:

### Final Report for Supply Line 36-1032 Section 4 Replacement Project

- a. The Project Team obtained permits from multiple agencies along the proposed alignment that included Caltrans, County of Santa Barbara, and the City of Lompoc.
  - b. Caltrans required the removal of approximately 778 feet of existing pipeline hanging under the Highway 1 bridge crossing the Santa Ynez River.
6. Land Use:
- a. Two laydown yards were utilized for HDD equipment and general fabrication and staging.
  - b. One work space agreement and one permanent easement was also required.
7. Environmental:
- a. The Project Team identified permits for U.S. Army Corps of Engineers, Central Coast Regional Water Quality Control Board, and California Department of Fish and Wildlife.
  - b. Removal of the existing pipeline across the Santa Ynez River had to occur between September 1 and November 1 to avoid bird nesting season and rainy season.
  - c. The Project Team planned for typical abatement activities when removing existing pipe for tie-ins.
8. Reroute: The City of Lompoc’s Engineer informed the Project Team that they would not grant a private easement for the realignment and HDD due to concerns regarding interference with a waterway. The Project Team shifted the proposed route and HDD from the City of Lompoc right of way (ROW) to the adjacent Caltrans ROW.
9. Valves: One valve was installed to replace an existing valve.

## D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 36-1032 Section 4 Replacement Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered into a competitive bidding process to select a construction contractor. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas’ Preliminary Construction Cost Estimate (*confidential*): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Bid (*confidential*): The Construction Contractor’s bid was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	07/10/2017
Construction Completion Date	09/28/2017
NOP Date	08/23/2017

#### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 36-1032 Section 4 Replacement Project

Figure 3: Setting Shoring Box



Final Report for Supply Line 36-1032 Section 4 Replacement Project

Figure 4: Checking for Leaks Before Start of Line Odorizing.



Final Report for Supply Line 36-1032 Section 4 Replacement Project

Figure 5: Abatement for Pipe Removal of Santa Ynez River Bridge.



## Final Report for Supply Line 36-1032 Section 4 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 36-1032 Section 4 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Scope Change: During gas handling, the Project Team removed the planned installation of a bypass to reduce the number of PCF installations without impacting service to customers.
2. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.
3. Water Management: Utilized water for dust control.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$6,482,482. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in

Final Report for Supply Line 36-1032 Section 4 Replacement Project

accordance with Company overhead allocation policies. The total loaded cost of the Project is \$6,105,956.

Table 4: Estimated and Actual Direct Costs and Variances<sup>6</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	285,554	182,204	(103,350)
Materials	357,308	140,288	(217,020)
Construction Contractor	2,489,529	2,376,403	(113,126)
Construction Management & Support	645,695	238,494	(407,201)
Environmental	489,694	268,922	(220,772)
Engineering & Design	996,722	1,084,724	88,002
Project Management & Services	206,354	387,289	180,935
ROW & Permits	378,000	99,368	(278,633)
GMA	633,626	620,244	(13,382)
<b>Total Direct Costs</b>	<b>6,482,482</b>	<b>5,397,935</b>	<b>(1,084,547)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>7</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	497,804	494,581	(3,223)
AFUDC	851,407	187,219	(664,188)
Property Taxes	189,186	26,220	(162,966)
<b>Total Indirect Costs</b>	<b>1,538,397</b>	<b>708,020</b>	<b>(830,377)</b>
<b>Total Direct Costs</b>	<b>6,482,482</b>	<b>5,397,935</b>	<b>(1,084,547)</b>
<b>Total Loaded Costs</b>	<b>8,020,879</b>	<b>6,105,956</b>	<b>(1,914,923)</b>

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> Ibid.

Final Report for Supply Line 36-1032 Section 4 Replacement Project

**D. Disallowance**

The scope of the Line 36-1032 Section 4 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 36-1032 Section 4 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 36-1032 Section 4 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.307 miles of pipeline in the City of Lompoc. The total loaded cost of the Project is \$6,105,956.

SoCalGas executed this project prudently through the replacement of pipeline using HDD across the Santa Ynez River.

SoCalGas engaged in prudent cost avoidance efforts by efficiently managing the number of PCF installations without impacting service to customers, utilizing water for dust control, and bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

**End of Supply Line 36-1032 Section 4 Replacement Project Final Report**

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

## I. SUPPLY LINE 36-9-09 NORTH SECTIONS 5B-02 AND 5C REPLACEMENT PROJECT

---

### A. Background and Summary

The Supply Line 36-9-09 North Section 5B-02 and 5C Replacement Project is a rerouted alignment of a [REDACTED] diameter supply line that runs approximately 0.9 miles parallel to Highway 101, adjacent to a public sports complex owned by the City of Pismo Beach, and crossing a railroad right of way (ROW). The pipeline runs through both commercial and residential neighborhoods in the City of Pismo Beach. This report describes the activity associated with the Supply Line 36-9-09 North Section 5B-02 and 5C Replacement Project that consists of a replacement and reroute of 0.894 miles of pipeline within the city franchise to improve accessibility for routine maintenance and emergency response, two horizontal directional drills (HDDs), the installation of a regulator station, and removal of an existing span. The total loaded cost of the Project is \$13,746,075.

The Supply Line 36-9-09 North 5B-02 and 5C Replacement Project is a component of Supply Line 36-9-09 North, which was identified in the 2011 PSEP filing<sup>1</sup> as a 16.016 mile replacement project. The pipeline is located in the cities of Atascadero, San Luis Obispo, Pismo Beach, and Arroyo Grande. For project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline, SoCalGas divided Supply Line-36-9-09 North into several project sections to be managed individually (see Figure 1). Two key reasons drove the decision to manage the work on Supply Line 36-9-09 North in this manner; the sections were in different locations and physically separated from each other by non-PSEP segments of pipeline, and the project scopes (hydrotesting, replacement, or abandonment) differed among the sections and had differing permit acquisition timelines. Additionally, the entire length of Supply Line 36-9-09 North was made up of varying pipe diameters. SoCalGas standardized the pipeline diameter to make the pipeline piggable.

---

<sup>1</sup>See Amended December 2, 2011 Pipeline Safety Enhancement Plan (PSEP) of SoCalGas and SDG&E.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Table 1: General Project Information

Project Name		Supply Line 36-9-09 North Section 5B-02		
Project Type		Replacement		
Length		0.278 miles		
Location		Pismo Beach		
Class		3		
MAOP (confidential)		[REDACTED]		
Pipe Vintage		1932		
Construction Start		11/13/2018		
Construction Finish		03/20/2019		
Original Pipe Diameter (confidential)		[REDACTED]		
New Diameter (confidential)		[REDACTED]		
Original SMYS <sup>2</sup> (confidential)		[REDACTED]		
New SMYS (confidential)		[REDACTED]		
Project Name		Supply Line 36-9-09 North Section 5C		
Project Type		Replacement		
Length		0.617 miles		
Location		Pismo Beach		
Class		3		
MAOP (confidential)		[REDACTED]		
Pipe Vintage		1932		
Construction Start		12/12/2016		
Construction Finish		03/24/2016		
Original Pipe Diameter (confidential)		[REDACTED]		
New Diameter (confidential)		[REDACTED]		
Original SMYS <sup>3</sup> (confidential)		[REDACTED]		
New SMYS (confidential)		[REDACTED]		
Project Costs (\$)		Capital	O&M	Total
Loaded Project Costs		13,746,075	-	13,746,075
Disallowed Costs		-	-	-

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

<sup>3</sup> Ibid.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

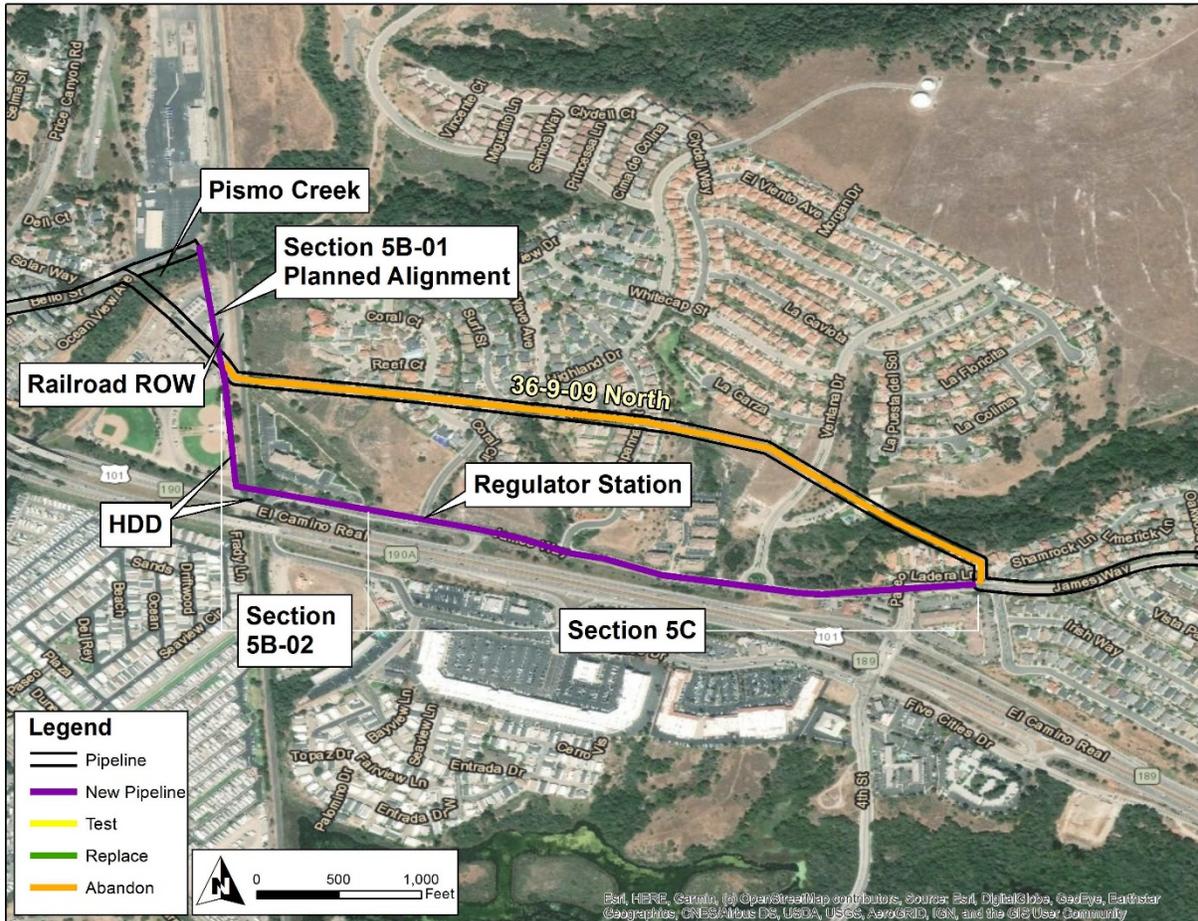
### B. Maps and Images

Figure 1: Map of Supply Line 36-9-09 North PSEP Projects



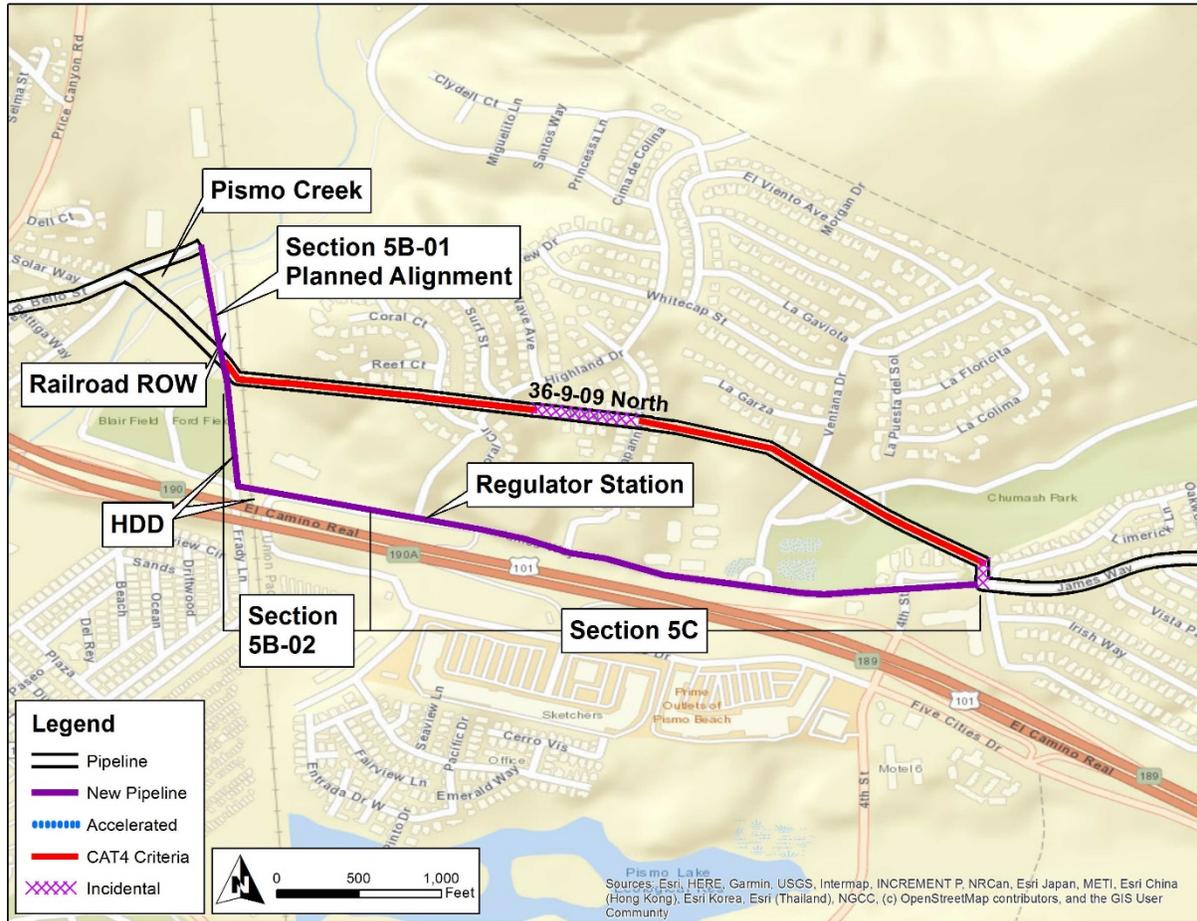
## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 2: Satellite Image of Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project



## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 3: Overview Map of Line 36-9-09 North Sections 5B-02 and 5C Replacement Project



Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information<sup>4</sup>

	Criteria	Accelerated	Incidental	New	Total <sup>5</sup>
Section 5B-02	0.670 mi.	0 mi.	0.161 mi.	0 mi.	0.278 mi.
	3,536 ft.	0 ft.	848 ft.	0 ft.	1,466 ft.
Section 5C	0 mi.	0 mi.	0.617 mi.	0 mi.	0.617 mi.
	0 ft.	0 ft.	3,257 ft.	0 ft.	3,257 ft.
Total Final Mileage	0.670 mi.	0 mi.	0.777 mi.	0 mi.	0.894 mi.
	3,536 ft.	0 ft.	4,105 ft.	0 ft.	4,723 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing. Prior to initiating execution of the Project in 2016, SoCalGas and SDG&E reviewed existing pipeline records to validate the scope of the project. During the Engineering, Design and Planning phase, SoCalGas and SDG&E further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: Supply Line 36-9-09 North was identified as a Phase 1A replacement project comprised of 9.662 miles of Category 4 Criteria pipe and 6.354 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 8.802 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. SoCalGas initially scoped Supply Line 36-9-09 North Section 5 as a single project; however, due to long lead permitting delays and constructability issues, the Project

<sup>4</sup> Total mileage of the completed project differs from the mileage of the pipe addressed due to realignment of the pipeline route.

<sup>5</sup> Values may not add to total due to rounding.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Team decided that Supply Line 36-9-09 North Section 5 should be sectioned into 5A<sup>6</sup>, 5B, and 5C.

- b. Subsequently, the Project Team determined that Section 5B should be further split into two sections, 5B-01<sup>7</sup> and 5B-02, due to delays in the City of Pismo Beach's own construction plans along the proposed alignment for Section 5B.
  - c. The Project Team designed the Supply Line 36-9-09 North Section 5B-02 and 5C Projects as one continuous rerouted replacement in the City of Pismo Beach utilizing open trench and two HDD crossings.
4. Final Project Scope: The final project scope for Sections 5B-02 and 5C consists of a 0.894 mile rerouted replacement, replacement of one regulator station, and the abandonment of 0.855 miles of pipeline. The Incidental mileage consists of 0.779 miles of pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line Section 5B-02 and 5C and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation of federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas has already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for

---

<sup>6</sup> Supply Line 36-9-09 North Section 5A Replacement Projects was submitted for Reasonableness Review in the 2018 proceeding.

<sup>7</sup> Supply Line 36-9-09 North Section 5B-01 will be submitted for reasonableness review in a future proceeding.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

in-line inspection, likely have non-state-of-the-art welds and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission’s directive in D.11-06-017 to “address retrofitting pipeline to allow for inline inspection tools,” the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and with the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in.
2. Customer Impacts: The Project Team determined that service could be maintained to customers by utilizing pressure control fittings (PCFs) during the tie-in.
3. Community Impacts: The rerouted alignment of the pipeline along Frady Lane would impact traffic and usage of the sports complex and James Way.
4. Permit Conditions: The Project Team identified multiple permit agencies and requirements.
5. Piggability: Non-piggable.
6. Pipe Vintage: 1932.
7. Existing Pipe Attributes: Existing non-piggable plug valves and unbarred tees.
8. Longseam Type: Unknown.
9. Longseam Repair History: No identified issues.
10. Condition of Coating: No identified issues.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

11. History of Leaks: No identified issues.

## C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a site walk. Key factors that influenced the engineering and design of the Project are as follows:

### 1. Constructability:

- a. The Project Team initially scoped Supply Line 36-9-09 North Section 5 as a single project. Due to long lead delays and constructability issues for crossing Pismo Creek and railroad tracks, the Project Team determined that Supply Line 36-9-09 North Section 5 needed to be sectioned into 5A, 5B, and 5C, and project execution commenced on Sections 5A and 5C. The Project Team identified the following as potential delays:
  - i. Existing fiber optic lines in close proximity to the train tracks that would require additional railroad oversight when work is performed adjacent to the tracks.
  - ii. A geotechnical evaluation that revealed a risk of lateral movement in the event of an earthquake for the planned horizontal directional drill (HDD) crossing of Pismo Creek.
- b. The existing pipeline remained in service while the Project Team planned and designed Section 5B in accordance to the requirements set forth by the City of Pismo Beach.
- c. The Project Team determined that due to delays in the City of Pismo Beach's own construction plans in the proposed alignment for 5B, that it must be split into two sections, 5B-01 and 5B-02. The Project Team could move forward with project execution of 5B-02, while 5B-01 would need to wait until the City of Pismo Beach completed their construction project.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

- d. In order to address constructability issues and reduce community impact, the Project Team designed the Project with two HDD crossings. One to cross under a railroad ROW and the other was under an access road behind the nearby sports complex, avoiding the need to restrict access to the local community.
- 2. Reroute: Due to residential and commercial development that had occurred since the original installation of the pipeline in 1932, the Project Team determined that a rerouted alignment within the city franchise which runs alongside Highway 101 would improve accessibility for routine maintenance and emergency response.
- 3. Shut-In Analysis: The Project Team completed an RER analysis and concluded the line could be shut-in by using PCFs.
- 4. Customer Impact: The Project Team determined that utilizing a PCF will facilitate tying into the existing Supply Line 36-9-09 North without disruption of service. One regulator station would be replaced to maintain uninterrupted customer service.
- 5. Community Impact:
  - a. The Section 5B-02 Project was designed to include one HDD to cross under an access road at the City of Pismo Beach’s sports complex and reduce impacts to the sports complex’s facilities.
  - b. The Section 5C Project was designed to maintain two open lanes of traffic along James Way (parallel to Highway 101) during construction to minimize the impact to the community.
- 6. Permit Conditions: The Project Team identified multiple permit agencies and requirements:
  - a. City of Pismo Beach required an encroachment permit that allowed for two lanes of traffic along James Way and curb to curb repaving of the roadway.
  - b. Caltrans required an encroachment permit to close the northbound Highway 101 ramp near James Way.
  - c. The Railroad required a permit for crossing ROW using an HDD.
- 7. Diameter Changes: The Project Team replaced the existing [REDACTED] line with a [REDACTED] line based on the recommendation of the RER and to standardize the pipeline for

### Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

future pigability purposes, additionally taking advantage of cost savings from favorable pricing of bulk purchased pipe.

8. Substructures: The Project Team identified multiple substructures within the proposed construction alignment by reviewing public records and completing pre-construction potholing.
9. Environmental: The Project Team planned for typical abatement activities.

### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design for Sections 5B-02 and 5C. Following completion of the engineering, design, and planning activities described above, the Project Team evaluated the scope of the projects and determined to execute construction of Section 5B-02 by utilizing competitive bids while executing Section 5C through the Performance Partner. SoCalGas awarded Section 5B-02 to the successful bidder.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], that was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Supply Line 36-9-09 North Section 5B-02	
Construction Start Date	11/13/2018
Construction Completion Date	03/20/2019
NOP Date	01/31/2019
Supply Line 36-9-09 North Section 5C	
Construction Start Date	12/12/2016
Construction Completion Date	03/24/2017
NOP Date	03/09/2017

**C. Changes During Construction**

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$654,000 in change orders.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

## Section 5B-02

1. Site Restoration: The City of Pismo Beach required extensive additional restoration work at the Sports Complex including replacement of the scoreboard.
2. Schedule Delay: Due to conditions encountered during construction, the duration of construction was extended by approximately eight weeks. Additional field support costs were incurred to support the completion of this project.
3. Constructability Issues: The Construction Contractor encountered ground water approximately eight feet below the grade that required additional activities to prevent the water from overflow and the trench from collapsing.

## Section 5C

1. Site Restoration: The City of Pismo Beach permit requirement to repave the roadway from curb to curb from tie-in to tie-in was added by the City after the Construction Contractor submitted their estimate.
2. Substructures: A forced sewer main (FSM) encased in a 35-inch steel casing was not included in the plans provided by the City of Pismo Beach and was discovered during construction. The Project Team realigned the pipeline to avoid this sewer line.
3. Weather: Due to poor weather conditions, construction was delayed by 12 days.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 6: Test Head and Material Staging at Sports Complex



Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 7: Access Road Leading to James Way Horizontal Directional Drill Exit Pit



Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 8: Excavation in Progress for James Way Horizontal Directional Drill Exit Pit



Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Figure 9: Applying Epoxy Coating to New Pipeline



Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. A cost avoidance action taken on this project was the use of material bulk purchasing of [REDACTED] pipe.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$16,093,296. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$13,746,075.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

Table 4: Section 5B-02 and 5C Estimated and Actual Direct Costs and Variances<sup>8</sup>

Direct Costs (\$)	Estimate	Actuals <sup>9</sup>	Delta Over/(Under)
Company Labor	897,232	458,128	(439,104)
Materials	571,353	388,481	(182,872)
Construction Contractor	8,518,269	5,582,388	(2,935,881)
Construction Management & Support	833,154	630,297	(202,857)
Environmental	600,119	405,756	(194,363)
Engineering & Design	1,501,215	2,382,953	881,738
Project Management & Services	867,513	284,885	(582,628)
ROW & Permits	508,739	424,314	(84,425)
GMA	1,795,702	1,270,447	(525,255)
<b>Total Direct Costs</b>	<b>16,093,296</b>	<b>11,827,648</b>	<b>(4,265,648)</b>

Table 5: Section 5B-02 and 5C Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>10</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,833,504	1,411,448	(422,056)
AFUDC	1,931,762	443,960	(1,487,802)
Property Taxes	424,709	63,019	(361,690)
<b>Total Indirect Costs</b>	<b>4,189,975</b>	<b>1,918,427</b>	<b>(2,271,548)</b>
<b>Total Direct Costs</b>	<b>16,093,296</b>	<b>11,827,648</b>	<b>(4,265,648)</b>
<b>Total Loaded Costs</b>	<b>20,283,271</b>	<b>13,746,075</b>	<b>(6,537,196)</b>

<sup>8</sup> Values may not add to total due to rounding.

<sup>9</sup> Actual Material and Construction Contractor costs exclude the cost of upsizing the pipe.

<sup>10</sup> Values may not add to total due to rounding.

Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

## D. Disallowance

The scope of the Line 36-9-09 North Sections 5B-02 and 5C Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 36-9-09 North Sections 5B-02 and 5C Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.894 miles of pipe in the City of Pismo Beach. The total loaded cost of the Project is \$13,746,075.

SoCalGas executed this project prudently through installing 0.894 miles of pipeline in the City of Pismo Beach, including two HDD crossings to minimize impact to the community and a new regulator station.

SoCalGas engaged in prudent cost avoidance efforts by successfully negotiating site restoration alternatives with the City of Pismo Beach.

---

**End of Supply Line 36-9-09 North Sections 5B-02 and 5C Replacement  
Project Final Report**

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

## I. SUPPLY LINE 36-9-09 NORTH SECTION 6B REPLACEMENT PROJECT

---

### A. Background and Summary

Supply Line 36-9-09 North Section 6B is a predominantly [REDACTED] diameter transmission line that runs approximately 1.5 miles in Arroyo Grande, through residential neighborhoods, agricultural land, and commercial areas. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Supply Line 36-9-09 North Section 6B Replacement Project which consists of the replacement and reroute of 1.732 miles of pipeline using three horizontal directional drill (HDD) crossings, three flat slick bores along Alpine Street, and three flat bores along Valley Road. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$15,915,851.

The Supply Line 36-9-09 North Section 6B Replacement Project is a component of Supply Line 36-9-09-North, which was identified in the 2011 PSEP filing<sup>1</sup> as a 16.016 mile replacement project. The pipeline is located in the cities of Atascadero, San Luis Obispo, Pismo Beach, and Arroyo Grande. For project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline, SoCalGas divided Supply Line-36-9-09 North into several project sections to be managed individually (see Figure 1). Two key reasons drove the decision to manage the work on Supply Line 36-9-09 North in this manner; the sections were in different locations and physically separated from each other by non-PSEP segments of pipeline, and the project scopes (hydrotesting, replacement, or abandonment) differed among the sections and had differing permit acquisition timelines. Additionally, the entire length of Supply Line 36-9-09 North was made up of varying pipe diameters. SoCalGas standardized the pipeline diameter to make the pipeline piggable.

---

<sup>1</sup>See Amended December 2, 2011 Pipeline Safety Enhancement Plan (PSEP) of SoCalGas and SDG&E.

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Table 1: General Project Information

Project Name		Supply Line 36-9-09 North Section 6B		
Project Type	Replacement			
Length	1.732 miles			
Location	Arroyo Grande			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1955			
Construction Start	10/23/2017			
Construction Finish	04/18/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	15,915,851	-	15,915,851	
Disallowed Costs	-	-	-	

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

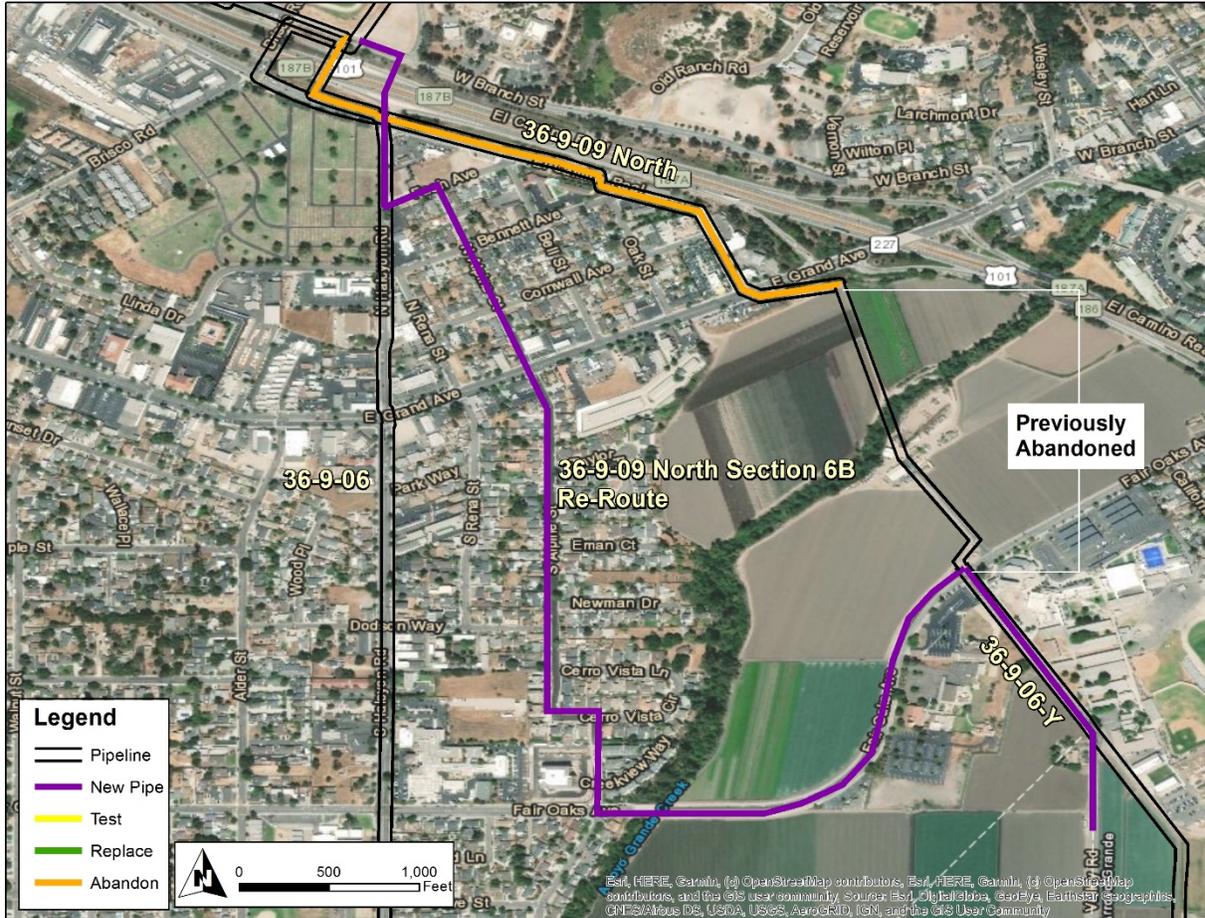
### B. Maps and Images

Figure 1: Map of Supply Line 36-9-09 North PSEP Projects



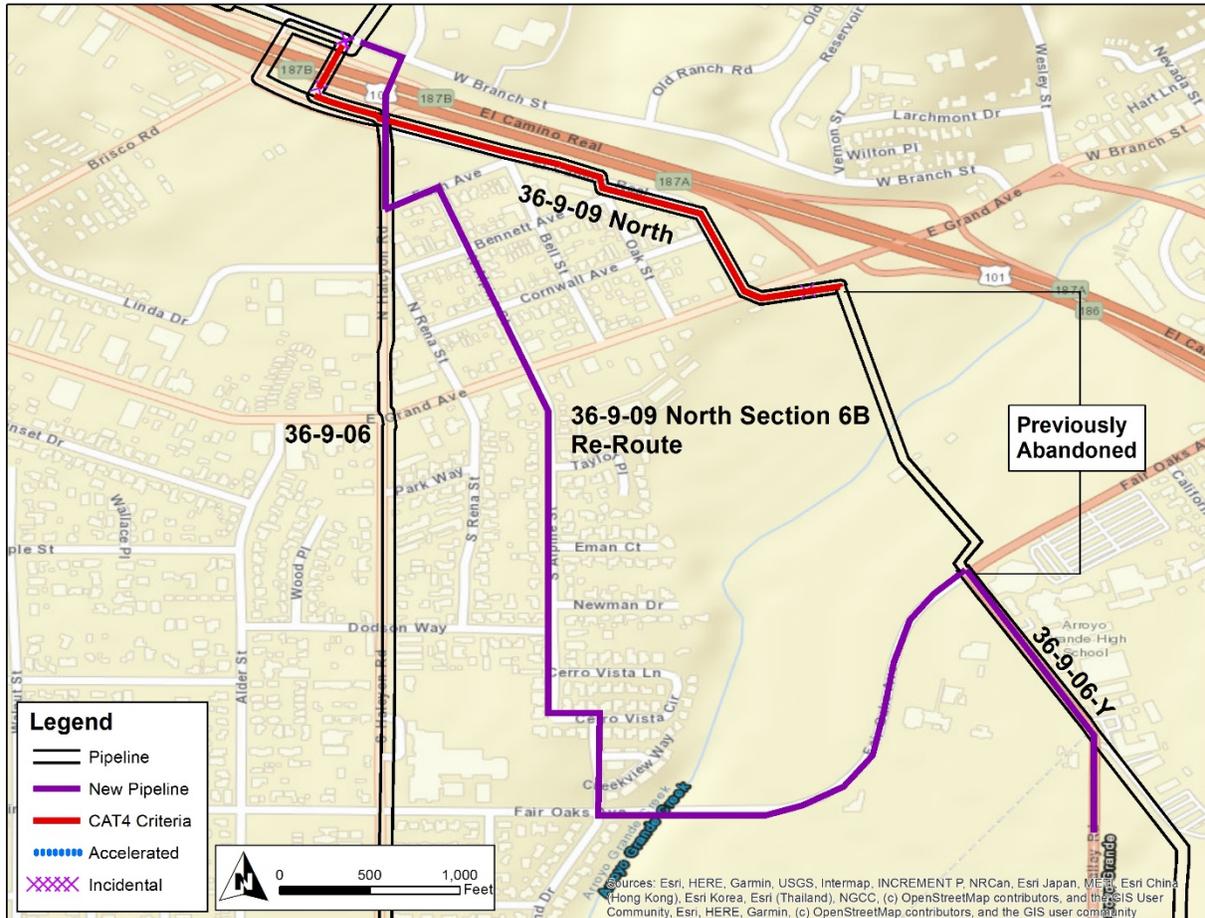
Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Figure 2: Satellite Image of Supply Line 36-9-09 North Section 6B Replacement Project



Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Figure 3: Overview Map of Supply Line 36-9-09 North Section 6B Replacement Project



Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated	Incidental	New	Total <sup>3</sup>
Final Mileage	0.605 mi.	0 mi.	0.016 mi.	1.112 mi.	1.732 mi.
	3,192 ft.	0 ft.	82 ft.	5,871 ft.	9,145 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 36-9-09 North as a Phase 1A Replacement Project comprised of 9.662 miles of Category 4 Criteria pipe and 6.354 miles of Accelerated pipe. Supply Line 36-9-09 Section 6B is a section within that project.
2. Scope Validation: Due to the unique characteristics of the non-contiguous portions of the Project, SoCalGas successfully reduced the scope of the Project by 9.048 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project could not follow the existing alignment due to land owner concerns over the Project impacting farming operations resulting in a reroute of approximately 0.325 miles of pipe along Fair Oaks Avenue and Valley Road around this property.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

### Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

- b. The reroute alignment was the best option the Project Team could obtain following negotiations with the City of Arroyo Grande.
  - c. Three HDD crossings were utilized for Highway 101, Grand Avenue, and culturally sensitive areas.
  - d. Three flat slick bores were utilized along Alpine Street to avoid plating for pedestrian safety.
  - e. Three flat bores were utilized along Valley Road to reduce the construction duration and complete work within the two week winter break of an adjacent high school.
  - f. Incidental mileage was included for the constructability of the reroute.
4. Final Project Scope: The final project scope consists of a 1.732 mile Replacement and 82 feet of Incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 36-9-09 North Section 6B and confirmed the project design should commence as a Replacement Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line be shut-in during any season as long as the PG&E Morro Bay inter-tie is online and supplying the system during the winter season.
2. Customer Impacts: Customers impacted by the Project were transferred to the adjacent medium pressure system prior to the construction of the Project to prevent impacts and avoid CNG costs.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1955.
5. Existing Pipe Attributes: Multiple pipe diameters.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities including reviewing public records, potholing, and ground penetrating radar (GPR) of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded that the line could be shut-in during any season as long as the PG&E Morro Bay inter-tie is online and supplying the system during the winter season.
2. Customer Impact: Per the RER, customers impacted by the Project would be transferred to the adjacent medium pressure system prior to the construction of the Project to prevent impacts and avoid CNG costs.
3. Community Impact:

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

- a. The Project required closure of one lane of the roadway and two way traffic was maintained using flaggers.
  - b. Residences along Alpine Street could experience occasional blocking of driveways. The Project Team coordinated with residents and communicated when the blockages would occur. The Project Team made adjustments as needed to minimize any inconveniences.
  - c. For the HDD crossing under Highway 101, a portion of Halcyon Road was closed and traffic was diverted around the site.
  - d. For installation of pipe on Faeh Avenue, the street was temporarily closed and traffic was diverted around the site.
4. Diameter Changes: The Project Team replaced the existing multiple diameter line with a [REDACTED] line to standardize the pipeline for future pigability purposes, taking advantage of cost savings from favorable pricing of bulk purchased pipe.
5. Schedule Coordination: Impacted customers were tied-over and converted to an adjacent medium pressure system prior to construction to avoid CNG costs.
6. Substructures: The Project Team initially planned to route the new pipeline along Halcyon Road to Fair Oaks Avenue. Following the completion of potholing, it was determined that it was too congested with existing substructures to install another pipeline within that corridor. This resulted in the rerouting along Alpine Street. Extensive potholing was completed along Alpine Street to confirm this route.
7. Permit Conditions: The Project Team identified multiple agencies along the proposed alignment that included:
- a. Caltrans Encroachment Permit.
  - b. County of San Luis Obispo Encroachment Permit.
  - c. Arroyo Grande Temporary Use Permit.
  - d. Arroyo Grande Encroachment Permit. This permit contained a condition to repave Alpine Street.
8. Environmental:

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

- a. Due to the cultural sensitivity of the Project area, the Project Team consulted with representatives of the Chumash Tribe to receive input on the final disposition of any findings during construction.
  - b. Potholing, slot trench efforts, and GPR was performed in the culturally sensitive areas. The Project Team determined that utilizing an HDD under the culturally sensitive areas would minimize impact.
  - c. A California Department of Fish and Wildlife (CDFW) permit was required for work on the Fair Oaks Avenue bridge crossing of Arroyo Grande Creek. The Project Team determined that using pipe hangers from the bridge would minimize impact to this environmentally sensitive area.
  - d. The Central Coast Regional Water Quality Control required that construction on the Fair Oaks Avenue bridge crossing of Arroyo Grande Creek be completed prior to November 30, as no construction activities could occur between December 1 and May 21.
  - e. The Project Team identified that a Storm Water Pollution Prevention Plan (SWPPP) would be required.
9. Reroute:
- a. Land owner concerns over the Project impacting farming operations resulted in a reroute along Fair Oaks Avenue and Valley Road around this property.
  - b. Reroute along Brisco Road was required to cross Highway 101.
10. Tie-In: The southern tie-in location was relocated to existing easement space and the public ROW due to a land owner preventing the use of temporary workspace.

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

## D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the preliminary cost estimate does not fully reflect the final scope. The notable change in scope made after the preliminary cost estimate was developed and approved was to address the land owner concerns over the Project alignment impacting farming operations. The solution resulted in revisions and a reroute of approximately 0.325 miles of pipe along Fair Oaks Avenue and Valley Road around this private property.

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered a competitive bidding process to select a construction contractor, that included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Bid (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	10/23/2017
Construction Completion Date	04/18/2018
NOP Date	04/09/2018

#### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Figure 4: Pipe Strung Out Along Alpine Street



Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Figure 5: Pipe Being Lowered into Trench



Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

Figure 6: Site Restoration / Repaved Street



## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for [REDACTED] pipe.
2. Schedule Coordination: Abandonment and tie over work was done prior to the replacement project to save on CNG costs and help with the tie over.
3. Water Management: Test water reused for dust mitigation.
4. Construction Execution:
  - a. Flat slick bores were installed for safety and ease of construction through the intersection on Alpine and on Valley Road during the short holiday work period.
  - b. During the pothole operations on Woodland Road, a [REDACTED] gas line was found to be off location. With the gas line plotted in the right location, the Construction Contractor was able to install the pipe over a large storm drain.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$14,972,448. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$15,915,851.

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	887,368	465,393	(421,975)
Materials	410,520	432,628	22,108
Construction Contractor	7,514,367	7,241,400	(272,967)
Construction Management & Support	541,639	849,900	308,261
Environmental	902,029	631,368	(270,661)
Engineering & Design	1,286,606	2,047,791	761,185
Project Management & Services	1,609,174	562,299	(1,046,875)
ROW & Permits	263,637	159,884	(103,753)
GMA	1,557,108	1,533,271	(23,837)
<b>Total Direct Costs</b>	<b>14,972,448</b>	<b>13,923,934</b>	<b>(1,048,514)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>6</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,255,063	1,379,935	124,872
AFUDC	2,561,688	533,904	(2,027,784)
Property Taxes	574,748	78,078	(496,670)
<b>Total Indirect Costs</b>	<b>4,391,499</b>	<b>1,991,917</b>	<b>(2,399,582)</b>
<b>Total Direct Costs</b>	<b>14,972,448</b>	<b>13,923,934</b>	<b>(1,048,514)</b>
<b>Total Loaded Costs</b>	<b>19,363,946</b>	<b>15,915,851</b>	<b>(3,448,095)</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Ibid.

Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

## D. Disallowance

The scope of the Line 36-9-09 North Section 6B Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 36-9-09 North Section 6B Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 36-9-09 North Section 6B Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 1.732 miles of pipeline. The total loaded cost of the Project is \$15,915,851.

SoCalGas executed this project prudently by using three HDD crossings to avoid culturally sensitive areas and three flat slick bores along Alpine Street, and three flat bores along Valley Road.

SoCalGas engaged in prudent cost avoidance efforts by Bulk Material purchases through the inventory system. Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

---

**End of Supply Line 36-9-09 North Section 6B Replacement Project  
Final Report**

## Final Report for Supply Line 36-9-21 Replacement Project

**I. SUPPLY LINE 36-9-21 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 36-9-21 is a predominantly [REDACTED] diameter transmission line that runs approximately 0.464 miles from Paso Robles to Templeton along Vine Street, crossing Highway 101, through commercial areas in Paso Robles. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Supply Line 36-9-21 Replacement Project which consists of the replacement and reroute of 0.463 miles of pipeline that includes a horizontal directional drill (HDD) under Highway 101. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$6,795,754.

Final Report for Supply Line 36-9-21 Replacement Project

Table 1: General Project Information

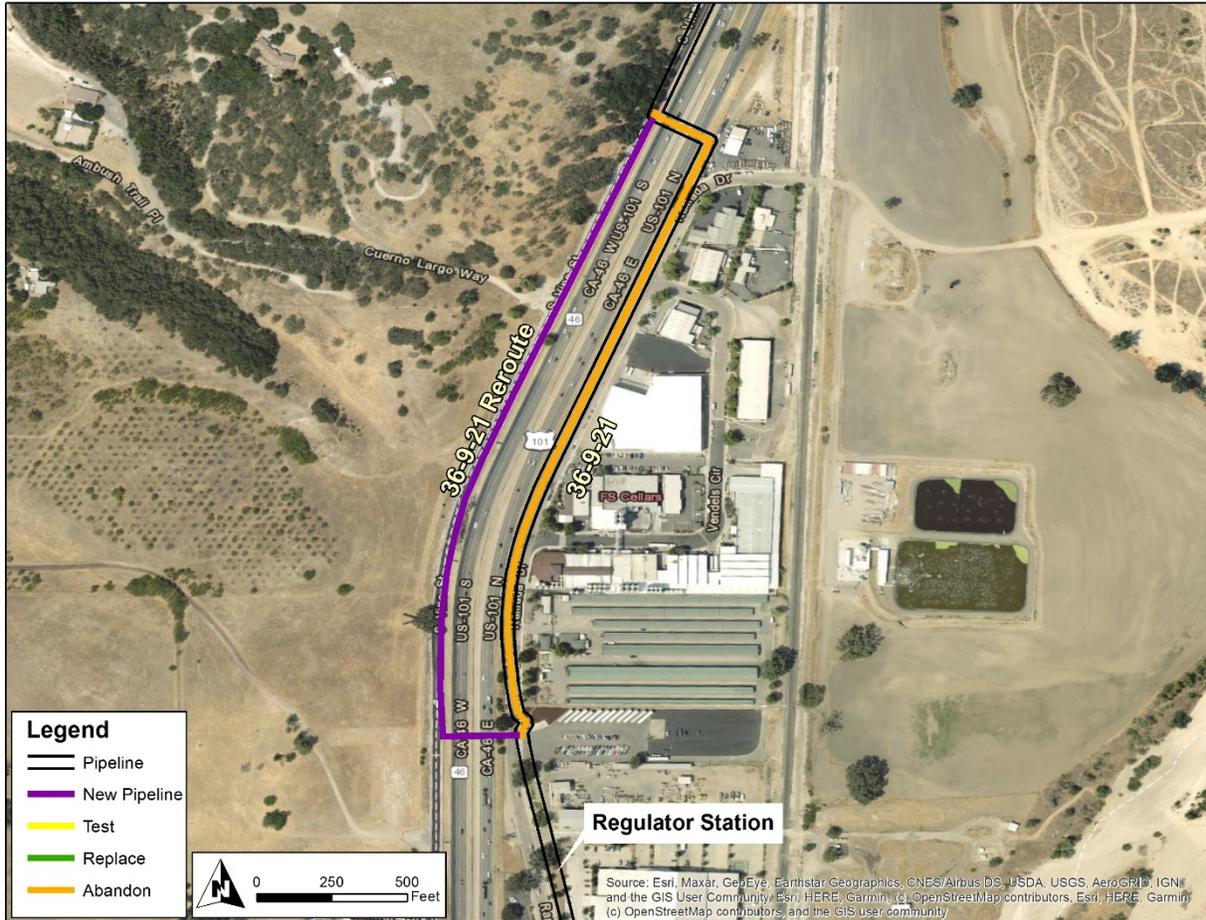
Project Name	Supply Line 36-9-21		
Project Type	Replacement		
Length	0.464 miles		
Location	Paso Robles		
Class	3		
MAOP ( <i>confidential</i> )	[REDACTED]		
Pipe Vintage	1950		
Construction Start	08/21/2017		
Construction Finish	11/15/2017		
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]		
New Diameter ( <i>confidential</i> )	[REDACTED]		
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]		
New SMYS ( <i>confidential</i> )	[REDACTED]		
Project Costs (\$)	Capital	O&M	Total
Loaded Project Costs	6,795,754	0	6,795,754
Disallowed Costs	-	-	-

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 36-9-21 Replacement Project

B. Maps and Images

Figure 1: Satellite Image of Supply Line 36-9-21 Replacement Project



## Final Report for Supply Line 36-9-21 Replacement Project

Figure 2: Overview Map of Supply Line 36-9-21 Replacement Project



Final Report for Supply Line 36-9-21 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>2</sup>	Incidental	New	Total <sup>3</sup>
Final Mileage	0.387 mi.	0.042 mi.	0.016 mi.	0.020 mi.	0.464 mi.
	2,041 ft.	221 ft.	83 ft.	106 ft.	2,451 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 36-9-21 as a Phase 1A Replacement Project comprised of 0.389 miles of Category 4 Criteria pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas confirmed the scope of the Project of 0.389 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. To reduce impacts to local businesses, the Project Team installed the new pipeline along Vine Street as opposed to Ramada Drive where the existing pipeline was located.
  - b. Accelerated mileage and Incidental mileage was included to facilitate the tie-in.

