Application No: A.13-12-xxx
Exhibit No.:
Witness: David Buczkowski

Application of Southern California Gas Company (U 904 G) and San Diego Gas & Electric Company (U 902 G) For Authority To Recover North-South Project Revenue Requirement In Customer Rates And For Approval Of Related Cost Allocation And Rate Design Proposals	A.13-12-xxx (Filed December 20, 2013)

DIRECT TESTIMONY OF

DAVID BUCZKOWSKI

SAN DIEGO GAS & ELECTRIC COMPANY

AND

SOUTHERN CALIFORNIA GAS COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

December 20, 2013

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DIRECT TESTIMONY OF DAVID BUCZKOWSKI

I. PURPOSE & OVERVIEW

The purpose of my direct testimony on behalf of Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) is to present the estimated direct project costs and schedule for the North-South Project. This project consists of three major components: Adelanto-Moreno Pipeline, Adelanto Compressor Station, and Moreno-Whitewater Pipeline. The estimated project direct costs are summarized as follows in Table 1:

Table 1
Estimated North - South Project Direct Costs
(In Millions of Dollars)

Direct Capital Costs	Total
Adelanto-Moreno Pipeline	$331.8
Adelanto Compressor Station	$110.7
Moreno-Whitewater Pipeline	$186.1
Total	$628.6

The costs described in this chapter are direct costs (in 2013 unloaded dollars) and cover anticipated project elements, including, engineering, environmental review, permitting, mitigation, land and right-of-way acquisition, equipment and materials, construction labor, construction management, consultant costs, and internal company labor.

The overall project schedule is estimated to encompass six years from commencing work until the new assets are placed in service. The estimated annual capital expenditures are summarized as follows in Table 2:

Table 2
Estimated North - South Project Annual Direct Capital Expenditures
(In Millions of Dollars)

2014	2015	2016	2017	2018	2019	2020-2039[1]	Total
$7.4	$10.2	$17.9	$188.0	$229.8	$174.2	$1.1	**$628.6**

II. PROJECT SCOPE

The North-South Project scope includes the design and construction of approximately 60 miles of new pipeline from Adelanto to our Moreno pressure limiting station (Moreno PLS), upgrades to the compressor station in Adelanto, and approximately 31 miles of new pipeline from Moreno to Whitewater. SoCalGas and SDG&E utilized the assistance of a third party firm, TRC Companies, Inc. (TRC), specializing in engineering services and construction management to support development of the project scope and cost estimates for this application.

Based on the preliminary engineering and design work completed to date and the project experience of SoCalGas, SDG&E, and TRC, the overall scope of work presented below is feasible and constructible. SoCalGas and SDG&E have evaluated this proposed project scope against other possible project alternatives, as discussed in the testimony of Ms. Musich and Mr. Bisi. High-level cost estimates for the two of the most feasible project alternatives are presented in Section V below.

This project is anticipated to require an extensive environmental review and involve monitoring and mitigation activities throughout the construction phase. For purposes of determining the environmental activities and costs associated with this project, SoCalGas and SDG&E assume that the project will be subject to the requirements of the National

[1] Accounts for post-construction environmental monitoring that will occur after the assets are placed in service.

Environmental Policy Act and the California Environmental Quality Act as well as discretionary permits from various federal, state and local agencies.

A. Adelanto-Moreno Pipeline

The Adelanto-Moreno pipeline is a new 36" diameter pipeline that originates at SoCalGas' Adelanto Compressor Station and traverses approximately 60 miles in a southeasterly direction, terminating at the Moreno PLS. The new pipeline will traverse both undeveloped and urban locations in San Bernardino and Riverside counties, and will pass through private and public land. SoCalGas project management, environmental, land services, and operations personnel, developed the proposed pipeline alignment.

SoCalGas and SDG&E provided this alignment to TRC for their review and analysis and to aid in their support of the cost estimation effort. TRC obtained publicly available GIS, topography, land ownership, and fault data to use in their review and analysis of the pipeline route. TRC identified several challenges along the route, including traversing the Cajon Pass and crossings of multiple highways, earthquake faults, the California Aqueduct, Santa Ana River, and flood control channels.