<sup>2</sup> Accelerated mileage includes Phase 2B pipe. Phase 2B includes pipelines without record of a pressure test to modern – Subpart J – standards (Phase 2B). The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 36-9-21 Replacement Project

4. Final Project Scope: The final project scope consists of a 0.464 mile Replacement. The Accelerated mileage consists of 221 feet of Phase 2B pipe, and 83 feet of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 36-9-21 and confirmed the project design should commence as a Replacement Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that there is no transmission line that feeds Supply Line 36-9-21 from the North so it cannot be shut-in. Utilizing a bypass would alleviate customer impacts during tie-in.
2. Customer Impacts: The Project Team identified that utilizing a bypass would alleviate customer impacts. The Project Team identified one customer within the replacement region; however, by utilizing the bypass, adequate pressure would be maintained without interrupting service to customers along Ramada Drive.

Final Report for Supply Line 36-9-21 Replacement Project

3. Community Impacts: Potential impact to local businesses resulted in a reroute of the original alignment from Ramada Drive to Vine Street.
4. Permit Conditions:
  - a. The City of Paso Robles required an encroachment permit and traffic control. The city provided permit approval for mid-August 2017 to mid-November 2017 so that the Project Team could complete the Project prior to the holiday shopping season due to the proximity of shopping areas.
  - b. A Caltrans encroachment permit was required for the HDD crossing of Highway 101.
5. Piggability: Non-piggable.
6. Pipe Vintage: 1950.
7. Existing Pipe Attributes: Multiple diameters.
8. Longseam Type: Unknown.
9. Longseam Repair History: No identified issues.
10. Condition of Coating: No identified issues.
11. History of Leaks: No identified issues.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed an RER analysis and concluded that the line could be shut-in with the installation of a by-pass.
2. Customer Impact: Per the RER, two unutilized customer taps were abandoned. Further review confirmed that there were no active customer taps within the planned alignment. The Project Team maintained customer service utilizing stopple fittings.

### Final Report for Supply Line 36-9-21 Replacement Project

3. Community Impact: Potential impact to local businesses resulted in a reroute of the original alignment from Ramada Drive to Vine Street.
4. Diameter Changes: The Project Team replaced the existing [REDACTED] line with a [REDACTED] line based on the recommendation of the RER and to standardize the pipeline for future pigability purposes, taking advantage of cost savings from favorable pricing of bulk purchased pipe.
5. Substructures: The Project Team identified multiple utilities prior to construction and included them in the Project design.
6. Permit Conditions: Negotiations with the City of Paso Robles yielded less repaving work.
7. Land Use: Landowner concerns at the northern end of Ramada Drive prevented the tie-in to the existing Highway 101 crossing, resulting in the relocation of the HDD under Highway 101 to the southern end of the Project.
8. Environmental: The Project Team planned for typical abatement activities when removing existing pipe for tie-ins.
9. Reroute: Potential impact to local businesses resulted in a reroute of the original alignment from Ramada Drive to Vine Street. Landowner concerns at the northern end of Ramada Drive also prevented the tie-in to the existing Highway 101 crossing, resulting in the relocation of the HDD under Highway 101 to the southern end of the Project.
10. Coupons: The Project Team conducted an examination study to confirm the existing pipe was within PSEP scope.

### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 36-9-21 Replacement Project

**III. CONSTRUCTION**

---

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	08/21/2017
Construction Completion Date	11/15/2017
NOP Date	10/19/2017

**C. Changes During Construction**

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 36-9-21 Replacement Project

Figure 3: Trenching Along Vine Street



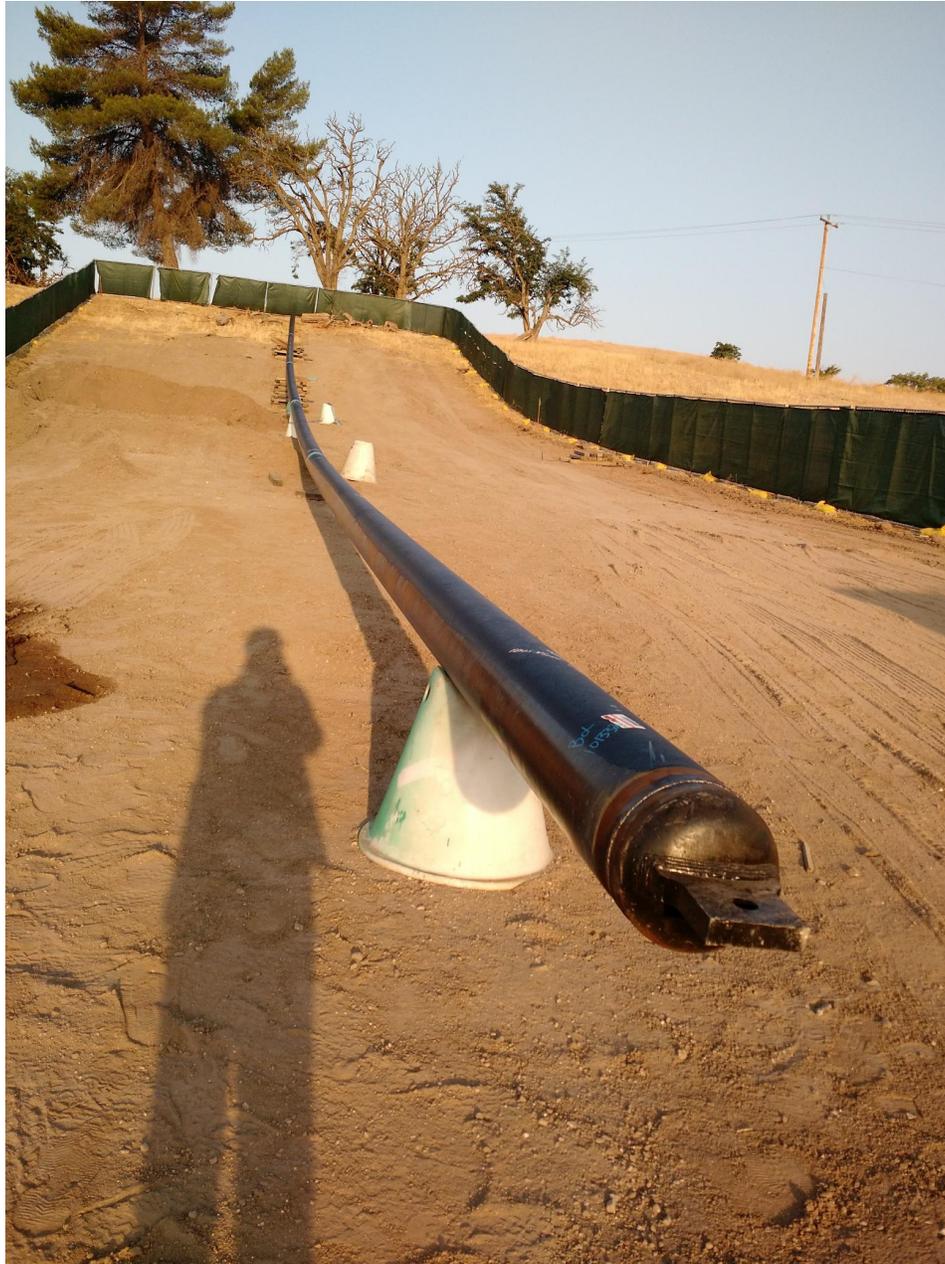
Final Report for Supply Line 36-9-21 Replacement Project

Figure 4: PCF Connecting the Old and New Pipeline



Final Report for Supply Line 36-9-21 Replacement Project

Figure 5: Preparation for the HDD Across Highway 101



Final Report for Supply Line 36-9-21 Replacement Project

Figure 6: Back Reamer for HDD



## Final Report for Supply Line 36-9-21 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 36-9-21 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.
2. Water Management: Water sourcing was negotiated with the city and the project was allowed to use a nearby fire hydrant for hydrotest.
3. Future Maintenance: The Project Team removed an existing mainline valve (MLV) after confirming it was no longer needed for system isolation.
4. Permit Conditions: Negotiations with the City of Paso Robles yielded less repaving work. The city required the project to repave only up to the center line on the road of Vine Street as opposed to the entire width.
5. Construction Execution: Prior to construction, the project design utilized a temporary bypass method at the tie-in points to maintain gas flow. During construction, the Project Team reevaluated the design to utilize simpler Pressure Control Fittings.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$6,895,764. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

Final Report for Supply Line 36-9-21 Replacement Project

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$6,795,754.

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals <sup>6</sup>	Delta Over/(Under)
Company Labor	321,332	241,526	(79,806)
Materials	269,290	145,280	(124,010)
Construction Contractor	3,504,860	2,711,024	(793,836)
Construction Management & Support	254,703	292,996	38,293
Environmental	275,155	155,183	(119,972)
Engineering & Design	1,116,499	1,278,308	161,809
Project Management & Services	412,527	310,020	(102,507)
ROW & Permits	115,500	127,405	11,905
GMA	625,898	648,552	22,654
<b>Total Direct Costs</b>	<b>6,895,764</b>	<b>5,910,292</b>	<b>(985,472)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>7</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	628,634	597,151	(31,483)
AFUDC	398,874	256,151	(142,723)
Property Taxes	77,257	32,159	(45,098)
<b>Total Indirect Costs</b>	<b>1,104,765</b>	<b>885,461</b>	<b>(219,304)</b>
<b>Total Direct Costs</b>	<b>6,895,764</b>	<b>5,910,292</b>	<b>(985,472)</b>
<b>Total Loaded Costs</b>	<b>8,000,529</b>	<b>6,795,754</b>	<b>(1,204,775)</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Actual Material and Construction Contractor costs exclude the cost of upsizing the pipe.

<sup>7</sup> Values may not add to total due to rounding.

Final Report for Supply Line 36-9-21 Replacement Project

**D. Disallowance**

The scope of the Line 36-9-21 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 36-9-21 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 36-9-21 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.464 miles of pipeline in Paso Robles. The total loaded cost of the Project is \$6,795,754.

SoCalGas executed this project prudently through replacement and reroute along Vine Street that included an HDD under Highway 101.

SoCalGas engaged in prudent cost avoidance efforts by removing a MLV no longer needed for system isolation, negotiating less repaving work with the city, utilizing PCF bottom out fittings as opposed to a temporary bypass, and utilizing bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

**End of Supply Line 36-9-21 Replacement Project Final Report**

---

## Final Report for Supply Line 37-18-K Replacement Project

**I. SUPPLY LINE 37-18-K REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 37-18-K is a predominantly [REDACTED] diameter transmission line that runs approximately three miles along the heavily trafficked 190<sup>th</sup> Street from Flagler Lane to Crenshaw Boulevard, through residential neighborhoods and commercial areas within the City of Redondo Beach and City of Torrance. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with the Supply Line 37-18-K Replacement Project which consists of the replacement of two segments of pipeline totaling 1.928 miles and the installation of two mainline valves (MLVs). The post-completion pressure test was conducted in one continuous test rather than two, thus capturing approximately 950 feet of Incidental pipe avoiding the cost of two separate post-completion pressure tests. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$16,812,563.

Final Report for Supply Line 37-18-K Replacement Project

Table 1: General Project Information

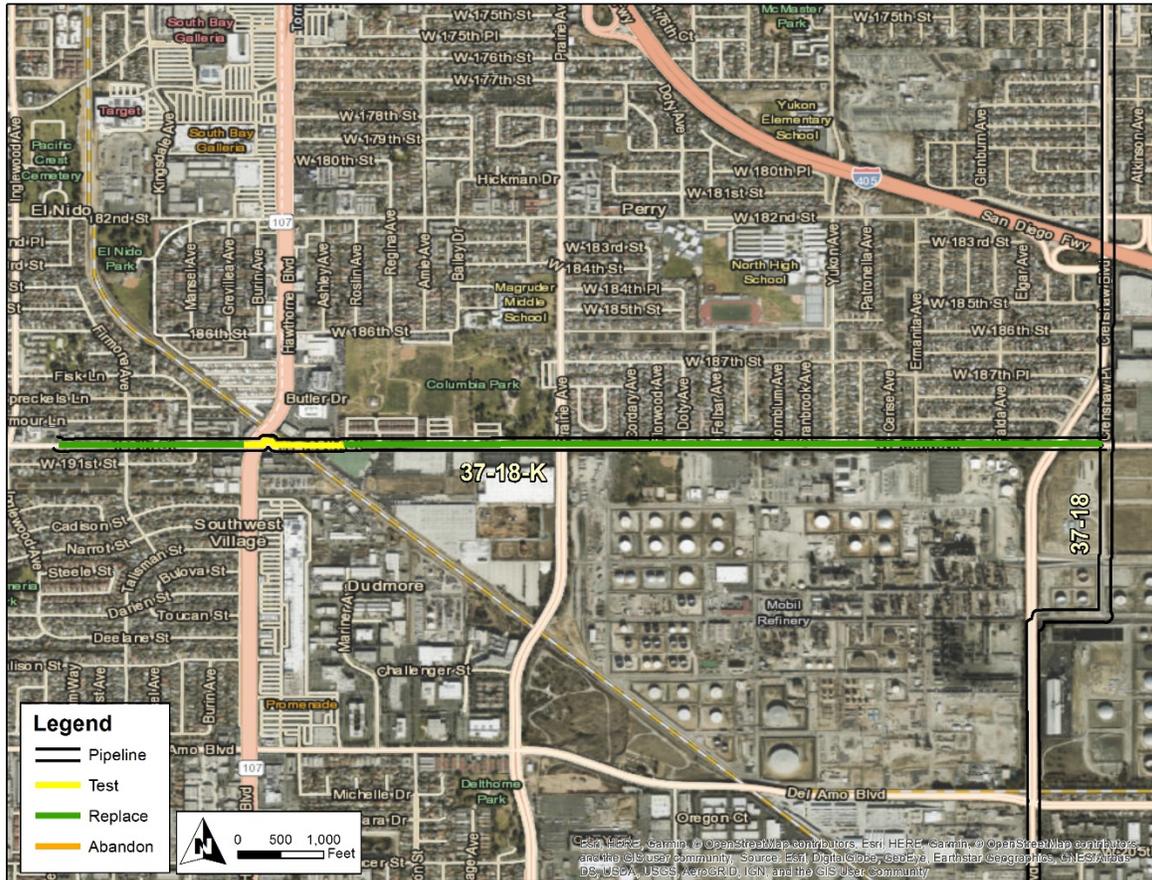
Project Name		Supply Line 37-18-K		
Project Type	Replacement			
Length	1.928 miles			
Location	City of Redondo Beach and City of Torrance			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1949			
Construction Start	03/05/2018			
Construction Finish	07/27/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	16,812,563	-	16,812,563	
Disallowed Costs	-	-	-	

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Supply Line 37-18-K Replacement Project

### B. Maps and Images

Figure 1: Satellite Image of Supply Line 37-18-K Replacement Project



Final Report for Supply Line 37-18-K Replacement Project

Figure 2: Overview Map of Supply Line 37-18-K Replacement Project



Final Report for Supply Line 37-18-K Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated	Incidental	New	Total <sup>2</sup>
Final Mileage	1.714 mi.	0 mi.	0.202 mi.	0.012 mi.	1.928 mi.
	9,052 ft.	0 ft.	1064 ft.	63 ft.	10,179 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>3</sup> Prior to initiating execution of the Project in 2018, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 37-18-K as a Phase 1A Replacement Project comprised of 2.850 miles of Category 4 Criteria pipe and no Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 1.114 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. Supply Line 37-18-K was filed as a Phase 1A replacement project and the Test versus Replacement (TVR) analysis ultimately concluded that replacement was the best option.
  - b. Incidental mileage was included to allow the post-completion pressure test to be executed in one continuous test rather than multiple tests. This avoided additional costs for land acquisition and test head materials.

<sup>2</sup> Values may not add to total due to rounding.

<sup>3</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 37-18-K Replacement Project

4. Final Project Scope: The final project scope consists of a 1.928 mile Replacement, including the installation of two MLVs. There is 0.202 miles of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 37-18-K and initially concluded the project design should commence as a Hydrotest.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

As scope development continued, SoCalGas reviewed the results of several External Corrosion Direct Assessments (ECDA), which indicated potential long seam related flaws increasing the risk of a pressure test failure. Based on this information and the lack of piggability, the Project Team recommended replacement rather than hydrotest as the best option.

Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line could be shut-in only under summer conditions with manageable system impacts.
2. Customer Impacts: Customers impacted by the shut-in of the line would need to be transferred to a nearby medium pressure line or be fed by an alternate source.
3. Community Impacts: Significant traffic impacts and occasional noise.

Final Report for Supply Line 37-18-K Replacement Project

4. Permit Conditions: Multiple issues relating to traffic control, work times, moratoriums, and coordinating between multiple permitting agencies.
5. Piggability: Non-piggable.
6. Pipe Vintage: 1949.
7. Existing Pipe Attributes: The line is not suitable for smart-pigging due to the existence of multiple plug valves.
8. Longseam Type: Unknown.
9. Longseam Repair History: SoCalGas performed several ECDAs that yielded results indicating potential longseam related flaws. Five repair bands had been installed by SoCalGas to remediate the longseam issues. The ECDAs indicated potential longseam related flaws which increases the risks in case of a hydrotest failure. The change from hydrotest to replacement eliminates the risk.
10. Condition of Coating: Coal tar wrap in poor condition.
11. History of Leaks: No identified issues.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded that the line could only be shut-in and backfed under summer conditions.
2. Customer Impact: A core customer fed by Supply Line 37-18-K on Prairie Avenue was transferred from a high pressure to a medium pressure feed to avoid the use of CNG.
3. Community Impact: Significant traffic impacts and occasional noise.

## Final Report for Supply Line 37-18-K Replacement Project

4. Constructability: The Project Team determined that it was feasible and would be more efficient to perform the post-completion pressure test in one continuous test rather than two separate tests.
5. Substructures: Potholing activities were performed and confirmed known substructures.
6. Permit Conditions: The Project Team identified multiple agencies along the proposed alignment that included
  - a. Caltrans Traffic Control Permit.
  - b. City of Torrance Encroachment Permit.
  - c. City of Torrance Traffic Control Permit.
  - d. City of Redondo Beach Encroachment Permit.
  - e. City of Redondo Beach Traffic Control Permit.
7. Land Use: A laydown yard was shared with the PSEP Supply Line 30-18 Section 2 Project.
8. Environmental: The Project Team planned for typical abatement activities when removing existing pipe for tie-ins.
9. Valves: The Project Team planned to replace two existing mainline plug valves with two new mainline ball valves for piggability purposes.
10. Tie-In: To facilitate the tie-in at 190th Street and Hawthorne Boulevard, the Project Team replaced two lateral valves on Supply Line 37-18-K1 and Supply Line 37-18-K1BR1 with new ball valves.

## D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 37-18-K Replacement Project

### III. CONSTRUCTION

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	03/05/2018
Construction Completion Date	07/27/2018
NOP Date	07/11/2018

#### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

## Final Report for Supply Line 37-18-K Replacement Project

Figure 3: Positioning New Pipe Along 190<sup>th</sup> Street



Final Report for Supply Line 37-18-K Replacement Project

Figure 4: Installing Pipe Along 190<sup>th</sup> Street



Final Report for Supply Line 37-18-K Replacement Project

Figure 5: Trenching Along 190<sup>th</sup> Street Near Hawthorne Boulevard



Final Report for Supply Line 37-18-K Replacement Project

Figure 6: Traffic Control Along 190<sup>th</sup> Street Near Crenshaw Boulevard



## Final Report for Supply Line 37-18-K Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 37-18-K Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Engineering & Design: The post completion hydrotest was designed to be completed in one continuous test rather than multiple tests to avoid additional land acquisition and test head material costs.
2. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED], [REDACTED], and [REDACTED] pipe.
3. Schedule Coordination: The Project Team was able to take advantage of resources from the Supply Line 30-18 Section 2 Project by planning the Supply Line 37-18-K Project to begin construction sequentially after Supply Line 30-18 Section 2 was completed. Construction down time and project costs were reduced by utilizing the same crew and sharing laydown yards.
4. Land Use: Laydown yard was shared with the PSEP Supply Line 30-18 Section 2 Project.
5. Future Maintenance: One of the factors driving the Supply Line 37-18-K Replacement Project was the need to replace the line in the future due to existing non-piggable pipeline features. The Project Team removed the existing non-piggable plug valves and installed new ball valves.
6. Construction Execution: The Project was planned to be sequenced with other PSEP Projects within the area to reduce mobilization costs.

Final Report for Supply Line 37-18-K Replacement Project

**B. Cost Estimate**

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$21,316,490. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$16,812,563.

Table 4: Estimated and Actual Direct Costs and Variances<sup>4</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	867,962	389,384	(478,578)
Materials	1,698,070	862,654	(835,416)
Construction Contractor	10,918,315	9,319,633	(1,598,682)
Construction Management & Support	473,982	370,781	(103,201)
Environmental	288,956	161,215	(127,741)
Engineering & Design	2,550,067	1,495,561	(1,054,506)
Project Management & Services	2,174,934	211,959	(1,962,975)
ROW & Permits	61,879	439,107	377,228
GMA	2,282,325	1,647,320	(635,005)
<b>Total Direct Costs</b>	<b>21,316,490</b>	<b>14,897,615</b>	<b>(6,418,875)</b>

<sup>4</sup> Values may not add to total due to rounding.

Final Report for Supply Line 37-18-K Replacement Project

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>5</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	2,053,422	1,560,165	(493,257)
AFUDC	3,377,516	308,391	(3,069,125)
Property Taxes	767,207	46,392	(720,815)
<b>Total Indirect Costs</b>	<b>6,198,145</b>	<b>1,914,947</b>	<b>(4,283,198)</b>
<b>Total Direct Costs</b>	<b>21,316,490</b>	<b>14,897,615</b>	<b>(6,418,875)</b>
<b>Total Loaded Costs</b>	<b>27,514,635</b>	<b>16,812,563</b>	<b>(10,702,072)</b>

<sup>5</sup> Values may not add to total due to rounding.

Final Report for Supply Line 37-18-K Replacement Project

**D. Disallowance**

The scope of the Line 37-18-K Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 37-18-K Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 37-18-K Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 1.928 miles of pipe and two mainline valves (MLVs) in the cities of Redondo Beach and Torrance. The total loaded cost of the Project is \$16,812,563.

SoCalGas executed this project prudently through minimizing community impacts, conducting the post-completion pressure test in one continuous test rather than two, and improving safety by executing this Project as a replacement rather than a hydrotest project.

SoCalGas engaged in prudent cost avoidance efforts by sharing the same crew and laydown yard with the Supply Line 30-18 Section 2 Replacement Project.

**End of Supply Line 37-18-K Replacement Project Final Report**

## Final Report for Supply Line 38-101 Replacement Project

**I. SUPPLY LINE 38-101 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 38-101 is a predominantly [REDACTED] diameter pipeline that runs approximately 12 miles through agricultural land in Kern County. The pipeline is primarily routed across a Class 1 location. This report describes the activities associated with the Supply Line 38-101 Replacement Project that consists of replacement and reroute of 3.955 with the installation of 4.525 miles of pipeline and the removal of 1.175 miles of pipeline. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$14,442,883.

The Project Team divided Supply Line 38-101 Replacement Project construction activity into separate Sections, at two separate construction locations. Section 1 consisted of the installation of 1.799 miles of [REDACTED] pipe paralleling the east side of Interstate 5 to the junction of Highway 99. Section 2 consisted of the installation of 2.726 miles of [REDACTED] pipe and the removal of 1.175 miles of [REDACTED] pipe west of Interstate 5.

Final Report for Supply Line 38-101 Replacement Project

Table 1: General Project Information

Project Name		Supply Line 38-101 Section 1		
Project Type		Replacement		
Length		1.799 miles		
Location		Kern County		
Class		Class 1		
MAOP (confidential)		[REDACTED]		
Pipe Vintage		1921		
Construction Start		05/17/2019		
Construction Finish		08/27/2019		
Original Pipe Diameter (confidential)		[REDACTED]		
New Diameter (confidential)		[REDACTED]		
Original SMYS <sup>1</sup> (confidential)		[REDACTED]		
New SMYS (confidential)		[REDACTED]		
Project Name		Supply Line 38-101 Section 2		
Project Type		Replacement		
Length		2.726 miles		
Location		Kern County		
Class		Class 1		
MAOP (confidential)		[REDACTED]		
Pipe Vintage		1921		
Construction Start		01/23/2020		
Construction Finish		02/26/2020		
Original Pipe Diameter (confidential)		[REDACTED]		
New Diameter (confidential)		[REDACTED]		
Original SMYS <sup>2</sup> (confidential)		[REDACTED]		
New SMYS (confidential)		[REDACTED]		
Project Costs (\$)		Capital	O&M	Total
Loaded Project Costs		14,442,883	-	14,442,883
Disallowed Costs		-	-	-

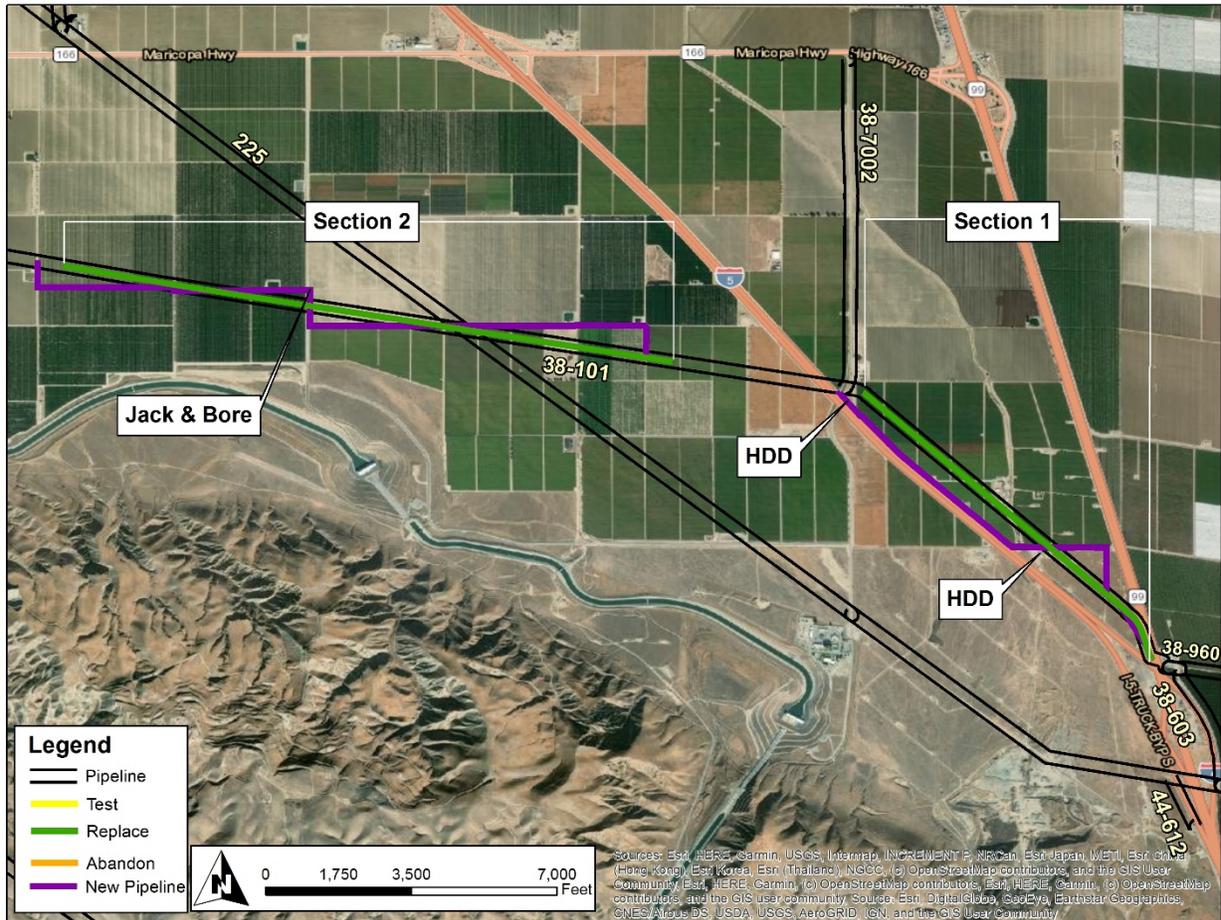
<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

<sup>2</sup> Ibid

## Final Report for Supply Line 38-101 Replacement Project

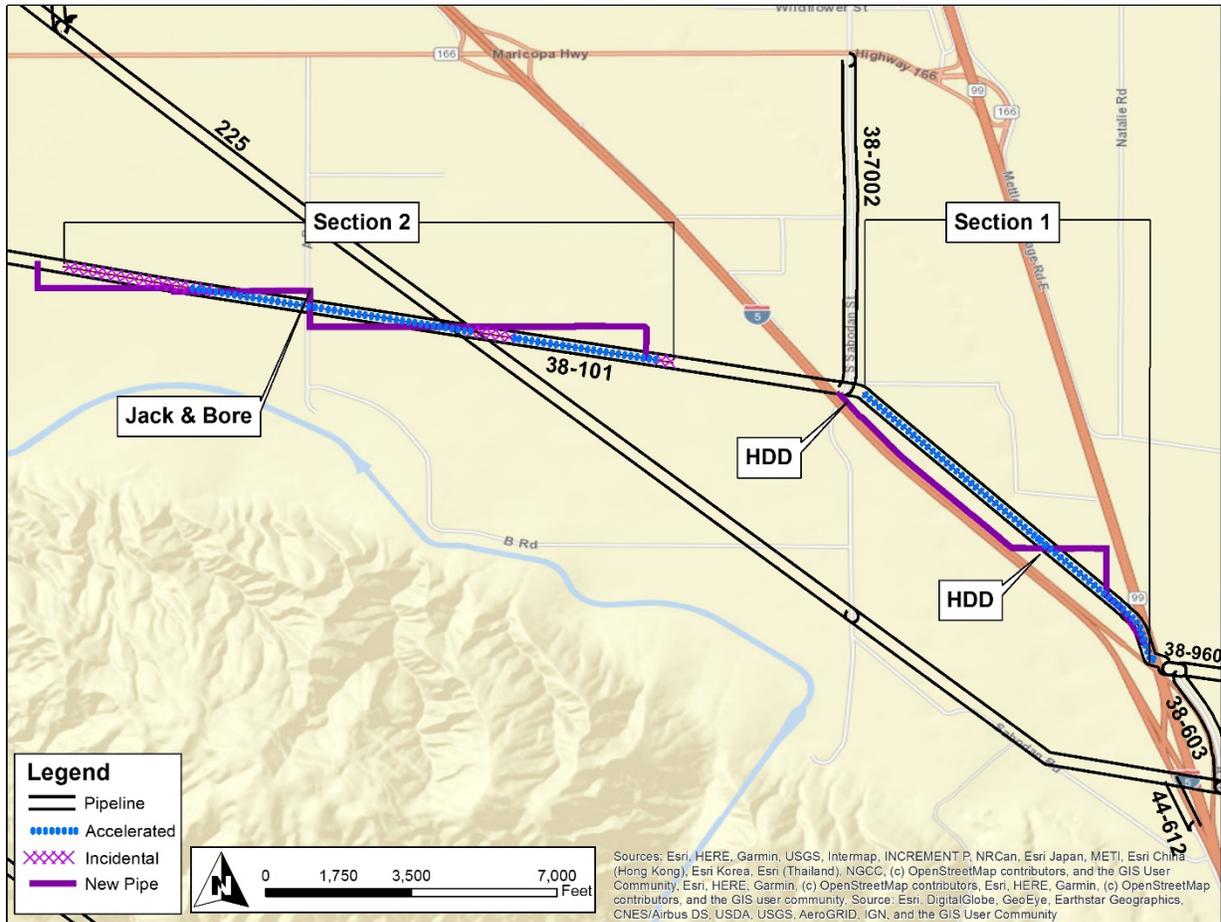
### B. Maps and Images

Figure 1: Satellite Image of Supply Line 38-101 Replacement Project



## Final Report for Supply Line 38-101 Replacement Project

Figure 2: Overview Map of Supply Line 38-101 Replacement Project



Final Report for Supply Line 38-101 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Section 1	1.561 mi.	0.066 mi.	0 mi.	0.172 mi.	1.798 mi.
	8,243 ft.	346 ft.	0 ft.	907 ft.	9,496 ft.
Section 2	1.554 mi.	0.023 mi.	0.743 mi.	0.407 mi.	2.727 mi.
	8,205 ft.	120 ft.	3,924 ft.	2,148 ft.	14,397 ft.
Final Mileage	3.115 mi.	0.088 mi.	0.743 mi.	0.579 mi.	4.525 mi.
	16,448 ft.	466 ft.	3,924 ft.	3,055 ft.	23,893 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>5</sup> Prior to initiating execution of the Project in 2019, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified the Supply Line 38-101 Replacement Project as a Phase 1B Replacement Project comprised of approximately 7.32 miles of Phase 1B pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas identified 7.212 miles of Phase 1B pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team rerouted Supply Line 38-101 from agriculture fields to an adjacent dirt road and at a greater depth any reduce the likelihood of a third party incident due to the agricultural activities within the area.

<sup>3</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 38-101 Replacement Project

- b. Two Horizontal Directional Drills (HDDs) were utilized for the crossings of Tecuya Creek and Sabodan Street. One jack and bore was utilized to cross under the Wheeler Ridge Access Road.
  - c. Landowner negotiations with for the easement providing the most efficient pipeline route resulted in the removal of 1.175 miles of pipeline.
  - d. The Project Team included incidental pipe for constructability purposes and the location between segments of Phase 1B pipe.
4. Final Project Scope: The final project scope consists of replacement and reroute of 3.955 with the installation of 4.525 miles of pipeline and the removal of 1.175 miles of pipeline. The Criteria mileage consists of 3.115 miles of Phase 1B pipe. The Accelerated mileage consists of 320 feet of Phase 2A pipe, 146 feet of Phase 2B pipe and 0.743 miles of Incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 38-101 and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas have already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for in-line inspection, likely have non-state-of-the-art welds, and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission’s directive in D.11-06-017 to “address retrofitting pipeline to allow for inline inspection tools,” the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be

## Final Report for Supply Line 38-101 Replacement Project

capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in.
2. Customer Impacts: The Project Team determined that customer service could be maintained to core and non-core customers by utilizing pressure control fittings (PCFs) during the tie-in.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1921
5. Existing Pipe Attributes: The Project Team identified multiple existing non-piggable features such as short radius elbows, plug valves, non-piggable tees, and multiple diameter changes on the existing pipeline rendering the pipeline non-piggable.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: The Project Team identified past leaks due to third party incidents.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground

## Final Report for Supply Line 38-101 Replacement Project

utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the line could be shut-in.
2. Customer Impact: The Project Team determined that service could be maintained to core and non-core customers by utilizing pressure control fittings (PCFs) during the tie-in.
3. Community Impact: No identified issues.
4. Reroute:
  - a. The Project Team rerouted Supply Line 38-101 from agriculture fields to an adjacent dirt road at a greater depth any reduce the likelihood of a third party incident due to agricultural activities within the area.
  - b. The reroute resulted in the need to utilize an HDD to cross under both the Tecuya Creek and Interstate 5 interchange, and a slick bore to cross under the Wheeler Ridge Access Road.
5. Land Use:
  - a. Landowner negotiations to obtain the easement providing the most efficient pipeline route resulted in the removal of 1.175 miles of existing Supply Line 38-101.
  - b. The Project Team rerouted Supply Line 38-101 from agriculture fields to an adjacent dirt road and at a greater depth any reduce the likelihood of a third party incident due to agricultural activities within the area.
6. Diameter Changes: The Project Team replaced the existing [REDACTED] portion of the pipeline with [REDACTED] pipe based on the recommendation of the RER and to standardize the pipeline diameter to facilitate future pigging activities. This also resulted in cost savings from favorable pricing of bulk purchased pipe.
7. Substructures: The Project Team identified multiple utilities prior to construction and included them in the Project design.

## Final Report for Supply Line 38-101 Replacement Project

8. Permit Conditions: The Project Team obtained encroachment permits from Kern County and the California Department of Water Resources (DWR).
9. Environmental
  - a. California Department of Fish and Wildlife (CDFW) required a permit to cross Tecuya Creek utilizing an HDD.
  - b. The Project Team determined that the pipe coating on the existing pipeline likely contained asbestos and planned for abatement activities wherever existing pipe was to be exposed.

#### D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the preliminary cost estimate does not fully reflect the final scope. Summarized below are notable changes in scope made after the preliminary cost estimate was developed and approved.

1. The Project Team reduced the replacement scope by approximately one mile and removed the installation of a new regulator station from the Project scope.
2. The Project Team initially planned to utilize water to pressure test the new pipe. The test medium was changed after the creation of the TIC to nitrogen.
3. The Project Team redesigned the replacement for Section 2 and removed an HDD of approximately 575 feet in length.

Final Report for Supply Line 38-101 Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered into a competitive bidding process to select a construction contractor, that included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED] which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

<b>Supply Line 38-101 Section 1</b>	
Construction Start Date	05/17/2019
Construction Completion Date	08/27/2019
NOP Date	07/23/2019
<b>Supply Line 38-101 Section 2</b>	
Construction Start Date	01/23/2020
Construction Completion Date	02/26/2020
NOP Date	02/11/2020

## Final Report for Supply Line 38-101 Replacement Project

## C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$525,000 in change orders.

### 1. Field Design Changes:

- a. The Construction Contractor estimated for the installation of the new pipeline in 50 foot lengths of pipe while the average length of pipe available was 44 feet. Additional welding was required for the shorter length of pipe.
- b. The Project Team installed a portion of the new pipeline deeper than estimated due to agricultural activities.

Final Report for Supply Line 38-101 Replacement Project

Figure 3: Lowering in Pipe at the Wheeler Ridge Access Road Crossing



Final Report for Supply Line 38-101 Replacement Project

Figure 4: Excavation for Section 2 Reroute



Final Report for Supply Line 38-101 Replacement Project

Figure 5: Pipe Prepared for HDD under Sabodan Street



## Final Report for Supply Line 38-101 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection, and placement of the pipeline back into service, transportation, and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 38-101 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$22,172,339. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$14,442,883.

Final Report for Supply Line 38-101 Replacement Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>6</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	884,867	435,954	(448,913)
Materials	2,136,931	1,280,570	(856,361)
Construction Contractor	11,760,326	6,001,202	(5,759,124)
Construction Management & Support	1,201,477	444,226	(757,251)
Environmental	737,344	337,880	(399,464)
Engineering & Design	1,218,738	2,434,412	1,215,674
Project Management & Services	1,119,470	154,311	(965,159)
ROW & Permits	604,472	665,859	61,387
GMA	2,508,714	459,426	(2,049,288)
<b>Total Direct Costs</b>	<b>22,172,339</b>	<b>12,213,839</b>	<b>(9,958,500)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>7</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	2,153,017	1,832,137	(320,880)
AFUDC	3,306,421	343,674	(2,962,747)
Property Taxes	1,128,378	53,233	(1,075,145)
<b>Total Indirect Costs</b>	<b>6,587,816</b>	<b>2,229,044</b>	<b>(4,358,772)</b>
<b>Total Direct Costs</b>	<b>22,172,339</b>	<b>12,213,839</b>	<b>(9,958,500)</b>
<b>Total Loaded Costs</b>	<b>28,760,155</b>	<b>14,442,883</b>	<b>(14,317,272)</b>

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> Values may not add to total due to rounding.

Final Report for Supply Line 38-101 Replacement Project

**C. Disallowance**

The scope of the Supply Line 38-101 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 38-101 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 38-101 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 3.955 miles of pipeline by installing 4.525 miles of pipeline and removing 1.13 miles of abandoned pipeline in Mettler and Kern County. The total loaded cost of the Project is \$14,442,883.

SoCalGas executed this project prudently rerouting the pipeline to avoid existing substructures and minimize the risk of third party line strikes, removal of portions of abandoned pipeline to obtain easements, and coordinating work efforts with the acquisition of permits.

SoCalGas engaged in prudent cost avoidance efforts by bulk ordering of [REDACTED] pipe and other materials, as well as the use of nitrogen for the post completion pressure test of the new pipeline. SoCalGas also negotiated with landowners to obtain easements and allow for easier future maintenance by rerouting out of agricultural fields.

**End of Supply Line 38-101 Replacement Project Final Report**

---

## Final Report for Supply Line 41-6001-2 Replacement Project

**I. SUPPLY LINE 41-6001-2 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 41-6001-2 is a [REDACTED] diameter transmission line that runs approximately 35 miles from Niland Station to El Centro, through agricultural land and commercial areas. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Supply Line 41-6001-2 Replacement Project which consists of the replacement of 26 feet of pipeline in the City of Brawley. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$722,536.

Final Report for Supply Line 41-6001-2 Replacement Project

Table 1: General Project Information

Project Name		Supply Line 41-6001-2		
Project Type	Replacement			
Length	26 feet			
Location	Brawley			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1967			
Construction Start	10/02/2017			
Construction Finish	12/19/2017			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	722,536	-	722,536	
Disallowed Costs	7,692	-	7,692	

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 41-6001-2 Replacement Project

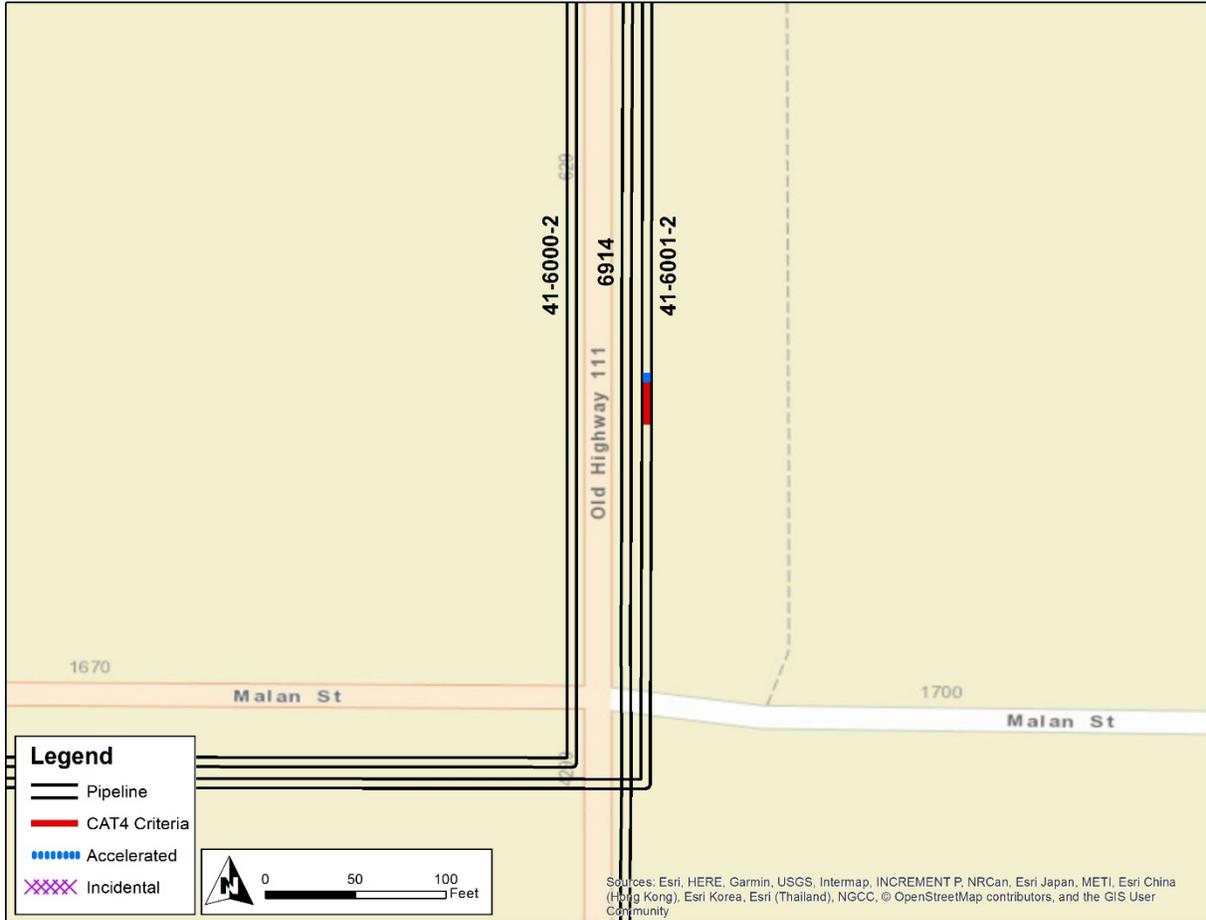
B. Maps and Images

Figure 1: Satellite Image of Supply Line 41-6001-2 Replacement Project



Final Report for Supply Line 41-6001-2 Replacement Project

Figure 2: Overview Map of Supply Line 41-6001-2 Replacement Project



Final Report for Supply Line 41-6001-2 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>2</sup>	Incidental	New	Total <sup>3</sup>
Final Mileage	0.005 mi.	0 mi.	0 mi.	0 mi.	0.005 mi.
	24 ft.	2 ft.	0 ft.	0 ft.	26 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 41-6001-2 as a Phase 1A Replacement Project comprised of 24 feet of Category 4 Criteria.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas confirmed the scope of the Project.
3. Engineering, Design, and Constructability:
  - a. The Project Team coordinated the shut-in with the PSEP Supply Line 41-6000-2 Abandonment Project.
  - b. Accelerated mileage was included to realize efficiencies and enhance project constructability.

<sup>2</sup> Accelerated mileage includes Phase 2B pipe. Phase 2B includes pipelines without record of a pressure test to modern – Subpart J – standards (Phase 2B). The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 41-6001-2 Replacement Project

4. Final Project Scope: The final project scope consists of a 26 foot pipeline replacement. The Accelerated mileage consists of 2 feet of Phase 2B pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 41-6001-2 and confirmed the project design should commence as a Replacement Project.

Segments of less than 1,000 feet are identified for replacement under the approved PSEP Decision Tree because, for short segments of pipe, the logistical costs associated with pressure testing (for example, permitting, construction, water handling, and service disruptions for a non-looped system) can approach or exceed the cost of replacement. In such circumstances, replacement affords a more cost-effective approach to achieving compliance with D.11-06-017 while providing equal safety enhancement benefits. Moreover, installation of the new segment can usually be performed while the existing service is maintained to customers, thereby avoiding service disruptions that may otherwise occur during pressure testing.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in without system impacts.
2. Community Impacts: Minimal traffic impacts.
3. Piggability: Piggable.
4. Pipe Vintage: 1967.
5. Existing Pipe Attributes: No identified issues.
6. Longseam Type: Seamless.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

## Final Report for Supply Line 41-6001-2 Replacement Project

## C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the line could be shut-in, but service could not be interrupted to a major core customer and all residential customers would need to be fed from an alternate source during the shut-in.
2. Customer Impact: To maintain service to all core and residential customers the Project Team utilized an existing pressure control fitting (PCF) and coordinated with a planned customer maintenance outage.
3. Community Impact: Traffic control with limited impact.
4. Schedule Coordination: The Project Team coordinated with the PSEP Supply Line 41-6000-2 Abandonment Project shut-in.
5. Substructures: Potholing was completed, no design changes were made.
6. Permit Conditions: City of Brawley encroachment permit.
7. Land Use:
  - a. The Project shared a laydown yard with the PSEP Supply Line 41-6000-2 Abandonment Project.
  - b. The existing pipeline is located in the street near the edge of the pavement and adjacent to Imperial Irrigation District (IID) right of way (ROW). Due to the IID permitting process typically taking nine months, the Project Team completed the excavation without encroaching on IID ROW to avoid this delay.
8. Environmental: The Project Team planned for typical abatement activities when removing existing pipe.

Final Report for Supply Line 41-6001-2 Replacement Project

**D. Scope Changes**

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 41-6001-2 Replacement Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered into a competitive bidding process to select a construction contractor. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Bid (confidential): The Construction Contractor’s bid was [REDACTED], that was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	10/02/2017
Construction Completion Date	12/19/2017
NOP Date	12/16/2017

#### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 41-6001-2 Replacement Project

Figure 3: Excavation and Removal of Asphalt



Final Report for Supply Line 41-6001-2 Replacement Project

Figure 4: Cut of Existing Pipeline for Replacement



Final Report for Supply Line 41-6001-2 Replacement Project

Figure 5: Tie-in Weld



## Final Report for Supply Line 41-6001-2 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 41-6001-2 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the project. Specific examples of cost avoidance actions taken on this project are:

1. Schedule Coordination: The Project Team coordinated shut-in with the PSEP Supply Line 41-6000-2 Abandonment Project.
2. Construction Execution: Mobilization costs were shared with the PSEP Supply Line 41-6000-2 Abandonment Project.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$498,232. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in

Final Report for Supply Line 41-6001-2 Replacement Project

accordance with Company overhead allocation policies. The total loaded cost of the Project is \$722,536.

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	50,390	48,802	(1,588)
Materials	11,747	8,858	(2,889)
Construction Contractor	302,139	254,928	(47,211)
Construction Management & Support	8,506	9,975	1,469
Environmental	12,654	20,063	7,409
Engineering & Design	43,231	123,944	80,714
Project Management & Services	28,712	8,036	(20,676)
ROW & Permits	4,754	564	(4,190)
GMA	36,099	71,837	35,738
<b>Total Direct Costs</b>	<b>498,232</b>	<b>547,008</b>	<b>48,777</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>6</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	55,317	91,259	35,942
AFUDC	26,129	74,701	48,572
Property Taxes	6,135	9,568	3,433
<b>Total Indirect Costs</b>	<b>87,581</b>	<b>175,528</b>	<b>87,947</b>
<b>Total Direct Costs</b>	<b>498,232</b>	<b>547,008</b>	<b>48,777</b>
<b>Total Loaded Costs</b>	<b>585,812</b>	<b>722,536</b>	<b>136,724</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Ibid.

## Final Report for Supply Line 41-6001-2 Replacement Project

**D. Disallowance**

For this replacement project, SoCalGas identified 24 feet of pipe as being installed after 1955 and lacking records that provide the minimum information necessary to demonstrate compliance with then-applicable industry standards or regulatory strength testing and recordkeeping requirements. Of the pipeline that was replaced, 24 feet of Phase 1A pipe is disallowed. Therefore, a \$7,692 reduction to rate base was calculated by multiplying 0.0045 miles of pipe by \$1,709,257 per mile, which was SoCalGas and SDG&E's system average cost of pressure testing at the time the pipeline was returned to service.

## Final Report for Supply Line 41-6001-2 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 41-6001-2 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 26 feet of pipeline in the City of Brawley. The total loaded cost of the Project is \$722,536.

SoCalGas executed this project prudently through coordination with the PSEP Supply Line 41-6001-2 and Supply Line 41-6000-2 projects for shut-in.

SoCalGas engaged in prudent cost avoidance efforts by sharing mobilization costs with the PSEP Supply Line 41-6000-2 Abandonment Project and utilized bulk ordered pipe, providing volume pricing for the [REDACTED] pipe.

**End of Supply Line 41-6001-2 Replacement Project Final Report**

---

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

# I. SUPPLY LINE 43-121 NORTH SECTIONS 2, 3, AND 4 REPLACEMENT PROJECT

---

## A. Background and Summary

Supply Line 43-121 is a [REDACTED] diameter transmission pipeline that runs approximately 15 miles along several major arterial roads and parallels Interstate 405, through highly developed and congested residential and commercial areas in the City of Los Angeles. The pipeline is primarily routed across a Class 3 location and traverses some Class 1, 2, and 4 locations. This report describes the activities associated with Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project which consist of the installation of a new mainline valve (MLV), the removal of 0.964 miles of pipeline, and the replacement of 1.054 miles of pipeline along the heavily trafficked Sepulveda Boulevard. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$22,641,902.

SoCalGas separated the Supply Line 43-121 Project into four separate projects: Supply Line 43-121<sup>1</sup> Sections 1, 2, 3, and 4 for project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline.

---

<sup>1</sup> Supply Line 43-121 Section 1 Replacement Project was filed for recovery in A.18-11-010 and authorized in D.20-08-034.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Table 1: General Project Information

<b>Project Name</b>	
<b>Project Name</b>	<b>Supply Line 43-121 North Section 2</b>
Project Type	Replacement
Length	704 feet
Location	Los Angeles
Class	3
MAOP ( <i>confidential</i> )	[REDACTED]
Pipe Vintage	1930
Construction Start	04/03/2017
Construction Finish	08/07/2017
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]
New Diameter ( <i>confidential</i> )	[REDACTED]
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]
New SMYS ( <i>confidential</i> )	[REDACTED]
<b>Project Name</b>	
<b>Project Name</b>	<b>Supply Line 43-121 North Section 3</b>
Project Type	Replacement
Length	800 feet
Location	Los Angeles
Class	3
MAOP ( <i>confidential</i> )	[REDACTED]
Pipe Vintage	1930
Construction Start	04/17/2017
Construction Finish	08/07/2017
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]
New Diameter ( <i>confidential</i> )	[REDACTED]
Original SMYS <sup>3</sup> ( <i>confidential</i> )	[REDACTED]
New SMYS ( <i>confidential</i> )	[REDACTED]

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

<sup>3</sup> Ibid.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Table 1: General Project Information (Continued)

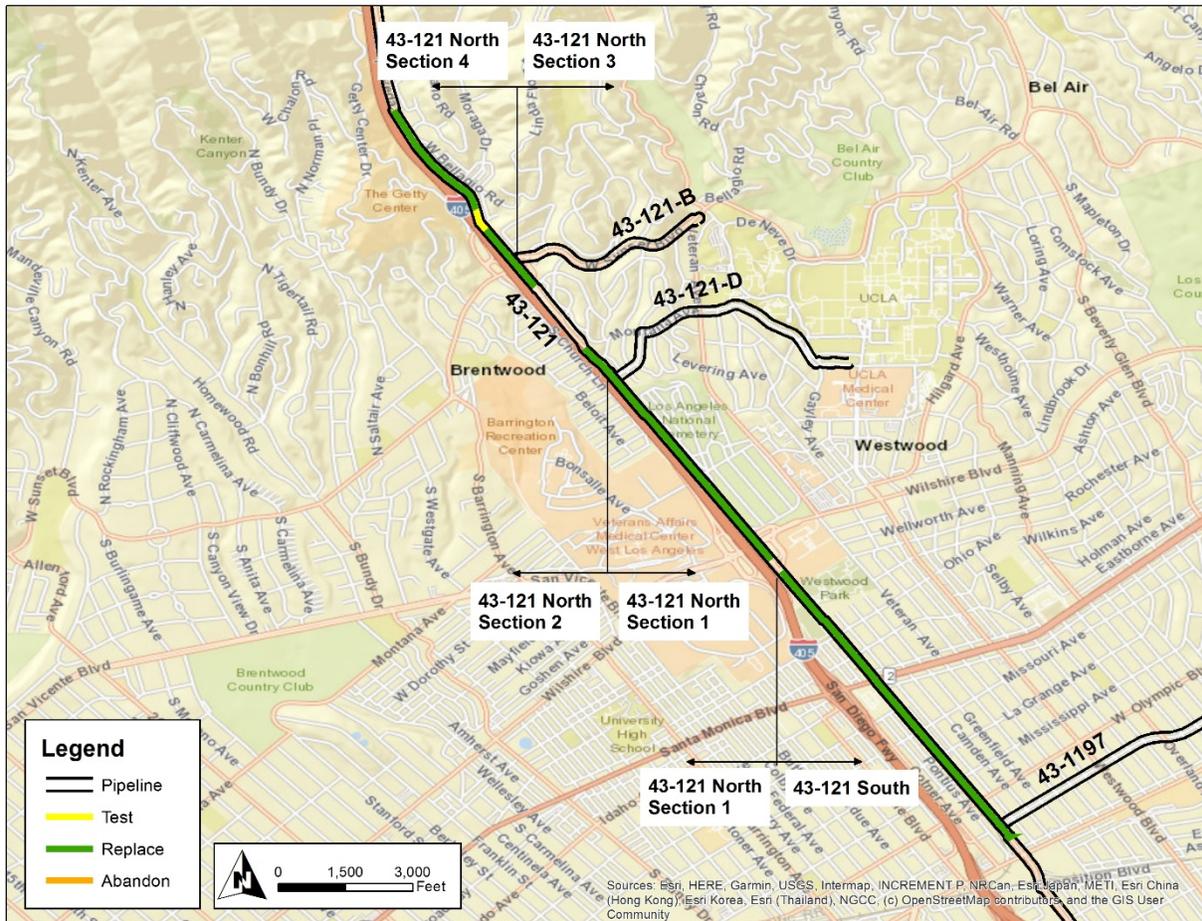
Project Name		Supply Line 43-121 North Section 4		
Project Type	Replacement			
Length	0.769 miles			
Location	Los Angeles			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1930			
Construction Start	08/07/2017			
Construction Finish	12/15/2017			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>4</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	22,641,902	-	22,641,902	
Disallowed Costs	-	-	-	

<sup>4</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

### B. Maps and Images

Figure 1: Overview Image of Supply Line 43-121 Replacement Project



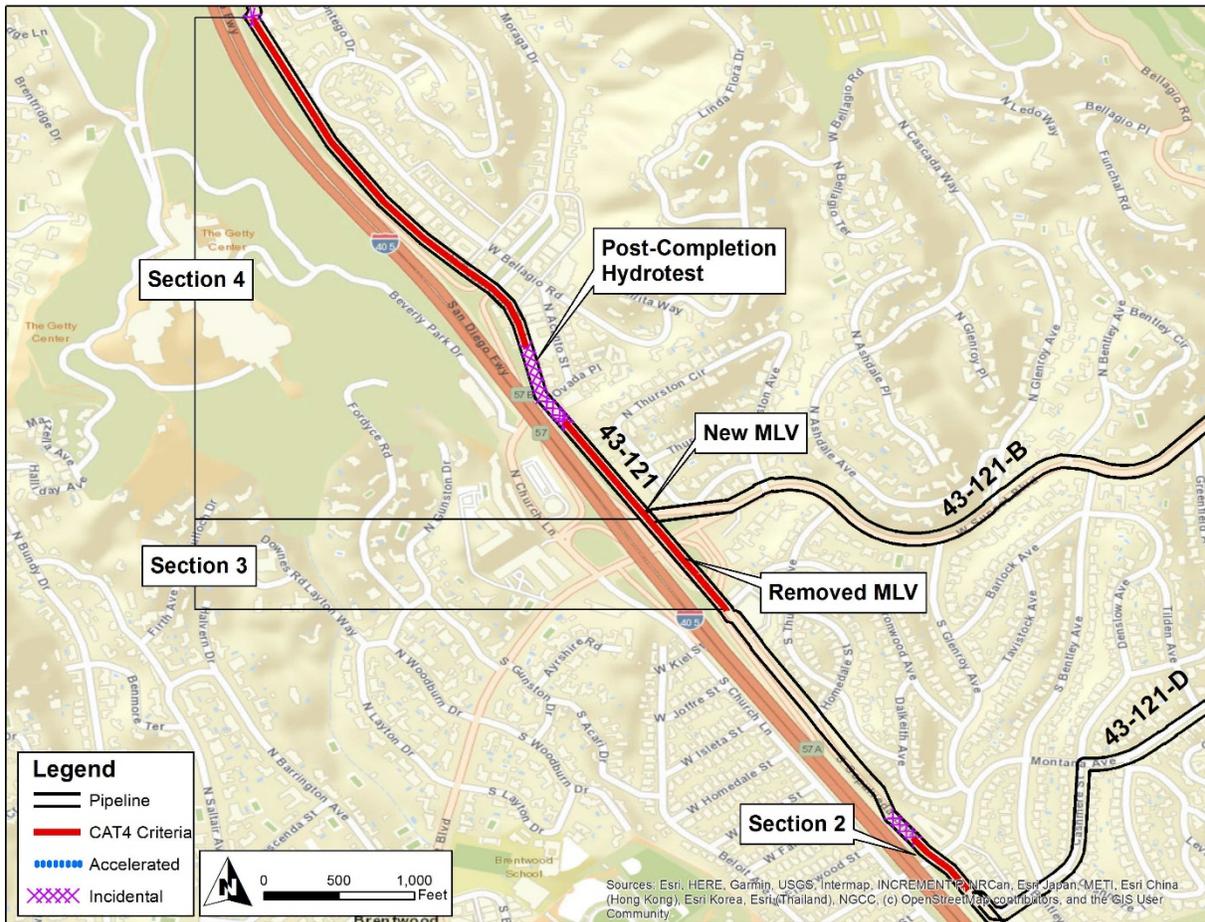
## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

### Figure 2: Satellite Image of Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project



## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

### Figure 3: Overview Image of Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 4: Satellite Image of Supply Line 43-121 North Section 2 Replacement Project



## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

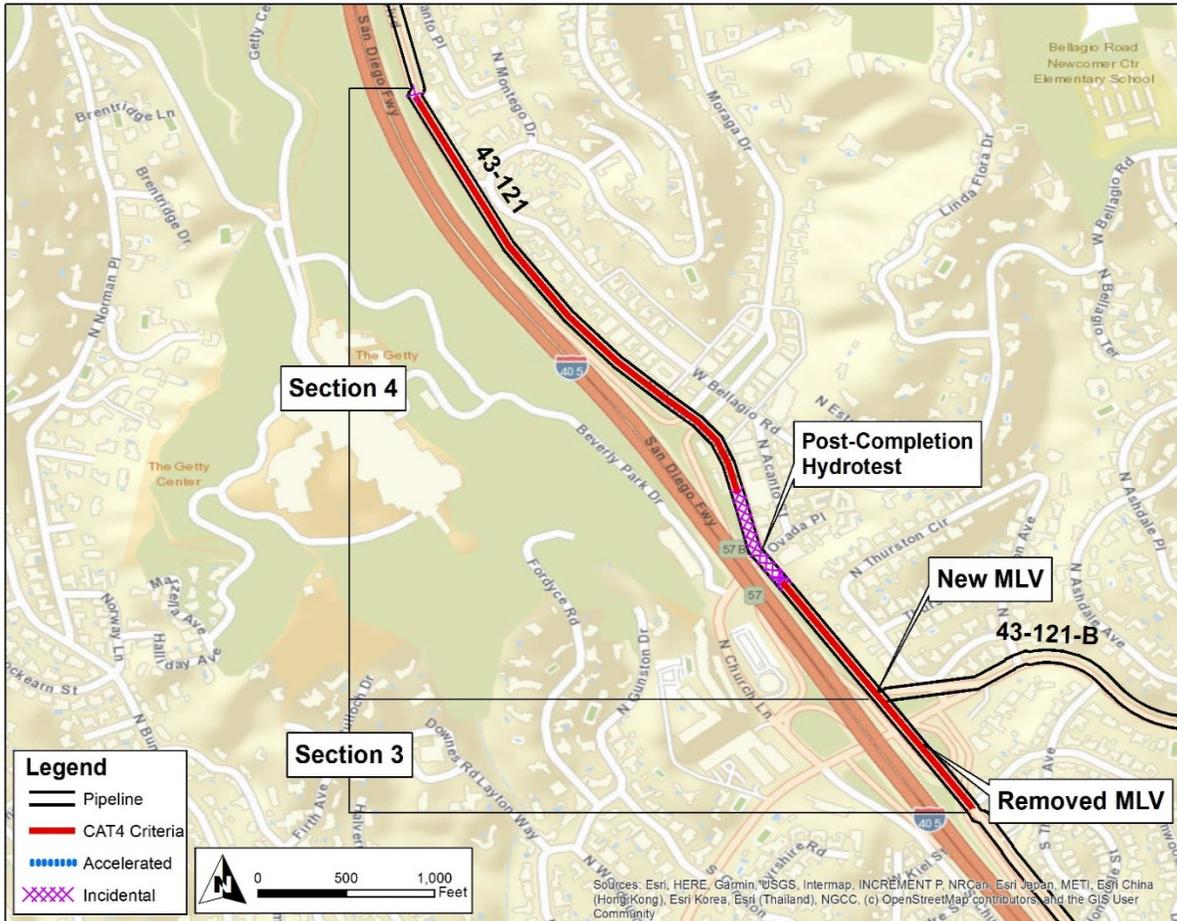
### Figure 5: Overview Map of Supply Line 43-121 North Section 2 Replacement Project





## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

### Figure 7: Overview Map of Supply Line 43-121 North Section 3 and Section 4 Replacement Project



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information<sup>5</sup>

	Criteria	Accelerated	Incidental	New	Total <sup>6</sup>
Section 2	0.071 mi.	0 mi.	0.074 mi.	0 mi.	0.133 mi.
	377 ft.	0 ft.	393 ft.	0 ft.	704 ft.
Section 3	0.134 mi.	0 mi.	0.008 mi.	0.009 mi.	0.152 mi.
	710 ft.	0 ft.	41 ft.	49 ft.	800 ft.
Section 4	0.661 mi.	0 mi.	0.105 mi.	0.003 mi.	0.769 mi.
	3,489 ft.	0 ft.	556 ft.	16 ft.	4,061 ft.
Final Mileage	0.867 mi.	0 mi.	0.188 mi.	0 mi.	1.054 mi.
	4,576 ft.	0 ft.	990 ft.	0 ft.	5,565 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>7</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 43-121 North as a Phase 1A Replacement Project comprised of 2.766 miles of Category 4 Criteria pipe and 1.645 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas increased the scope of the Project by 0.544 miles of Category 4 Criteria pipe.

<sup>5</sup> Total mileage of the completed project differs from the mileage of the pipe addressed due to realignment of the pipeline route.

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

3. Engineering, Design, and Constructability: Due to the non-contiguous locations of Criteria pipe segments along the length of the pipeline and for constructability purposes, SoCalGas strategically separated and executed the project in multiple sections<sup>8</sup>:
  - a. Section 2: Replacement of 855 feet and removal of 770 feet of pipe along Sepulveda Boulevard between Montana Avenue and Cashmere Street.
  - b. Section 3: Replacement of 800 feet and removal of 751 feet of pipe. This project section runs along Sepulveda Boulevard, between Sunset Boulevard and Bronwood Avenue.
  - c. Section 4: Replacement of 0.769 miles and removal of 0.676 miles of pipe along Sepulveda Boulevard, between Casiano Road and Sunset Boulevard.
  - d. The Project Team planned the scope of Supply Line 43-121 North Sections 3 and 4 as two replacement segments (0.692 miles) but one post-completion pressure test that incorporated 450 feet of incidental pipe to reduce the number of test breaks and reduce the impact of construction on the community.
  - e. Incidental mileage was included for constructability and the location between segments of Category 4 Criteria pipe.
4. Final Project Scope: The final project scope consists of three non-contiguous replacement sections that total 1.054 miles, the removal of 0.964 miles of pipe, and installation of a new MLV. The Incidental mileage totals 990 feet of pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 43-121 North and confirmed the project design should commence as a Replacement Project.

---

<sup>8</sup> Section 1 South: This 1.477 mile section of the project was completed in 2016 and included for reasonableness review in A.18-11-010. It is located outside of the Caltrans Right of Way (ROW) and was executed separately to meet the PSEP objective of executing projects as soon as practicable.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas had already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for in-line inspection, likely have non-state-of-the-art welds and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission's directive in D.11-06-017 to "address retrofitting pipeline to allow for inline inspection tools," the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace these sections include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the pipeline could only be shut-in during summer conditions.
2. Customer Impacts: The Project Team identified no customer impacts; back feeding averted the need to provide CNG or to shut-in customers.
3. Piggability: Piggable.
4. Pipe Vintage: 1930.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

5. Existing Pipe Attributes: The Project Team identified a non-active tap along the existing pipeline.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: Unknown.
9. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

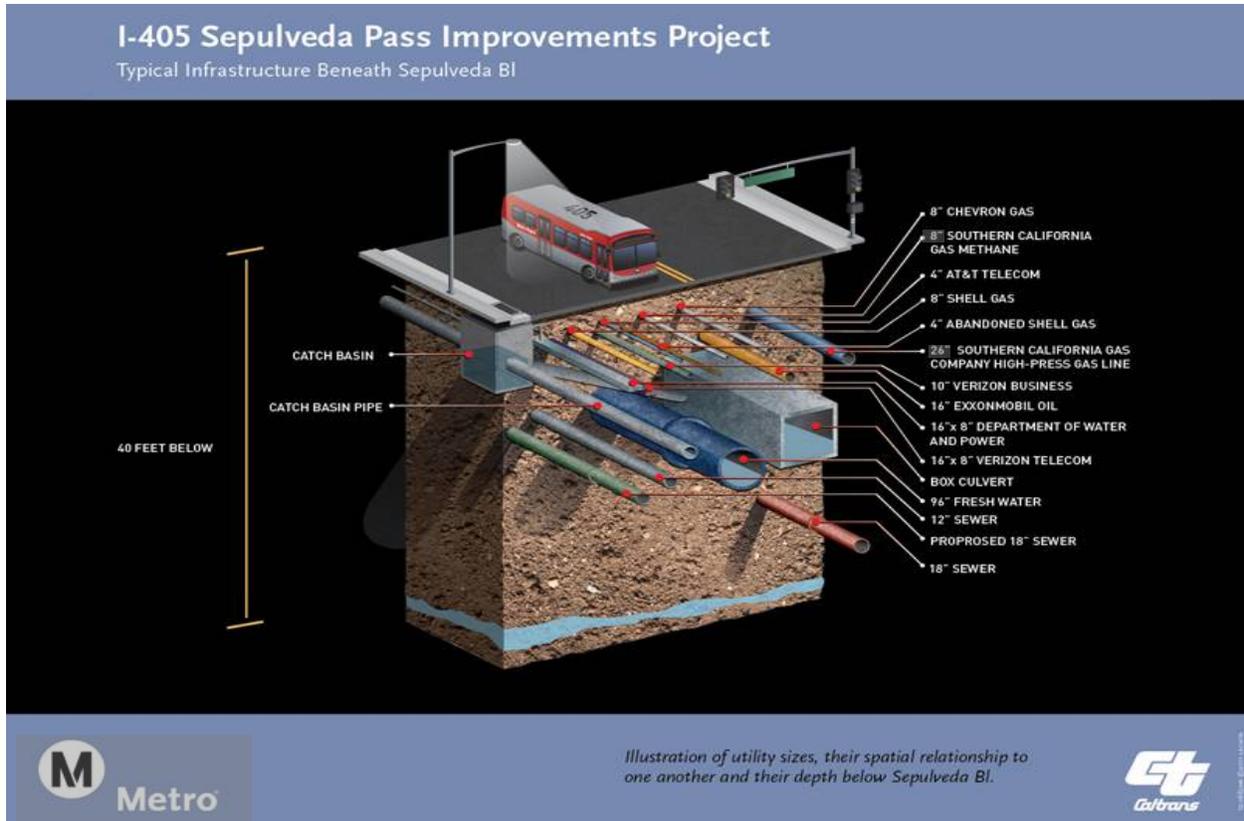
1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the pipeline could only be shut-in during summer conditions.
2. Customer Impact: The Project Team identified no customer impacts because back feeding averted the need to provide CNG or to shut-in customers.
3. Community Impact: The Project is located along the heavily congested Sepulveda Boulevard alongside a residential area. The northern tie-in location for Section 4 is adjacent to the intersection of Sepulveda Boulevard and Moraga Drive and Interstate 405 off ramp.
4. Diameter Changes: SoCalGas analyzed typical load demands and future capacity planning and determined that a smaller replacement diameter of [REDACTED] would be sufficient and could serve present and future demand.
5. Substructures: The Project Team researched existing records and survey results and identified multiple substructures within the construction alignment.
6. Permit Conditions:
  - a. City of Los Angeles and Caltrans permits were required for encroachment, excavation, and traffic control plans.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

- b. The work hours were limited to Monday through Friday from 9AM to 3:30PM with a ten-hour Saturday option from 8AM to 6PM.
7. Land Use: The Project used one primary laydown yard.
8. Environmental: The Project Team planned for typical abatement activities when removing existing pipe.
9. Valves: One MLV and vault was removed and relocated along with a new bridle assembly connecting to Supply Line 43-121-B.
10. Tie-In: Each tie-in location was subject to space constraints and limited work hours due to the circumstances described below:
  - a. Section 2: Criteria pipe for the northern tie-in was located in the heavily trafficked intersection of Sepulveda Boulevard and Montana Avenue. The Project Team extended the northern tie-in outside of the intersection to reduce the impact to traffic. The southern tie-in location had no conflicts.
  - b. Section 3: The northern tie-in was located by the intersection of Sepulveda Boulevard and Sepulveda Way, a high traffic three-way intersection. The southern tie-in was located in a residential area.
  - c. Section 4: The northern tie-in was located near the intersection on Sepulveda Boulevard near Casiano Road. The southern tie-in ties into the north end of Section 3, located by the intersection of Sepulveda Boulevard and Sepulveda Way, a high traffic three-way intersection.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 8: Cross Section of Typical Substructures Beneath Sepulveda Boulevard



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

## D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package, which included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], that was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

<b>Section 2</b>	
Construction Start	04/03/2017
Construction Completion	08/07/2017
NOP Date	07/17/2017
<b>Section 3</b>	
Construction Start	04/17/2017
Construction Completion	08/07/2017
NOP Date	07/17/2017
<b>Section 4</b>	
Construction Start	08/07/2017
Construction Completion	12/15/2017
NOP Date	11/27/2017

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 9: Demolition of a Concrete Vault



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 10: Lowering in of New Pipe



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 11: Removal of Hydraulic Shoring and Road Plates



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 12: Construction Crew Welding



Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

Figure 13: Pipeline Warning Tape



## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.
2. Land Use: All Project sections shared one primary laydown yard avoiding costs for mobilization and demobilization.
3. Water Management: Water from the Section 2 post completion pressure test was reused for the Section 3 and 4 post completion pressure test.
4. Engineering & Design: The post completion pressure test for Sections 3 and 4 were designed and executed in one continuous test to reduce the number of test breaks and reduce the impact of construction on the community.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared estimates of the Direct Costs of the Project in the amount of \$38,816,329. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$22,641,902.

Table 4<sup>9</sup>: Estimated and Actual Direct Costs and Variances

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	4,035,906	425,117	(3,610,789)
Materials	1,135,411	703,647	(431,764)
Construction Contractor	19,965,282	10,919,331	(9,045,951)
Construction Management & Support	2,326,344	1,416,655	(909,689)
Environmental	720,200	362,607	(357,593)
Engineering & Design	3,464,020	2,549,456	(914,564)
Project Management & Services	2,634,990	828,420	(1,806,570)
ROW & Permits	1,093,260	825,747	(267,513)
GMA	3,440,916	2,084,814	(1,356,102)
<b>Total Direct Costs</b>	<b>38,816,329</b>	<b>20,115,793</b>	<b>(18,700,536)</b>

Table 5<sup>10</sup>: Estimated and Actual Indirect Costs, Total Costs, and Variances

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	4,989,569	1,648,633	(3,340,936)
AFUDC	1,987,696	723,849	(1,263,847)
Property Taxes	472,846	153,627	(319,219)
<b>Total Indirect Costs</b>	<b>7,450,111</b>	<b>2,526,109</b>	<b>(4,924,002)</b>
<b>Total Direct Costs</b>	<b>38,816,329</b>	<b>20,115,793</b>	<b>(18,700,536)</b>
<b>Total Loaded Costs</b>	<b>46,266,440</b>	<b>22,641,902</b>	<b>(23,624,538)</b>

<sup>9</sup> Values may not add to total due to rounding.

<sup>10</sup> Ibid.

Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

## D. Disallowance

The scope of the Line 43-121 North Sections 2, 3, and 4 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 43-121 North Sections 2, 3, and 4 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 43-121 North Replacement Projects. Through these Replacement Projects, SoCalGas successfully replaced 1.054 miles of pipeline in the City of Los Angeles. The total loaded cost of the Project is \$22,641,902.

SoCalGas executed this project prudently through dividing Supply Line 43-121 North into several project sections to be managed individually.

SoCalGas engaged in prudent cost avoidance efforts by using the same laydown yard for all replacement sections, reusing hydrotest water, and bulk ordering pipe which provided volume pricing for the [REDACTED] pipe.

**End of Supply Line 43-121 North Replacement Projects Final Report**

## Final Report for Supply Line 45-120 Section 2 Replacement Project

**I. SUPPLY LINE 45-120 SECTION 2 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Supply Line 45-120 is a predominately [REDACTED] diameter pipeline that runs approximately five miles from Newhall Station in the City of Santa Clarita, through mountainous terrain to the Sylmar Compressor Station in the City of Los Angeles. The pipeline is primarily routed across a Class 3 location and traverses some Class 1 locations. This report describes the activities associated with the Supply Line 45-120 Section 2 Replacement Project that consists of the replacement of 3.588 miles of pipeline rerouted from mountainous terrain to existing roadways through the Newhall Pass, the installation of four engineered crossings, and the replacement of one mainline valve (MLV). The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$92,044,279.

The Project Team divided Supply Line 45-120 Section 2 Replacement Project construction activity into separate construction sections, 2A and 2B, to execute the post completion hydrotest. Section 2A consisted of the installation of approximately 2.5 miles of [REDACTED] pipe along Sierra Highway and Foothill Boulevard. Section 2B consisted of the installation of approximately 1.01 miles along San Fernando Road, four engineered crossings, and tie-in with Supply Line 33-120.

Final Report for Supply Line 45-120 Section 2 Replacement Project

Table 1: General Project Information

Project Name		Supply Line 45-120 Section 2A		
Project Type	Replacement			
Length	2.488 miles			
Location	City of Santa Clarita, City of Los Angeles			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1930			
Construction Start	09/02/2014			
Construction Finish	06/10/2017			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Name		Supply Line 45-120 Section 2B		
Project Type	Replacement			
Length	1.101 miles			
Location	City of Los Angeles			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1930			
Construction Start	06/15/2017			
Construction Finish	02/01/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	92,044,279	-	92,044,279	
Disallowed Costs	-	-	-	

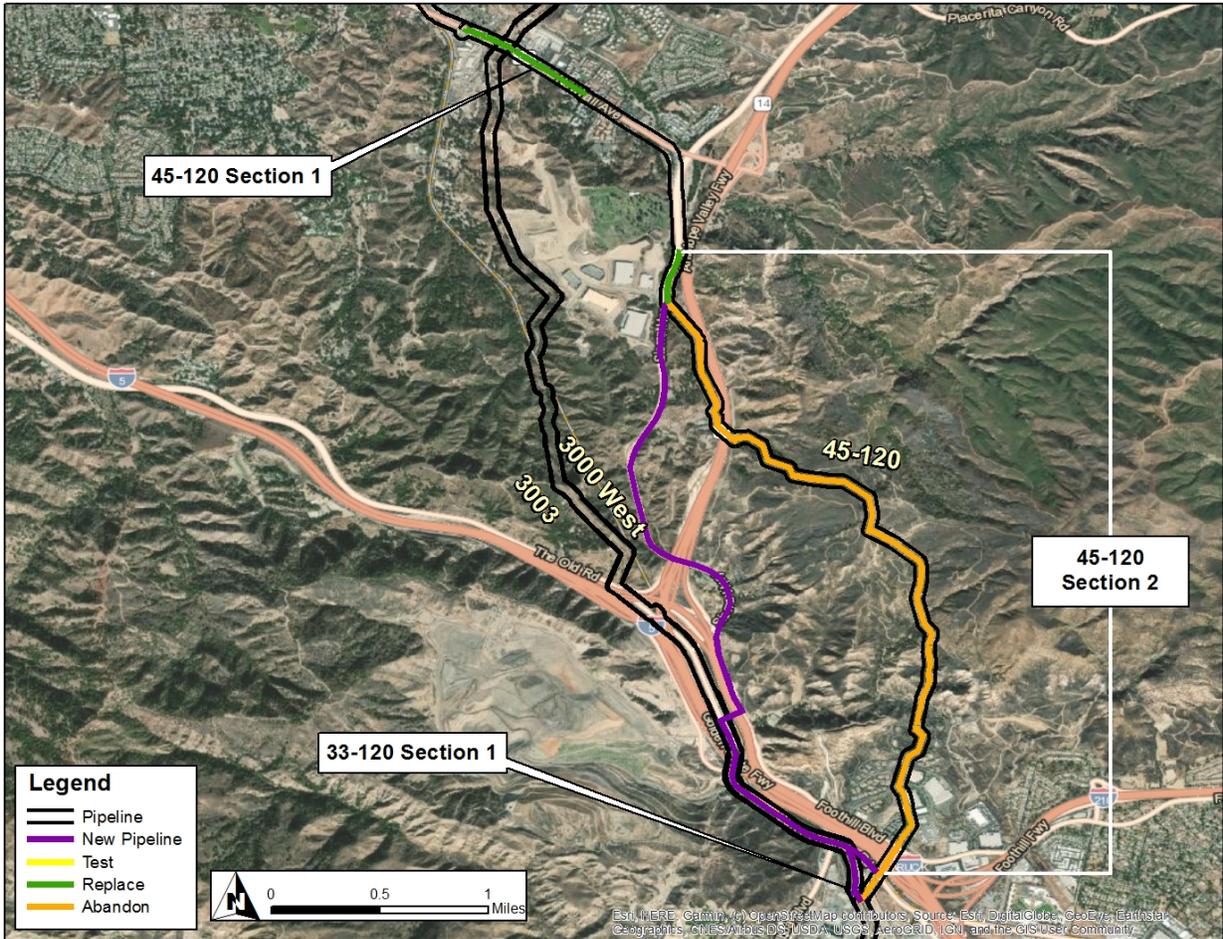
<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

<sup>2</sup> Ibid

Final Report for Supply Line 45-120 Section 2 Replacement Project

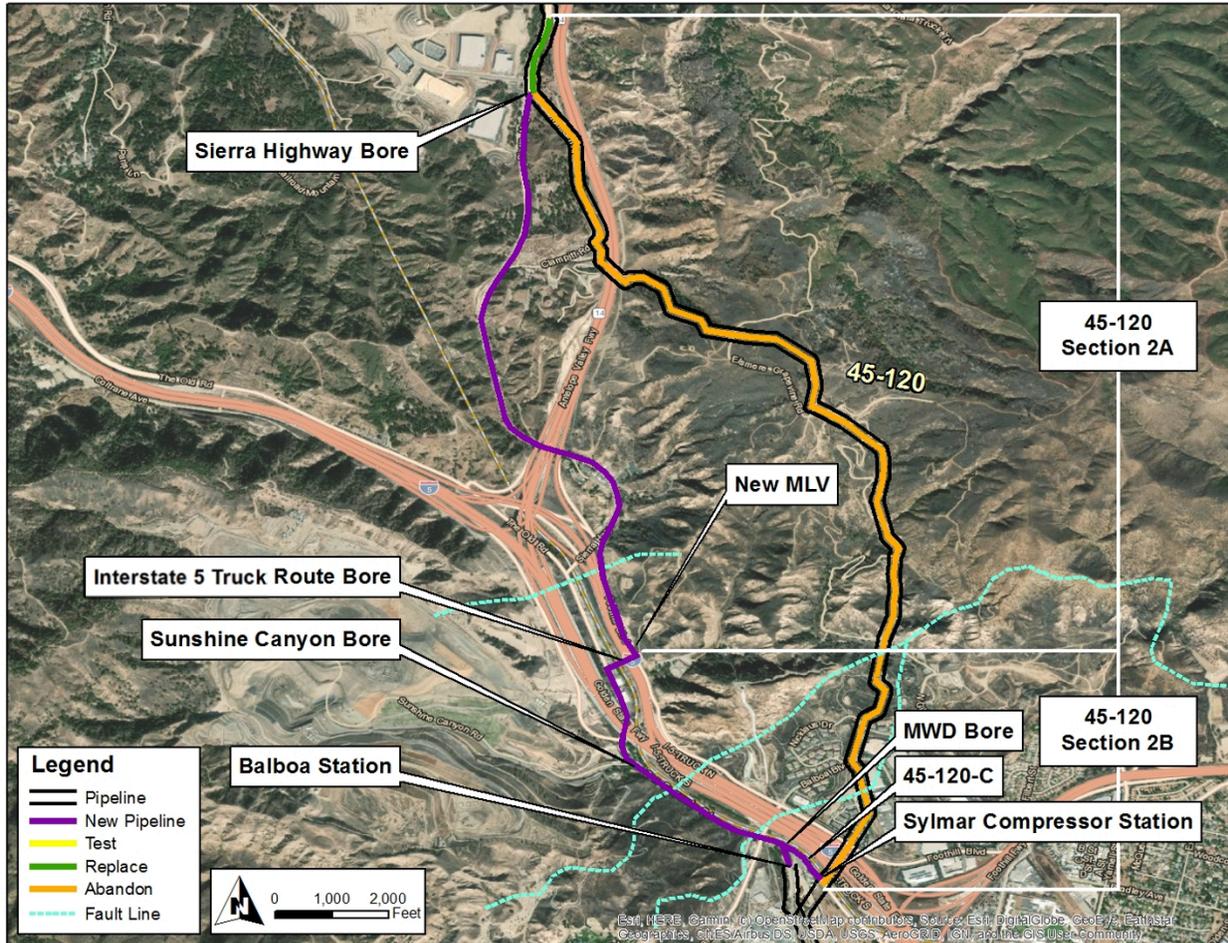
B. Maps and Images

Figure 1: Satellite Image of Supply Line 45-120 Sections 1 and 2 and Supply Line 33-120 Section 1 Replacement Projects



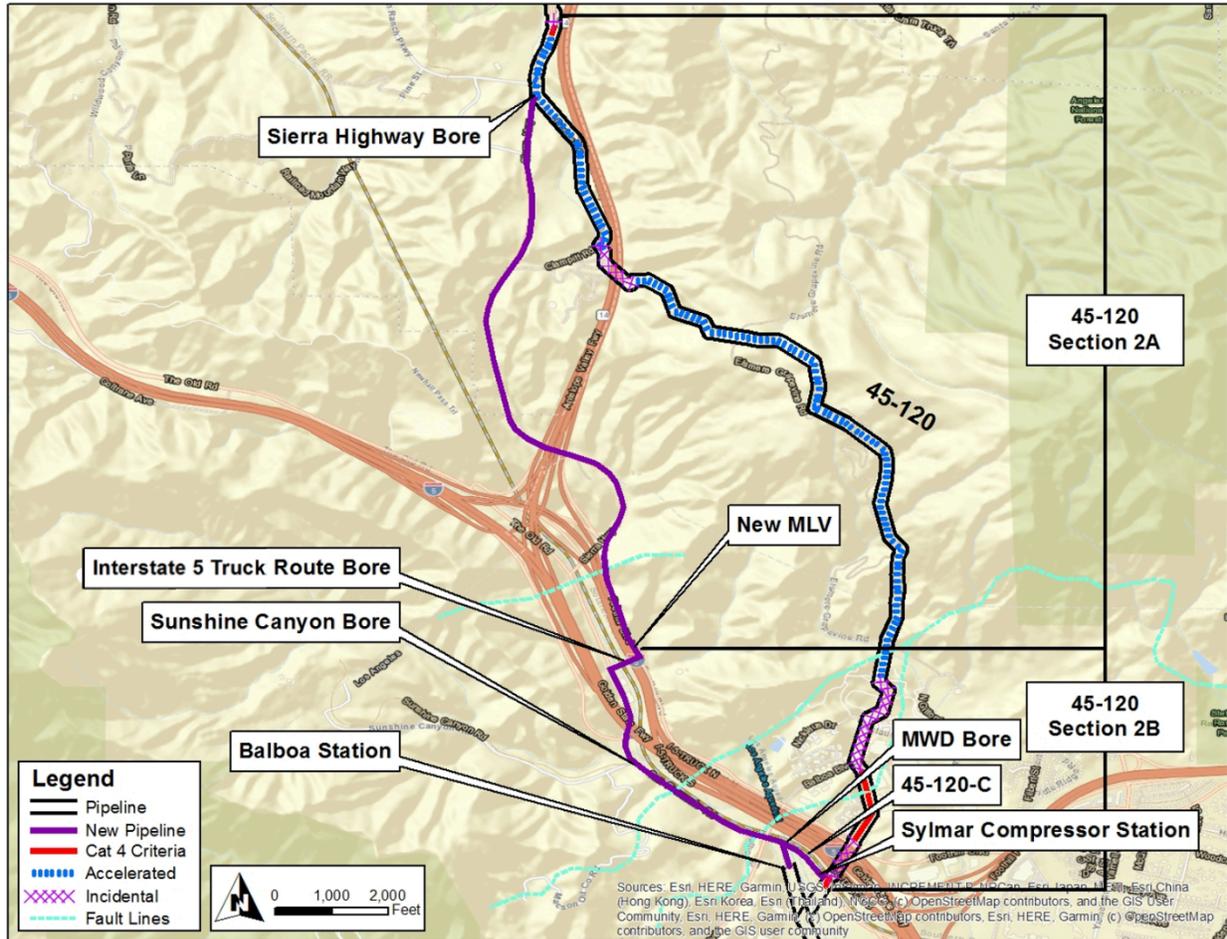
Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 2: Satellite Image of Supply Line 45-120 Section 2 Replacement Project