B. Adelanto Compressor Station

The project scope for this application also includes an upgrade of the existing Adelanto Compressor Station. SoCalGas and SDG&E determined the operational requirements for the station (e.g., minimum and maximum station throughput, minimum inlet pressure, maximum outlet pressure), and TRC used their expertise in conjunction with input from equipment manufacturers to determine the overall station horsepower requirement and develop the preliminary design for the station upgrade.

The current station consists of a single gas-turbine driven compressor installed in the early 1970's. The total horsepower of this existing unit is inadequate to provide the necessary throughput for the North-South Project at the required design conditions. Without the ability to move the required volume of gas through the Adelanto Compressor Station, the minimum flow requirements on the Southern System described in the testimonies of Ms. Musich and Mr. Bisi could not be met through this project. As such, the aforementioned station upgrades are required. Since the existing turbine-driven compressor is no longer in commercial production, and ongoing maintenance and procurement of replacement parts is difficult and costly, it will be retired.[2]

C. Moreno-Whitewater Pipeline

The Moreno-Whitewater pipeline is a new 36" diameter pipeline that originates at SoCalGas' Moreno PLS and traverses approximately 31 miles eastward, terminating in Whitewater. The pipeline will follow the I-10 corridor near the towns of Whitewater, Cabazon, Banning and Beaumont in Riverside County.

SoCalGas initially considered replacement of a portion of Line 5000 with the new Moreno-Whitewater pipeline. However, this approach would entail significant cost for the abandonment and removal of this portion of the Line 5000, which happens to be a 1980's vintage segment. As such, we determined that building an additional pipeline from Moreno to Whitewater and leaving Line 5000 intact would be the better approach to this project.

III. COST ESTIMATES

SoCalGas and SDG&E developed direct cost estimates to implement the above scope of work, including costs associated with project management, engineering and design,

[2] The same type of gas turbine-driven compressor (GE LM 1500) is also being replaced through a different project at the Aliso Canyon Storage facility. *See* Decision 13-11-023.

environmental permitting, land acquisition, material and equipment procurement, and construction. TRC provided support for this effort. All cost information and vendor quotes gathered by TRC were reviewed by experienced SoCalGas project and construction management personnel.

A. Adelanto-Moreno Pipeline

The installation of approximately 60 miles of new 36" diameter pipeline from Adelanto Compressor Station to Moreno is estimated to cost $331.8 million (direct).

Table 3[3]
Estimated Adelanto-Moreno Pipeline Direct Costs
(In Millions of Dollars)

Direct Capital Costs	Total
Materials	$84.7
Construction	$180.1
Other	$66.9
Total	$331.8[4]

SoCalGas and SDG&E consulted with vendors to determine current material costs for pipe and valves. The new pipeline will allow passage of commonly available in-line inspection tools. Costs are included for a launcher/receiver at each end of the new pipeline. The project scope includes nine main line valves for the Adelanto-Moreno pipeline route. The main line valves installed as part of this project will be capable of operating in automatic shut-off and remote control modes, and the cost estimates include the controls and actuators necessary to permit such operation.

TRC obtained estimates for the construction costs from two pipeline contractors, each with extensive experience constructing large diameter natural gas transmission pipeline. The

[3] *See* Appendix A for Adelanto-Moreno Pipeline Direct Cost Detail.
[4] Some of the numbers in the tables in this testimony do not add due to rounding.

estimates account for type of terrain traversed during construction and the effect of the terrain on such factors as type of construction methods employed and rate of construction progress. Each estimate was reviewed by TRC and experienced SoCalGas project management personnel and each was considered to be technically acceptable and complete with respect to scope and schedule. The superior of the two estimates in terms of overall cost and proposed execution, particularly in the more populated city areas, is incorporated into the direct costs presented in Table 3 above. TRC also provided anticipated third party construction management man hours and used a labor rate provided by knowledgeable and experienced SoCalGas personnel to develop the cost estimate for this activity.

Land costs include acquisition of both temporary work space and permanent easements along the proposed Adelanto-Moreno pipeline route. After construction is completed, our scope and estimate basis is that the sections of the pipeline outside dedicated roads and highways will have a 50 foot right-of-way. Temporary work space during construction will require an additional 50 feet in areas where space is available.

TRC combined analysis of aerial images and U.S. Geological Survey maps with multiple site visits to inform their engineering and construction cost estimates. The engineering cost estimate incorporates anticipated man hours and estimated labor rates for activities related to site investigation, project coordination, design drawings and review, preparation of bid specifications and coordination with vendors, construction support, review of right-of-way documents, and project closeout.

SoCalGas environmental staff provided anticipated man-hours and labor rates in order to develop estimated costs for environmental data collection surveys (including cultural resources, natural resources, water resources, soils, geology and hazardous materials), geotechnical support,

and permitting activities, as well as preconstruction surveys, mitigation compliance, and construction monitoring. Costs for mitigation are based on estimated acreage impacts and fees to available mitigation banks, as well as standard costs per acre for restoration of specific habitat types.

Other items covered in the cost estimate are legal support services, an allowance for public relations activities and community outreach, and installation of fiber optic right-of-way monitoring and methane detection devices along the pipeline route.

B. Adelanto Compressor Station

Compressor station upgrades at Adelanto adding approximately 30,000 horsepower of compression are estimated to cost $110.7 million (direct).

Table 4[5]
Estimated Adelanto Compressor Station Direct Costs
(In Millions of Dollars)

Direct Capital Costs	Total
Equipment and Materials	$67.5
Construction	$30.8
Other	$12.5
Total	$110.7

This estimate assumes the 30,000 horsepower of compression is provided by three natural gas turbine-driven compressors. It is assumed that this three-unit configuration will allow for the required operational flexibility. TRC consulted with a reputable compressor manufacturer to obtain pricing for the compressors and related equipment. As the project design moves forward, additional engineering is required to thoroughly evaluate the horsepower and flow rate requirements of the station. If further engineering and design suggests an alternate configuration

[5] *See* Appendix B for Adelanto Compressor Station Direct Cost Detail.

of type and quantity of compressors is better suited for this project, it is assumed the resultant change will be within the accuracy of the cost estimate.

Construction of the station upgrades is assumed to take place just outside the fence line of the existing Adelanto Compressor Station. The total parcel of land owned by SoCalGas is approximately 560 ft. x 875 ft., with the existing Adelanto Station covering much less than half of the entire parcel. This provides sufficient room to install the new compressor station on the SoCalGas parcel, outside the existing fence line and due south of the existing station. This will avoid land acquisition costs for the new compression facilities. In addition, executing the construction in this manner will eliminate the need for any immediate demolition of the existing compressor and will not impact system operation and remote control of critical valves while the new station is being built. The current turbine driven compressor will remain in service until the new units are installed and commissioned. The direct costs for the Adelanto Compressor Station do not include demolition of the existing unit. As stated in Mr. Yee's testimony, those costs are accounted for in authorized depreciation rates.

In order to meet regional air quality requirements, emissions controls and continuous emissions monitoring equipment will be required. The compressor station will be subject to Federal Operating Permit (Title V) requirements due to its potential to emit emissions in excess of federal major source thresholds. As a federal major source, the facility will meet the Lowest Achievable Emission Rate (LAER). The capital costs for procurement and installation of this equipment are included in the project estimate. Internal estimates were developed for the anticipated costs of emission reduction credits. These emissions offset costs and other air permit related fees necessary to construct the station upgrades are also included towards the total cost of the compressor station.

SoCalGas and SDG&E evaluated natural gas driven compression as the basis for the project scope and cost estimates in this application. As stated in Mr. Bisi's testimony, SoCalGas and SDG&E believe that this new compression should be gas-driven for a number of reasons.