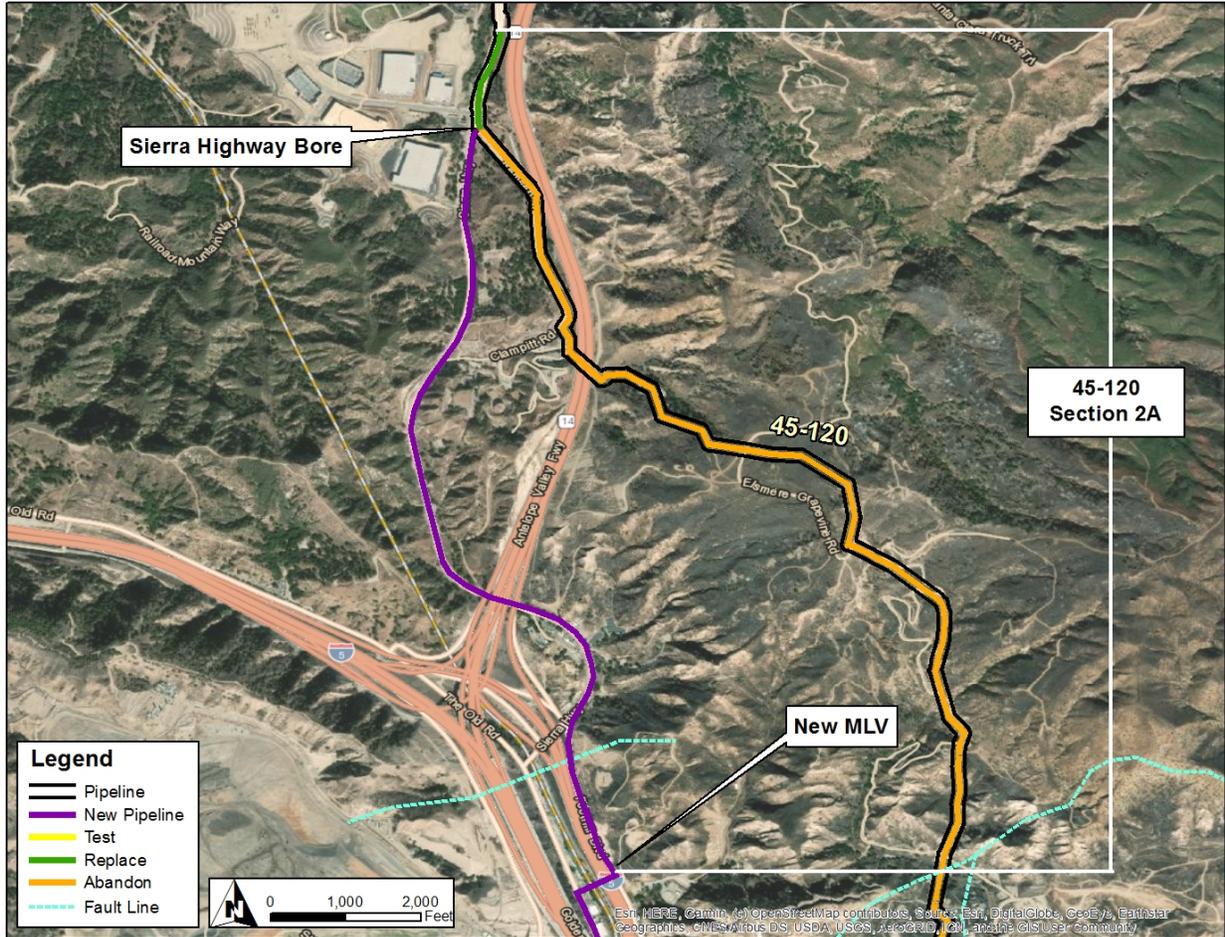
## Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 3: Overview Map of Supply Line 45-120 Section 2 Replacement Project



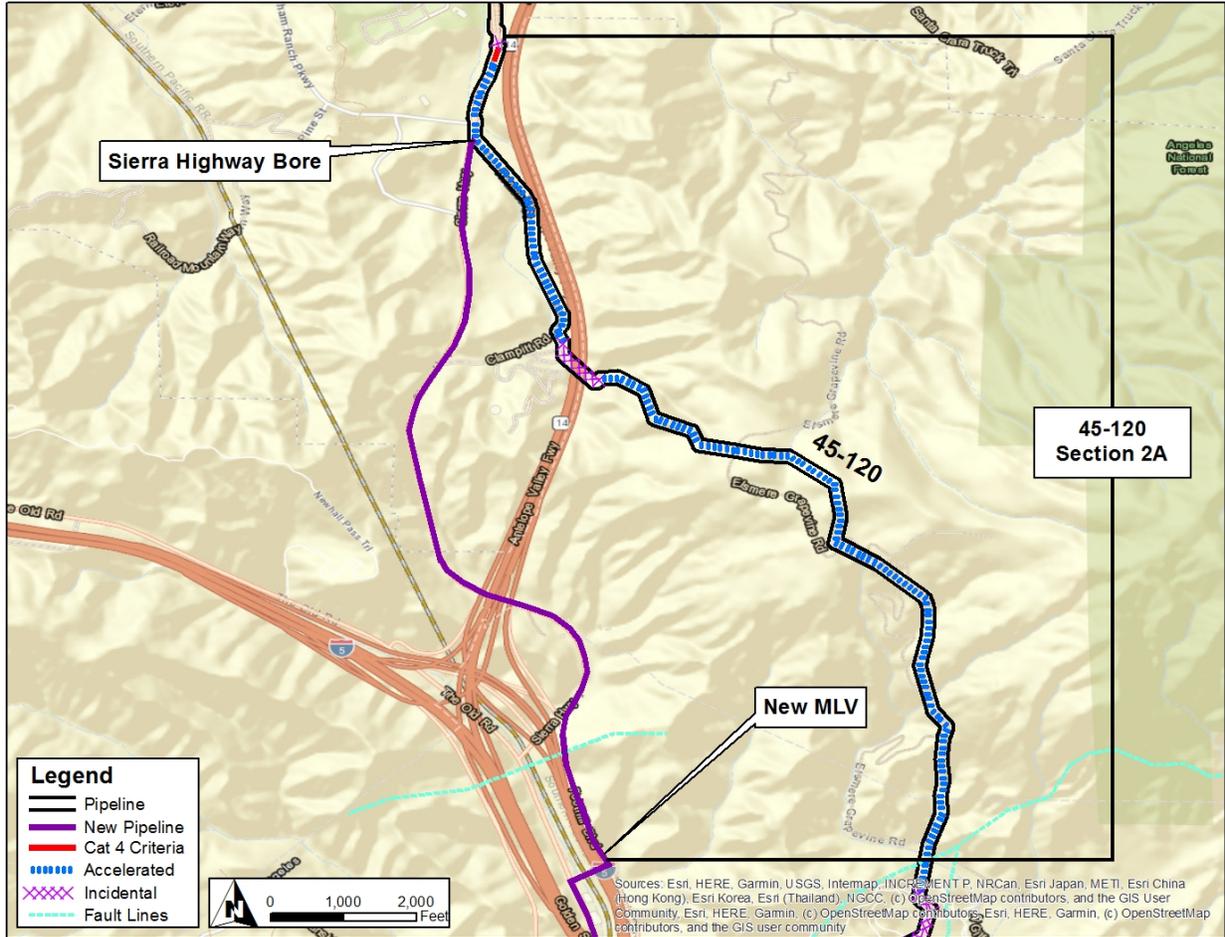
Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 4: Satellite Image of Supply Line 45-120 Section 2A



Final Report for Supply Line 45-120 Section 2 Replacement Project

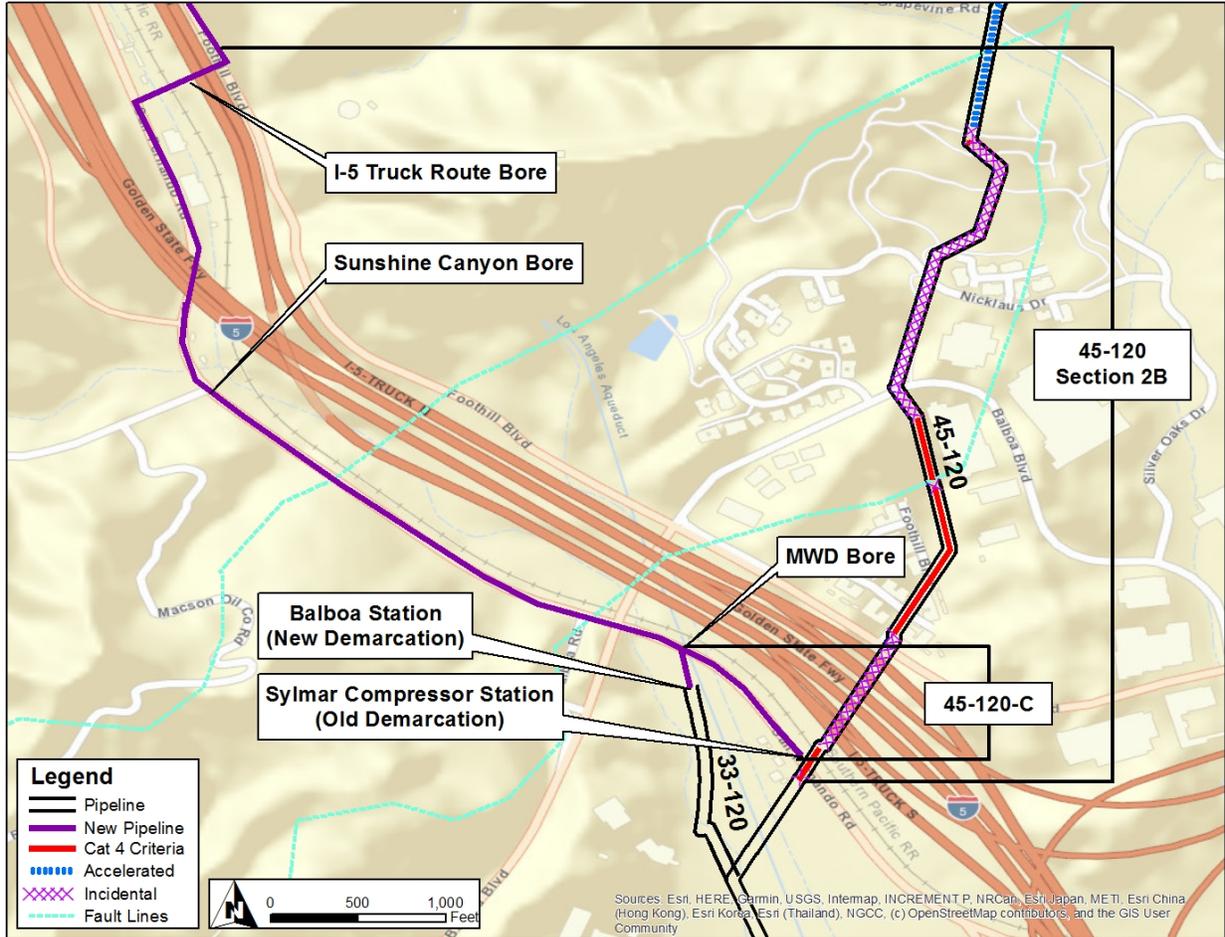
Figure 5: Overview Map of Supply Line 45-120 Section 2A





## Final Report for Supply Line 45-120 Section 2 Replacement Project

### Figure 7: Overview Map of Supply Line 45-120 Section 2B



Final Report for Supply Line 45-120 Section 2 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Final Mileage	0.324 mi.	2.524 mi.	0.684 mi.	0.056 mi.	3.588 mi.
	1,712 ft.	13,325 ft.	3,610 ft.	296 ft.	18,943 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>5</sup> Prior to initiating execution of the Project in 2014, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. The progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 45-120 as a Phase 1A Replacement Project comprised of 1.772 miles of Category 4 Criteria pipe and 2.529 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing, and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 1.484 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. For project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline, SoCalGas separated the Supply Line 45-120 Project into two separate projects: Supply Line 45-120 Section 1<sup>6</sup> Replacement Project, and Supply Line 45-120 Section 2 Replacement Project.

<sup>3</sup> Accelerated mileage includes Phase 1B. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

<sup>6</sup> Supply Line 45-120 Section 1 Replacement Project was filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

Section 1 was executed and completed in 2014 to meet the requirements of the City of Santa Clarita’s paving moratorium.

- b. The Project Team engineered and designed a rerouted pipeline alignment from mountainous terrain for Section 2 to improve accessibility during routine maintenance and emergency responses.
  - c. The Project Team installed engineered crossings at four locations to cross substructures, roads, and highways.
  - d. The Project Team installed one new MLV.
  - e. The Project Team included Accelerated and Incidental mileage to accommodate the rerouted alignment.
4. Final Project Scope: The final project scope consists of a 3.588 mile Replacement. The final mileage consists of 2.524 miles of Accelerated Phase 1B pipe and 0.684 miles of Incidental pipe, one MLV and four engineered crossings.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 45-120 Section 2 and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas has already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas system are not suited for in-line inspection, likely have non-state-of-the-art welds, and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission’s directive in D.11-06-017 to “address retrofitting pipeline to allow for inline inspection tools,” the requirement in California Public Utilities Code

## Final Report for Supply Line 45-120 Section 2 Replacement Project

section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in with no system impact.
2. Customer Impacts: Per the RER, the Project Team was able to maintain service to customers without impact during tie-in activities.
3. Community Impacts: The location of this project is in a heavily trafficked area that required extensive traffic control measures and work hour restrictions to mitigate construction impact to business and residents along the construction route.
4. Piggability: Non-piggable.
5. Pipe Vintage: 1930.
6. Existing Pipe Attributes: The Project Team identified multiple diameters, short radius elbows, and unbarred tees along the existing pipeline.
7. Longseam Type: Unknown.
8. Longseam Repair History: No identified issues.
9. Condition of Coating: No identified issues.
10. History of Leaks: No identified issues.
11. Constructability: The existing pipeline traversed steep and mountainous terrain and was located in a seismically active area, crossing multiple fault lines. The Project Team rerouted the new pipeline to improve pipeline accessibility for routine and emergency maintenance.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

## C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed multiple site walks. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in with no system impact.
2. Customer Impact: Per the RER, the Project Team was able to maintain service to customers without impact during tie-in activities.
3. Community Impact:
  - a. The Project is in a heavily trafficked area that required extensive traffic control measures and work hour restrictions to mitigate construction impact to business and residents along the construction route.
  - b. Nightwork was performed at some Project sites to reduce impacts.
  - c. The Project temporarily relocated three residences near the Sunshine Canyon Bore site.
4. Diameter Changes: The Project Team replaced the existing [REDACTED] line with a [REDACTED] line to standardize the pipeline for piggability purposes.
5. Valves: The Project Team installed one new MLV along Foothill Boulevard adjacent to the I-5 Truck Crossing bore.
6. Land Use:
  - a. The Project Team determined this project would require multiple laydown yards and obtained Temporary Rights of Entry (TREs) for six locations along the construction route to use for materials and equipment staging, construction offices, water tank staging, and other construction related activities.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

- b. The Project Team acquired one easement for a bore site from the landowner on the west side of the I-5 Truck Route/Railroad bore. The remaining bore sites were within the new franchise.
7. Permit Conditions: The Project Team identified multiple jurisdictional agencies and permitting requirements that necessitated careful scheduling and coordination to synchronize the permit acquisition, being mindful of permit expiration dates as well. Permit acquisition time varied at each agency, depending on the type of permit being issued. This created a risk of approved permits expiring before the remaining permits for an area were approved. The Project Team identified the following agencies that had jurisdiction over portions of this project:
  - a. Caltrans
  - b. The City of Santa Clarita
  - c. The City of Los Angeles (Bureau of Engineering, Bureau of Street Services, Department of Transportation, LAPD, Industrial Waste Division, etc.)
  - d. The County of Los Angeles
  - e. Metrolink - Los Angeles County Metropolitan Transit Authority (LACMTA)
  - f. Metropolitan Water District (MWD)
8. Environmental:
  - a. The Project Team obtained permits for the treatment and discharge of hydrotest water as well as the ground water encountered during construction.
  - b. The Project Team planned for abatement activities for possible asbestos containing materials (ACMs) and lead based paint.
9. Schedule Coordination: The Project Team coordinated a portion of construction, the tie-in, and the post-completion hydrotest design with the PSEP Supply Line 33-120 Section 1 Replacement Project to avoid system disruptions. The two projects also shared a laydown yard.
10. Schedule Delay: The Project Team executed the design and construction of each pipeline section in the order that permits were being issued and/or reissued due to changes in design during construction. This allowed the Project Team to initiate

## Final Report for Supply Line 45-120 Section 2 Replacement Project

construction as soon as construction risks were identified, mitigation measures were in place and all necessary permits were obtained. As construction proceeded, unanticipated rock and sandy soil conditions resulted in delays and redesigns.

11. Reroute: The Project Team encountered a number of constraints along the preexisting route and determined that they could be mitigated by rerouting the pipeline alignment. In determining the rerouted alignment, the Project Team considered the following:
  - a. Due to the residential and commercial development that had occurred since the original installation of the pipeline in 1930, the Project Team determined that a rerouted alignment primarily within the county and city franchise would improve accessibility for routine maintenance and emergency response.
  - b. The existing pipeline is aligned in mountainous terrain and the Project Team determined that there was not sufficient space to safely complete construction in these areas. The Project Team rerouted the pipeline to existing roadways to provide adequate space for construction and to improve safety when accessing the pipeline for routine maintenance.
12. Tie-In: The Project Team relocated the demarcation of Supply Line 45-120 and Supply Line 33-120 from Sylmar Compressor Station to Balboa Station in order to abandon an existing span over a creek. These activities were a part of the PSEP Supply Line 33-120 Section 1 Replacement Project. In order to maintain suction pressure at the Sylmar Compressor Station after the updated pipeline configuration, the Project installed a new lateral, Supply Line 45-120-C.
13. Groundwater: The Project Team identified that the groundwater table was shallow along portions of San Fernando Road between Sierra Highway and Sunshine Canyon. The Project Team anticipated that this would be a factor at the trenching and bore sites at Interstate 5 and at Sunshine Canyon. The Project Team designed a one mile long dewatering system and installed piping from the Interstate 5 Truck Route/Railroad bore at the north end of San Fernando Road through Sunshine Canyon to a laydown yard where the sediment was removed.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

14. Substructures:

- a. The Project Team designed the pipeline alignment to accommodate the existing above structures and substructures. The Project Team reviewed public records and potholed along the route, to the extent possible, to confirm the exact location of the underground substructures along the proposed pipeline alignment and soil conditions. Potholing necessitated Traffic Control Plans (TCPs) from the jurisdictional agencies that have oversight along each section of the alignment.
- b. The Project Team obtained TCPs and completed potholing in the City of Santa Clarita and Los Angeles County; however, the Project Team experienced delays of over a year in acquiring permits from the City of Los Angeles and Caltrans. The Project Team continued design activities without confirmation of substructures and soil conditions along San Fernando Road. Due to the restrictions on potholing, the Project Team anticipated encountering unknown substructures and other conditions once construction began.

15. Seismic Mitigation: The Project Team incorporated seismic mitigation measures into the final pipeline design. The new pipeline reroute crosses three active faults, the San Fernando Fault, the North Santa Susana Fault, and the South Santa Susana Fault.

16. Post Completion Hydrotest:

- a. The Project Team identified that a test break, Sections 2A and 2B, was necessary due to the elevation difference between the highest point of the rerouted pipeline to the lowest point of the pipeline.
- b. The test break was sited at the end of Section 2A at the new MLV sited at the I-5 Truck Route bore crossing.
- c. The post construction hydrotest for Section 2B incorporated the post completion hydrotest for Supply Line 33-120 Section 1 Replacement Project to eliminate an additional hydrotest for the Supply Line 33-120 Section 1 Replacement Project.

17. Constructability: The Project Team identified four locations that required crossing roadways and substructures. The Project encountered unforeseen conditions that

## Final Report for Supply Line 45-120 Section 2 Replacement Project

required redesigns with new permitting requirements, resulting in schedule delays. The details regarding the four engineered crossings are as follows:

### I-5 Truck Route Bore Crossing

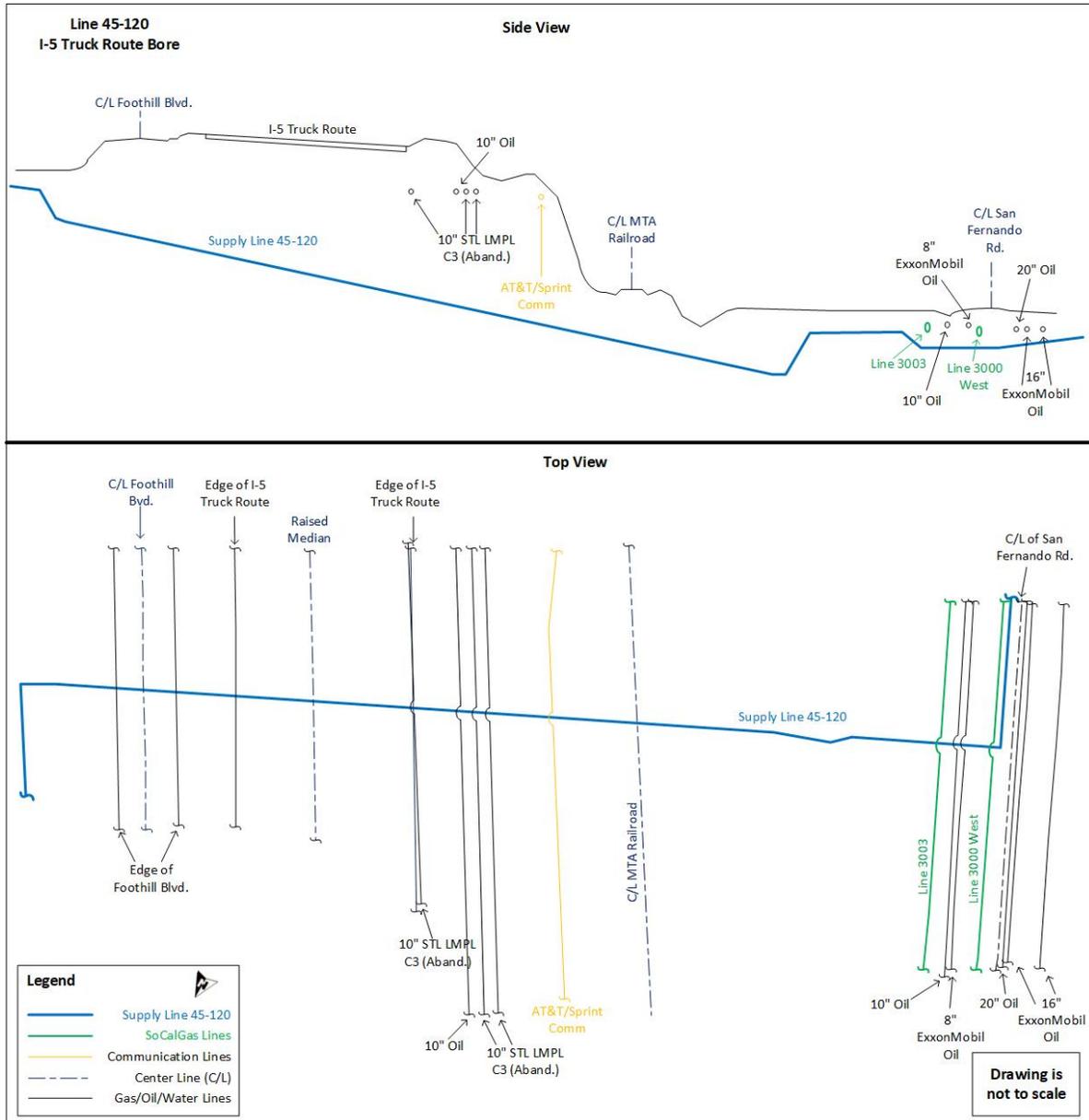
The Project Team developed several preliminary plans to find the optimal location to cross from Sierra Highway and Foothill Boulevard under I-5 Truck Route to San Fernando Road. The Project Team encountered an abandoned tunnel near the Sierra Highway Bridge making the initial route impassable due to the narrow corridor. The Project Team identified an alternate location south of the Sierra Highway Bridge crossing along Foothill Boulevard under I-5 Truck Route and MTA railroad to San Fernando Road. This engineered crossing experienced extensive delays in obtaining permits.

1. Constructability: Approximately 120 feet into the bore, the Construction Contractor hit a hard, impenetrable object deflecting the pilot bore from its laser guided path. The Project Team determined that the bore was striking rock requiring a redesign of the bore crossing using a cased bore, requiring a new permit from Cal/OSHA. Once bore operations were continued and rock was encountered, the boring head was removed, and a crew member would manually excavate with a jack hammer through the rock.
2. Groundwater: The Project Team encountered groundwater in excess of what was anticipated undermining the bore pit. The Project Team excavated the groundwater wells and the area was shored immediately and backfilled with slurry to prevent cave-ins. Once the groundwater issue was under control, the Construction Contractor began manually excavating within the casing.
3. Permit Conditions:
  - a. Caltrans required the redesigned bore to undergo a structural review. The redesigned bore diameter was 36-inches. The bore then qualified as a tunnel since it measured more than 30-inches in diameter. This initiated a tunneling requirements review as required by Caltrans. Once the Project Team submitted the application for the redesigned bore, Caltrans notified the Project Team that a Cal/OSHA mining and boring permit would be required.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

- b. Cal/OSHA mining and bore permit resulted in delaying the project schedule to complete the necessitated soil report.

Figure 8: Schematic of Substructure Crossings of I-5 Truck Route

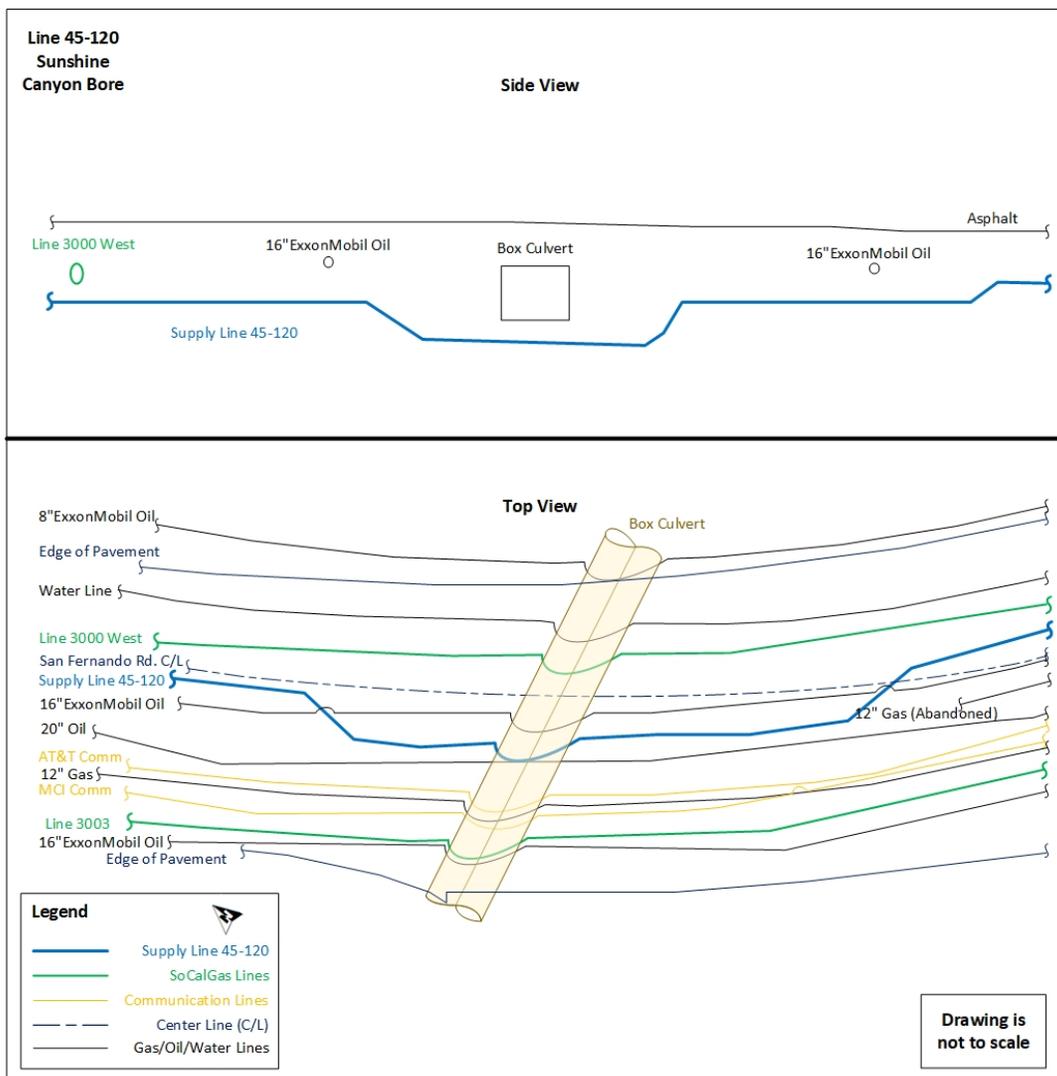


## Final Report for Supply Line 45-120 Section 2 Replacement Project

### Sunshine Canyon Bore Crossing

The Sunshine Canyon bore crossing is located at the heavily trafficked intersection of San Fernando Road and Sunshine Canyon Road. This bore crossing was executed to cross under a large box culvert. The elevation of this area is at the lowest point of the Newhall Pass and the Project Team anticipated a substantial amount of groundwater and prepared for dewatering efforts.

Figure 9: Schematic of Substructure Crossings Along Sunshine Canyon Road and San Fernando Road

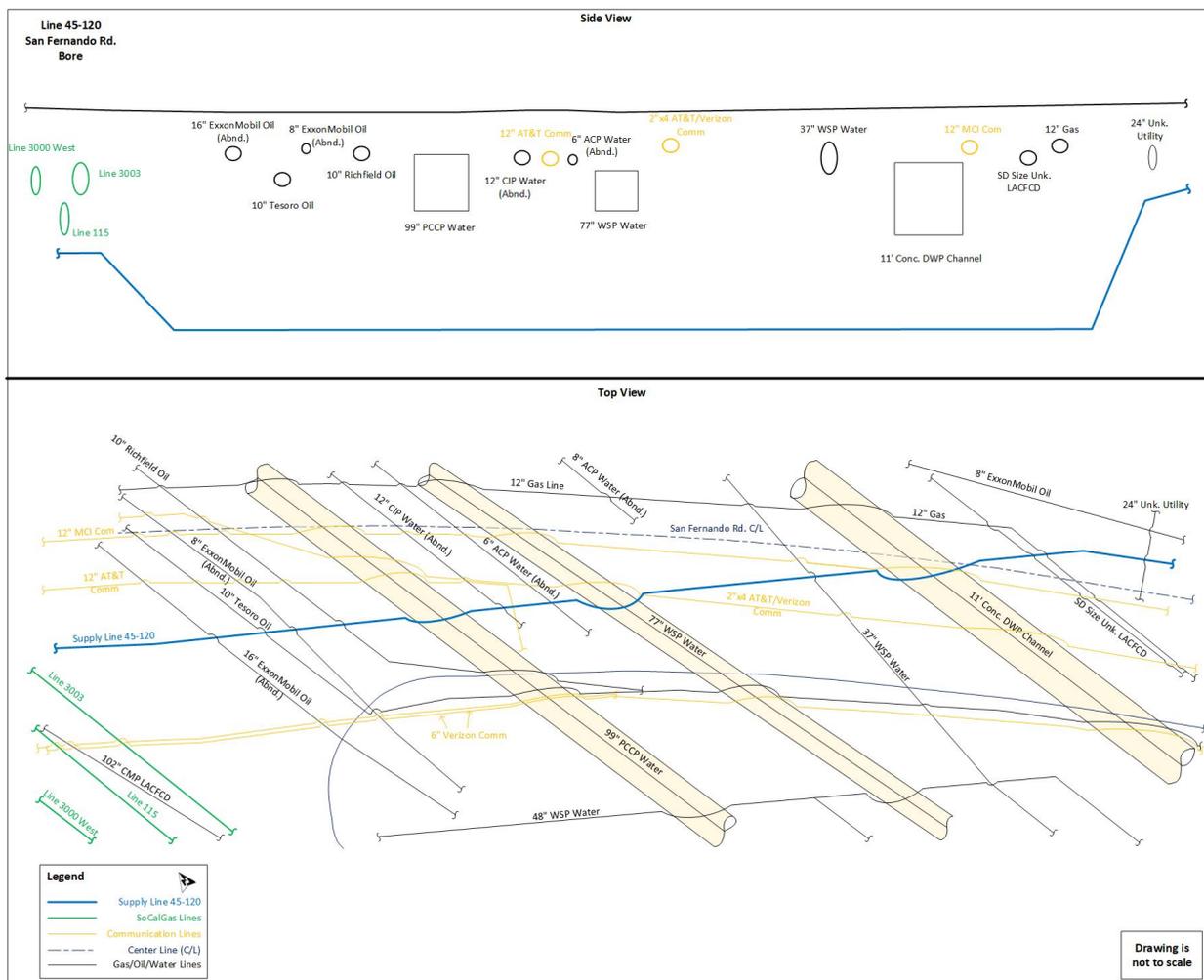


## Final Report for Supply Line 45-120 Section 2 Replacement Project

### MWD Bore Crossing

The MWD Bore is located along San Fernando Road at the primary entrance of an MWD Water Treatment Facility. This crossing was executed using jack and bore to cross under multiple large diameter LADWP substructures and to provide uninterrupted access for MWD vehicles to ingress and egress from the facility.

Figure 10: Schematic of Substructure Crossings Along San Fernando Road Near Balboa Boulevard – MWD Bore Crossing

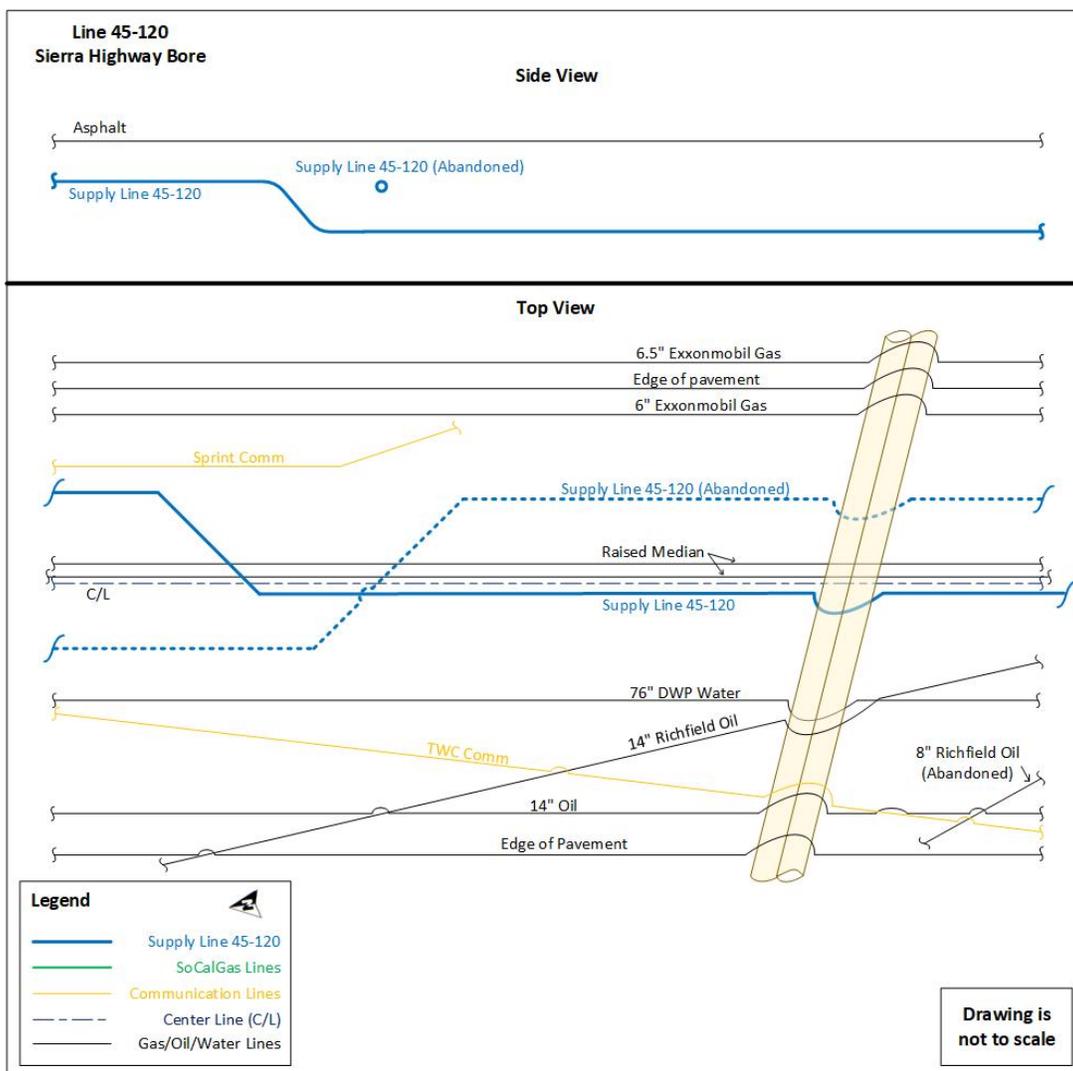


Final Report for Supply Line 45-120 Section 2 Replacement Project

Sierra Highway Bore Crossing

The Project Team determined that the bore pit at Sierra Highway and Remsen Street required engineered shoring since the bore pit was in excess of 30 feet deep. The Project Team encountered sand and cobble not previously identified requiring immediate backfill with slurry to prevent cave-ins as shoring was removed.

Figure 11: Schematic of Substructures Near Sierra Highway and Remsen Street



## Final Report for Supply Line 45-120 Section 2 Replacement Project

## D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the additional Construction Contractor Costs are reflected in change orders; however, additional costs incurred by Engineering & Design, Project Management, Environment, etc. are not reflected in the preliminary estimate nor in change orders and include the following:

1. Construction Method: The I-5 Truck Route bore experienced three unsuccessful attempts to bore through what was assumed to be large boulders. It was determined there was a layer of bedrock causing the unsuccessful crossing attempts. Ultimately, a method of utilizing a casing and hand mining was used to complete the bore. Each crossing attempt required extensive engineering analysis to determine the feasibility of the crossing method, resubmittal of permits to Caltrans, MTA, and the City of Los Angeles.
2. Groundwater: Extensive amounts of groundwater ranging from 50,000 to 100,000 gallons of water per day were encountered along San Fernando Road, resulting in reduced Construction Contractor productivity from the planned installation of 90 feet per day to 10 feet per day. Groundwater mitigation efforts also resulted in additional environmental monitoring, water handling and storage, water filtration equipment, and disposal costs.

Final Report for Supply Line 45-120 Section 2 Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed a Performance Partner to prepare cost estimates for the Section 2A work. SoCalGas awarded the Section 2A construction contract to this Performance Partner. The Project Team directed a separated Performance Partner to prepare cost estimates for Section 2B. SoCalGas awarded the Section 2B to a separate Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractors’ Price Estimates (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

<b>Section 2A</b>	
Construction Start Date	09/02/2014
Construction Completion Date	06/10/2017
NOP Date	06/10/2017
<b>Section 2B</b>	
Construction Start Date	06/15/2017
Construction Completion Date	02/01/2018
NOP Date	12/22/2017

## Final Report for Supply Line 45-120 Section 2 Replacement Project

## C. Changes During Construction

The conditions summarized below were encountered during construction and occurred in conjunction with the design challenges discussed above. Activities to address or mitigate these conditions resulted in approximately \$11,262,000 in change orders.

### 1. Site Conditions:

- a. The Project Team encountered additional unidentified substructures, contaminated soil, and groundwater requiring the daily discharge of water in excess of the anticipated amount.
- b. The Construction Contractor hit a hard object while performing the I-5 Truck Route Bore. Due to hard soil conditions, the bore could not be completed as originally planned. During the evaluation of the alternative options to complete the bore, the Construction Contractor provided necessary equipment to maintain the bore pits.
- c. The Project Team encountered unstable soil conditions while removing the shoring box at the Sierra Highway Bore Crossing that required the bore pit to be backfilled with slurry to stabilize the soil and roadway.

2. Schedule Delay: Conditions encountered in the field extended the Project duration by approximately 20 weeks. Additional field support costs were incurred to support the completion of this project.

3. Traffic: Delays in obtaining approval of a traffic signal control plan (TCP) from LADOT prevented the cutting of a segment of traffic loops along the Project route. The Project Team completed work out of sequence and maintained shoring in the affected area until the approval of TCP.

4. Field Design Changes: The Construction Contractor completed additional potholing to locate utilities for the I-5 Truck Route Crossing.

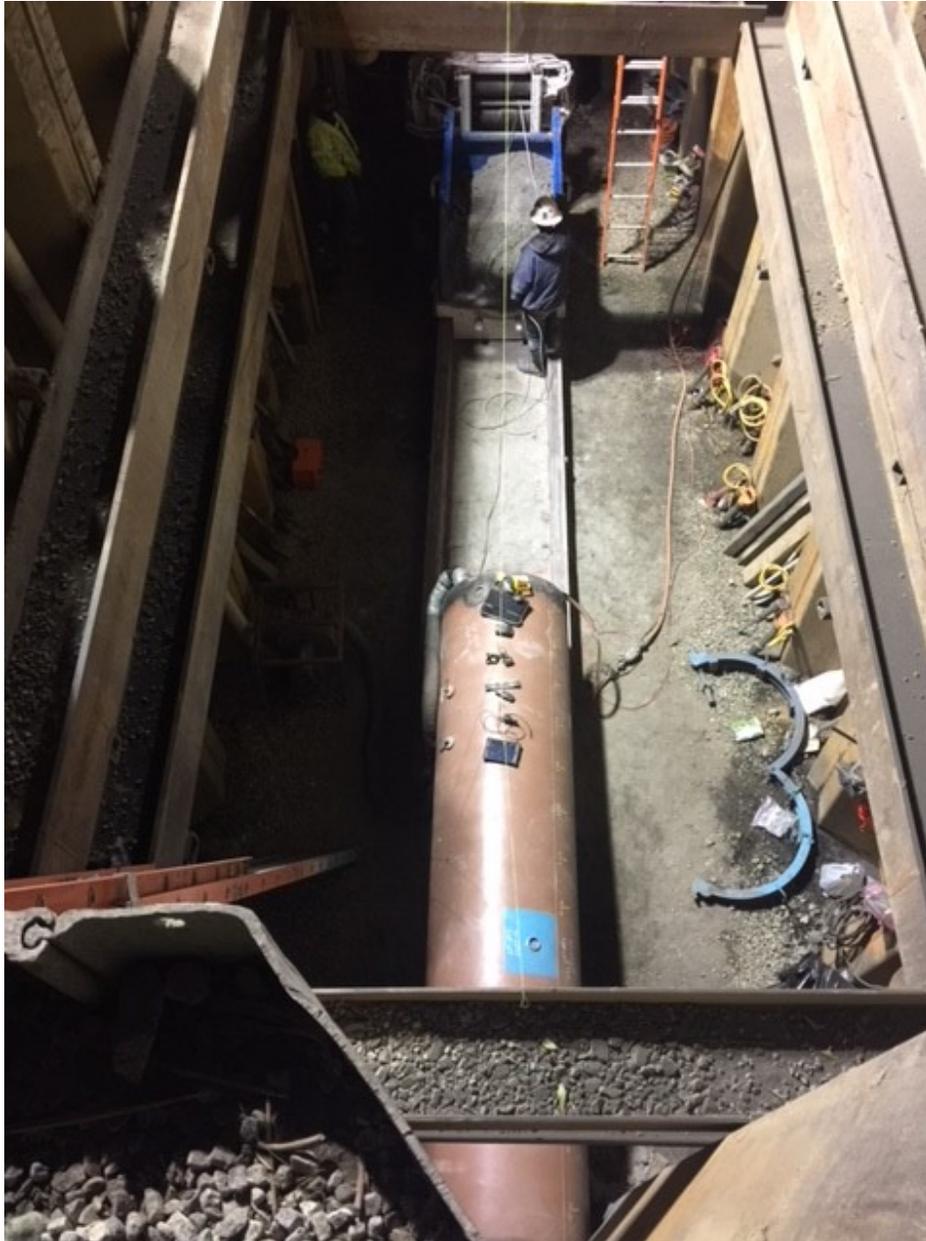
Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 12: Lowering in New Pipe



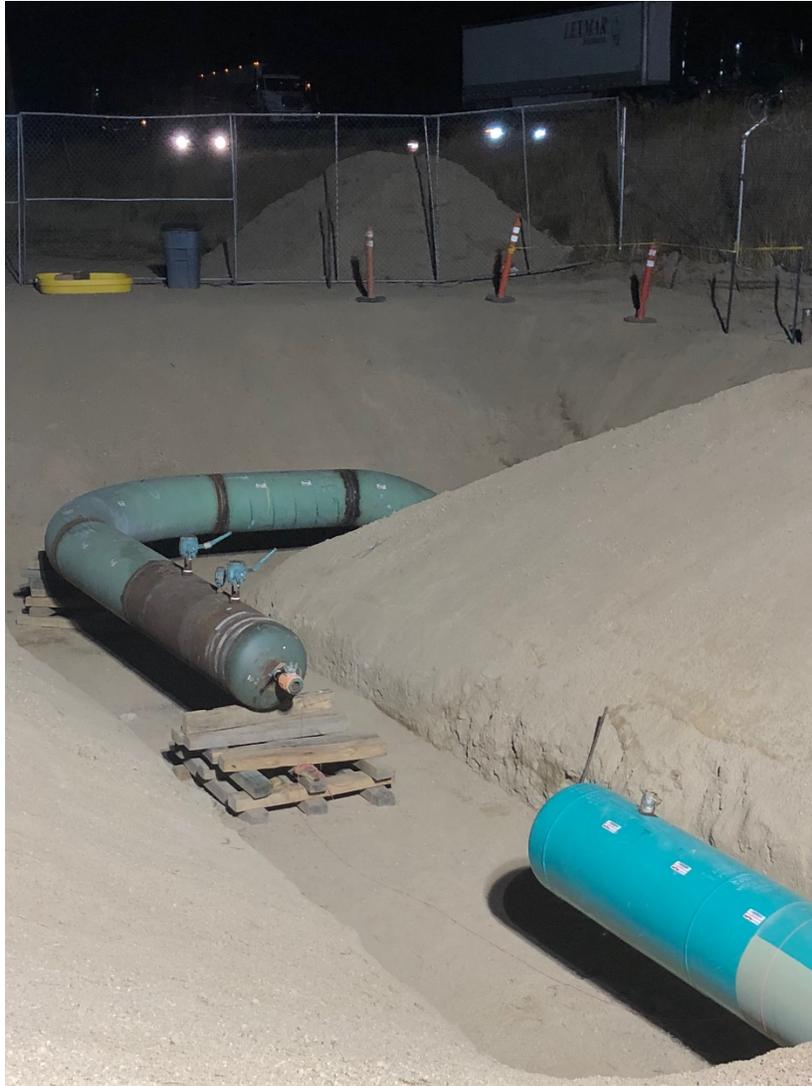
Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 13: Bore Casing for Interstate 5 and Metrolink Crossing



Final Report for Supply Line 45-120 Section 2 Replacement Project

Figure 14: Test Heads at I-5 Truck Route Crossing



## Final Report for Supply Line 45-120 Section 2 Replacement Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: Bulk ordered pipe provided volume pricing for the [REDACTED] pipe.
2. Land Use: A laydown yard was shared with the Supply Line 33-120 Section 1 Replacement Project.
3. Construction Execution:
  - a. Construction crews were redeployed to other construction locations when delays occurred.
  - b. During the potholing effort, the Construction Contractor trenched the validated potholes and secured permission from the City of Los Angeles to keep the trench open and avoided approximately 2,000 feet of retrenching.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$54,405,172. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Supply Line 45-120 Section 2 Replacement Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$92,044,279.