C. Moreno-Whitewater Pipeline

The installation of approximately 31 miles of 36" diameter pipeline from the Moreno PLS to Whitewater is estimated to cost $186.1 million (direct). The project scope includes six main line valves along the Moreno-Whitewater pipeline route. Similar assumptions and cost estimating methodologies as described above in the Adelanto-Moreno Pipeline section for materials, construction, and several other costs are used for the Moreno-Whitewater Pipeline. On a per-mile basis, the only cost that is substantially different between the Adelanto-Moreno pipeline and the Moreno-Whitewater pipeline is the land and right-of-way acquisition cost due to differences in land values and proportion of the anticipated routes in franchise, as opposed to non-franchise areas for which additional right-of-way will have to be purchased.

Table 5[6]
Estimated Moreno-Whitewater Direct Costs
(In Millions of Dollars)

Direct Capital Costs	Total
Materials	$43.1
Construction	$95.2
Other	$47.7
Total	$186.1

In addition to the pipeline costs, the overall estimate for this portion of the project includes building three pressure limiting stations.

D. Company Labor

[6] *See* Appendix C for Moreno-Whitewater Pipeline Direct Cost Detail.

SoCalGas will use company resources to perform various functions over the course of the project. In particular, SoCalGas will be responsible for overall project and construction management, environmental management, project controls, and various other support functions. All third party contractor and consultant activity, including but not limited to environmental surveys and monitoring, procurement, engineering/design, land and right-of-way acquisition, construction management, and legal services will be overseen by company resources. SoCalGas developed a preliminary staffing plan for the functions that will be supporting the project. It is estimated that the number of SoCalGas full-time equivalent employees working on this project will range from roughly 14 in the early stages of the project to approximately 24 during the peak construction activities. The total direct costs for company labor are estimated to be approximately $15.1 million.

E. Contingency

The estimated project costs in this application include contingencies that, in aggregate, amount to between 8% and 9% of the total direct cost. Contingency is a direct cost to the project and will be spent over the course of engineering, design, procurement, and construction. Per the Association for the Advancement of Cost Engineering (AACE), contingency is defined as "a cost element of the estimate used to cover the uncertainty and variability associated with a cost estimate, and unforeseeable elements of cost within the defined project scope."[7] The risk of these unknown elements within the defined scope, and their associated costs materializing, is always present on construction projects like the North-South Project. Including a contingency allows for these costs to be budgeted, even though the exact contingency-related expenditures and unforeseen events are unknown at the current level of project definition. To calculate

[7] AACE International Recommended Practice, No. 34-R-05, TCM Framework: 7.3 - Cost Estimating and Budgeting, 2007, p. 4.

contingency, we analyzed each cost component, considered the risks related to the component that fall within the defined project scope, and established a contingency percentage. This is a common process for calculating contingency. For example, in D.09-03-026, the Commission authorized PG&E's smart meter Program Upgrade. The approved authorized cost of that project included a risk based allowance (i.e., contingency) of 12.9%. In another example, in D.06-07-027 the Commission authorized PG&E's Advanced Metering Infrastructure project with an 8.0% contingency included in the cost estimate. In D.09-03-026, the Commission explains that "the analysis of risk for the Upgrade should consider the risk profiles specific to the Upgrade, rather than that of the original AMI project."[8] Consistent with good estimating practice and these prior Commission precedents, SoCalGas and SDG&E have taken the approach of contemplating the risks specific to the North-South Project costs when determining a reasonable contingency to include in the cost estimate.

At the project component level, we included contingency amounts that range from 0% to 40% of the direct cost. Those project components where fewer issues are expected to arise and the scope and cost estimates are more fully developed will have contingencies towards the lower end of the aforementioned range. Project components where issues with greater cost impact can arise and the scope and costs estimates are not as fully developed will have a higher contingency applied. In aggregate, the contingency for the project is approximately $54 million.

Even after accounting for the contingency in the direct cost estimate, there still may be variability in the overall cost of the project. The amount of expected variability is related to external, uncontrollable factors that impact skilled labor costs, material costs, etc. For example, the best quality estimate would be a firm quote from a vendor to perform a specific task. While many cost estimates for this project are based on input from vendors and contractors, no firm

[8] D.09-03-026, mimeo., at 88.

quotations were obtained, as many of the project activities estimated will not be occurring for several years.