Table 4: Estimated and Actual Direct Costs and Variances<sup>7</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	348,116	1,097,074	748,958
Materials	6,979,498	2,303,755	(4,675,743)
Construction Contractor	28,434,162	43,725,028	15,290,866
Construction Management & Support	6,083,254	5,769,593	(313,661)
Environmental	1,502,253	5,606,349	4,104,096
Engineering & Design	3,404,093	6,954,049	3,549,956
Project Management & Services	1,289,514	1,765,692	476,178
ROW & Permits	616,157	1,918,265	1,302,108
GMA	5,748,125	6,971,211	1,223,086
<b>Total Direct Costs</b>	<b>54,405,172</b>	<b>76,111,017</b>	<b>21,705,845</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>8</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	2,476,414	5,185,243	2,708,829
AFUDC	2,155,659	9,473,334	7,317,675
Property Taxes	206,856	1,274,686	1,067,830
<b>Total Indirect Costs</b>	<b>4,838,929</b>	<b>15,933,262</b>	<b>11,094,333</b>
<b>Total Direct Costs</b>	<b>54,405,172</b>	<b>76,111,017</b>	<b>21,705,845</b>
<b>Total Loaded Costs</b>	<b>59,244,101</b>	<b>92,044,279</b>	<b>32,800,178</b>

<sup>7</sup> Values may not add to total due to rounding.

<sup>8</sup> Ibid

Final Report for Supply Line 45-120 Section 2 Replacement Project

**D. Disallowance**

The scope of the Line 45-120 Section 2 Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 45-120 Section 2 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 45-120 Section 2 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced and rerouted 3.588 miles of pipeline and one MLV in the City of Los Angeles and City of Santa Clarita. The total loaded cost of the Project is \$92,044,279.

SoCalGas executed this project prudently through the replacement and reroute of 3.588 miles of pipeline utilizing open trench, three jack and bores, one slick bore beneath the I-5 Truck Route, and the replacement of one MLV.

SoCalGas engaged in prudent cost avoidance efforts by obtaining a groundwater discharge permit, as opposed to hauling water off-site to disposal facilities, rerouting the pipeline to avoid environmentally sensitive areas, coordinating design and construction with the adjacent PSEP Supply Line 33-120 Section 1 Replacement Project, and utilizing bulk ordered pipe provided volume pricing for the [REDACTED] pipe.

---

**End of Supply Line 45-120 Section 2 Replacement Project Final Report**

## Final Report for Line 404 Section 4A Replacement Project

**I. LINE 404 SECTION 4A REPLACEMENT PROJECT**

---

**A. Background and Summary**

Line 404 is an [REDACTED] diameter transmission line that runs approximately 55 miles through Ventura County and Los Angeles County, including the Cities of Ventura, Camarillo, Moorpark, Thousand Oaks, and Los Angeles, terminating in the Encino neighborhood in the City of Los Angeles. The pipeline is primarily routed across Class 3 locations. This report describes the activities associated with Line 404 Section 4A Replacement Project which consists of the replacement of 0.831 miles of non-piggable dual run pipeline with 0.400 miles of single run pipeline, one mainline valve (MLV), and one jack and bore installation. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$18,671,944.

The Line 404 Section 4A Replacement Project is a component of Line 404, which was identified in the 2011 PSEP filing<sup>1</sup> as a 24.450 mile hydrotest project. For project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline, SoCalGas divided Line 404 into several project sections to be managed individually (see Figure 1). Three key reasons drove the decision to manage the work on Line 404 in this manner; the sections were in different locations and physically separated from each other by non-PSEP segments of pipeline, the project scopes (hydrotesting and replacement) differed among the sections, and the project sections had differing permit acquisition timelines. SoCalGas standardized the pipeline diameter as part of the effort to make the pipeline piggable.

---

<sup>1</sup> See Amended December 2, 2011 Pipeline Safety Enhancement Plan (PSEP) of SoCalGas and SDG&E.

Final Report for Line 404 Section 4A Replacement Project

Table 1: General Project Information

Project Name	Line 404 Section 4A		
Project Type	Replacement		
Length	0.831 miles		
Location	Ventura		
Class	1		
MAOP ( <i>confidential</i> )	[REDACTED]		
Pipe Vintage	1944		
Construction Start	08/13/2018		
Construction Finish	11/20/2019		
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]		
New Diameter ( <i>confidential</i> )	[REDACTED]		
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]		
New SMYS ( <i>confidential</i> )	[REDACTED]		
Project Costs (\$)	Capital	O&M	Total
Loaded Project Costs	18,671,944	-	18,671,944
Disallowed Costs	342	-	342

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Line 404 Section 4A Replacement Project

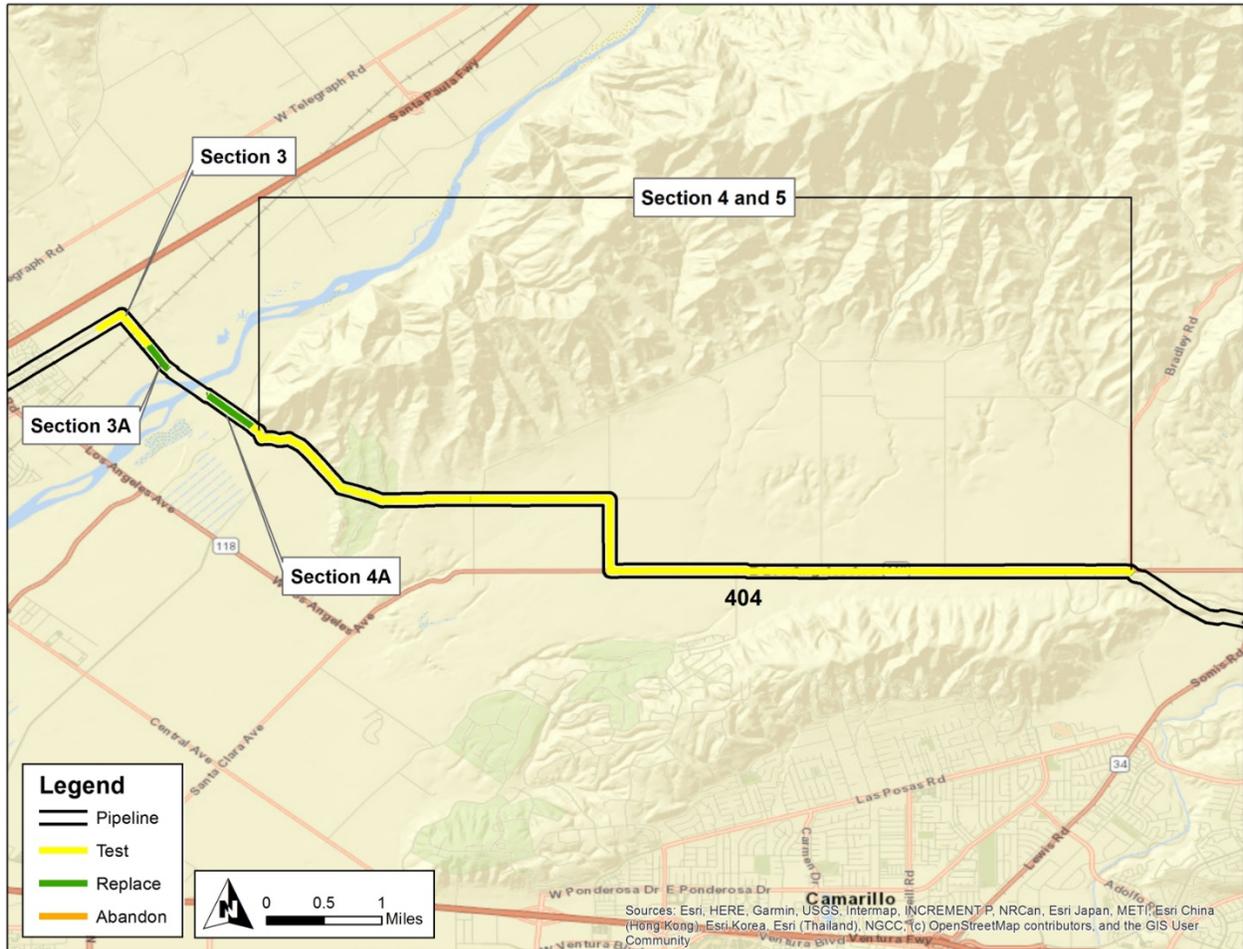
### B. Maps and Images

Figure 1: Overview Image of Line 404 Hydrotest and Replacement Projects



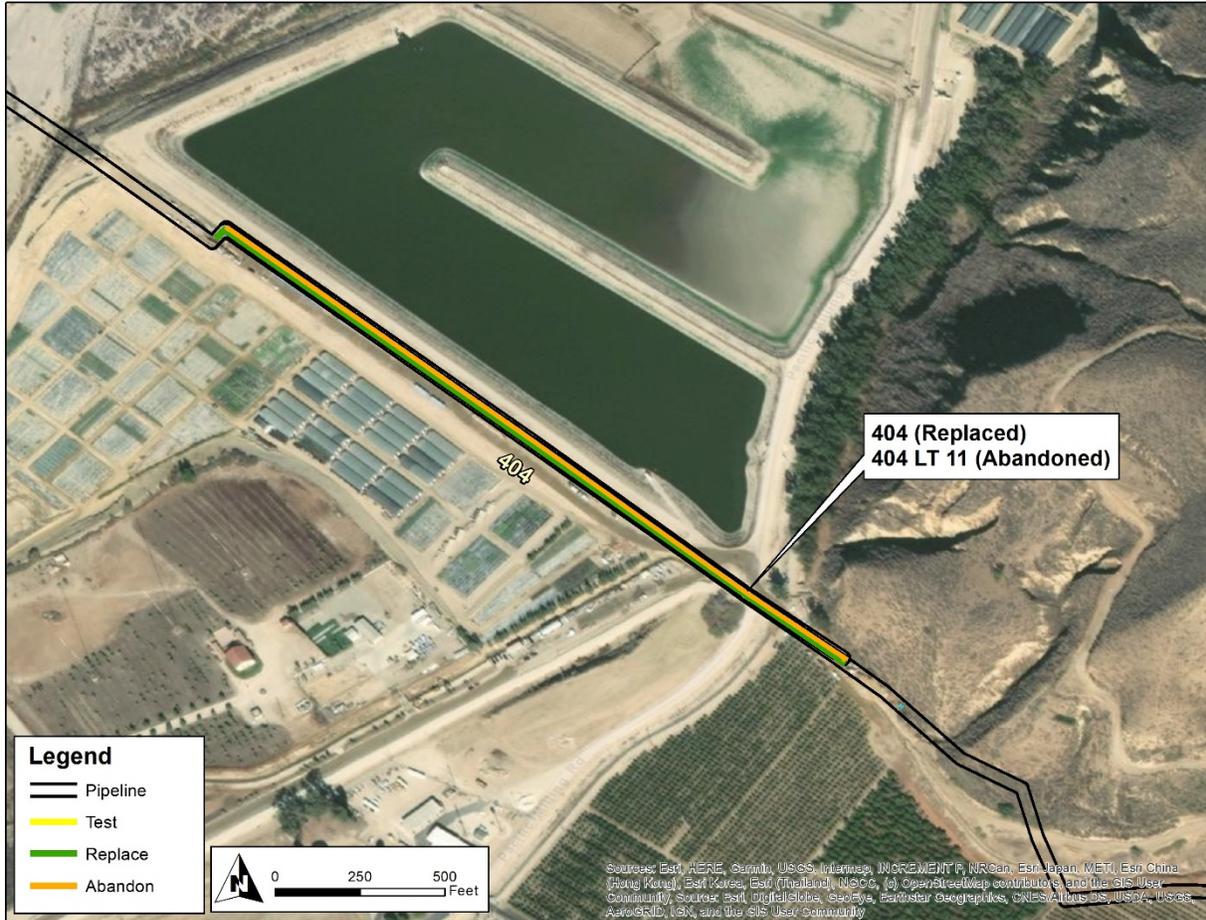
## Final Report for Line 404 Section 4A Replacement Project

Figure 2: Satellite Image of Line 404 Section 3 Hydrotest, Section 3A Replacement, Section 4A Replacement and Section 4&5 Hydrotest Projects



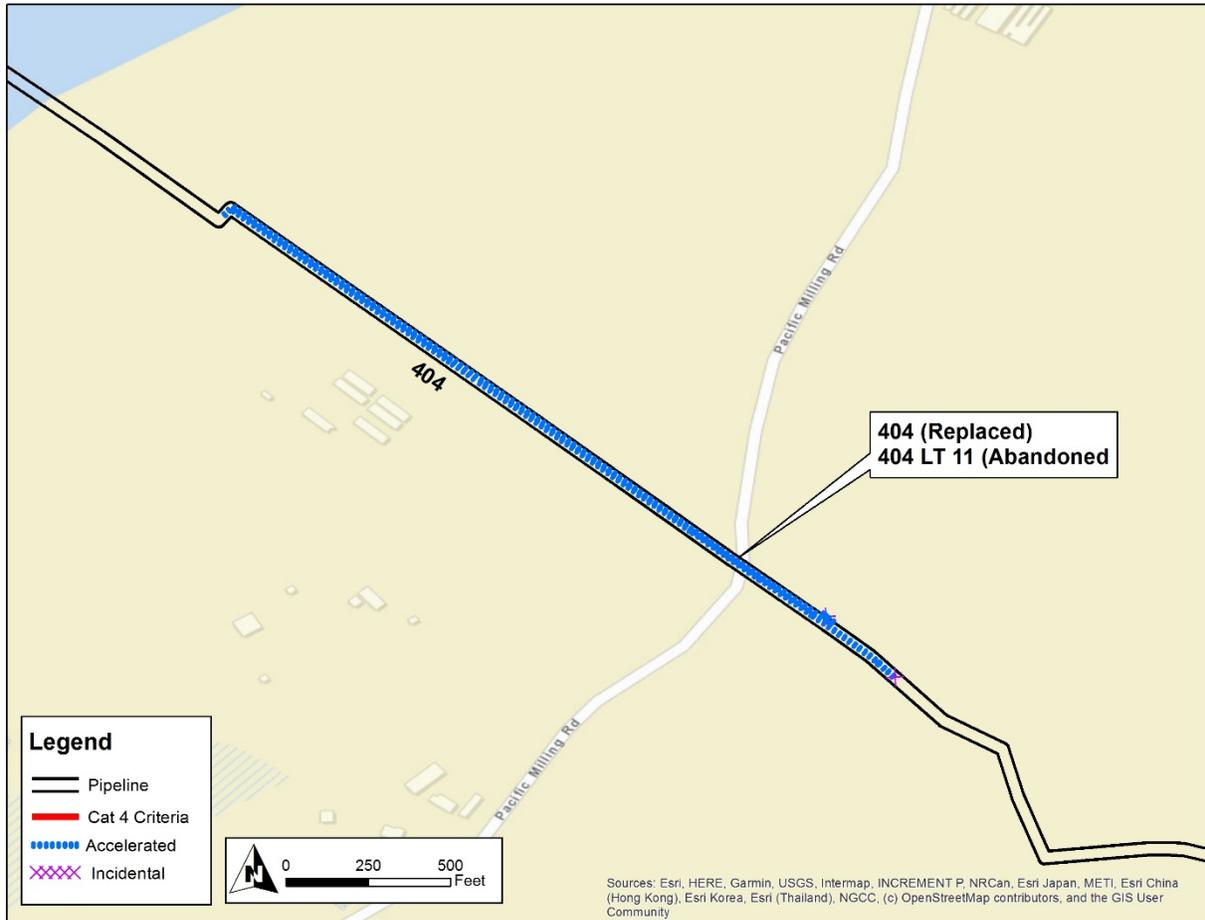
## Final Report for Line 404 Section 4A Replacement Project

Figure 3: Satellite Image of Line 404 Section 4A Replacement Project



Final Report for Line 404 Section 4A Replacement Project

Figure 4: Overview Map of Line 404 Section 4A Replacement Project



Final Report for Line 404 Section 4A Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Final Mileage	0 mi.	0.964 mi.	0.001 mi.	0 mi.	0.831 mi. <sup>5</sup>
	0 ft.	5,092 ft.	7 ft.	0 ft.	4,387 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>6</sup> Prior to initiating execution of the Project in 2018, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas & SDG&E identified Line 404 as a Phase 1A Hydrotest Project comprised of 24.450 miles of Category 4 Criteria pipe and 13.350 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of Line 404 by 18.874 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. SoCalGas reviewed existing pipeline records and determined that Section 4A was within a Class 1 location and was composed of Phase 1B, non-piggable pipe and was addressed in conjunction with the contiguous Phase 1A Line 404 projects.

<sup>3</sup> Accelerated mileage includes 0.331 miles of Phase 1B and 0.061 miles of Phase 2 pipe. The Phase 2 mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> Total Mileage for Section 4A includes both replacement and abandonment mileage of the dual piping.

<sup>6</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Line 404 Section 4A Replacement Project

- b. Line 404 Section 4A is a dual feed pipeline that consists of two separate parallel lengths of pipe. The scope of Line 404 Section 4A is approximately 2,042 feet and the parallel Line 404 LT 11 is approximately 2,005 feet. The Project Team designed Line 404 Section 4A Replacement Project to replace both sections of pipe with a single new pipeline.
  - c. Section 4A was further scoped to include the replacement of two preexisting, non-piggable, pre-46 valves (non-automated MLV and cross-tie valve).
  - d. Phase 1B Accelerated mileage was included to make the entire 55 mile run of Line 404 piggable and Phase 2 Accelerated and Incidental mileage was included for constructability.
4. Final Project Scope: The final project scope consists of a 0.390 mile replacement of dual run [REDACTED] pipe with a single run [REDACTED] diameter line. The Accelerated mileage consists of 0.900 miles of Phase 1B pipe, 278 feet of Phase 2A pipe, 61 feet of Phase 2B pipe, and 0.001 miles of Incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 404 and confirmed the project design should commence as a Replacement Project.

Pipeline segments installed prior to 1946 that are not capable of being assessed using in-line inspection technology are identified for replacement under the approved PSEP Decision Tree. As explained in the testimony supporting the approved PSEP, as part of the work previously completed during implementation federal gas transmission pipeline integrity management regulations (49 CFR 192, Subpart O), SoCalGas has already identified, retrofitted and in-line inspected pre-1946 transmission pipelines that were constructed using acceptable welding techniques and are operationally suited to in-line inspection. The remaining pre-1946 segments in the SoCalGas/SDG&E system are not suited for in-line inspection, likely have non-state-of-the-art welds, and would require significant investment for retrofitting to accommodate in-line inspection tools. Accordingly, consistent with the Commission's directive in D.11-06-017 to "address

## Final Report for Line 404 Section 4A Replacement Project

retrofitting pipeline to allow for inline inspection tools,” the requirement in California Public Utilities Code section 958 that upon completion of the PSEP, where warranted, pipelines are to be capable of accommodating in-line inspection devices, and the overarching objectives of PSEP to enhance the safety of the pipeline system in a proactive, cost effective manner, the approved PSEP Decision Tree identifies pre-1946 non-piggable pipeline segments for abandonment and/or replacement.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas’ determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed an RER analysis and concluded that the line could be shut-in as long as the adjacent Line 406 remained in service.
2. Customer Impacts: The Project Team identified that Line 404 Section 4A as the primary feed to 27 customers. There were no non-core customers served by the line within the shut-in limits. The Project Team utilized CNG to prevent service disruptions to customers.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1944.
5. Existing Pipe Attributes: This section of Line 404 is non-piggable due to multiple tees and diameter changes. Additionally, the pipeline transitions from [REDACTED] pipe to a dual [REDACTED] run for approximately 2,000 feet. The pipeline then transitions back to a single run of pipe with a [REDACTED] diameter.
6. Longseam Type: Seamless.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

Final Report for Line 404 Section 4A Replacement Project

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed an RER analysis and concluded that the line could be shut-in as long as the adjacent Line 406 remained in service.
2. Customer Impact: Per the RER, The Project Team identified that Line 404 Section 4A is the primary feed to 27 customers. There were no non-core customers served by the line within the shut-in limits. The Project Team utilized CNG to prevent service disruptions to customers.
3. Community Impact: No identified issues.
4. Diameter Changes: The Project Team replaced the existing dual [REDACTED] line with a [REDACTED] line to standardize the pipeline diameter as part of the effort to make the pipeline piggable.
5. Schedule Coordination:
  - a. The Project Team coordinated the shut-in with the PSEP Line 404-406 Replacement Project – Somis Station.
  - b. The Project Team coordinated with other PSEP Line 404 Projects in order to have a fully piggable Line 404.
6. Substructures: The original pipe depth was assumed to be 7 feet, however once potholing was completed it was confirmed that pipe depth was approximately 30 feet.
7. Permit Conditions:
  - a. The Project Team obtained an encroachment permit from the Ventura County Watershed Protection District.
  - b. The Project Team obtained an encroachment permit and a traffic control permit from Caltrans for construction equipment traveling to the job site.

## Final Report for Line 404 Section 4A Replacement Project

- c. The Project Team obtained an encroachment permit from Ventura County.
  - d. The Project Team obtained an encroachment permit from the Army Corps of Engineers (ACOE). The acquisition of this permit delayed the start of construction.
  - e. The Project Team obtained an environmental permit from the State Water Resources Control Board for pipeline installation near the river crossing.
8. Land Use: The Project Team notified the adjacent property owner prior to the start of construction activities.
9. Environmental:
- a. The Project Team identified nesting bird habitat for a federally and state endangered bird near the excavation area with the potential impact to the construction activities.
  - b. The Project Team planned for abatement activities for possible asbestos containing materials (ACMs) and lead based paint.
  - c. The Project Team utilized applicable best management practices (BMPs) to prevent any discharged water from entering the Santa Clara River. This included the use of perimeter controls to prevent contaminants from entering the river via storm water runoff or leaving the Project site.
10. Valves: The Project Team replaced two preexisting non-piggable, pre-46 valves.

## D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Line 404 Section 4A Replacement Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

- SoCalGas’ Preliminary Construction Cost Estimate (confidential):  
SoCalGas/SDG&E’s preliminary cost estimate for construction was [REDACTED].
- Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	08/13/2018
Construction Completion Date	11/20/2019
NOP Date	10/24/2019

#### C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$4,435,000 in change orders.

- Constructability Issues:

## Final Report for Line 404 Section 4A Replacement Project

- a. During HDD boring the Construction Contractor encountered rock in excess of two feet in diameter. The Project Team redesigned the bore to a larger reamer to clear the bore path of cobblestones.
  - b. Due to damage sustained by the HDD bore pipe during installation, the Project Team conducted a bell hole inspection and tether pig run. This included the excavation of 30 foot bell holes at the end of the HDD bore pipe for pig launcher and pig receiver area for the tether pig.
  - c. The Project Team redesigned the HDD to a jack and bore crossing to address unknown obstructions. During the boring operations, the Project Team encountered oversized cobble resulting in hand mining to work through the obstructions and limitations of the jack and bore equipment.
2. Environmental: Due to endangered bird nesting activity, the Project temporarily demobilized until the nesting birds left the Project site.
  3. Construction Method: The ACOE required the Project Team to slurry fill the abandoned dual [REDACTED] pipeline. During the review with the ACOE, the Project Team negotiated the use of a less expensive slurry mix than what the ACOE had initially proposed. The initial ACOE slurry mix would only allow the slurry fill to occur in 500 foot increments with multiple excavations, while the Project Team's proposed slurry fill allowed the abandoned pipeline to be filled in one continuous fill and without additional excavations.

Final Report for Line 404 Section 4A Replacement Project

Figure 5: Horizontal Directional Drill Pullback



Final Report for Line 404 Section 4A Replacement Project

Figure 6: Lowering of Casing Pipe into Bore Pit



## Final Report for Line 404 Section 4A Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 404 Section 4A Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: The Project Team ordered the [REDACTED] pipe in bulk.
2. Schedule Coordination: The Project Team coordinated the shut-in with the PSEP Line 404-406 Replacement Project – Somis Station.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$7,454,723. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in

Final Report for Line 404 Section 4A Replacement Project

accordance with Company overhead allocation policies. The total loaded cost of the Project is \$18,671,944.

Table 4: Estimated and Actual Direct Costs and Variances<sup>7</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	737,583	710,414	(27,169)
Materials	580,023	997,300	417,277
Construction Contractor	3,479,288	8,884,024	5,405,001
Construction Management & Support	372,076	911,977	539,901
Environmental	280,701	765,732	485,031
Engineering & Design	650,563	1,897,780	1,247,217
Project Management & Services	458,588	281,640	(176,948)
ROW & Permits	29,073	142,569	113,496
GMA	867,093	1,119,688	252,595
<b>Total Direct Costs</b>	<b>7,454,723</b>	<b>15,711,123</b>	<b>8,256,400</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>8</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	388,081	1,898,890	1,510,809
AFUDC	237,465	920,851	683,386
Property Taxes	53,955	141,079	87,124
<b>Total Indirect Costs</b>	<b>679,501</b>	<b>2,960,820</b>	<b>2,281,319</b>
<b>Total Direct Costs</b>	<b>7,854,324</b>	<b>15,711,123</b>	<b>8,256,400</b>
<b>Total Loaded Costs</b>	<b>8,134,224</b>	<b>18,671,944</b>	<b>10,537,720</b>

<sup>7</sup> Values may not add to total due to rounding.

<sup>8</sup> Ibid.

## Final Report for Line 404 Section 4A Replacement Project

**D. Disallowance**

For this replacement project, SoCalGas identified 1 foot of pipe as being installed after 1955 and lacking records that provide the minimum information necessary to demonstrate compliance with then-applicable industry standards or regulatory strength testing and recordkeeping requirements. Of the pipeline that was replaced, 1 foot of Phase 1A pipe is disallowed. Therefore, a \$342 reduction to ratebase was calculated by multiplying 0.0002 miles of pipe by \$1,709,257 per mile, which was SoCalGas and SDG&E's system average cost of pressure testing at the time the pipeline was returned to service.

## Final Report for Line 404 Section 4A Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 404 Section 4A Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 0.831 miles of pipeline through the installation of 0.400 miles of new pipeline and the abandonment of 0.371 miles of parallel pipeline. The total loaded cost of the Project is \$18,671,944.

SoCalGas executed this project prudently by engaging in scope validation efforts that reduced project mileage, performing early and detailed risk identification and mitigation, and by responding to unanticipated field conditions. With this project, SoCalGas also made Line 404 fully piggable.

SoCalGas engaged in prudent cost avoidance efforts to complete this safety enhancement at a reasonable cost by carefully planning and coordinating engineering and construction activities to maximize efficiencies and reduce customer and community impacts.

**End of Line 404 Section 4A Replacement Project Final Report**

---

## Final Report for Line 404-406 Somis Station Replacement Project

**I. LINE 404-406 SOMIS STATION REPLACEMENT PROJECT**

---

**A. Background and Summary**

Line 404 is an [REDACTED] diameter transmission line and Line 406 is a [REDACTED] diameter transmission line that run in parallel for approximately 55 miles through Ventura County and Los Angeles County, including the Cities of Ventura, Camarillo, Moorpark, Thousand Oaks, and Los Angeles, terminating in the Encino neighborhood in the City of Los Angeles. The pipelines are primarily routed across Class 3 locations. This report describes the activities associated with Line 404-406 Somis Station Replacement Project which is located within the existing Somis Station. Through this Project, SoCalGas enhanced the safety of its natural gas transmission system by replacing 411 feet of Category (CAT) Criteria 4 pipe, and by enabling the rapid detection of a significant change in pipeline pressure and remote isolation and depressurization of Lines 404 and 406 in the event of a pipeline rupture. The Project consists of the removal of pipeline that was replaced by 716 feet of pipeline, the replacement of crossover lines between Lines 404 and 406, valve enhancements made to two new mainline valves (MLVs), the installation of a pressure limiting station, the automation of four valves in the pressure limiting station, the removal of a condensate collection system, and the installation of new power equipment, new communication equipment, and the necessary automation equipment at the site. The total loaded cost of the Project is \$9,387,598.

This Project's costs were shared by PSEP and the Operating District. PSEP funded the activities that remediated the CAT Criteria 4 and the activities that provided system isolation through the installation and automation of the new valves. The Operating District funded the costs related to the removal of a filter separator and the installation of a new pig launcher and receiver. The specific attributes of this Project are detailed in Table 1 below.

Final Report for Line 404-406 Somis Station Replacement Project

Table 1: General Project Information

Line 404 Pipeline Replacement	
Location	Somis
Project Type	Replacement
Length	360 feet
Location	Somis
Class	3
MAOP ( <i>confidential</i> )	[REDACTED]
Pipe Vintage	1951
Construction Start	08/13/2018
Construction Finish	03/25/2019
Valve Commissioning Date	05/23/2019
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]
New Diameter ( <i>confidential</i> )	[REDACTED]
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]
New SMYS ( <i>confidential</i> )	[REDACTED]

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Line 404-406 Somis Station Replacement Project

<b>Line 404 Valve Upgrades</b>	
Valve Number	404-20.80-18
Valve Type	New – Ball
Actuator	New
Actuator Above-/Below-Grade	Above-Grade
ASV	Yes
RCV	Yes
Valve Number	404-20.80-5
Valve Type	New – Ball
Actuator	New
Actuator Above-/Below-Grade	Above-Grade
ASV	No
RCV	Yes
Valve Number	404-20.80-6
Valve Type	New – Ball
Actuator	New
Actuator Above-/Below-Grade	Above-Grade
ASV	No
RCV	Yes
Valve Number	404-20.80-7
Valve Type	New – Ball
Actuator	New
Actuator Above-/Below-Grade	Above-Grade
ASV	No
RCV	Yes
Valve Number	404-20.80-8
Valve Type	New – Ball
Actuator	New
Actuator Above-/Below-Grade	Above-Grade
ASV	No
RCV	Yes

Final Report for Line 404-406 Somis Station Replacement Project

Line 406 Pipeline Replacement				
Project Type	Replacement			
Length	356 feet			
Location	Somis			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1951			
Construction Start	08/13/2018			
Construction Finish	03/25/2019			
Valve Commissioning Date	05/23/2019			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Line 406 Valve Upgrades				
Valve Number	406-19.39-0			
Valve Type	New – Ball			
Actuator	New			
Actuator Above-/Below-Grade	Above-Grade			
ASV	Yes			
RCV	Yes			
Site Upgrades				
Vault	No			
Power	Upgraded – Utility			
Communication	Upgraded – Radio			
SCADA Panel	New			
Equipment Shelter	New			
Fencing	Existing			
Project Costs (\$)		Capital	O&M	Total
Loaded Project Costs		9,387,598	-	9,387,598
Disallowed Costs		-	-	-

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Line 404-406 Somis Station Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Line 404	0.034 mi.	0 mi.	0.004 mi.	0.030 mi.	0.068 mi.
	177 ft.	0 ft.	23 ft.	160 ft.	360 ft.
Line 406	0.044 mi.	0 mi.	0.015 mi.	0.008 mi.	0.067 mi.
	233 ft.	1 ft.	80 ft.	42 ft.	356 ft.
Final Mileage	0.078 mi.	0 mi.	0.020 mi.	0.038 mi.	0.136 mi.
	411 ft.	1 ft.	103 ft.	202 ft.	716 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>5</sup> This conceptual scope identified MLV 404-20.80-0 for automation to enable remote isolation to a portion of Line 404. Prior to initiating execution of the Project in 2018, SoCalGas reviewed existing pipeline records, performed a detailed system flow analysis to validate the scope of the Project, and identified six additional valves for enhancement to provide the planned isolation. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

- 2011 PSEP Filing: SoCalGas and SDG&E identified Line 404 as a Phase 1A Hydrotest Project comprised of 24.450 miles of Category 4 Criteria pipe and 13.350 miles of Accelerated pipe. SoCalGas and SDG&E identified Line 406 as a Phase 1A Hydrotest Project comprised of 7.862 miles of Category 4 Criteria pipe and 12.837 miles of Accelerated pipe. SoCalGas and SDG&E also identified MLV 404-20.80-0 for automation to achieve the objective of rapid system isolation.

<sup>3</sup> Accelerated mileage include Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

Final Report for Line 404-406 Somis Station Replacement Project

2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of Line 404 by 18.874 miles and Line 406 by 7.344 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project was designed to complete the shut-in of Line 404 and Line 406 in two phases to isolate only one pipeline at a time to maintain system capacity.
  - b. Existing pipe and valves would be replaced and not abandoned in place due to the limited workspace at the Project site.
  - c. The Project Team decided to permanently remove the existing condensate system as recommended by SoCalGas Engineering.
  - d. Accelerated and Incidental mileage was included for constructability.
4. Final Project Scope: The final project scope consists of a 716 foot Replacement that consisted of the removal and replacement of CAT 4 Criteria pipe, crossover lines between Line 404 and Line 406, the removal of a preexisting condensate system, and the automation of six valves that included the installation of three new MLVs, the installation of a new pressure limiting station, the installation of six new actuators, the installation of new communications equipment, the installation of new power equipment, and the installation of the necessary automation equipment at the project site.

Table 3: Final Valve Automation Scope

Final Project Scope					
Line	Mile	Valve #	Valve Size ( <i>confidential</i> )	Installation Type	Function
404	404-20.80	18		NV	ASV/RCV
404	404-20.80	5		NV	RCV
404	404-20.80	6		NV	RCV
404	404-20.80	7		NV	RCV
404	404-20.80	8		NV	RCV
406	406-19.39	0		NV	ASV/RCV

## Final Report for Line 404-406 Somis Station Replacement Project

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 404-406 Somis Station and confirmed the project design should commence as a Replacement Project.

Segments of less than 1,000 feet are identified for replacement under the approved PSEP Decision Tree because, for short segments of pipe, the logistical costs associated with pressure testing (for example, permitting, construction, water handling, and service disruptions for a non-looped system) can approach or exceed the cost of replacement. In such circumstances, replacement affords a more cost-effective approach to achieving compliance with D.11-06-017 while providing equal safety enhancement benefits. Moreover, installation of the new segment can usually be performed while the existing service is maintained to customers, thereby avoiding service disruptions that may otherwise occur during pressure testing.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded both Line 404 and Line 406 cannot be shut-in at the same time to maintain overall system capacity. The Project was designed to complete the shut-in in two phases to isolate only one pipeline at a time.
2. Customer Impacts: There were no non-core customers served by the line within the shut-in limits. Service to core customers during shut-ins was maintained using CNG.
3. Community Impacts: No identified issues.
4. Piggability: Non-piggable.
5. Pipe Vintage: 1951.
6. Existing Pipe Attributes: Multiple pipe diameters and non-piggable plug valves.
7. Longseam Type: Electric Resistance Weld (ERW).
8. Longseam Repair History: No identified issues.

## Final Report for Line 404-406 Somis Station Replacement Project

9. Condition of Coating: No identified issues.
10. History of Leaks: No identified issues.

### C. Site Evaluation and Planning

SoCalGas initiated the planning process for the Line 404-406 Replacement Project by performing a pre-design site walk to determine the existing conditions and assess any potential impact on the design. Key factors that influenced the engineering and design of this project are as follows:

1. Site Description: This site is an existing SoCalGas facility in an agricultural and industrial area in unincorporated Ventura County.
2. Land Issues: During the pre-design site walk, the Project Team noted that the existing power and communications equipment would need to be redesigned in order to accommodate the new equipment.
3. DOT Class: This Project site is in a Class 3 location.
4. Power Source: The Project site had existing utility power. The existing utility power was modified to accommodate the new equipment and to satisfy the requirements from the local electric utility.
5. Communication Technology: The Project site had existing radio communications. The radio communications equipment was redesigned to accommodate the new equipment.

### D. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded both Line 404 and Line 406 cannot be shut-in at the same time to

## Final Report for Line 404-406 Somis Station Replacement Project

maintain system capacity. The Project was designed to complete the shut-in in two phases to isolate only one pipeline at a time.

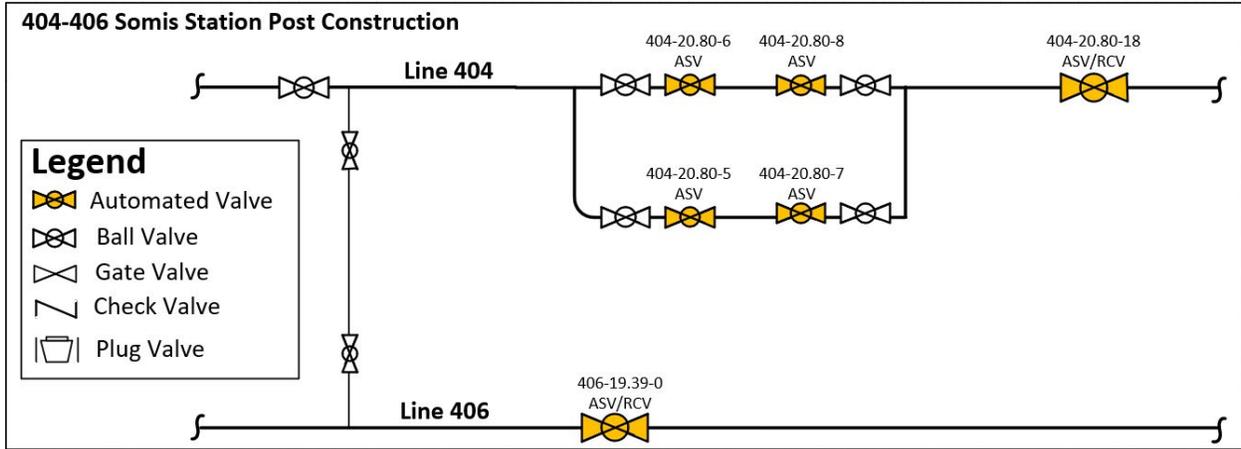
2. Customer Impacts: There were no non-core customers served by the line within the shut-in limits. Service to core customers was maintained by utilizing CNG during the shut-ins.
3. Community Impacts: No identified issues.
4. Constructability:
  - a. Existing pipe and valves would be permanently removed and not abandoned in place due to the limited workspace at the Project site.
  - b. The Project Team decided to permanently remove the existing condensate system as recommended by Gas Engineering.
5. Valve Details:
  - a. 404-20.80-18: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
  - b. 404-20.80-5: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
  - c. 404-20.80-6: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
  - d. 404-20.80-7: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
  - e. 404-20.80-8: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
  - f. 406-19.39-0: The preexisting valve was a manually operated Class 400 ball valve, which was replaced by the Project Team.
6. Actuator Details:
  - a. 404-20.80-18: There was no preexisting actuator. The Project Team installed a new actuator.
  - b. 404-20.80-5: There was no preexisting actuator. The Project Team installed a new actuator.

Final Report for Line 404-406 Somis Station Replacement Project

- c. 404-20.80-6: The was no preexisting actuator. The Project Team installed a new actuator.
  - d. 404-20.80-7: The was no preexisting actuator. The Project Team installed a new actuator.
  - e. 404-20.80-8: The was no preexisting actuator. The Project Team installed a new actuator.
  - f. 406-19.39-0: The was no preexisting actuator. The Project Team installed a new actuator.
7. Schedule Coordination: The Project Team coordinated the shut-in with the PSEP Line 404 Section 4A Replacement Project.
  8. Known Substructures: The Project Team confirmed known substructures against recent as-builts from the PSEP Line 404 Section 4&5 Hydrotest Project.
  9. Permit Conditions:
    - a. The Project Team obtained an encroachment permit from Caltrans for traffic control along Highway 118.
    - b. The Project Team obtained an encroachment permit from Ventura County for the CNG trailer placed along the roadway.
  10. Land Use:
    - a. The Project Team coordinated with the local electric utility to relocate a power pole to install a segment of new pipe.
    - b. The Project Team obtained a laydown yard adjacent to the Project site from an oil pipeline company.
  11. Environmental: The Project Team identified multiple existing pipeline components that would require proper management for their re-use or disposal. The potential contaminants of concern consist of polychlorinated biphenyls (PCBs), asbestos fibers in some fabricated materials, and heavy metals in most paint coatings.
  12. Tie-In: The Project Team determined that Line 406 could not be isolated until the tie-in of PSEP Line 404 Section 4A Replacement Project was complete.

Final Report for Line 404-406 Somis Station Replacement Project

Figure 1: Schematic of Line 404-406 Somis Station Replacement Project



Final Report for Line 404-406 Somis Station Replacement Project

## E. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Line 404-406 Somis Station Replacement Project

### III. CONSTRUCTION

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered into a competitive bidding process to select a mechanical and electrical construction contractor. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the construction contractors prepared and submitted their bid. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas Preliminary Mechanical Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Mechanical Construction Contractor’s Bid (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] SoCalGas’ preliminary cost estimate for construction.
3. SoCalGas’ Preliminary Electrical Contractor Estimate (confidential): SoCalGas’ preliminary cost estimate for the electrical contractor was [REDACTED].
4. Electrical Contractor’s Estimate (confidential): The Electrical Contractor’s estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	08/13/2018
Construction Completion Date	03/25/2019
NOP Date	01/30/2019
Valve Commissioning Date	05/23/2019

## Final Report for Line 404-406 Somis Station Replacement Project

## C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$456,000 in change orders.

1. Schedule Delay: Due to conditions encountered during construction, the duration of construction was extended by approximately 17 weeks. Additional field support costs were incurred to support the completion of this project.
2. Constructability Issues: During the tie-in for Line 406, the Project Team identified that a crossover valve between Line 404 and Line 406 did not fully close, and this did not allow for full isolation of the crossover. The Project Team replaced this valve. The replacement of the valve required additional hand digging excavation, removal of the valve, fabrication, assisting with the nitrogen pressure test of the replacement valve, tie-in, coating, and backfill.

Final Report for Line 404-406 Somis Station Replacement Project

Figure 2: Applying Cathodic Protection Wrap



Final Report for Line 404-406 Somis Station Replacement Project

Figure 3: Bolting up Blind Flange



Final Report for Line 404-406 Somis Station Replacement Project

Figure 4: Installation of Isolation Cap



## Final Report for Line 404-406 Somis Station Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline and valves into service, transportation and disposal of hydrotreated water and hazardous material, and site demobilization. During this stage, SoCalGas successfully performed site acceptance testing, and conducted point-to-point verification with Gas Control for the newly automated valves, and transferred ownership of the new equipment to Field Operations. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work. The site was commissioned on May 23, 2019, as summarized in Table 3.

## Final Report for Line 404-406 Somis Station Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Schedule Coordination: This project was coordinated with the PSEP Line 404 Section 4A Replacement Project so that the schedules could overlap as resources were shared by both Projects.
2. Future Maintenance: The installation of a new condensate collection system at the station was removed from the project scope allowing for more efficient maintenance and operations.
3. Known Substructures: The Project Team confirmed known substructures against recent as-builts from the PSEP Line 404 Section 4&5 Hydrotest Project. Cost savings resulted from eliminating the need to complete an additional basemap survey and potholing.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$7,061,246. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Line 404-406 Somis Station Replacement Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$9,387,598.

Table 4: Estimated and Actual Direct Costs and Variances<sup>6, 7</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	671,952	687,757	15,805
Materials	951,056	1,182,952	231,896
Mechanical Construction Contractor	2,599,313	2,434,196	(165,117)
Electrical Construction Contractor	267,951	82,888	(185,063)
Construction Management & Support	533,749	454,134	(79,615)
Environmental	221,748	412,311	190,563
Engineering & Design	818,838	1,274,654	455,816
Project Management & Services	241,213	283,639	42,426
ROW & Permits	7,540	15,669	8,129
GMA	747,886	889,693	141,807
<b>Total Direct Costs</b>	<b>7,061,246</b>	<b>7,717,893</b>	<b>656,647</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>8, 9</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,081,709	1,244,926	163,217
AFUDC	1,365,143	366,921	(998,222)
Property Taxes	306,889	57,859	(249,030)
<b>Total Indirect Costs</b>	<b>2,753,741</b>	<b>1,669,705</b>	<b>(1,084,036)</b>
<b>Total Direct Costs</b>	<b>7,061,246</b>	<b>7,717,893</b>	<b>656,647</b>
<b>Total Loaded Costs</b>	<b>9,814,987</b>	<b>9,387,598</b>	<b>(427,389)</b>

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> Values in table represent PSEP costs only.

<sup>8</sup> Values may not add to total due to rounding.

<sup>9</sup> Values in table represent PSEP costs only

Final Report for Line 404-406 Somis Station Replacement Project

**D. Disallowance**

The scope of the Line 404-406 Somis Station Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 404-406 Somis Station Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 404-406 Somis Station Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 716 feet of pipeline, automated six valves, and replaced a pressure regulator system in Somis. The total loaded cost of the Project is \$9,387,598.

SoCalGas executed this project prudently by engaging in scope validation efforts that reduced project mileage, performing early and detailed risk identification and mitigation, and by responding to unanticipated field conditions.

SoCalGas engaged in prudent cost avoidance efforts by developing and executing an efficient design to complete the safety enhancement work as soon as practicable.

**End of Line 404-406 Somis Station Replacement Project Final Report**

---

## Final Report for Line 2006 Replacement Project

**I. LINE 2006 REPLACEMENT PROJECT**

---

**A. Background and Summary**

Line 2006 is a [REDACTED] diameter transmission line that runs approximately five miles along heavily trafficked arterial streets, through residential neighborhoods and commercial areas within the City of Los Angeles, ending in the City of Carson. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Line 2006 Replacement Project, which consists of the replacement of 497 feet of pipeline and one mainline valve (MLV) along South Central Avenue and within SoCalGas' Victoria Station. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$5,391,455.

Final Report for Line 2006 Replacement Project

Table 1: General Project Information

Project Name		Line 2006		
Project Type	Replacement			
Length	497 feet			
Location	City of Carson			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1954			
Construction Start	09/16/2019			
Construction Finish	12/20/2019			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	[REDACTED]			
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	[REDACTED]			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	5,391,455		5,391,455	
Disallowed Costs	-	-	-	

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Line 2006 Replacement Project

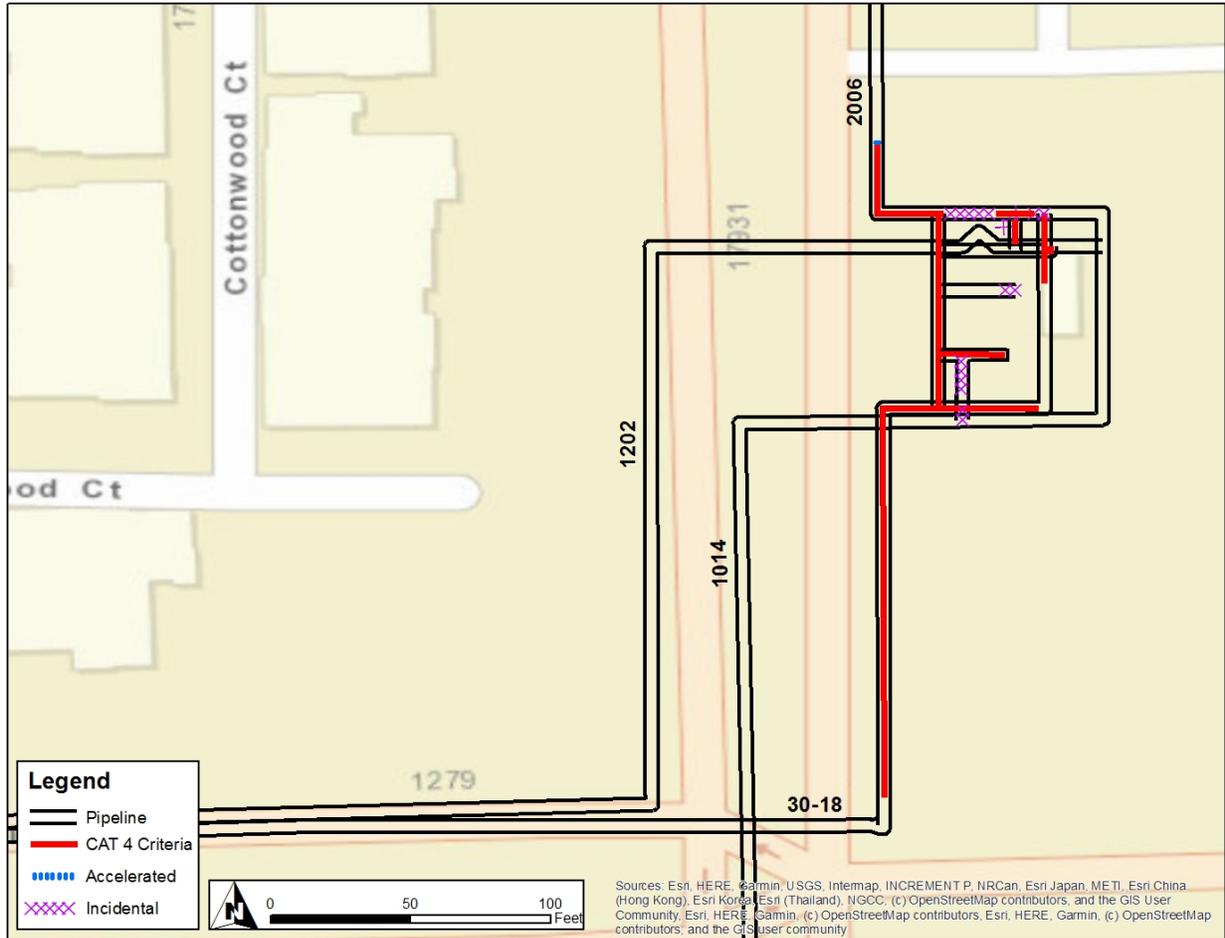
B. Maps and Images

Figure 1: Satellite Image of Line 2006 Replacement Project



Final Report for Line 2006 Replacement Project

Figure 2: Overview Map of Line 2006 Replacement Project



Final Report for Line 2006 Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>2</sup>	Incidental	New	Total <sup>3</sup>
Final Mileage	0.050 mi.	0.011 mi.	0.020 mi.	0.013 mi.	0.094 mi.
	263 ft.	57 ft.	106 ft.	71 ft.	497 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2019, SoCalGas and SDG&E reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas and SDG&E further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas and SDG&E did not identify Line 2006 in the 2011 PSEP filing.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas and SDG&E identified 0.064 miles of Category 4 Criteria pipe and added this as a PSEP Phase 1A project.
3. Engineering, Design, and Constructability:
  - a. The Project replaced one MLV.
  - b. Accelerated and Incidental mileage was included to realize efficiencies and enhance project constructability.

<sup>2</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Line 2006 Replacement Project

4. Final Project Scope: The final project scope consists of a 497 foot Replacement. The Accelerated mileage consists of 57 feet of Phase 2B pipe, and 106 feet of incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 2006 and confirmed the project design should commence as a Replacement Project.

Segments of less than 1,000 feet are identified for replacement under the approved PSEP Decision Tree because, for short segments of pipe, the logistical costs associated with pressure testing (for example, permitting, construction, water handling, and service disruptions for a non-looped system) can approach or exceed the cost of replacement. In such circumstances, replacement affords a more cost-effective approach to achieving compliance with D.11-06-017 while providing equal safety enhancement benefits. Moreover, installation of the new segment can usually be performed while the existing service is maintained to customers, thereby avoiding service disruptions that may otherwise occur during pressure testing.

Through this Decision Tree analysis, SoCalGas identified replacement as the more prudent option. Key considerations that support SoCalGas' determination to replace this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the pipeline could be shut-in with manageable customer impacts.
2. Customer Impacts: The Project Team identified one customer that would be supported utilizing CNG and one customer will have a coordinated outage.
3. Piggability: Piggable.
4. Pipe Vintage: 1954.
5. Existing Pipe Attributes: No identified issues.
6. Longseam Type: Unknown.

## Final Report for Line 2006 Replacement Project

7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the pipeline could be shut-in with manageable customer impacts.
2. Customer Impact: The Project Team prevented service disruptions to one customer by utilizing CNG. The Project Team scheduled the shut-in to coordinate with another customer's planned outage.
3. Community Impacts: The Project Team identified significant traffic impacts along South Central Avenue and East Victoria Street.
4. Tie-In: The Project Team determined that the tie-in could only occur during the weekend to minimize community impact. Closure of the northbound lanes of a major arterial street and the eastbound turning lane of a major arterial street occurred during tie-in activities.
5. Substructures: Based on potholing data, the Project Team confirmed substructures within the excavation locations.
6. Permit Conditions:
  - a. The City of Carson required encroachment and excavation permits.
  - b. The City of Compton required encroachment and traffic control permits.
7. Land Use: The Project obtained a temporary right of entry (TRE) for a laydown yard.
8. Environmental: The Project Team anticipated abatement activities for asbestos containing materials (ACMs) and lead paint.

## Final Report for Line 2006 Replacement Project

9. Valves: The Project Team replaced one MLV.

### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Line 2006 Replacement Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	09/16/2019
Construction Completion Date	12/20/2019
NOP Date	11/21/2019

**C. Changes During Construction**

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$233,000 in change orders.

1. Tie-In: The Project Team excavated an unidentified concrete telecom vault within the tie-in location at the entrance of the station. The Project Team would relocate the tie-

## Final Report for Line 2006 Replacement Project

in to avoid this vault. Relocation of the tie-in resulted in additional demolition and replacement of the concrete driveway, a block wall, curb, gutter, and fence.

2. Constructability Issues: The Project Team encountered a layer of slurry ranging from three feet to six feet deep with a 3-inch conduit within the slurry at the intersection of Victoria Street and South Central Avenue. This resulted in the need for additional labor and equipment to remove the slurry.

Final Report for Line 2006 Replacement Project

Figure 3: Newly Coated Pipeline



Final Report for Line 2006 Replacement Project

Figure 4: Workspace Along South Central Avenue



## Final Report for Line 2006 Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotreated water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 2006 Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project.

1. Scope Change: The Project Team reduced the total number of tests from seven to five.
2. Future Maintenance: The Project Team included the installation of [REDACTED] blowdown pipe that will allow for the pipeline to be isolated for future maintenance.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$5,868,741. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$5,391,455.

Final Report for Line 2006 Replacement Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	479,881	416,978	(62,903)
Materials	290,382	358,802	68,420
Construction Contractor	3,138,393	2,464,650	(673,743)
Construction Management & Support	391,582	162,388	(229,194)
Environmental	45,987	129,659	83,672
Engineering & Design	218,713	665,282	446,569
Project Management & Services	592,382	291,238	(301,144)
ROW & Permits	32,473	23,927	(8,546)
GMA	678,948	157,943	(521,005)
<b>Total Direct Costs</b>	<b>5,868,741</b>	<b>4,670,868</b>	<b>(1,197,873)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>6</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	812,881	668,634	(144,247)
AFUDC	158,464	41,459	(117,005)
Property Taxes	45,805	10,495	(35,310)
<b>Total Indirect Costs</b>	<b>1,017,150</b>	<b>720,587</b>	<b>(296,563)</b>
<b>Total Direct Costs</b>	<b>5,868,741</b>	<b>4,670,868</b>	<b>(1,197,873)</b>
<b>Total Loaded Costs</b>	<b>6,885,891</b>	<b>5,391,455</b>	<b>(1,494,436)</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Ibid.

## Final Report for Line 2006 Replacement Project

### D. Disallowance

The scope of Line 2006-P1A Replacement Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 2006 Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of its integrated natural gas transmission system by prudently executing the Line 2006 Replacement Project. Through this Replacement Project, SoCalGas successfully replaced 497 feet of pipeline and replaced one MLV. The total loaded cost of the Project is \$5,391,455.

SoCalGas executed this project prudently through completing the tie-in on a weekend to reduce community impact and replaced pipe in a location with multiple substructure crossings.

SoCalGas engaged in prudent cost avoidance efforts by decreasing the number of pressure tests from seven to five, mitigating unanticipated field conditions such as unknown substructures, and coordinating tie-in procedures to avoid community impacts. SoCalGas safely completed construction along a major arterial road and replaced the pipe to complete the safety enhancement project as soon as practicable.

**End of Line 2006 Replacement Project Final Report**

## Final Report for Storage - Goleta Project

**I. STORAGE - GOLETA PROJECT**

---

**A. Background and Summary**

The Storage – Goleta Project consists of the hydrotest of 0.286 miles of pipe with diameters ranging from [REDACTED] to [REDACTED] at the SoCalGas Goleta Storage Facility, located in Goleta. The Project is within Class 1 and Class 3 locations near residential neighborhoods, agricultural land and commercial developments. Due to the complexity of the piping system within the storage facility, the Project was divided into two different test phases located throughout the storage facility. Phase 1 consisted of the pressure testing of 475 feet of withdrawal piping and Phase 2 consisted of the pressure testing of 0.197 miles of injection piping. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$7,514,377.

Final Report for Storage - Goleta Project

Table 1: General Project Information

Project Name		Storage – Goleta Phase 1		
Project Type		Hydrotest		
Length		475 feet		
Location		Goleta		
Class		1 and 3		
MAOP ( <i>confidential</i> )		[REDACTED]		
Pipe Vintage		1948		
Construction Start		04/22/2019		
Construction Finish		05/23/2019		
Original Pipe Diameter ( <i>confidential</i> )		Multiple Diameters		
New Diameter ( <i>confidential</i> )		N/A		
Original SMYS <sup>1</sup> ( <i>confidential</i> )		Multiple SMYS values		
New SMYS ( <i>confidential</i> )		N/A		
Project Name		Storage – Goleta Phase 2		
Project Type		Hydrotest		
Length		0.197 miles		
Location		Goleta		
Class		1 and 3		
MAOP ( <i>confidential</i> )		[REDACTED]		
Pipe Vintage		1948		
Construction Start		10/21/2019		
Construction Finish		12/18/2019		
Original Pipe Diameter ( <i>confidential</i> )		Multiple Diameters		
New Diameter ( <i>confidential</i> )		N/A		
Original SMYS <sup>2</sup> ( <i>confidential</i> )		Multiple SMYS values		
New SMYS ( <i>confidential</i> )		N/A		
Project Costs (\$)		Capital	O&M	Total
Loaded Project Costs		1,597,316	5,917,061	7,514,377
Disallowed Costs		4,102	1,391,205	1,395,307

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

<sup>2</sup> Ibid.

Final Report for Storage - Goleta Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated	Incidental	Total <sup>3</sup>
Phase 1	0.063 mi.	0.011 mi.	0.015 mi.	0.090 mi.
	335 ft.	59 ft.	81 ft.	475 ft.
Phase 2	0.131 mi.	0.054 mi.	0.012 mi.	0.197 mi.
	692 ft.	284 ft.	64 ft.	1040 ft.
Total Final Mileage	0.123 mi.	0.065 mi.	0.027 mi.	0.286 mi.
	1,027 ft.	343 ft.	145 ft.	1,515 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2019, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified the Storage – Goleta Project as a Phase 1A Hydrotest Project comprised of 0.913 miles of Category 4 Criteria pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 0.720 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project was designed to be completed in two phases in order to satisfy system needs. During Phase 1, the Project Team isolated, and pressure tested the piping. During Phase 2, the Project Team isolated, and pressure tested the piping.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

Final Report for Storage - Goleta Project

- b. The Project Team included Accelerated and Incidental mileage for constructability purposes.
- 4. Final Project Scope: The final project scope consists of a 0.286 mile Hydrotest. The Accelerated mileage consists of 18 feet of Phase 1B pipe, 112 feet of Phase 2A pipe, 213 feet of Phase 2B pipe, and there was 145 feet of Incidental pipe.

**B. Decision Tree Analysis**

SoCalGas performed a PSEP Decision Tree analysis of Storage – Goleta and confirmed the project design should commence as a Hydrotest Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas complete a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compare the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified pressure testing as the more prudent option. Key considerations that support SoCalGas’ determination to pressure test this segment include:

- 1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the shut-ins should occur in two phases to prevent disruptions to the system.
- 2. Customer Impacts: No identified issues.
- 3. Community Impacts: No identified issues.
- 4. Piggability: Non-piggable.
- 5. Pipe Vintage: Multiple vintages.
- 6. Existing Pipe Attributes: Multiple pipe diameters.

## Final Report for Storage - Goleta Project

7. Longseam Type: Seamless.
8. Longseam Repair History: No identified issues.
9. Condition of Coating: No identified issues.
10. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, and conducted survey activities, of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded to complete the shut-ins in two phases one to isolate the withdrawn piping and in a second phase isolation the injection piping.
2. Customer Impacts: No identified issues.
3. Community Impacts: No identified issues.
4. Known Substructures: All work will be completed on aboveground piping.
5. Permit Conditions: There were no special permits or permit restrictions for this project. All project work was completed within existing SoCalGas property.
6. Land Use: The Project Team used the existing SoCalGas facility as a laydown yard.
7. Environmental: The Project Team planned for abatement activities for possible asbestos containing materials (ACMs) and lead based paint.

### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Storage - Goleta Project

**III. CONSTRUCTION**

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, SoCalGas entered into a competitive bidding process to select a construction contractor. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when SoCalGas entered into a competitive bidding process. SoCalGas awarded the construction contract to the bidder that best met the selection criteria for this project.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Bid (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

<b>Storage – Goleta Phase 1</b>	
Construction Start Date	04/22/2019
Construction Completion Date	05/23/2019
NOP Date	05/23/2019
<b>Storage – Goleta Phase 2</b>	
Construction Start Date	10/21/2019
Construction Completion Date	12/18/2019
NOP Date	11/12/2019

## Final Report for Storage - Goleta Project

## C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$331,000 in change orders.

1. Work Hours: SoCalGas limited the days that the Project Team could perform the shut-in. The Construction Contractor changed the construction schedule to 14 hour days for seven days a week to complete construction within the shut-in window.
2. Equipment Needs: The Construction Contractor initially planned to utilize torches to cut the pipe inside the facility. During construction the pipe inside the facility was cold cut.

Final Report for Storage - Goleta Project

Figure 1: Welding of Pipe and Reducer Flange



Final Report for Storage - Goleta Project

Figure 2: Completed Weld of Pipe and Reducer Flange



Final Report for Storage - Goleta Project

Figure 3: Flanges Being Prepared Prior to Hydrotest



## Final Report for Storage - Goleta Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotested water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Storage - Goleta Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. The Project completed all construction activities within existing SoCalGas property.

### B. Cost Estimate

Based on the preliminary design, once the preliminary project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$3,067,646. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project, based on initial design plans.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$7,514,377 accordance with Company overhead allocation policies.

Final Report for Storage - Goleta Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	249,356	585,532	336,176
Materials	362,705	681,941	319,236
Construction Contractor	1,162,152	2,934,657	1,772,505
Construction Management & Support	477,363	663,078	185,715
Environmental	63,250	450,974	387,724
Engineering & Design	145,550	382,314	236,764
Project Management & Services	298,361	462,278	163,917
ROW & Permits	-	-	-
GMA	308,909	524,783	215,874
<b>Total Direct Costs</b>	<b>3,067,646</b>	<b>6,685,557</b>	<b>3,617,911</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>6</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	512,630	786,748	274,118
AFUDC	14,806	34,150	19,344
Property Taxes	3,307	7,923	4,616
<b>Total Indirect Costs</b>	<b>530,743</b>	<b>828,820</b>	<b>298,077</b>
<b>Total Direct Costs</b>	<b>3,067,646</b>	<b>6,685,557</b>	<b>3,617,911</b>
<b>Total Loaded Costs</b>	<b>3,598,389</b>	<b>7,514,377</b>	<b>3,915,988</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Ibid.

## Final Report for Storage - Goleta Project

## D. Disallowance

For this hydrotest project, SoCalGas and SDG&E identified a total of 356 feet of pipe as installed post-1955 and lacking pressure test records that provide the minimum information to demonstrate compliance with industry standards or then-applicable strength testing and recordkeeping requirements. Of the 0.276 miles of pipeline that was pressure tested, 343 feet (24%) of test mileage was disallowed, therefore \$1,391,205 of total project O&M costs are disallowed from recovery. In addition, of the pipeline that was replaced, 13 feet of Phase 1A pipe is disallowed. Therefore, a \$4,102 reduction was made to ratebase calculated by determining the replacement mileage and multiplying the amount by \$1,709,257 per mile, which was SoCalGas' and SDG&E's system average cost of pressure testing.

## Final Report for Storage - Goleta Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of its natural gas system by prudently executing the Storage - Goleta Project. Through this Project, SoCalGas hydrotested hydrotest of 0.286 miles of pipe. The total loaded cost of the Project is \$7,514,377.

SoCalGas executed this project prudently through minimizing customer impacts and improving safety by executing this Project in two different test phases for the hydrotesting of withdrawal pipelines with an MAOP of [REDACTED] and the hydrotesting of injection pipelines with an MAOP of [REDACTED].

SoCalGas engaged in prudent cost avoidance efforts to complete this safety enhancement at a reasonable cost by carefully planning and coordinating engineering and construction activities to maximize efficiencies and reduce customer and community impacts, engaging in reasonable efforts to promote competitive and market based rates for contractor services and materials, and using a reasonable amount of company and contractor resources to complete this safety enhancement as soon as practicable.

**End of Storage - Goleta Project Final Report**

---

## Final Report for Supply Line 33-121 Hydrotest Project

**I. SUPPLY LINE 33-121 HYDROTEST PROJECT**

---

**A. Background and Summary**

Supply Line 33-121 is a predominantly [REDACTED] diameter transmission line that runs approximately 0.5 miles along Sepulveda Boulevard, a major arterial road, from Valley Meadow Road and Royal Woods Road through residential neighborhoods in Encino. The pipeline is primarily routed across a Class 3 location. This report describes the activities associated with Supply Line 33-121 Hydrotest Project which consists of the hydrotest of 0.478 miles of pipeline. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$4,589,291.

Final Report for Supply Line 33-121 Hydrotest Project

Table 1: General Project Information

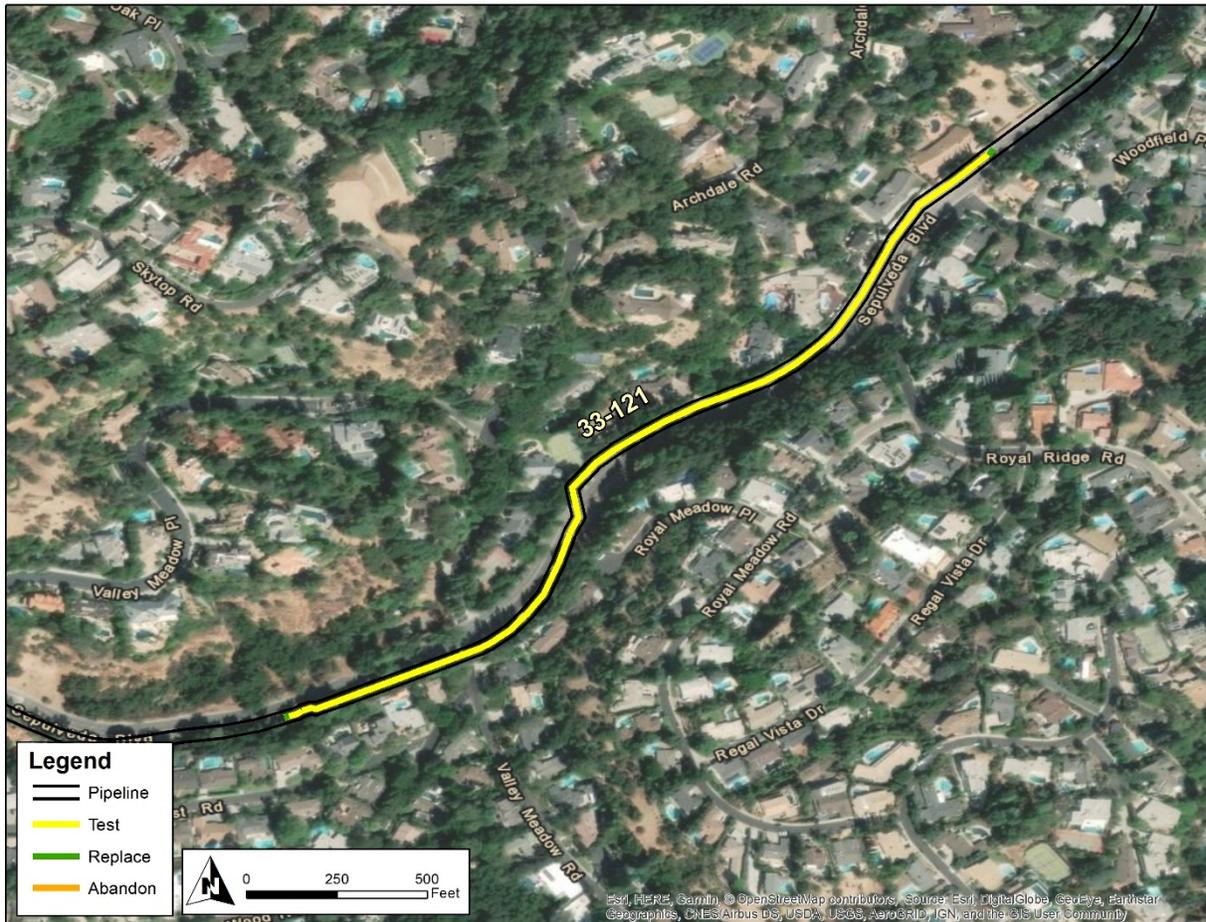
Project Name		Supply Line 33-121		
Project Type	Hydrotest			
Length	0.478 miles			
Location	Encino			
Class	3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1950			
Construction Start	01/08/2018			
Construction Finish	03/03/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	N/A			
Original SMYS <sup>1</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	N/A			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	-	4,589,291	4,589,291	
Disallowed Costs	-	-	-	

<sup>1</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 33-121 Hydrotest Project

B. Maps and Images

Figure 1: Satellite Image of Supply Line 33-121 Hydrotest Project



Final Report for Supply Line 33-121 Hydrotest Project

Figure 2: Overview Map of Supply Line 33-121 Hydrotest Project



Final Report for Supply Line 33-121 Hydrotest Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>2</sup>	Incidental	Total <sup>3</sup>
Final Mileage	0.164 mi.	0.005 mi.	0.309 mi.	0.478 mi.
	865 ft.	24 ft.	1,633 ft.	2,522 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>4</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Supply Line 33-121 as a Phase 1A Replacement and Hydrotest Project comprised of 0.609 miles of Category 4 Criteria pipe and 0.001 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 0.445 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team determined that due to the complexity of gas handling and traffic control, a hydrotest would be more cost effective and cause less impact to residents and traffic.

<sup>2</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>3</sup> Values may not add to total due to rounding.

<sup>4</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 33-121 Hydrotest Project

- b. Accelerated and Incidental mileage were included because of constructability issues of nearby utilities, working area, and traffic control. The northern end of the test segment was extended by approximately 0.292 miles to utilize undeveloped land as a laydown yard and work area
4. Final Project Scope: The final project scope consists of a 0.478 mile Hydrotest. The Accelerated mileage consists of 24 feet of Phase 2B pipe, and 0.309 miles of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 33-121 and initially confirmed the project design should commence as a Replacement Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completed a preliminary review, to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compared the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

As scope development continued, SoCalGas conducted a Test versus Replace (TVR) analysis that analyzed the hydrotest scenario and concluded that Supply Line 33-121 could be hydrotested in one continuous hydrotest, resulting in manageable disruptions to the community, and that a single hydrotest was the most cost-effective option, thereby changing the recommendation to hydrotest the line.

Key considerations that support SoCalGas' determination to hydrotest this segment include:

## Final Report for Supply Line 33-121 Hydrotest Project

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the pipeline could be shut-in.
2. Customer Impacts: No customer impacts.
3. Community Impacts: The Project is located along Sepulveda Boulevard, a major arterial road with heavy traffic. Construction activities would cause major traffic delays in this area.
4. Piggability: Non-piggable.
5. Pipe Vintage: 1950.
6. Existing Pipe Attributes: Non-piggable stopple fitting.
7. Longseam Type: Unknown.
8. Longseam Repair History: No identified issues.
9. Condition of Coating: No identified issues.
10. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed an RER analysis and concluded the line could be shut in.
2. Customer Impact: Per the RER, there are no high pressure services tapped off Supply Line 33-121. Supply Line 33-121 provides sole source feed to a regulator station that was backfed.
3. Community Impact: The Project is located along Sepulveda Boulevard, a major arterial road with heavy traffic. The hydrotest was extended approximately 0.292 miles north due to the limitation in work area, traffic impact, and to provide undeveloped land as a laydown yard and work area.

### Final Report for Supply Line 33-121 Hydrotest Project

4. Substructures: No substructures were identified within the excavation areas.
5. Permit Conditions:
  - a. The Project Team obtained permits from the City of Los Angeles for excavation and traffic control.
  - b. K-rail was required to enhance safety for workers due to the high speed of traffic along Sepulveda Boulevard.
6. Land Use: The Project shared a laydown yard with the PSEP Supply Line 43-121 Projects.
7. Environmental: Water cannot be discharged directly to storm drain system. Water storage tanks were used, and the water was hauled away after the hydrotest.

#### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Supply Line 33-121 Hydrotest Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], that was [REDACTED] than SoCalGas preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	01/08/2018
Construction Completion Date	03/03/2018
NOP Date	02/15/2018

#### C. Changes During Construction

SoCalGas successfully mitigated conditions during construction in a manner that minimized potential impacts on project scope, cost, and schedule. As a result, these conditions did not result in any notable change orders.

Final Report for Supply Line 33-121 Hydrotest Project

Figure 3: Installing Test Head



Final Report for Supply Line 33-121 Hydrotest Project

Figure 4: Prepping for Slurry and Backfill



## Final Report for Supply Line 33-121 Hydrotest Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 33-121 Hydrotest Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. A specific example of a cost avoidance action taken on this Project was a shared laydown yard with the PSEP Supply Line 43-121 Replacement Projects.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$6,296,163. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$4,589,291.

Final Report for Supply Line 33-121 Hydrotest Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>5</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	703,711	293,658	(410,053)
Materials	81,368	233,134	151,766
Construction Contractor	1,769,205	834,004	(935,201)
Construction Management & Support	904,307	442,061	(462,246)
Environmental	244,084	176,363	(67,721)
Engineering & Design	857,285	1,250,600	393,315
Project Management & Services	926,936	238,875	(688,061)
ROW & Permits	240,305	181,358	(58,947)
GMA	568,963	525,081	(43,882)
<b>Total Direct Costs</b>	<b>6,296,163</b>	<b>4,175,134</b>	<b>(2,121,030)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>6</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,191,912	414,158	(777,754)
AFUDC	-	-	-
Property Taxes	-	-	-
<b>Total Indirect Costs</b>	<b>1,191,912</b>	<b>414,158</b>	<b>(777,754)</b>
<b>Total Direct Costs</b>	<b>6,296,163</b>	<b>4,175,134</b>	<b>(2,121,030)</b>
<b>Total Loaded Costs</b>	<b>7,488,076</b>	<b>4,589,291</b>	<b>(2,898,784)</b>

<sup>5</sup> Values may not add to total due to rounding.

<sup>6</sup> Ibid.

## Final Report for Supply Line 33-121 Hydrotest Project

### D. Disallowance

The scope of the Line 33-121 Hydrotest Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Supply Line 33-121 Hydrotest Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 33-121 Hydrotest Project. Through this Hydrotest Project, SoCalGas successfully hydrotested 0.478 miles of pipeline in the City of Los Angeles. The total loaded cost of the Project is \$4,589,291.

SoCalGas executed this project prudently through minimizing community impacts and improving safety by executing this Project as a hydrotest rather than a replacement project.

SoCalGas engaged in prudent cost avoidance efforts by sharing the laydown yard with Supply Line 43-121 Replacement Projects.

**End of Supply Line 33-121 Hydrotest Project Final Report**

## Final Report for Line 2000-D Hydrotest Project

**I. LINE 2000-D HYDROTEST PROJECT**

---

**A. Background and Summary**

Line 2000 is a predominantly [REDACTED] diameter transmission line that runs approximately 225 miles from the California/Arizona border in Blythe to the Los Angeles Basin. The pipeline is primarily routed across a Class 1 location. This report describes the activities associated with the Line 2000-D Hydrotest Project that consists of three separate hydrotests that totaled approximately three miles and repairs associated with a hydrotest failure due to small liquidation cracks<sup>1</sup>. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$10,336,753.

SoCalGas separated the Line 2000 Phase 1A Project into five separate projects: Line 2000-A<sup>2</sup>, Line 2000-C<sup>3</sup>, Line 2000-D, Line 2000-West<sup>4</sup>, and Line 2000-West Santa Fe Springs Station<sup>5</sup> for project manageability purposes and due to unique characteristics related to non-contiguous portions of the pipeline.

---

<sup>1</sup> The results of a metallurgical analysis indicate that the leak occurred at the inner diameter (ID) surface breaking liquidation cracks in the weld metal that were pre-existing.

<sup>2</sup> Line 2000-A Hydrotest Project was submitted for reasonableness review in A.14-12-016 and authorized in D.16-12-063.

<sup>3</sup> Line 2000-C was filed for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

<sup>4</sup> 2000-West Sections 1,2, and 3 were filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004.

<sup>5</sup> Line 2000-West Santa Fe Springs was filed for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

Final Report for Line 2000-D Hydrotest Project

Table 1: General Project Information

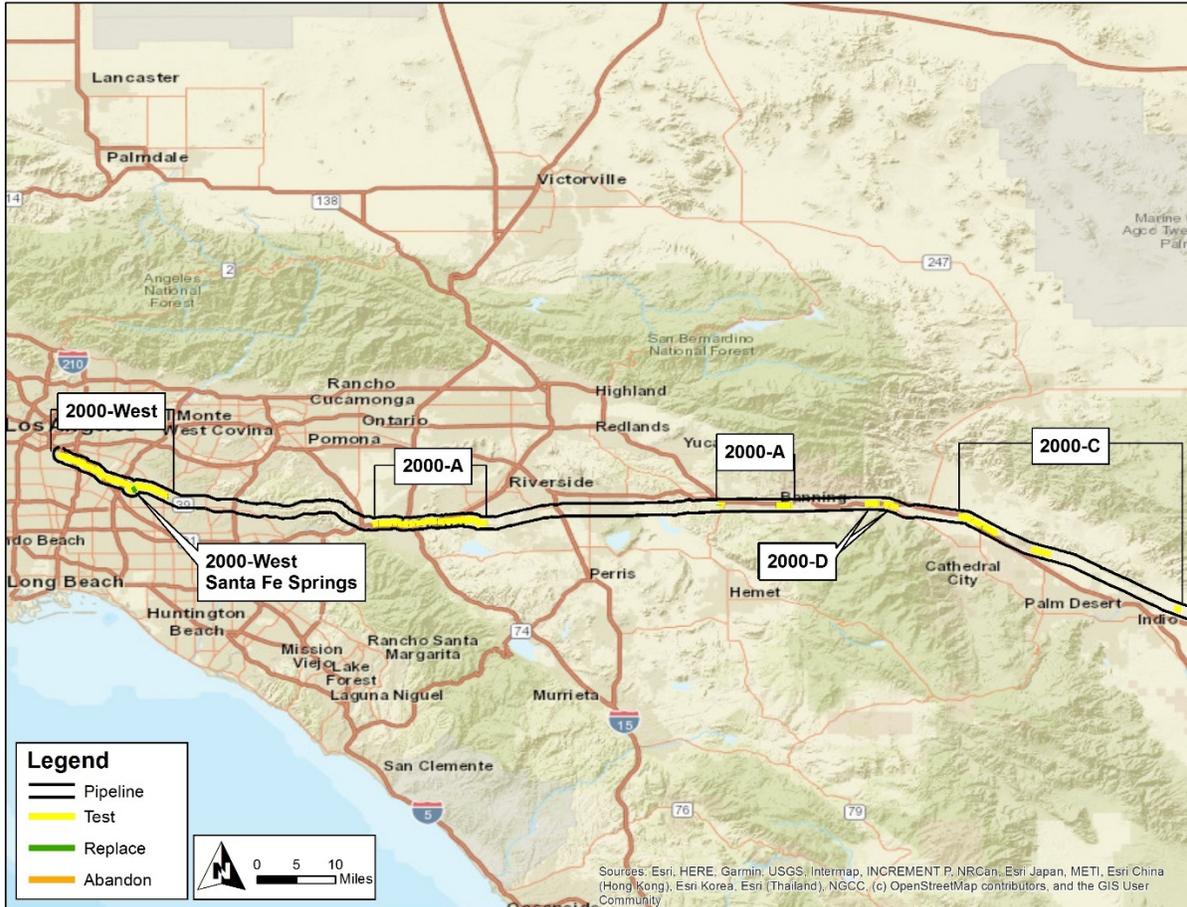
Project Name		Line 2000-D		
Project Type	Hydrotest			
Length	3.184 miles			
Location	Whitewater, Palm Springs, Cabazon, Beaumont, Banning			
Class	1			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1947			
Construction Start	09/25/2017			
Construction Finish	06/01/2018			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	N/A			
Original SMYS <sup>6</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	N/A			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	2,664,724	7,672,029	10,336,753	
Disallowed Costs	-	-	-	

<sup>6</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Line 2000-D Hydrotest Project

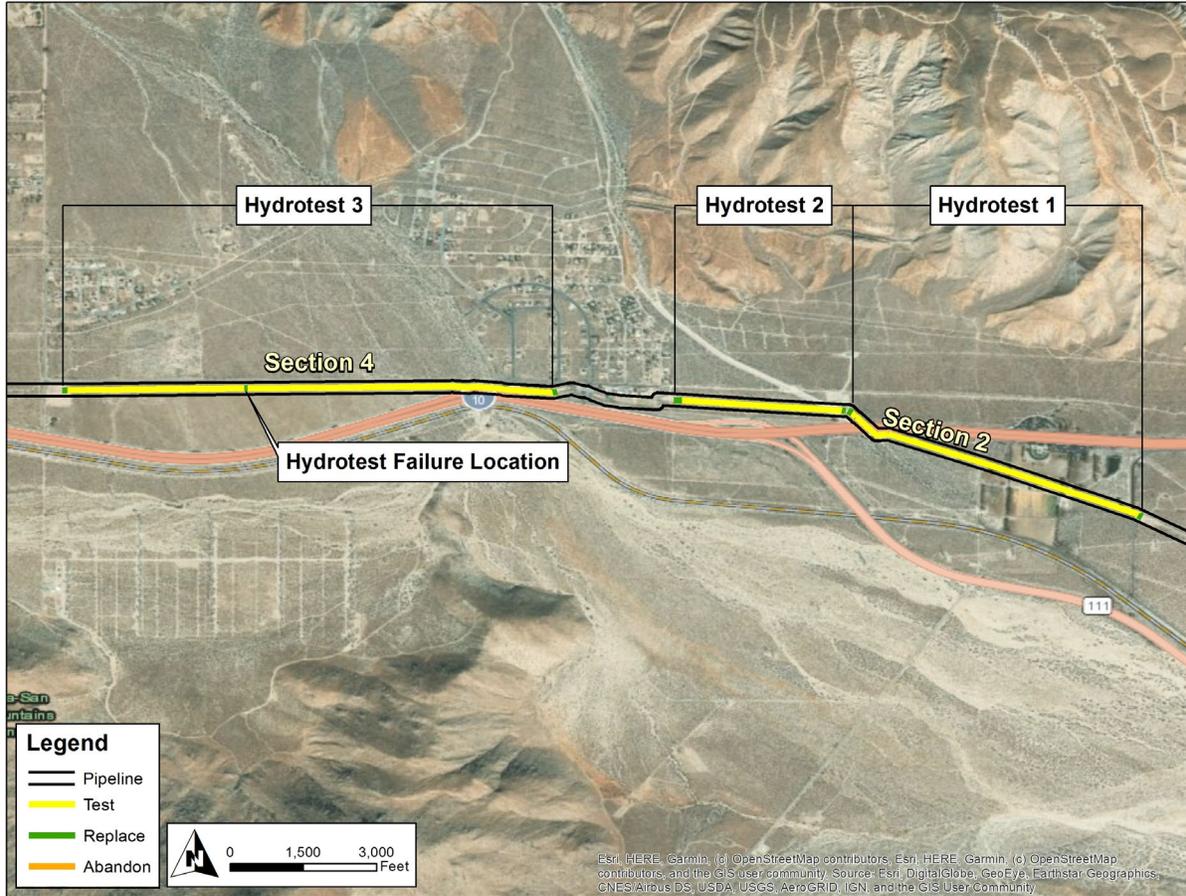
B. Maps and Images

Figure 1: Overview Map of Line 2000 Phase 1A Projects



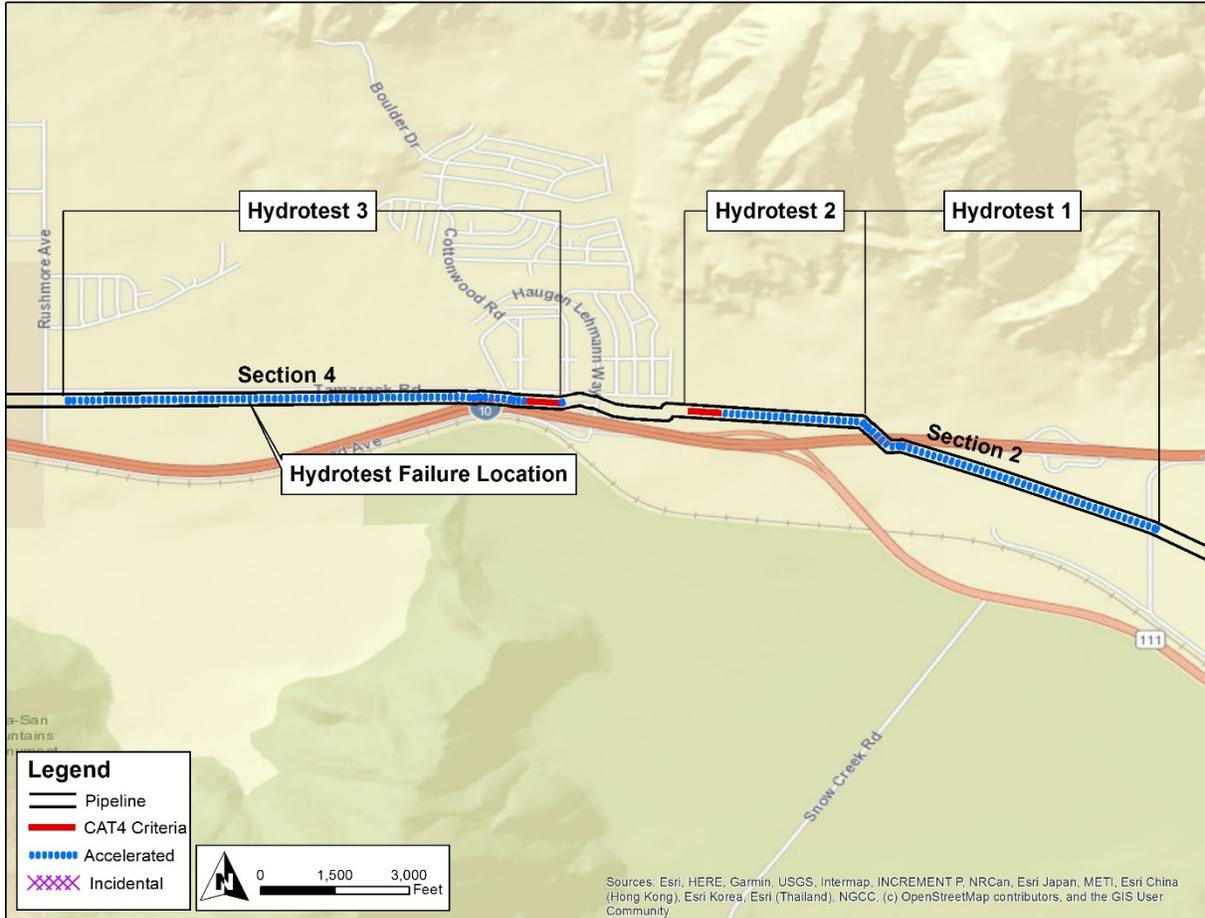
Final Report for Line 2000-D Hydrotest Project

Figure 2: Satellite Image of Line 2000-D Hydrotest Project



## Final Report for Line 2000-D Hydrotest Project

### Figure 3: Overview Map of Line 2000-D Hydrotest Project



Final Report for Line 2000-D Hydrotest Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>7</sup>	Incidental	New	Total <sup>8</sup>
Final Mileage	0.668 mi.	2.511 mi.	0.006 mi.	0 mi.	3.184 mi.
	3,527 ft.	13,257 ft.	30 ft.	0 ft.	16,814 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>9</sup> Prior to initiating execution of the Project in 2018, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Line 2000 as a Phase 1A Hydrotest Project comprised of 55.027 miles of Category 4 Criteria pipe and 62.574 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Line 2000-D Project, SoCalGas successfully reduced the scope of the 2000-D Project by 0.605 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. Section 2 contained two hydrotests in order to isolate a station during hydrotesting activities.
  - b. New pipe was included for a test head replacement segment in Section 4.

<sup>7</sup> Accelerated mileage includes Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>8</sup> Values may not add to total due to rounding.

<sup>9</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Line 2000-D Hydrotest Project

- c. Accelerated mileage was included because of proximity to water source, water storage space, hydrotest break locations, and to reduce future construction costs.
  - d. Incidental mileage was included for constructability.
4. Final Project Scope: The final project scope consists of three separate hydrotests that total 3.184 miles. The Accelerated mileage consists of 2.246 miles of Phase 2A pipe, 0.265 miles of Phase 2B pipe, and 30 feet of Incidental pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 2000-D and confirmed the project design should commence as a Hydrotest Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified pressure testing as the more prudent option. Key considerations that support SoCalGas' determination to pressure test this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in with minimal customer impact.
2. Customer Impacts: Per the RER, existing customer taps could be supported with bridled feeds from adjacent pipelines and one customer required CNG support.
3. Piggability: Piggable.
4. Pipe Vintage: 1947.