It should be noted that there are risks outside of the defined project scope that are excluded from the cost estimate and contingency. Examples of such risks include:

- Costs for skilled labor and qualified resources (e.g., engineers, contractors, construction workers, specialty consultants), materials, or other commodities increasing significantly over the project duration, beyond the escalation included in the revenue requirement.
- Significant changes to the project scope as a result of the environmental and/or regulatory review of the project.
- Significant delays in the project schedule as a result of the environmental and/or regulatory review, local community intervention, natural disaster, labor strike, etc.
- Changes to laws or regulations that would significantly affect project cost and/or schedule.
- Earthquakes, fires, natural disasters, strikes or other force majeure type events.

F. O&M Costs

O&M Costs During Project Construction

The costs discussed in the preceding sections of this testimony are all estimated capital expenditures. In addition, we also expect that there will be O&M expenses incurred during project execution, prior to placing the new pipelines and compressor equipment in service. These expenses are anticipated to be primarily for office space and other office related costs. The cost estimate includes office space for the project team, including company personnel and key consultants. These costs are included in the revenue requirement discussed in Mr. Yee's testimony.

Table 6
Estimated North - South Project O&M Expenses
(In Millions of Dollars)

2014	2015	2016	2017	2018	2019
$0.5	$0.3	$0.3	$0.3	< $0.1	< $0.1

Ongoing Post-Construction O&M Costs

This project will also result in incremental ongoing O&M expenses for the pipelines and compressor station after they are placed into service. Estimates of these costs are provided in Table 7. Pipeline operations and compliance activities, including valve maintenance and cathodic protection, will incur ongoing costs, as will activities related to right-of-way mitigation. The compressor station will have associated O&M expenses (labor and non-labor) from such activities as operating the station and maintaining the emissions monitoring equipment. Emissions fees based on the amount of greenhouse gases generated through operation of the compressors will also be an ongoing expense. Recovery of these ongoing O&M costs is not included in the proposed revenue requirement for this application. However as discussed in the

testimony of Mr. Ahmed, these post-construction O&M costs will be recorded in the requested memorandum account until they are addressed in SoCalGas' next GRC or other applicable proceeding.

Table 7[9]
Estimated Ongoing O&M Costs
(In Millions of Dollars Per Year)

O&M Costs	Total
Pipeline Operations & Compliance	$0.2
Right-of-Way	$0.8
Compressor Station	$0.7
Greenhouse Gas Emissions Fees[10]	$3.4
Total	$5.1

IV. PROJECT SCHEDULE

SoCalGas and SDG&E estimate that it will take approximately six years to permit, engineer/design, procure, construct and place the new assets in service. The basis for the schedule, cost estimates, and revenue requirement is that all assets will go into service at approximately the same time. We may be able to place certain project components in service before the others are completed. If this ends up occurring, per Mr. Ahmed's testimony, the capital-related costs of the assets in-service will be recorded in the requested memorandum account until we are authorized to recover the revenue requirement in rates.

If SoCalGas and SDG&E wait to commence work on the project until after regulatory approval, the project will take the time needed for regulatory approval plus approximately six

[9] One expense not included in Table 7 is the cost of catalyst replacement. It is assumed replacement of the catalyst will not occur prior to the next GRC or other applicable proceeding after the compressor station is placed in service.
[10] The estimated cost presented in Table 7 assumes the compressors operate at 100% load. Actual fees will be assessed based on actual compressor operation and greenhouse gas generation.

years. In order to develop this project as quickly as possible, SoCalGas and SDG&E plan on initiating planning, engineering, design, and permitting work in advance of Commission authorization, so these estimates reflect an in-service date in Q4 2019 rather than Q4 2021.