### Final Report for Line 2000-D Hydrotest Project

5. Existing Attributes: Previous In-Line Inspections identified anomalies that were outside of the risk required for remediation by PSEP prior to hydrotesting.
6. Longseam Type: Submerged Arc Weld (SAW).
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded the line could be shut-in with minimal customer impact.
2. Customer Impacts: Per the RER, existing customer taps could be supported with bridled feeds from adjacent pipelines and one customer required CNG support.
3. Community Impact: No identified issues.
4. Schedule Coordination: The Project Team coordinated construction schedules with the Operating District to start construction following the completion of an In-Line Inspection (ILI) on the nearby SoCalGas Line 4000 because Line 2000 and Line 4000 cannot be out of service at the same time.
5. Substructures: Potholing confirmed no substructures were within the excavation locations.
6. Permit Conditions:
  - a. The Project Team obtained encroachment and traffic control permits for water sourcing and work areas from City of Banning.
  - b. The Project Team obtained encroachment and traffic control permits for water sourcing and work areas from County of Riverside.

### Final Report for Line 2000-D Hydrotest Project

7. Land Use: The Project obtained a temporary right of entry for a laydown yard and negotiated multiple work space agreements.
8. Environmental: Typical abatement activities for locations of pipe removal.

### D. Scope Changes

SoCalGas and did not make any notable scope changes during detailed design.

Final Report for Line 2000-D Hydrotest Project

### III. CONSTRUCTION

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	09/25/2017
Construction Completion Date	06/01/2018
NOP Date	05/24/2018

#### C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in a credit of approximately \$967,000.

1. Land Rights/Acquisition: Due to ongoing discussions with the Morongo Tribes regarding expiring right of way (ROW) agreements, the Project Team deferred two of

### Final Report for Line 2000-D Hydrotest Project

the planned hydrotests. The Project Team planned for five hydrotest sections and completed three due to the expiring ROW agreements.

2. Other:

- a. During the hydrotest of Section 4, there was a gradual loss of pressure, indicating a leak. The Project Team requested that the Construction Contractor assist with locating the leak. The leak location was identified by using a helium and nitrogen combination. The Construction Contractor subsequently removed the segment of affected pipe and installed approximately 60 feet of new [REDACTED] pipe.
- b. After the leak was repaired, the test section was successfully rehydrotested. The additional hydrotesting activities included reinstallation of test heads, filling the line, hydrotesting, pigging, and dewatering the segment of pipe when finished.

Final Report for Line 2000-D Hydrotest Project

Figure 4: Liquid Nitrogen Truck and Equipment Used For Leak Detection



Final Report for Line 2000-D Hydrotest Project

Figure 5: Helium Truck Used For Leak Detection



Final Report for Line 2000-D Hydrotest Project

Figure 6: Helium Leak Detection



Final Report for Line 2000-D Hydrotest Project

Figure 7: Leak Detection Bubbles Used to Locate Leak



Final Report for Line 2000-D Hydrotest Project

Figure 8: Excavated Leak Location



Final Report for Line 2000-D Hydrotest Project

Figure 9: Tie-in Activities



## Final Report for Line 2000-D Hydrotest Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 2000-D Hydrotest Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: The Project utilized pre-tested pipe for tie-in segments, pre-fabricated test heads, and isolation caps.
2. Water Management: Following the hydrotest failure, the water was treated on-site and reused.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$12,314,847. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in

Final Report for Line 2000-D Hydrotest Project

accordance with Company overhead allocation policies. The total loaded cost of the Project is \$10,336,753.

Table 4: Estimated and Actual Direct Costs and Variances<sup>10</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	680,677	544,268	(136,409)
Materials	255,534	174,094	(81,440)
Construction Contractor	4,701,107	3,377,280	(1,323,827)
Construction Management & Support	497,217	754,961	257,744
Environmental	1,973,394	856,499	(1,116,895)
Engineering & Design	1,444,389	2,181,909	737,520
Project Management & Services	1,098,388	143,156	(955,232)
ROW & Permits	410,416	240,525	(169,891)
GMA	1,253,725	1,027,278	(226,447)
<b>Total Direct Costs</b>	<b>12,314,847</b>	<b>9,299,971</b>	<b>(3,014,876)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>11</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,000,082	995,378	(4,704)
AFUDC	248,264	34,598	(213,666)
Property Taxes	57,668	6,807	(50,861)
<b>Total Indirect Costs</b>	<b>1,306,014</b>	<b>1,036,782</b>	<b>(269,232)</b>
<b>Total Direct Costs</b>	<b>12,314,847</b>	<b>9,299,971</b>	<b>(3,014,876)</b>
<b>Total Loaded Costs</b>	<b>13,620,861</b>	<b>10,336,753</b>	<b>(3,284,108)</b>

<sup>10</sup> Values may not add to total due to rounding.

<sup>11</sup> Ibid

## Final Report for Line 2000-D Hydrotest Project

### D. Disallowance

The scope of the Line 2000-D Hydrotest Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 2000-D Hydrotest Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 2000-D Hydrotest Project. Not only did SoCalGas enhance the safety of their integrated natural gas transmission system by prudently executing the Line 2000-D Hydrotest Project, but more importantly, exposed a defect in the line while hydrotesting it in a safe and controlled environment, avoiding the potential of a rupture during normal operations. Through this Hydrotest Project, SoCalGas successfully identified and repaired a hydrotest leak resulting in the hydrotesting of 3.184 miles of pipeline between the cities of Whitewater and Banning. The total loaded cost of the Project is \$10,336,753.

SoCalGas executed this project prudently through responding to unanticipated field conditions and mitigated unknown irregularities in the pipe, such that all final pressure tests were completed successfully.

SoCalGas engaged in prudent cost avoidance efforts by coordinating with other SoCalGas departments, prefabricating pipe materials, and reusing test heads to complete the safety enhancement work as soon as practicable.

**End of Line 2000-D Hydrotest Project Final Report**

## Final Report for Line 2001 West-C Desert Hydrotest Project

**I. LINE 2001 WEST-C DESERT HYDROTEST PROJECT**

---

**A. Background and Summary**

Line 2001 West is a [REDACTED] diameter transmission line that runs approximately 146 miles east of Indio to the City of Rosemead. The pipeline is primarily routed across a Class 1 location. This report describes the activities associated with Line 2001 West-C Desert Hydrotest Project, which consists of the hydrotest of 16.803 miles of pipeline through three separate hydrotests and repairs associated with a hydrotest failure. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$13,156,168.

SoCalGas separated the Line 2001 Phase 1A Project into four separate Phase 1A projects: Line 2001 West-A<sup>1</sup> (Sections 15 and 16), Line 2001 West-B<sup>2</sup> (Sections 10, 11, 14, 17, 18, and 19), Line 2001 West-C<sup>3</sup> (Desert), and Line 2001 West-D (Whitewater). This report summarizes activity and actual costs related to Line 2001 West-C Desert Hydrotest Project only.

---

<sup>1</sup> Line 2001 West-A Sections 15 and 16 were filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004.

<sup>2</sup> Line 2001 West-B Sections 10, 11, and 14 were filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004. Line 2001 West-B Sections 17, 18, and 19 were filed for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

<sup>3</sup> Line 2001 West-C Desert Hydrotest Project is being submitted for reasonableness review concurrently with Line 2001 West-D Whitewater.

Final Report for Line 2001 West-C Desert Hydrotest Project

Table 1: General Project Information

Project Name	Line 2001 West-C Desert Hydrotest		
Project Type	Hydrotest		
Length	16.803 miles		
Location	Coachella, Indio, Cathedral City, and Thousand Palms		
Class	1		
MAOP ( <i>confidential</i> )	[REDACTED]		
Pipe Vintage	1953		
Construction Start	02/19/2019		
Construction Finish	08/30/2019		
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]		
New Diameter ( <i>confidential</i> )	N/A		
Original SMYS <sup>4</sup> ( <i>confidential</i> )	[REDACTED]		
New SMYS ( <i>confidential</i> )	N/A		
Project Costs (\$)	Capital	O&M	Total
Loaded Project Costs	2,065,181	11,090,987	13,156,168
Disallowed Costs	-	-	-

<sup>4</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Line 2001 West-C Desert Hydrotest Project

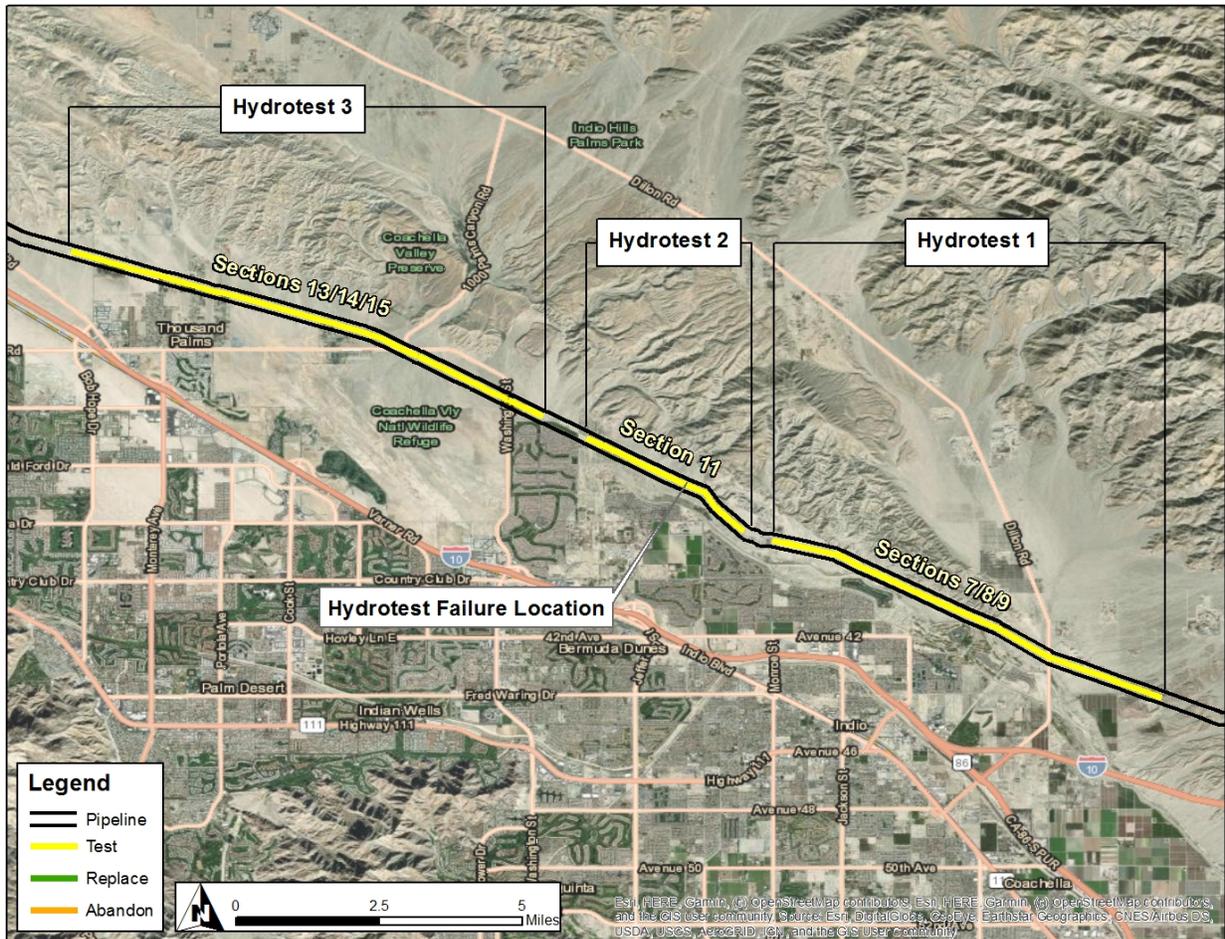
### B. Maps and Images

Figure 1: Overview of Line 2001 West Projects



Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 2: Satellite Image of Line 2001 West-C Desert Hydrotest Project<sup>5</sup>



<sup>5</sup> Hydrotest 3 was retested in three subsequent follow-up tests to identify the location of the test failure described below in III. Construction C. Changes During Construction.

## Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 3: Overview Map of Line 2001 West-C Desert Hydrotest Project



Final Report for Line 2001 West-C Desert Hydrotest Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>6</sup>	Incidental	New	Total <sup>7</sup>
Final Mileage	0.947 mi.	15.832 mi.	0.018 mi.	0.007 mi.	16.803 mi.
	4,999 ft.	83,591 ft.	93 ft.	36 ft.	88,719 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>8</sup> Prior to initiating execution of the Project in 2019, SoCalGas and SDG&E reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas and SDG&E identified Line 2001 West as a Phase 1A Hydrotest Project comprised of 15.809 miles of Category 4 Criteria pipe and 48.291 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas and SDG&E successfully reduced the scope of the Project by 11.172 miles of Category 4 Criteria pipe for all Project sections.
3. Engineering, Design, and Constructability:
  - a. For constructability and project management purposes, SoCalGas divided the Category 4 Criteria pipe into four separate Phase 1A projects: Line 2001 West-A (Sections 15 and 16), Line 2001 West-B (Sections 10, 11, 14, 17, 18, and 19), and Line 2001 West-C (Desert) and Line 2001 West-D (Whitewater). This report

<sup>6</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>7</sup> Values may not add to total due to rounding.

<sup>8</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Line 2001 West-C Desert Hydrotest Project

describes the activities associated with the Line 2001 West-C Desert Hydrotest Project.

- b. The Project Team included Accelerated and Incidental mileage to avoid costs of future mobilizations, disruption to the community, and ease of obtaining access to existing water sources.
4. Final Project Scope: The final project scope consists of a 16.803 mile Hydrotest in three separate test sections. The Accelerated mileage consists of 15.832 miles of Phase 2A pipe and 93 feet of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 2001 West-C and confirmed the project design should commence as a Hydrotest Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified pressure testing as the more prudent option. Key considerations that support SoCalGas' determination to pressure test this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line could not be shut-in. The Project Team maintained service by utilizing bridle feeds from adjacent pipelines.
2. Customer Impacts: Per the RER, existing customer taps could be supported with bridled feeds from adjacent pipelines.

## Final Report for Line 2001 West-C Desert Hydrotest Project

3. Piggability: Piggable.
4. Pipe Vintage: 1953.
5. Existing Pipe Attributes: The Project Team identified features along the pipeline where potential hydrotest failures may exist.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.
9. History of Leaks: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: As discussed above, the Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line could not be shut-in. The Project Team maintained service by utilizing bridle feeds from adjacent pipelines.
2. Customer Impact: Per the RER, existing customer taps were supported with bridled feeds from adjacent lines.
3. Community Impact: No identified issues.
4. Schedule Coordination: The Project Team coordinated construction schedules with the PSEP Line 2001 West-D Whitewater Hydrotest Project and scheduled both projects to share construction crews and coordinate the blowdown and isolation of the pipeline between the two projects.
5. Water Management: The Project Team open trenched a water fill line across Rio Del Sol Blvd that allowed hard piping from the water source to a lake tank. The lake tank provided water storage for two hydrotests. A second lake tank was procured for the third hydrotest.

## Final Report for Line 2001 West-C Desert Hydrotest Project

6. Substructures: Potholing confirmed no substructures were within the excavation locations.
7. Permit Conditions:
  - a. The Project Team obtained encroachment and traffic control permits from the City of Coachella for the water sourcing and work areas.
  - b. The Project Team obtained an encroachment permit from the City of Palm Springs.
  - c. The Project Team obtained an encroachment permit from Riverside County for workspace.
  - d. The Project Team obtained a temporary right of entry (TRE) from the Bureau of Land Management.
8. Land Use: No identified issues.
9. Environmental:
  - a. The Project Team planned for typical abatement activities at the hydrotest test break locations for coal tar wrap on the existing pipeline.
  - b. The Project Team determined that bird surveying was required during nesting season if it coincided with the Project's construction schedule.
  - c. The area where the Project is located was covered by SoCalGas' California Desert Conservation Area programmatic permits.
  - d. The South Coast Air Quality Management District required a dust control plan.
  - e. The Project Team treated and discharged the hydrotest water on site.

## D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the preliminary cost estimate does not fully reflect the final scope. The Project Team confirmed that the existing pipeline could be tested to 100% SMYS, this reduced the total number of tests from four to three, and added Accelerated mileage.

Final Report for Line 2001 West-C Desert Hydrotest Project

**III. CONSTRUCTION**

---

**A. Construction Contractor Selection**

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package, which included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	02/19/2019
Construction Completion Date	08/30/2019
NOP Date	06/27/2019

**C. Changes During Construction**

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$802,000 in change orders.

1. Hydrotest Failure (Hydrotest 3): Due to a loss of test pressure during Hydrotest 3, the Project Team deployed efforts to identify the location where the point of failure may have occurred. Efforts to locate the potential point of failure included the use of

## Final Report for Line 2001 West-C Desert Hydrotest Project

Ground Penetrating Radar (GPR) for the data collection, analysis, and post processing for seven miles of pipeline. Efforts to identify the potential leak were unsuccessful; therefore, the Project Team split Hydrotest 3 into three individual hydrotests. By dividing the section into three new hydrotests, the Project Team sought to identify the source of the pressure test failure. However, none of the three retests resulted in a pressure test failure.

2. Hydrotest Failure (Hydrotest 2): Due to a loss of test pressure during Hydrotest 2, the Project Team deployed efforts to identify the location of the cause of the pressure test failure and rupture. The Project Team and Construction Contractor conducted additional activities that included:
  - a. Implementation of the hydrotest failure mitigation plan.
  - b. Additional abatement.
  - c. Additional excavation.
  - d. Replacement of ruptured pipe segment.
  - e. Rehydrotest of the entire Hydrotest 2 pipe section after the replacement was completed.
  - f. Additional backfill and restoration.

Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 4: Lake Tank



Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 5: Pre Tie-In Activities



Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 6: Aerial View of Hydrotest 2 Failure and Rupture Mitigation



Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 7: Hydrotest 2 Rupture Location



Final Report for Line 2001 West-C Desert Hydrotest Project

Figure 8: 6-inch Rupture of Hydrotest 2



## Final Report for Line 2001 West-C Desert Hydrotest Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotested water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 2001 West-C Desert Hydrotest Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Scope Change: The Project Team reduced total number of tests from four to three while including additional Accelerated mileage.
2. Schedule Coordination: The Project Team coordinated construction to begin at the same time as Line 2001 West-D. This would provide cost savings by allowing the Project Team to utilize a single blowdown and isolation of the pipeline, as well as sharing construction crews and a laydown yard.
3. Water Management: The Project Team open trenched a water fill line across Rio Del Sol Blvd that allowed hard piping of our water source to a lake tank which was utilized for two hydrotests. This avoided transportation costs of approximately 1.8 million gallons of water two separate times.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$17,529,307. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Line 2001 West-C Desert Hydrotest Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$13,156,168.

Table 4: Estimated and Actual Direct Costs and Variances<sup>9</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	636,197	660,700	24,503
Materials	194,900	307,710	112,810
Construction Contractor	7,552,882	4,033,287	(3,519,595)
Construction Management & Support	916,227	1,004,499	88,272
Environmental	3,288,633	2,494,918	(793,715)
Engineering & Design	1,407,796	1,909,440	501,644
Project Management & Services	872,510	111,690	(760,820)
ROW & Permits	672,994	303,441	(369,553)
GMA	1,987,168	1,068,757	(918,411)
<b>Total Direct Costs</b>	<b>17,529,307</b>	<b>11,894,441</b>	<b>(5,634,866)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>10</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,932,071	1,196,691	(735,380)
AFUDC	344,878	55,698	(289,180)
Property Taxes	75,753	9,339	(66,414)
<b>Total Indirect Costs</b>	<b>2,352,702</b>	<b>1,261,727</b>	<b>(1,090,975)</b>
<b>Total Direct Costs</b>	<b>17,529,307</b>	<b>11,894,441</b>	<b>(5,634,866)</b>
<b>Total Loaded Costs</b>	<b>19,882,009</b>	<b>13,156,168</b>	<b>(6,725,841)</b>

<sup>9</sup> Values may not add to total due to rounding.

<sup>10</sup> Ibid.

Final Report for Line 2001 West-C Desert Hydrotest Project

**D. Disallowance**

The scope of the Line 2001 West-C Desert Hydrotest Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 2001 West-C Desert Hydrotest Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 2001 West-C Desert Hydrotest Project. Through this Hydrotest Project, SoCalGas successfully hydrotested 16.803 miles of pipeline in the Cities of Thousand Palms and Indio, and areas of the Coachella Valley Preserve. The total loaded cost of the Project is \$13,156,168.

SoCalGas executed this project prudently by minimizing the impact on environmentally sensitive species, responding to numerous unanticipated field conditions, and mitigated unknown irregularities in the pipe, such that all final pressure tests were completed successfully.

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 2001 West-C Desert Hydrotest Project, but more importantly, exposed a defect in the line while hydrotesting it in a safe and controlled environment, avoiding the potential of a rupture during normal operations.

**End of Line 2001 West-C Desert Hydrotest Project Final Report**

---

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

**I. LINE 2001 WEST-D WHITEWATER HYDROTEST PROJECT**

---

**A. Background and Summary**

Line 2001 West is a [REDACTED] diameter transmission line that starts east of the City of Indio and runs approximately 146 miles to the City of Rosemead. The pipeline is primarily routed across a Class 1 location. This report describes the activities associated with Line 2001 West-D Whitewater Hydrotest Project, which consists of two hydrotests that totaled 4.360 miles. The Project Team addressed two features on the pipeline prior to the hydrotest. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$6,938,906.

SoCalGas separated the Line 2001 Phase 1A Project into four separate Phase 1A projects: Line 2001 West-A<sup>1</sup> (Sections 15 and 16), Line 2001 West-B<sup>2</sup> (Sections 10, 11, 14, 17, 18, and 19), Line 2001 West-C<sup>3</sup> (Desert), and Line 2001 West-D (Whitewater). This report summarizes the activities and costs related to Line 2001 West-D Whitewater Hydrotest Project.

---

<sup>1</sup> Line 2001 West-A Sections 15 and 16 were filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004.

<sup>2</sup> Line 2001 West-B Sections 10, 11, and 14 were filed for reasonableness review in A.16-09-005 and authorized in D.19-02-004. Line 2001 West-B Sections 17, 18, and 19 were filed for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

<sup>3</sup> Line 2001 West-C Desert Hydrotest Project is being submitted for reasonableness review concurrently with Line 2001 West-D Whitewater.

Final Report for Line 2001 West-D Whitewater Hydrotest Project

Table 1: General Project Information

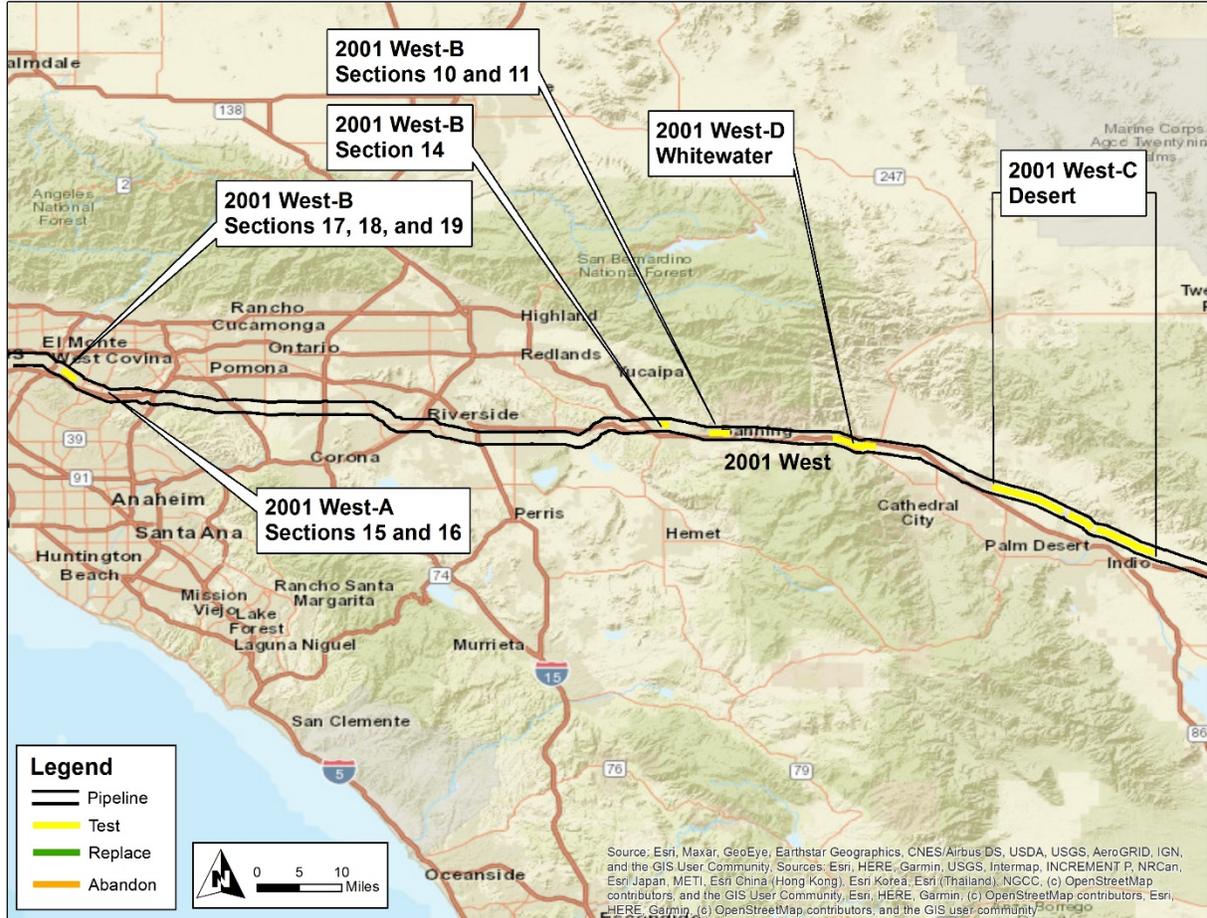
Project Name		Line 2001 West-D Whitewater Hydrotest		
Project Type	Hydrotest			
Length	4.360 miles			
Location	Whitewater			
Class	1			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1950			
Construction Start	02/19/2019			
Construction Finish	06/05/2019			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	N/A			
Original SMYS <sup>4</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	N/A			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	1,293,550	5,645,355	6,938,905	
Disallowed Costs	-	-	-	

<sup>4</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

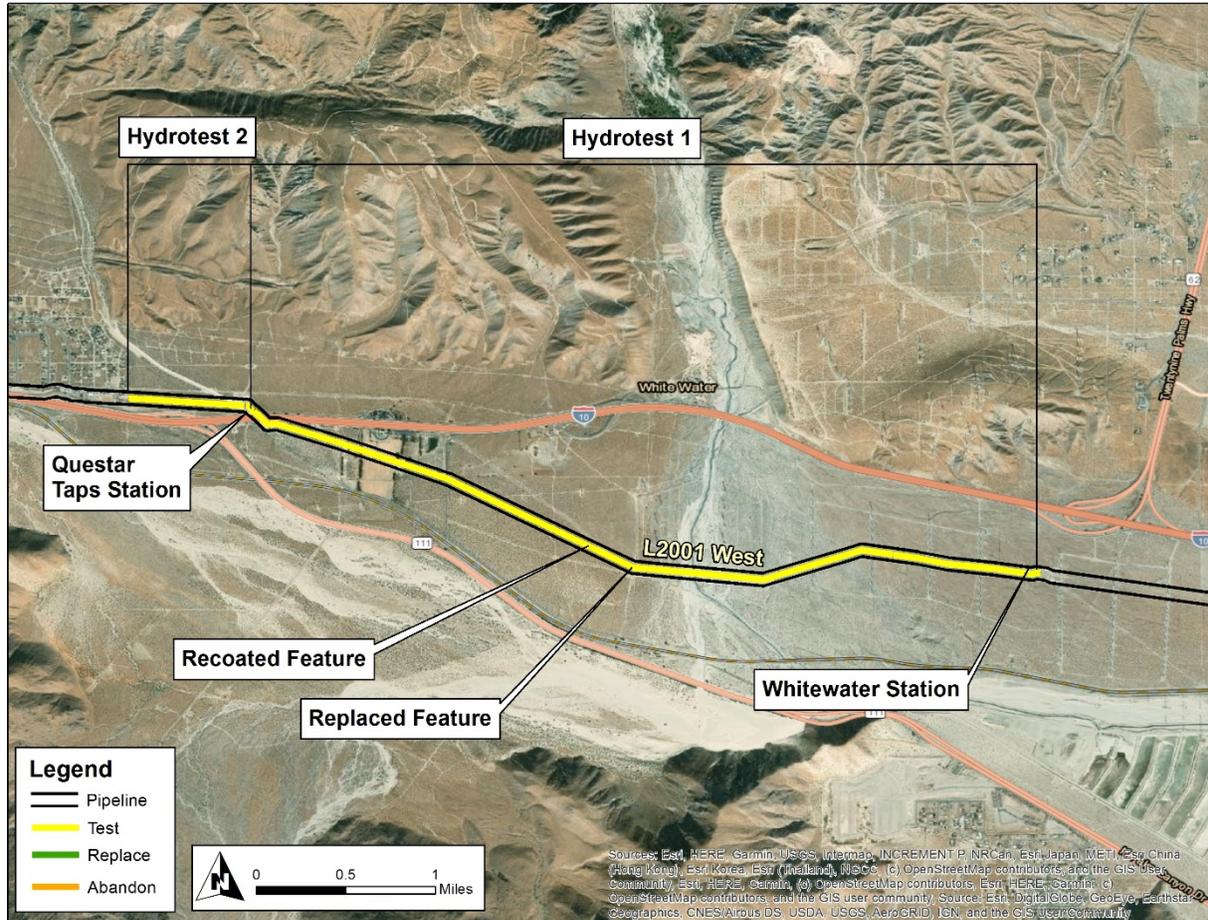
### B. Maps and Images

Figure 1: Overview of Line 2001 West Projects



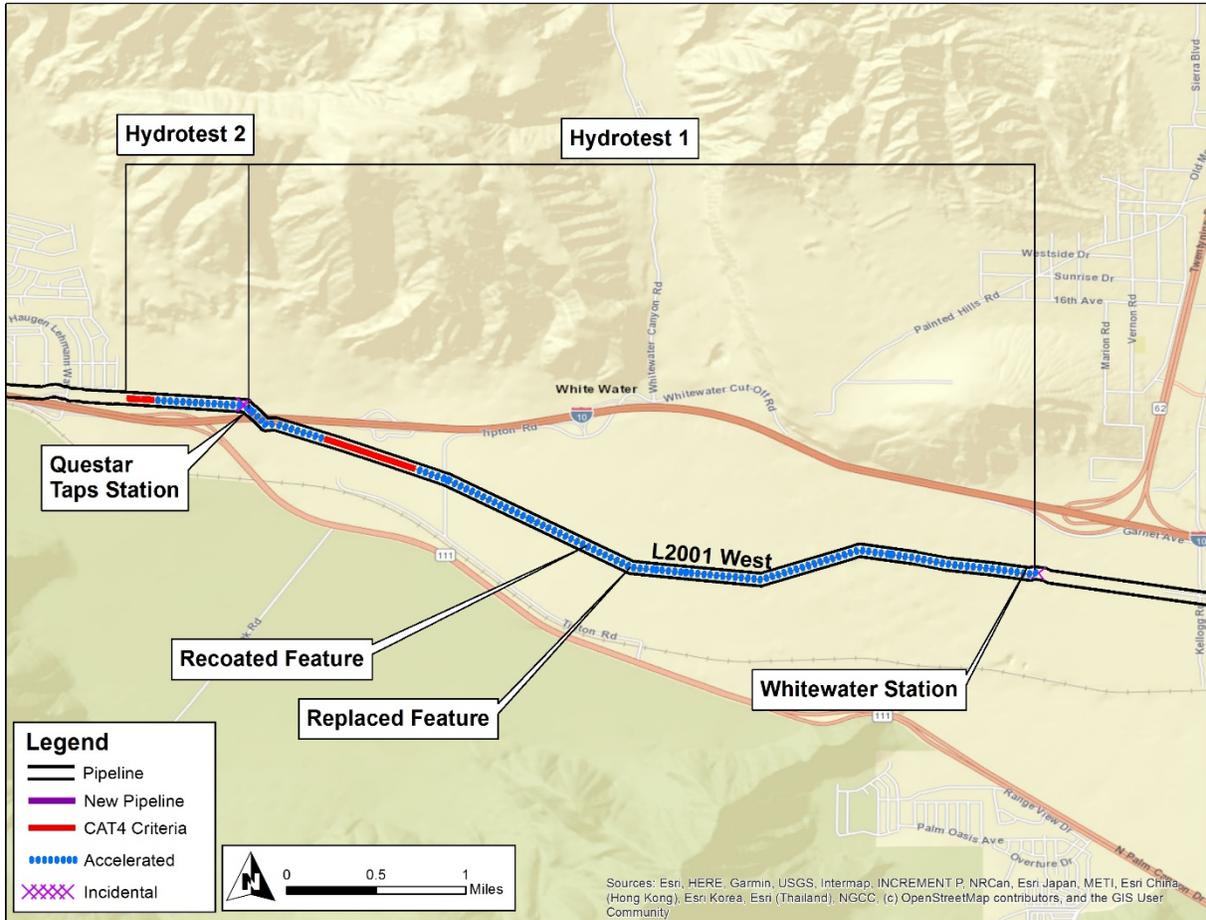
Final Report for Line 2001 West-D Whitewater Hydrotest Project

Figure 2: Satellite Image of Line 2001 West-D Whitewater Hydrotest Project



## Final Report for Line 2001 West-D Whitewater Hydrotest Project

### Figure 3: Overview Map of Line 2001 West-D Whitewater Hydrotest Project



Final Report for Line 2001 West-D Whitewater Hydrotest Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>5</sup>	Incidental	New	Total <sup>6</sup>
Final Mileage	0.457 mi.	3.902 mi.	0 mi.	0 mi.	4.360 mi.
	2,413 ft.	20,602 ft.	1 ft.	2 ft.	23,018 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>7</sup> Prior to initiating execution of the Project in 2019, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas and SDG&E identified Line 2001 West as a Phase 1A Hydrotest Project comprised of 15.809 miles of Category 4 Criteria pipe and 48.291 miles of Accelerated pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas and SDG&E successfully reduced the scope of the Project by 11.172 miles of Category 4 Criteria pipe for all Project sections.
3. Engineering, Design, and Constructability:
  - a. For constructability and project management purposes, SoCalGas divided the Category 4 Criteria pipe into four separate Phase 1A projects Line 2001 West-A (Sections 15 and 16), Line 2001 West-B (Sections 10, 11, 14, 17, 18, and 19), and

<sup>5</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

Line 2001 West-C (Desert) and Line 2001 West-D (Whitewater). This report describes the activities associated with the Line 2001 West-D Hydrotest Project.

- b. The Project Team determined that a single hydrotest was not feasible because the Questar Taps Station could not be tested through without requiring extensive isolation efforts. The Project Team separated the hydrotest into two test sections.
4. Final Project Scope: The final project scope consisted of two hydrotests that total 4.360 miles. The Accelerated mileage consists of 3.758 miles of Phase 2A pipe, 0.144 miles of Phase 2B pipe, and 1 foot of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 2001 West-D and confirmed the project design should commence as a Hydrotest Project.

For pipeline segments longer than 1,000 feet in length, under the approved PSEP Decision Tree, SoCalGas completes a preliminary review to determine whether SoCalGas can manage customer service impacts if the pipeline segment is taken out of service for a period of two to six weeks to complete pressure testing. Where mitigation of customer impacts to remove the line from service for pressure testing is feasible, SoCalGas compares the costs, constructability, risks, and benefits of pressure testing and replacement to determine whether pressure testing or replacement is the more prudent option.

Through this Decision Tree analysis, SoCalGas identified pressure testing as the more prudent option. Key considerations that support SoCalGas' determination to pressure test this segment include:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line could not be shut-in without service disruption to customers.
2. Customer Impacts: The Project Team utilized CNG to maintain service to one customer.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

3. Piggability: Piggable.
4. Pipe Vintage: 1950.
5. Existing Pipe Attributes: The Project Team excavated and inspected two identified pipeline features prior to the hydrotest.
6. Longseam Type: Unknown.
7. Longseam Repair History: No identified issues.
8. Condition of Coating: No identified issues.

### C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed a Request for Engineering Review (RER) analysis and concluded that the line could not be shut-in without service disruption to customers.
2. Customer Impact: The Project Team utilized CNG to maintain service to one customer.
3. Community Impact: The Project Team did not anticipate any notable impacts to the community during the project.
4. Constructability: The Project Team determined that a portion of the Questar Taps Station could not be tested without extensive isolation activities. The Project Team divided the hydrotest into two separate sections to avoid this portion of the station.
5. Schedule Coordination: The Project Team coordinated with the PSEP Line 2001 West-C Hydrotest Project and scheduled construction so that both projects could utilize the same construction crews. The Project Team scheduled the hydrotest so that both projects could blowdown and isolate these sections of Line 2001 West at the same time.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

6. Substructures: The Project Team did not identify any existing substructures that affected the design and engineering of this project.
7. Permit Conditions:
  - a. The Project Team obtained an encroachment permit from Riverside County.
  - b. The Project Team provided The Bureau of Land Management (BLM) and the California Department of Fish and Wildlife (CDFW) with Letter of Findings.
8. Land Use: No identified issues.
9. Environmental:
  - a. The Project Team obtained a dust control permit from the South Coast Air Quality Management District.
  - b. The Project Team obtained permits from the California Desert Conservation Area (CDCA) and CDFW.
  - c. The Project Team planned for coal tar wrap abatement activities at the test break locations.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

### D. Scope Changes

Through engineering, design, and planning activities, SoCalGas determined that changes in scope were appropriate to enhance the design of the Project and address engineering factors. As a result, the preliminary cost estimate does not fully reflect the final scope. The Project Team confirmed that the existing pipeline could be tested to 100% SMYS and included 2.912 of additional Phase 2 Accelerated mileage in the project design.

Final Report for Line 2001 West-D Whitewater Hydrotest Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. Following completion of the engineering, design, and planning activities described above, the Project Team directed the Performance Partner to prepare cost estimates based on a more detailed engineering design package, which included the updated design described in the discussion of notable Scope Changes above. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	02/19/2019
Construction Completion Date	06/05/2019
NOP Date	05/08/2019

#### C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$200,000 in change orders.

1. Field Design Changes: The Project Team directed the Construction Contractor to replace one segment of pipe along the pipeline. The Project Team also directed the

Final Report for Line 2001 West-D Whitewater Hydrotest Project

Construction Contractor to repair and recoat another segment of pipe along the pipeline.

Final Report for Line 2001 West-D Whitewater Hydrotest Project

Figure 4: Test Head Water Pipe



Final Report for Line 2001 West-D Whitewater Hydrotest Project

Figure 5: Test Head at the Whitewater Station



Final Report for Line 2001 West-D Whitewater Hydrotest Project

Figure 6: Water Storage Tanks at Test Break



Final Report for Line 2001 West-D Whitewater Hydrotest Project

Figure 7: Feature Repair and Recoating



## Final Report for Line 2001 West-D Whitewater Hydrotest Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotested water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Materials: The Project Team ordered the [REDACTED] pipe in bulk.
2. Schedule Coordination: The Project Team coordinated construction to begin at the same time as the PSEP Line 2001 West-C Hydrotest Project. This provided cost savings by allowing the Project Team to utilize a single blowdown to isolate this portion of the pipeline, the Project Team also shared construction crews between the two Projects.
3. Project Scope: The Project Team complete the pressure test at a 100% SMYS allowing additional mileage to be added to the Project. This provided cost savings by preventing the need for future construction activities.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$6,749,607. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

Final Report for Line 2001 West-D Whitewater Hydrotest Project

**C. Actual Direct and Indirect Costs**

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$6,938,906.

Table 4: Estimated and Actual Direct Costs and Variances<sup>8</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	551,047	341,298	(209,749)
Materials	143,764	159,299	15,535
Construction Contractor	2,253,332	1,922,329	(331,003)
Construction Management & Support	355,874	301,683	(54,191)
Environmental	668,207	719,957	51,750
Engineering & Design	1,256,152	1,382,406	126,254
Project Management & Services	554,747	324,710	(230,037)
ROW & Permits	184,539	112,582	(71,957)
GMA	781,945	646,892	(135,053)
<b>Total Direct Costs</b>	<b>6,749,607</b>	<b>5,911,156</b>	<b>(838,451)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>9</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	1,328,322	987,619	(340,703)
AFUDC	247,624	34,669	(212,955)
Property Taxes	54,534	5,171	(49,363)
<b>Total Indirect Costs</b>	<b>1,630,480</b>	<b>1,027,460</b>	<b>(602,731)</b>
<b>Total Direct Costs</b>	<b>6,749,607</b>	<b>5,911,156</b>	<b>(838,451)</b>
<b>Total Loaded Costs</b>	<b>8,380,087</b>	<b>6,938,906</b>	<b>(1,441,181)</b>

<sup>8</sup> Values may not add to total due to rounding.

<sup>9</sup> Ibid.

Final Report for Line 2001 West-D Whitewater Hydrotest Project

**D. Disallowance**

The scope of the Line 2001 West-D Whitewater Hydrotest Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 2001 West-D Whitewater Hydrotest Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 2001 West-D Whitewater Hydrotest Project. Through this Hydrotest Project, SoCalGas successfully hydrotested 4.360 miles of pipeline in the City of Whitewater. The total loaded cost of the Project is \$6,938,906.

SoCalGas executed this project prudently through inspecting and remediating pipeline features in the Project area, and by separating the Project into two hydrotests to avoid the Questar Taps Station that could not be hydrotested without extensive isolation efforts.

SoCalGas engaged in prudent cost avoidance efforts by coordinating shut-in and isolation with another hydrotest project, sharing construction crews between the two projects, and by utilizing bulk order volume pricing for the [REDACTED] pipe.

**End of Line 2001 West-D Whitewater Hydrotest Project Final Report**

---

## Final Report for Supply Line 41-6000-2 Abandonment Project

**I. SUPPLY LINE 41-6000-2 ABANDONMENT PROJECT**

---

**A. Background and Summary**

The Supply Line 41-6000-2 Abandonment Project consists of post-construction activities related to the Supply Line 41-6000-2 Replacement Project<sup>1</sup> that extended Line 6914. Line 6914 had to be operational and in service before Supply Line 41-6000-2 could be abandoned in order to maintain service to customers. Line 6914 is a [REDACTED] and [REDACTED] diameter pipeline that runs approximately 36 miles from El Centro to Calipatria. The pipeline traverse's flat terrain, through farmland, expansive networks of irrigation, and drainage canals. The Project is located in the Cities of Brawley, Calipatria, El Centro, Imperial, and Imperial County. The pipeline is primarily routed across a Class 1 location, and traverses some Class 2 and Class 3 locations. This report describes the activities associated with Supply Line 41-6000-2 Abandonment Project, which consists of the abandonment of 24.033 miles of pipeline, replacement of 0.239 miles and hydrotest of 995 feet of pipeline to tie over to adjacent pipelines, derate of 3.652 miles of existing pipelines<sup>2</sup>, installation of three mainline valves (MLVs), installation of eight regulator stations, removal of seven regulator stations, and removal of five pipeline spans. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$35,970,958.

---

<sup>1</sup> Supply Line 41-6000-2 Replacement Project was submitted for reasonableness review in A.18-11-010 and authorized in D.20-08-034.

<sup>2</sup> Supply Line 41-141, Supply Line 41-6000-2, Supply Line 41-80.