The environmental clearance process is also assumed to commence in parallel with the regulatory approval phase of the project. By not waiting for final regulatory approval before starting planning, engineering, design and permitting work, the overall schedule from the filing of this application to placing the new assets in service can be compressed, potentially saving in escalation costs that would otherwise be passed on to ratepayers.[11]

Since the environmental clearance process has the potential to impact the overall project scope, it is assumed that material procurement (including long lead time valves and compression equipment), land and right-of-way acquisition, and awarding of major construction contracts will not occur until after SoCalGas and SDG&E receive the final environmental clearance for the project. It is estimated that detailed engineering and design, procurement, and construction for the project will be completed within roughly three years of receiving the final environmental clearances.

V. PHYSICAL ALTERNATIVES

High-level cost estimates have been evaluated for the two alternative projects described in Mr. Bisi and Ms. Musich's testimonies (River Route and Cross Desert). These projects involve similar components as the proposed North-South Project (i.e., pipeline and compressor station equipment), though in different quantities. The pipeline material specifications (diameter, wall thickness, and grade) for each alternative would be the same as the proposed Adelanto to Moreno and Moreno to Whitewater pipelines, for which we've already obtained estimated costs. There may be lower construction costs in rural areas (particularly on the River Route) where

[11] Escalation is discussed in the testimony of Mr. Yee.

longer stretches of trench can be left open. However, these same areas may also have higher costs to mitigate environmental impacts. Other costs for activities such as engineering, survey, right-of-way acquisition, etc., should be comparable, on a unit cost basis, to the estimates obtained for the Adelanto to Moreno and Moreno to Whitewater pipelines. The compressor station required for the Cross Desert alternative would have a higher total horsepower than the station proposed as part of the North-South Project, but it would be comprised of similar equipment (i.e., gas turbine driven compressors, emissions reduction and monitoring equipment, compressor building, gas cooling, etc.) and would be subject to the same emissions requirements.

As such, we determined that applying overall per mile costs obtained for the Adelanto-Moreno and Moreno-Whitewater pipelines and overall per horsepower costs obtained for the proposed Adelanto Compressor Station to the project alternatives would provide sufficient preliminary estimates that can be used for comparison. While construction cost of these facilities is an important consideration, it should be noted that the other benefits of the North-South Project discussed in the testimonies of Mr. Bisi and Ms. Musich were the primary drivers for determining the best option to address long-term Southern System reliability.

Table 8
Preliminary Direct Costs for Project Alternatives
(In Millions of Dollars)

Direct Capital Costs	Total
River Route	$560
Cross Desert	$1,250

The costs above assume $5.6 million/mile for the 100 miles of pipeline in the River Route and 200 miles of pipeline in the Cross Desert option, and $3,500/horsepower for the 35,000 horsepower compressor station required for the Cross Desert option.

VI. QUALIFICATIONS

My name is David L. Buczkowski. I am employed by SoCalGas as the Director of Major Projects. My business address is 555 West Fifth Street, Los Angeles, California 90013-1011.

I graduated from the University of Illinois in 1989 with a Bachelor of Science degree in Mechanical Engineering. I have over 23 years of domestic and international experience in various energy industries.

I have been employed by SoCalGas as the Director of Major Projects since May of 2011. In this position, my responsibilities include overseeing the project management and project execution of major capital and expense gas infrastructure projects for SoCalGas and SDG&E.

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

From 1997 to 2001, I was employed by Parsons Corporation, first as a Project Engineer, then in various project management positions of increasing responsibility. From 1990 to 1995, I was employed by Shell Oil Company, first as an Operations Support Engineer and subsequently in various roles of increasing responsibility, including project management of major refinery

projects and ultimately ascended to the position of Start-Up Engineer for the Shell Refinery Expansion and Clean Fuels megaproject.

I have previously testified before the California Public Utilities Commission.

This concludes my prepared direct testimony.