Final Report for Supply Line 41-6000-2 Abandonment Project

Table 1: General Project Information

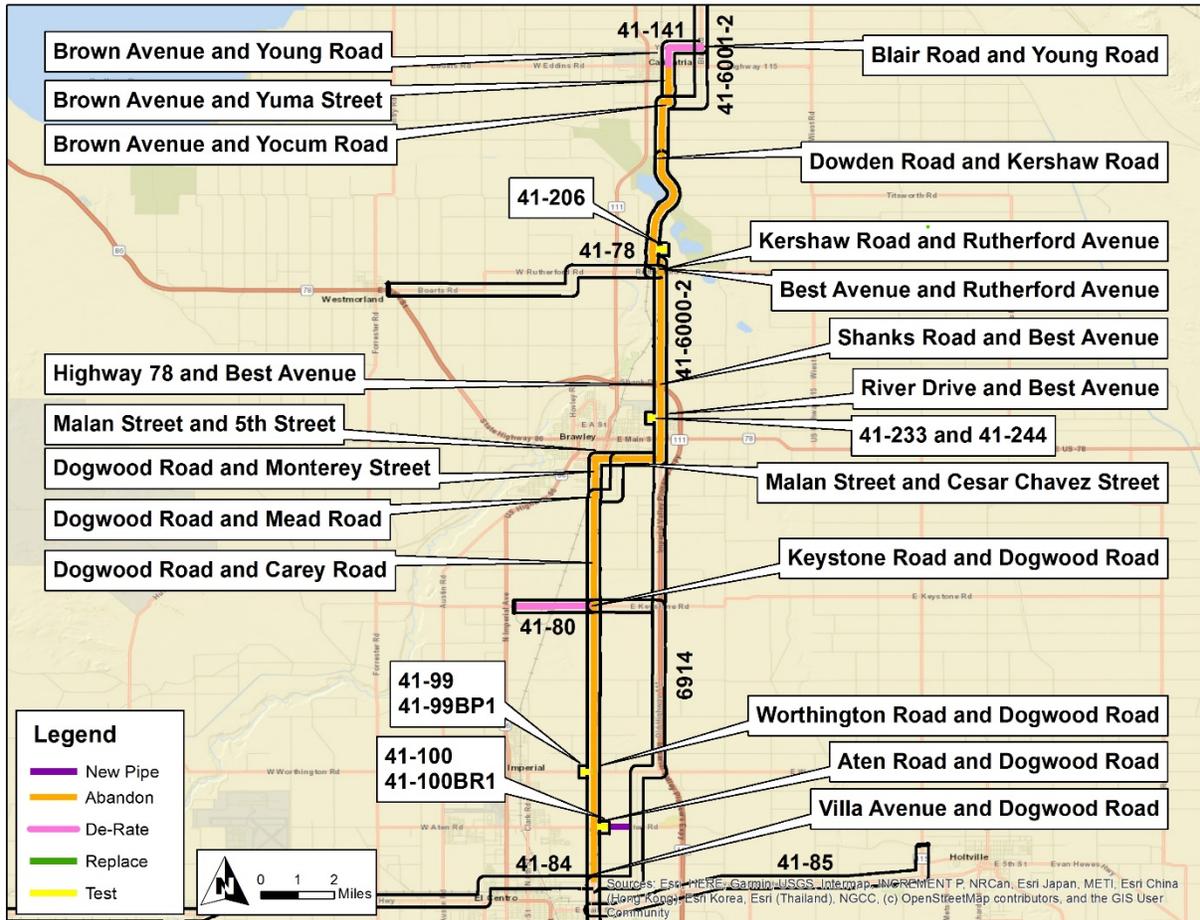
Project Name		Supply Line 41-6000-2 Abandonment		
Project Type	Abandonment			
Length	29.371 miles			
Location	Brawley, City of Imperial, Imperial County, City of Calipatria, City of El Centro			
Class	1, 2, and 3			
MAOP ( <i>confidential</i> )	[REDACTED]			
Pipe Vintage	1948			
Construction Start	10/02/2017			
Construction Finish	03/08/2019			
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]			
New Diameter ( <i>confidential</i> )	N/A			
Original SMYS <sup>3</sup> ( <i>confidential</i> )	[REDACTED]			
New SMYS ( <i>confidential</i> )	N/A			
Project Costs (\$)	Capital	O&M	Total	
Loaded Project Costs	35,970,958	-	35,970,958	
Disallowed Costs	13,503	-	13,503	

<sup>3</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Supply Line 41-6000-2 Abandonment Project

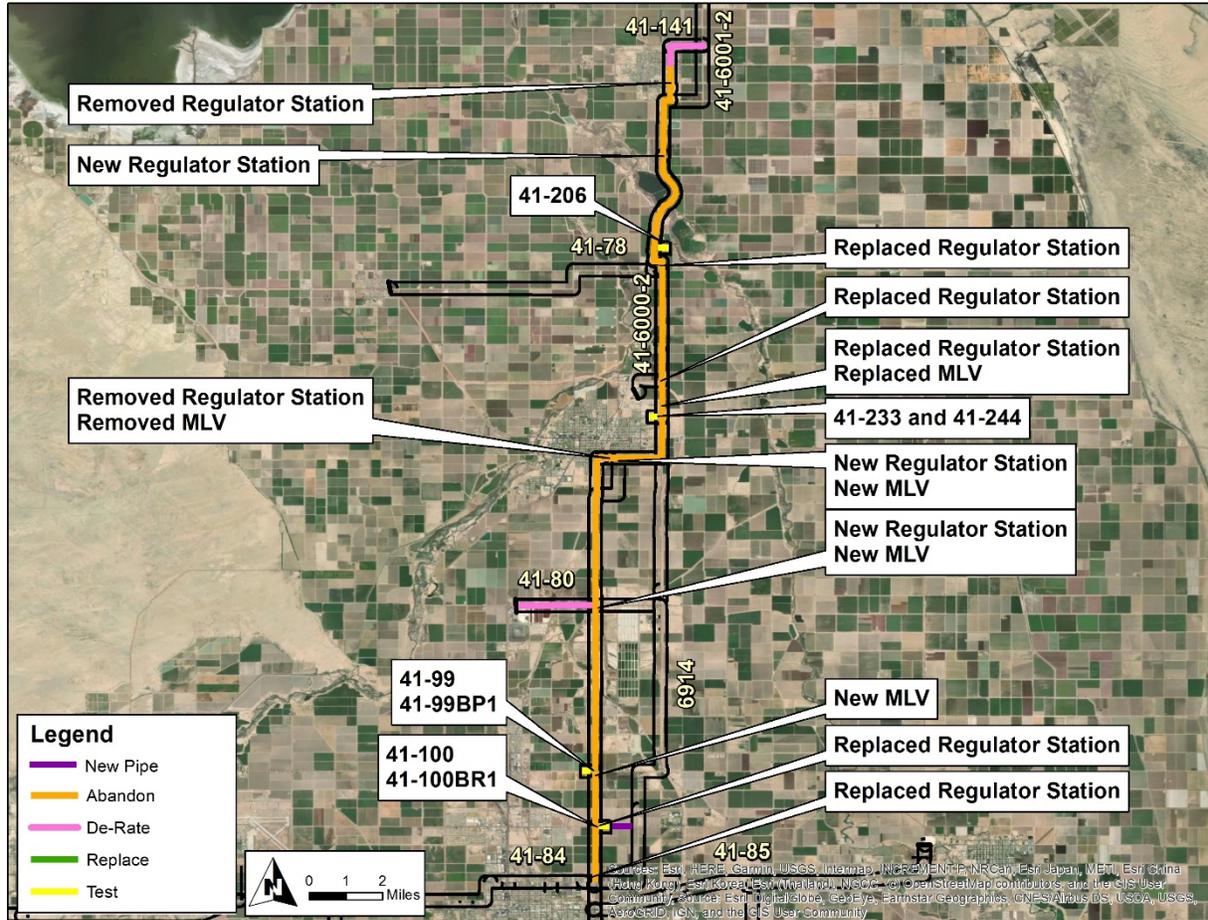
B. Maps and Images

Figure 1: Overview of Supply Line 41-6000-2 Abandonment Project Sites



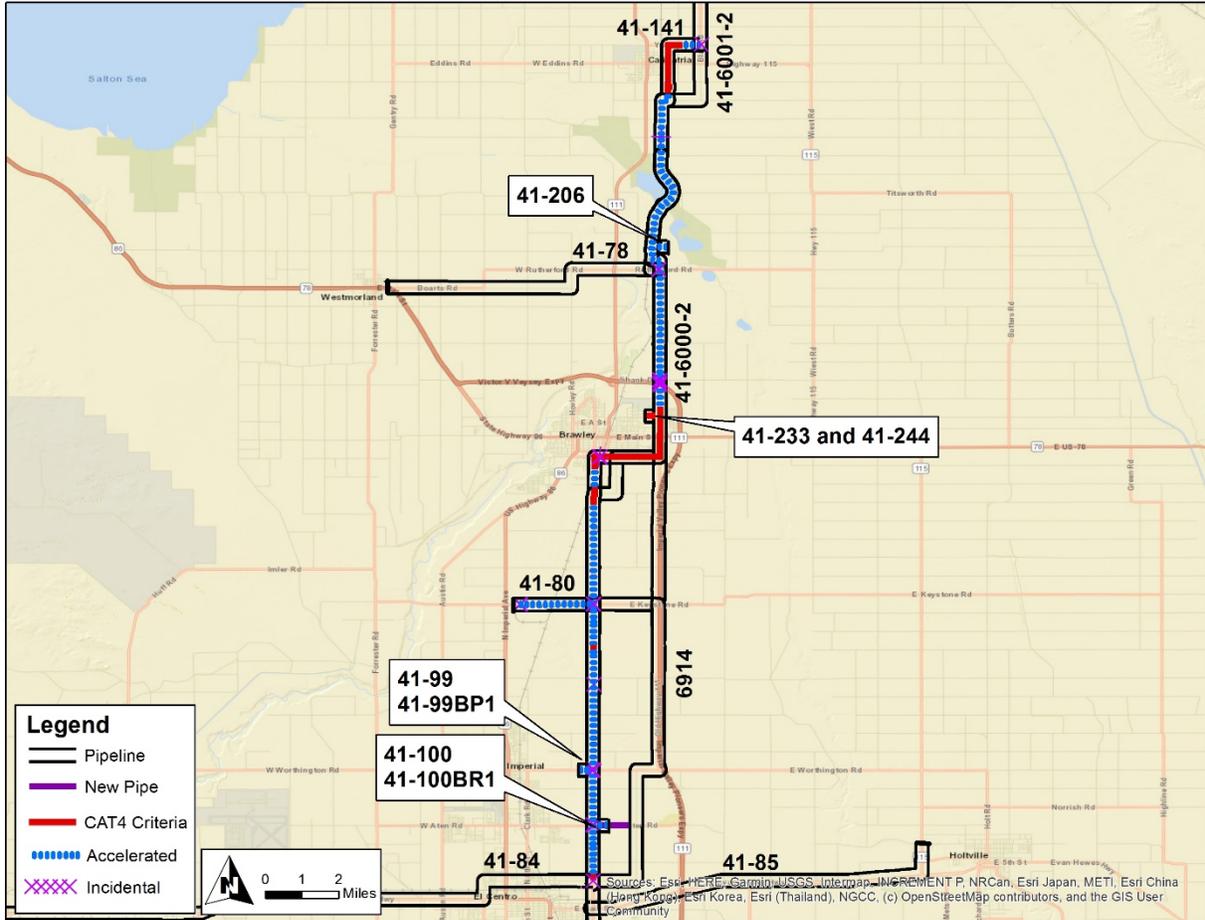
Final Report for Supply Line 41-6000-2 Abandonment Project

Figure 2: Satellite Map of Supply Line 41-6000-2 Abandonment Project



## Final Report for Supply Line 41-6000-2 Abandonment Project

Figure 3: Overview Map of Supply Line 41-6000-2 Abandonment Project



Final Report for Supply Line 41-6000-2 Abandonment Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information<sup>4</sup>

	Criteria	Accelerated <sup>5</sup>	Incidental	New	Total <sup>6</sup>
Final Mileage	5.648 mi.	21.467 mi.	0.997 mi.	1.259 mi.	29.371 mi.
	29,821 ft.	113,346 ft.	5,265 ft.	6,649 ft.	155,081 ft.

SoCalGas presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>7</sup> Prior to initiating execution of the Project in 2017, SoCalGas reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas and SDG&E identified Supply Line 41-6000-2 as a Phase 1A replacement project comprised of 11.373 Category 4 Criteria miles and 24.577 Accelerated miles, for a total of 35.950 miles.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas successfully reduced the scope of the Project by 5.679 miles of Category 4 Criteria pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team determined that the most prudent option to address the Criteria pipe on Supply Line 41-6000-2 was to abandon the line and continue serving customers via an extension of Line 6914. The new extension had to be operational

<sup>4</sup> Total mileage of the completed project differs from the mileage of the pipe addressed due to realignment of the pipeline route.

<sup>5</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>6</sup> Values may not add to total due to rounding.

<sup>7</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

## Final Report for Supply Line 41-6000-2 Abandonment Project

- before abandoning the existing pipeline in order to maintain customer service. The extension of Line 6914 was completed in November 2016.
- b. For the derate, the Project Team lowered the pressure for 3.652 miles of pipeline to continue to provide customer service but at a reduced pressure by installing new regulator stations.
  - c. For the tie-overs, the Project Team identified seven Project sites that required construction activities to occur in order to complete the tie overs of existing customer taps to adjacent pipelines to maintain customer service and system reliability. Tie over activities included the installation of three mainline valves (MLVs), the installation of six regulator stations, and the removal of four regulator stations.
  - d. For the abandonment, the Project Team identified 13 Project sites that required construction activities to occur in order to complete the abandonment of Supply Line 41-6000-2. Abandonment activities included the removal of five existing pipeline spans, installation of two regulator stations, and the removal of three regulator stations.
  - e. Accelerated and Incidental mileage was included to realize efficiencies and to enhance project constructability.
4. Final Project Scope: The final project scope consists of the abandonment of 24.033 miles of pipeline, replacement of 0.239 miles and hydrotest of 995 feet of pipeline to tie over to adjacent pipelines, derate of 3.652 miles of existing pipelines, installation of three mainline valves (MLVs), installation of eight regulator stations, removal of seven regulator stations, and removal of five pipeline spans. The Accelerated mileage consists of 21.450 miles of Phase 2A pipe and 92 feet of Phase 2B pipe.

## B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Supply Line 41-6000-2 and confirmed that the extension of Line 6914 and abandonment of Supply Line 41-6000-2 was the best option to address the Criteria pipe.

## Final Report for Supply Line 41-6000-2 Abandonment Project

## C. Engineering, Design, and Planning Factors

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records and potholing of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

1. Shut-In Analysis: The Project Team completed an RER analysis that confirmed that Line 41-6000-2 could only be abandoned once all tie over activities to the Line 6914 extension were completed and the new pipeline extension was fully operational.
2. Customer Impact:
  - a. Per the RER analysis, customer service was maintained utilizing CNG and pressure control fittings (PCFs). CNG was utilized to support two regulator stations and eight core customers. Two regulator stations and one core customer's service was maintained utilizing a PCF.
  - b. The Project Team identified that most of the customers and regulator stations on these lines had dual taps or feeds, so there was minimal or no services impacts. There was impact to some of the electric generation (EG) loads (power plants) downstream of the system. The Project Team managed the impact by coordinating the shut-in with planned EG outages.
  - c. In order to maintain uninterrupted customer service, conversion of six customers to a medium pressure from high pressure and the installation of 0.739 miles of distribution main was added to the Project scope.
3. Derate: The Project Team determined that Supply Line 41-80 and a segment of the northernmost end of 41-6000-2 could be derated to below 20% SMYS while still meeting customer service needs and maintaining system reliability. Two new regulator stations were needed to reduce the pressure.
4. Community Impact: The Project Team utilized traffic control at the construction sites.
5. Substructures:

### Final Report for Supply Line 41-6000-2 Abandonment Project

- a. Prior to construction, the Project Team confirmed optimal pipeline alignment and ensured that there were no major conflicts with underground structures. The Project Team performed potholing during construction to verify the results.
- b. The Project Team altered the design of the new MLV assembly at Malan Street and Cesar Chavez Street site due to identified substructures. The Project Team designed a 12 foot deep bore and located the tie-in to avoid a storm drain.
6. Permit Conditions:
  - a. Encroachment Permits were required from the City of Brawley, Imperial Irrigation District (IID), Imperial County, the City of Imperial, Union Pacific Railroad (UPRR), and Caltrans.
  - b. Imperial County limited the closure of large segments of the roadway in order to stagger the closures. This impacted the construction schedule, but not the design.
7. Land Use: The Project Team obtained easements to complete Project activities.
8. Environmental: The majority of the Project was located within agricultural areas.
  - a. The Project Team determined that Environmentally Sensitive Area (ESAs) were present and preconstruction surveys were conducted to confirm any potential impacts during construction. The Project Team determined that jurisdictional waters and special status species are potentially located in the project area. These environmental considerations were managed through project design to avoid disturbing these areas.
  - b. The Project Team anticipated typical abatement activities for asbestos containing materials (ACMs) for removed pipe.
  - c. The Project Team determined that dust control permits were required during construction.
  - d. Several construction areas are nesting habitats for burrowing owls. The Project Team planned for environmental monitors to be on site during construction.
9. Constructability: To maintain service, the Project Team identified 19 Project sites where construction activities would occur. Activities include the addition of taps,

Final Report for Supply Line 41-6000-2 Abandonment Project

installation or replacement of regulator stations and MLVs, and the cutting and capping of old pipe. The project scope at each site was as follows:

- a. Blair Road and Young Road: An existing high pressure transmission regulator station was converted to a medium pressure distribution regulator station to derate Supply Line 41-6000-2.
- b. Brown Avenue and Young Road:
  - i. Removal of one regulator station.
  - ii. Tie-in of the existing [REDACTED] medium pressure steel pipe to the derated section of Supply Line 41-6000-2.
- c. Brown Avenue and Yuma Street:
  - i. The installation of a stopple to cap and abandon Supply Line 41-6000-2 to the south and derate a portion of the pipeline to the north.
  - ii. The installation of a new [REDACTED] service line to the derated Supply Line 41-6000-2 to supply an existing customer.
  - iii. The removal of an existing span along the abandoned Supply Line 41-6000-2 within IID easement.
- d. Brown Avenue and Yocum Road: The removal of an existing span within IID easement along the abandoned Supply Line 41-6000-2.
- e. Dowden Road and Kershaw Road: The installation of one regulator station to monitor and control the MAOP between Line 6921 and Supply Line 41-6001-2.
- f. Kershaw Road and Rutherford Road: Replacement of one pre-existing regulator station.
- g. Best Avenue and Rutherford Road:
  - i. The removal of an existing span along the abandoned Supply Line 41-6000-2 within IID easement.
  - ii. Installation of [REDACTED] plastic conduit pipe from an existing utility power pole to the south side of Rutherford Road to connect a cathodic protection wire to Supply Line 41-6001-2 and Line 6914.
- h. Highway 78 and Best Avenue: Slurry fill the Caltrans Highway 78 crossing.

Final Report for Supply Line 41-6000-2 Abandonment Project

- i. Shank Road and Best Avenue: Replacement of one pre-existing regulator station.
- j. River Drive and Best Avenue: Replacement of one pre-existing regulator station and one valve.
- k. Malan Street and 5th Street: The scope at this site consists of:
  - i. Slurry fill of a railroad crossing.
  - ii. Removal of one regulator station.
  - iii. Removal of one MLV.
- l. Malan Street and Cesar Chavez Street:
  - i. The installation of one new MLV and bridle on Supply Line 41-6001-2.
  - ii. The installation of one new regulator station.
  - iii. The installation of approximately 180 feet of [REDACTED] pipe.
  - iv. The installation of approximately 110 feet of new [REDACTED] pipe.
  - v. The installation of approximately 100 feet of [REDACTED] pipe.
- m. Dogwood Road and Monterey Street: Slurry fill of a railroad crossing.
- n. Dogwood Road and Mead Road: Removal an existing span along the abandoned Supply Line 41-6000-2, that was located within the IID easement.
- o. Dogwood Road and Carey Road: Removal of an existing span along the abandoned Supply Line 41-6000-2 within IID easement.
- p. Keystone Road and Dogwood Road:
  - i. Installation of [REDACTED] pipe utilizing a bore crossing under a channel within IID jurisdiction to provide service from Supply Line 41-6001-2 to Supply Line 41-80.
  - ii. The installation of one new MLV and bridle on Supply Line 41-6001-2.
  - iii. The installation of one new regulator station.
- q. Worthington Road and Dogwood Road: The installation of one new MLV and bridle on Supply Line 41-6001-2.
- r. Aten Road and Dogwood Road:
  - i. Replacement of one pre-existing regulator station.
  - ii. The installation of 0.993 miles of [REDACTED] pipe to connect to Line 6914.
- s. Villa Avenue and Dogwood Road:

### Final Report for Supply Line 41-6000-2 Abandonment Project

- i. Stopple installation to cap and abandon Supply Line 41-6000-2 to the north.
- ii. Removal and replacement of one regulator station.

#### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

## Final Report for Supply Line 41-6000-2 Abandonment Project

### III. CONSTRUCTION

---

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design for Supply Line 41-6000-2 Abandonment. Following completion of the engineering, design, and planning activities described above, the Project Team evaluated the scope of the projects and determined that separate Construction Contractors for Tie Overs and Abandonment activities were needed to maintain the construction schedule. The Project Team also directed the Alliance Partner (Electrical Contractor) to prepare a cost estimate based on a more detailed design package. The Performance Partner was selected to execute Abandonment activities whereas the Construction Contractor selected to execute Tie Over activities was selected through a competitive bidding process with the construction contract was awarded to the bidder that best met the selection criteria for this project.

1. SoCalGas Preliminary Mechanical Construction Cost Estimate (confidential): SoCalGas' preliminary cost estimate for construction was [REDACTED].
2. Mechanical Construction Contractors' Cost Estimate (confidential): The Construction Contractor's cost estimate was [REDACTED], which was [REDACTED] than SoCalGas' preliminary cost estimate for construction.
3. SoCalGas Preliminary Electrical Contractor's Cost Estimate (confidential): SoCalGas' preliminary cost estimate for construction was [REDACTED].
4. Electrical Contractor's Estimate (confidential): The Construction Contractor's cost estimate was [REDACTED], which was [REDACTED] than SoCalGas' preliminary cost estimate for construction.

Final Report for Supply Line 41-6000-2 Abandonment Project

**B. Construction Schedule**

Table 3: Construction Timeline

Construction Start Date	10/02/2017
Construction Completion Date	03/08/2019
NOP Date	04/30/2018

**C. Changes During Construction**

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$4,196,000 in change orders.

1. Field Design Changes:

- a. The Project Team redesigned and extended the tie-in locations during construction at Blair Road and Young Road. The northern end of the station included additional excavation at Blair and Young was required to remove the existing [REDACTED] pipe, [REDACTED] valve, and pressure control fitting (PCF). The PCF was included to provide the shut-in of Blair Station; however, the PCF was incapable of isolating the station and unsuitable as repairs resulting in a refabrication of the north end of the station. The southern end of the station required additional excavation following the discovery of a wrinkle bend. The removal of the wrinkle bend resulted in a change in alignment and the relocation of the one valve.
- b. The Project Team redesigned and extended the tie-in locations during construction at Brown Avenue and Yuma Street. The design change included the installation of a [REDACTED] PCF, additional pressure test, and the installation of a medium pressure service.

2. Schedule Delay:

- a. Unplanned delays extended the Project schedule. Additional field support costs were incurred to support the completion of this project.

## Final Report for Supply Line 41-6000-2 Abandonment Project

- b. Unplanned delays extended the Project schedule. Additional shoring equipment costs were incurred to support the completion of this project.
3. Traffic: Extended traffic control support at Villa and Dogwood, Brown and Young, Keystone and Dogwood, and Blair and Young.
4. Field Design Changes: One regulator station was added to the Project at Dowden Road and Kershaw Road to monitor and control the MAOP between Line 6921 and Supply Line 41-6001-2.

Final Report for Supply Line 41-6000-2 Abandonment Project

Figure 7: Aerial View of New Regulator Station



Final Report for Supply Line 41-6000-2 Abandonment Project

Figure 8: New Tap Valve



Final Report for Supply Line 41-6000-2 Abandonment Project

Figure 9: Stringing of New [REDACTED] Pipe for Bore Along Aten Road



## Final Report for Supply Line 41-6000-2 Abandonment Project

### D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Supply Line 41-6000-2 Abandonment Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project. Specific examples of cost avoidance actions taken on this project are:

1. Schedule Coordination: Project construction crew and laydown yard were shared with the PSEP Supply Line 41-6001-2 Replacement Project.
2. Future Maintenance: New MLVs were installed outside major roadways, eliminating traffic control for future maintenance activities.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$27,986,526. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$35,970,958.

Final Report for Supply Line 41-6000-2 Abandonment Project

Table 4: Total Estimated and Actual Direct Costs and Variances<sup>8</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	1,645,807	1,812,796	166,989
Materials (Construction)	1,449,486	1,879,754	430,268
Mechanical Construction Contractor	12,567,295	13,027,692	460,397
Electrical Construction Contractor	250,287	166,615	(83,672)
Construction Management & Support	1,479,558	1,543,389	63,831
Environmental	1,688,084	1,552,858	(135,226)
Engineering & Design	3,639,336	6,787,673	3,148,337
Project Management & Services	1,691,928	737,346	(954,582)
ROW	696,212	251,203	(445,009)
GMA	2,878,533	3,271,883	393,350
<b>Total Direct Costs</b>	<b>27,986,526</b>	<b>31,031,209</b>	<b>3,044,683</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>9</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	2,595,908	4,162,125	1,566,217
AFUDC	1,539,320	665,616	(873,704)
Property Taxes	362,612	112,008	(250,604)
<b>Total Indirect Costs</b>	<b>4,497,840</b>	<b>4,939,749</b>	<b>441,909</b>
<b>Total Direct Costs</b>	<b>27,986,526</b>	<b>31,031,209</b>	<b>3,044,683</b>
<b>Total Loaded Costs</b>	<b>32,484,366</b>	<b>35,970,958</b>	<b>3,486,592</b>

<sup>8</sup> Values may not add to total due to rounding.

<sup>9</sup> Ibid.

## Final Report for Supply Line 41-6000-2 Abandonment Project

## D. Disallowance

For this replacement project, SoCalGas and SDG&E identified 41 feet of pipe as being installed after 1955 and lacking records that provide the minimum information necessary to demonstrate compliance with then-applicable industry standards or regulatory strength testing and recordkeeping requirements. Of the pipeline that was replaced, 41 feet of Phase 1A pipe is disallowed. Therefore, a \$13,503 reduction to ratebase was calculated by multiplying 0.0079 miles of pipe by \$1,709,257 per mile, which was SoCalGas and SDG&E's system average cost of pressure testing at the time the pipeline was returned to service.

## Final Report for Supply Line 41-6000-2 Abandonment Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Supply Line 41-6000-2 Abandonment Project. Through this Project, SoCalGas successfully addressed 29.371 miles of pipe in the City of Brawley, City of Calipatria, City of El Centro, City of Imperial, and Imperial County. The total loaded cost of the Project is \$35,970,958.

SoCalGas executed this project prudently through the abandonment of 24.033 miles of Line 41-6000-2, replacement of 0.239 miles and hydrotest of 995 feet of pipeline to tie over to adjacent pipelines, derate of 3.652 miles of existing pipelines, installation three MLVs, installation of eight regulator stations, removal of seven regulator stations, and removal of five pipeline spans without disrupting customer service.

SoCalGas engaged in prudent cost avoidance efforts by sharing construction crews and a laydown yard with another PSEP project. SoCalGas would also install new MLVs in locations that are safer and easier to access for future maintenance.

**End of Supply Line 41-6000-2 Abandonment Project Final Report**

---

## Final Report for Line 103 Derate and Replacement Project

**I. LINE 103 DERATE AND REPLACEMENT PROJECT**

---

**A. Background and Summary**

Line 103 is a [REDACTED] diameter transmission line that runs approximately 9.303 miles through Kern County. The pipeline is primarily routed across a Class 1 location and traverses some Class 2 and 3 locations. This report describes the activities associated with Line 103 Derate and Replacement Project which consists of the derate of 9.303 miles of pipeline and replacement of approximately 40 feet of pipe within a single regulator station. The specific attributes of this Project are detailed in Table 1 below. The total loaded cost of the Project is \$1,485,899.

Final Report for Line 103 Derate and Replacement Project

Table 1: General Project Information

<b>Project Name</b>	<b>Line 103 Derate and Replacement</b>		
Project Type	Derate (40 foot Replacement)		
Length	9.303 miles		
Location	Kern County		
Class	1		
MAOP <sup>1</sup> ( <i>confidential</i> )	[REDACTED]		
Pipe Vintage	1941		
Construction Start	05/21/2019		
Construction Finish	07/03/2019		
Original Pipe Diameter ( <i>confidential</i> )	[REDACTED]		
New Diameter ( <i>confidential</i> )	N/A		
Original SMYS <sup>2</sup> ( <i>confidential</i> )	[REDACTED]		
New SMYS ( <i>confidential</i> )	[REDACTED]		
<b>Project Costs (\$)</b>	<b>Capital</b>	<b>O&amp;M</b>	<b>Total</b>
Loaded Project Costs	1,485,899	-	1,485,899
Disallowed Costs	-	-	-

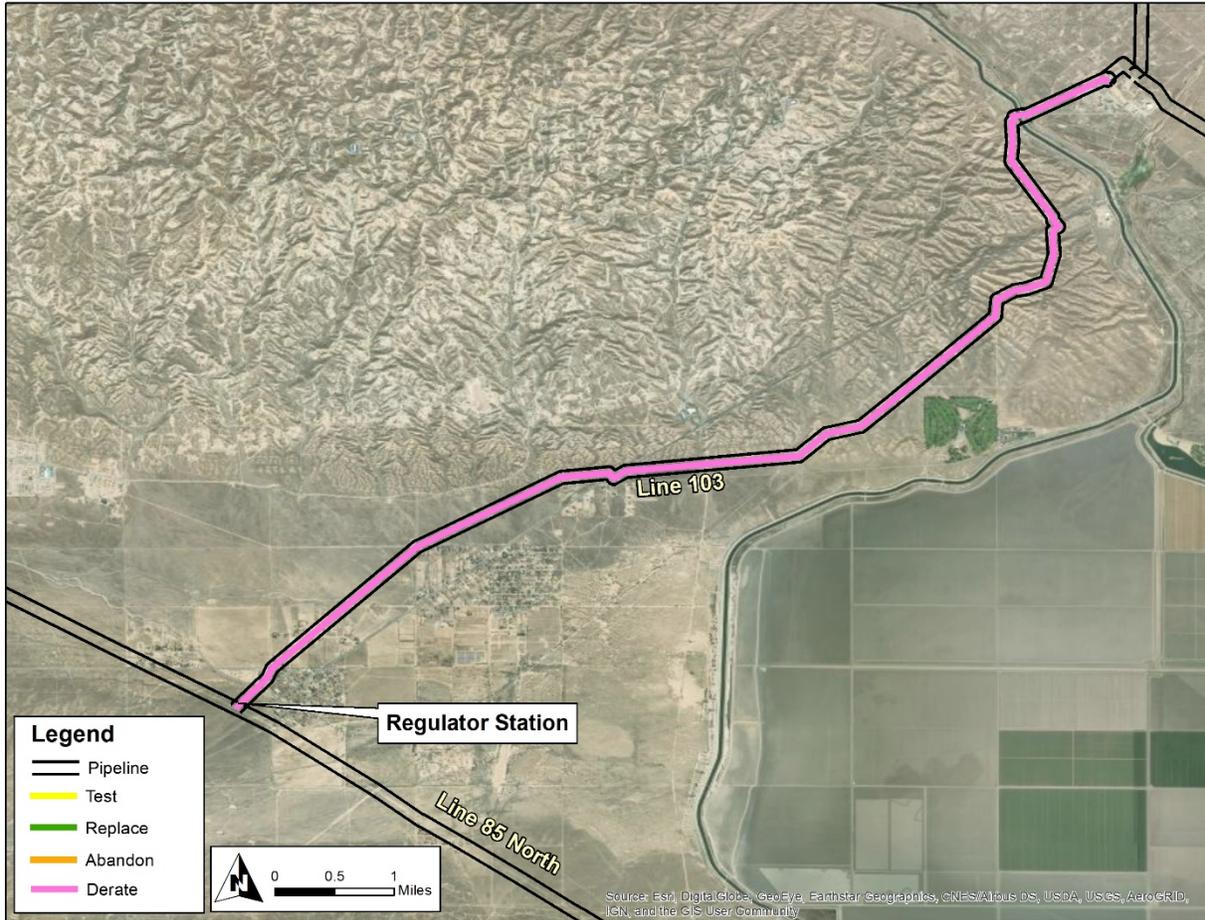
<sup>1</sup> MAOP represents the pre-construction MAOP.

<sup>2</sup> Highest percentage of Specified Minimum Yield Strength (SMYS) of Category 4 Criteria pipe.

Final Report for Line 103 Derate and Replacement Project

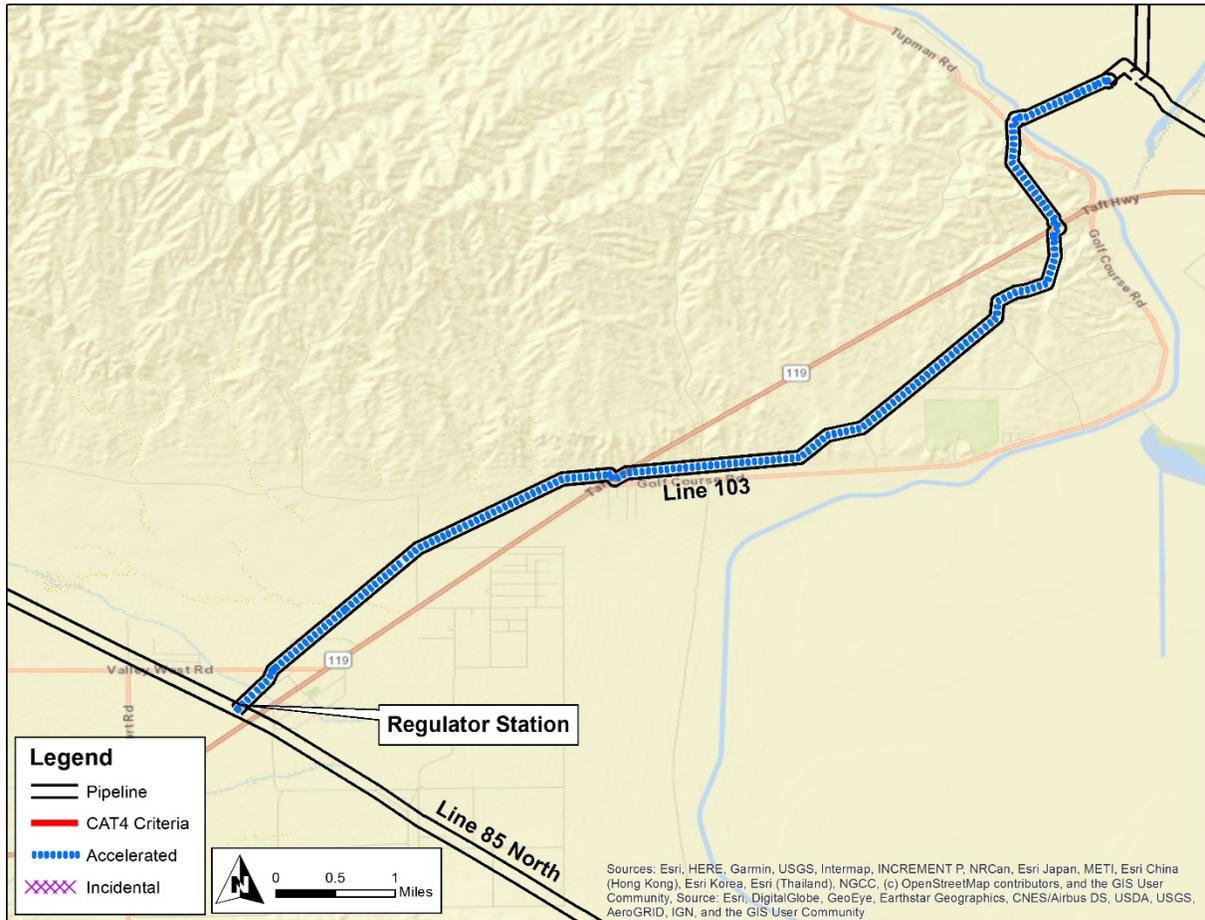
B. Maps and Images

Figure 1: Satellite Image of Line 103 Derate Project



## Final Report for Line 103 Derate and Replacement Project

### Figure 2: Overview Map of Line 103 Derate Project



Final Report for Line 103 Derate and Replacement Project

**II. ENGINEERING, DESIGN, AND PLANNING**

**A. Project Scope**

Table 2: Mileage Information

	Criteria	Accelerated <sup>3</sup>	Incidental	New	Total <sup>4</sup>
Final Mileage	0 mi.	9.031mi.	0.253 mi.	0.019 mi.	9.303 mi.
	0 ft.	47,686 ft.	1,334 ft.	100 ft.	49,120 ft.

SoCalGas and SDG&E presented a conceptual project scope in workpapers supporting the 2011 PSEP filing.<sup>5</sup> Prior to initiating execution of the Project in 2019, SoCalGas & SDG&E reviewed existing pipeline records to validate the scope of the Project. During the Engineering, Design, and Planning phase, SoCalGas & SDG&E further refined the scope. This progression of the project scope is summarized as follows:

1. 2011 PSEP Filing: SoCalGas identified Line 103 as a Phase 1B<sup>6</sup> Project comprised of approximately 8.53 miles of pipe.
2. Scope Validation: Through scope validation activities, after the 2011 filing and before initiating execution of the Project, SoCalGas reclassified this project as a replacement and derate project made up of 8.769 miles of Phase 1B pipe.
3. Engineering, Design, and Constructability:
  - a. The Project Team determined that the optimal method for addressing the Phase 1B PSEP pipe was to reduce the operating pressure of Line 103 because the system could operate at the lower pressure without an impact to customer service.

<sup>3</sup> Accelerated mileage includes Phase 1B and Phase 2 pipe. The Accelerated mileage was included to realize efficiencies and to enhance project constructability.

<sup>4</sup> Values may not add to total due to rounding.

<sup>5</sup> See Amended PSEP of SoCalGas and SDG&E, submitted December 2, 2011, in R.11-02-019 and subsequently transferred to A.11-11-002.

<sup>6</sup> As authorized in D. 14-06-007, PSEP’s Phase 1B is the replacement or abandonment of non-piggable pre-1946 pipe in non-HCA areas.

## Final Report for Line 103 Derate and Replacement Project

- b. In order to reduce the operating pressure, the Project Team identified the need to replace an existing regulator station to provide uninterrupted gas service and replace one customer tap with a [REDACTED] tap.
4. Final Project Scope: The final project scope consists of a 9.303 mile derate and the replacement of one regulator station, which included the replacement of 40 feet of pipe. The Accelerated mileage consists of 50 feet of Phase 2A pipe, 0.381 miles of Phase 2B, and 0.253 miles of Incidental pipe.

### B. Decision Tree Analysis

SoCalGas performed a PSEP Decision Tree analysis of Line 103 and confirmed the project design should commence as a Replacement Project.

The Project Team conducted an engineering analysis and determined that neither replacement, hydrotest, nor abandonment of Line 103 was the most cost effective means of addressing the PSEP Phase 1B pipe. Based on the engineering evaluation, SoCalGas confirmed that Line 103 could be derated rather than abandoned, replaced, or hydrotested and maintain system capacity. However, in order to lower the operating pressure, the preexisting regulator station needed to be replaced. SoCalGas identified derating as the more prudent option. Key considerations that support SoCalGas' determination to derate this segment include:

1. Shut-In Analysis: The Project Team completed an RER analysis and concluded that the line could be derated to a lower operating pressure and maintain capacity requirements.
2. Customer Impacts: Per the RER, the Project Team was able to maintain service to customers without impact. One customer required outage coordination during pipeline isolation to replace an existing tap.
3. Piggability: Non-piggable.
4. Pipe Vintage: 1941.
5. Existing Pipe Attributes: Varying diameter changes from [REDACTED] to [REDACTED] pipe.

Final Report for Line 103 Derate and Replacement Project

- 6. Longseam Type: Unknown.
- 7. Longseam Repair History: No identified issues.
- 8. Condition of Coating: No identified issues.
- 9. History of Leaks: No identified issues.

**C. Engineering, Design, and Planning Factors**

SoCalGas reviewed pipeline drawings and other information, contacted internal planning groups, communicated with external stakeholders, conducted survey activities, including reviewing public records of the area to confirm the presence of underground utilities and substructures, and completed a pre-design site walk. Key factors that influenced the engineering and design of the Project are as follows:

- 1. Shut-In Analysis:
  - a. As discussed above, the Project Team completed an RER analysis and concluded that the line could be derated and maintain capacity requirements.
  - b. Operating the pipeline at a reduced pressure required the replacement of an existing regulator station. The new regulator station provides the capability to operate the existing pipeline at medium pressure.
- 2. Customer Impacts: Per the RER, the Project Team was able to maintain service to customers without impact. One customer required outage coordination during pipeline isolation to replace an existing tap.
- 3. Community Impact: The Project had minimal community impact and traffic control was not needed because all construction work was conducted within SoCalGas property.
- 4. Substructures: No identified substructures within excavation locations.
- 5. Permit Conditions: No identified issues.
- 6. Land Use: The Project was completed within SoCalGas property.
- 7. Environmental:
  - a. Full time biological monitoring was required due to nearby environmental resources.

## Final Report for Line 103 Derate and Replacement Project

- b. Abatement activities were anticipated for lead paint and asbestos containing materials (ACMs) for removed pipe.

### D. Scope Changes

SoCalGas did not make any notable scope changes during detailed design.

Final Report for Line 103 Derate and Replacement Project

### III. CONSTRUCTION

#### A. Construction Contractor Selection

The Project Team prepared an initial cost estimate based on the preliminary design. As indicated above, there were no notable changes in scope between the time when the Project Team prepared the preliminary cost estimate and when the Performance Partner prepared and submitted its Target Price Estimate. SoCalGas awarded the construction contract to the Performance Partner.

1. SoCalGas’ Preliminary Construction Cost Estimate (confidential): SoCalGas’ preliminary cost estimate for construction was [REDACTED].
2. Construction Contractor’s Target Price Estimate (confidential): The Construction Contractor’s cost estimate was [REDACTED], which was [REDACTED] than SoCalGas’ preliminary cost estimate for construction.

#### B. Construction Schedule

Table 3: Construction Timeline

Construction Start Date	05/21/2019
Construction Completion Date	07/03/2019
NOP Date	06/20/2019

#### C. Changes During Construction

The conditions summarized below were encountered during construction. Activities to address or mitigate these conditions resulted in approximately \$55,000 in change orders.

1. Schedule Delay: Unplanned delays extended the Project by approximately 10 days. Additional field support costs were incurred to support the completion of this project.
2. Material Delays: Materials arrived incomplete at start of construction causing a two day delay to the schedule for fabrication activities.

## Final Report for Line 103 Derate and Replacement Project

3. Field Design Changes: Additional pipe supports were required for above ground piping during customer tap installation.

Final Report for Line 103 Derate and Replacement Project

Figure 3: Abatement Activities



Final Report for Line 103 Derate and Replacement Project

Figure 4: Prefabricated Assembly for Regulator Station



Final Report for Line 103 Derate and Replacement Project

Figure 5: Prefabricated Assembly for Customer Tap



## Final Report for Line 103 Derate and Replacement Project

## D. Commissioning and Site Restoration

Commissioning activities include restoration of the site, final inspection and placement of the pipeline back into service, transportation and disposal of hydrotest water and hazardous material, and site demobilization. Closeout activities include development of final drawings, finalization of a reconciliation package, and updates to company recordkeeping systems to reflect the completed scope of work.

## Final Report for Line 103 Derate and Replacement Project

## IV. PROJECT COSTS

---

### A. Cost Avoidance Actions

SoCalGas exercised due diligence in the planning, design, and construction activities for this project to minimize or avoid costs when prudent to do so. As discussed above, the Project Team conducted a site visit to identify and incorporate discernible site conditions into the engineering, design, and planning of the Project in the most cost effective manner to remediate the PSEP pipe. The Project Team coordinated a planned shut-in window with a customer, removing the need to use CNG to keep the customer serviced during construction.

### B. Cost Estimate

Based on the preliminary design, once the project scope was confirmed and engineering, design, and planning activities were underway, SoCalGas prepared an estimate of the Direct Costs of the Project in the amount of \$1,475,181. The Project Team considered the conditions known at the time to prepare the preliminary Direct Cost estimate. This estimate reflects the projected Labor, Material, and Services costs anticipated to be incurred to execute the Project.

SoCalGas estimated Indirect Costs of the Project based on the estimated Direct Costs and other project-related variables.

### C. Actual Direct and Indirect Costs

Actual Direct Costs reflect the Labor, Material, and Services costs incurred to execute the Project. Actual Indirect Costs reflect costs for incremental overhead loaders in accordance with Company overhead allocation policies. The total loaded cost of the Project is \$1,485,899.

Final Report for Line 103 Derate and Replacement Project

Table 4: Estimated and Actual Direct Costs and Variances<sup>7</sup>

Direct Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Company Labor	342,029	143,572	(198,457)
Materials	170,511	240,958	70,447
Construction Contractor	264,077	281,021	16,944
Construction Management & Support	119,000	52,901	(66,099)
Environmental	67,880	109,157	41,277
Engineering & Design	190,840	253,526	62,686
Project Management & Services	133,619	24,793	(108,826)
ROW & Permits	12,202	6,307	(5,895)
GMA	175,023	110,616	(64,407)
<b>Total Direct Costs</b>	<b>1,475,181</b>	<b>1,222,851</b>	<b>(252,330)</b>

Table 5: Estimated and Actual Indirect Costs, Total Costs, and Variances<sup>8</sup>

Indirect Costs/Total Costs (\$)	Estimate	Actuals	Delta Over/(Under)
Overheads	489,108	227,608	(261,500)
AFUDC	342,258	30,158	(312,100)
Property Taxes	95,326	5,282	(90,044)
<b>Total Indirect Costs</b>	<b>926,692</b>	<b>263,048</b>	<b>(663,644)</b>
<b>Total Direct Costs</b>	<b>1,475,181</b>	<b>1,222,851</b>	<b>(252,330)</b>
<b>Total Loaded Costs</b>	<b>2,401,873</b>	<b>1,485,899</b>	<b>(915,974)</b>

<sup>7</sup> Values may not add to total due to rounding.

<sup>8</sup> Ibid.

Final Report for Line 103 Derate and Replacement Project

**D. Disallowance**

The scope of the Line 103 Replacement and Derate Project did not include any pipe subject to disallowance under D.14-06-007 or D.15-12-020.

## Final Report for Line 103 Derate and Replacement Project

**V. CONCLUSION**

---

SoCalGas enhanced the safety of their integrated natural gas transmission system by prudently executing the Line 103 Derate and Replacement Project. Through this Replacement and Derate Project, SoCalGas successfully derated 9.303 miles of pipeline and replaced 40 feet of regulator station pipe in Kern County. The total loaded cost of the Project is \$1,485,899.

SoCalGas engaged in prudent cost avoidance efforts by identifying that Line 103 could successfully be derated instead of replaced, while maintaining system capacity requirements.

**End of Line 103 Derate and Replacement Project Final Report**

---