Appendix A – Adelanto-Moreno Pipeline Direct Cost Detail

I. Material Costs -

Cost Element	*Direct Cost ($ millions)*
Pipe & Coating	$59.9
Pipe Delivery	$9.3
Ells	$5.2
Valves	$1.0
Other Materials	$2.2
Freight	$0.6
Filter / Separator For Pipeline	$0.5
Odorization	$0.2
Tax	$5.9
Total	**$84.7**

II. Construction Costs

Cost Element	*Direct Cost ($ millions)*
Mobilization	$0.6
Unload –Stockpile Pipe	$0.8
Load Pipe – Haul to right-of-way	$0.8
County Paved Roads	$15.4
County Dirt Roads	$31.6
Light Residential – Paved	$17.5
City Street Paved	$52.2
SB National Forest	$8.4
Cajon Pass-Cross Country	$16.1
HDD Bores	$2.1
Cross Country	$14.3
Short bores	$1.7
Conventional Bores	$4.5

Mainline Valves	$2.1
Launcher/receiver	$0.1
Caliper Survey	$0.2
X-Ray Services	$1.5
Hydro Testing and Drying	$1.4
Demobilization	$0.3
Construction Management	$8.3
Total	**$180.1**

III. Other Costs

Cost Element	***Direct Cost ($ millions)***
ROW Acquisition	$16.0
Legal Services	$5.6
Public Relations	$1.1
Environmental Permitting	$15.8
Geotechnical Investigation	$0.4
Survey	$3.6
Ministerial Permits	$1.2
Engineering	$7.4
As-built	$0.8
SCADA	$0.9
ROW Intrusion Monitoring	$5.6
Methane Detection	$0.1
Moreno PLS	$2.4
Company Labor	$5.9
Total	**$66.9**

Appendix B – Adelanto Compressor Station Direct Cost Detail

I. Material Costs -

Cost Element	*Direct Cost ($ millions)*
Turbine-driven Compressors	$31.7
Buildings	$2.5
Gas Cooling	$3.8
Major Piping and Fittings	$1.1
Valves	$2.1
Major Electrical Equipment	$1.1
Concrete and Foundations	$0.2
Misc. Materials	$4.2
Auxiliary Generator	$6.6
Selective Catalytic Reduction System/ Oxidation Catalyst	$4.0
Continuous Emissions Monitoring Systems	$0.8
Aqueous Unit (Ammonia)	$3.9
Maintenance Parts	$0.2
Tax	$3.7
Freight	$1.7
Total	**$67.5**

II. Construction Costs

Cost Element	*Direct Cost ($ millions)*
Construction Labor	$26.5
Block Wall	$1.4
Electrical Upgrade - Construction	$0.3
Construction Management	$2.5
Total	**$30.8**

III. Other Costs

Cost Element	***Direct Cost ($ millions)***
Public Relations	$0.2
Environmental Permitting	$5.8
Survey	$0.4
Ministerial Permits	$0.1
Engineering	$1.8
As-built	$0.1
SCADA	$0.4
Company Labor	$3.7
Total	**$12.5**

Appendix C – Moreno-Whitewater Pipeline Direct Cost Detail

I. Material Costs -

Cost Element	*Direct Cost ($ millions)*
Pipe & Coating	$31.4
Pipe Delivery	$4.8
Ells	$0.6
Valves	$0.8
Other Materials	$1.9
Freight	$0.6
Odorization	$0.1
Tax	$3.0
Total	**$43.1**

II. Construction Costs

Cost Element	*Direct Cost ($ millions)*
Mobilization	$0.3
Unload –Stockpile Pipe	$0.4
Load Pipe – Haul to right-of-way	$0.4
County Paved Roads	$24.9
Narrow Right-of-Way	$21.2
Mountain Terrain	$31.6
Cross Country	$2.4
Conventional Bores	$3.3
HDD Bores	$2.8
Mainline Valves	$1.4
Launcher/receiver	$0.1
Caliper Survey	$0.2
X-Ray Services	$0.8
Hydro Testing and Drying	$0.7
Demobilization	$0.2

Construction Management	$4.5
Total	**$95.2**

III. Other Costs

Cost Element	***Direct Cost ($ millions)***
ROW Acquisition	$16.3
Legal Services	$3.0
Public Relations	$0.8
Environmental Permitting	$6.4
Geotechnical Investigation	$0.2
Survey	$1.8
Ministerial Permits	$0.5
Engineering	$3.7
SCADA	$0.6
As-built	$0.4
ROW Intrusion Monitoring	$2.8
Methane Detection	$0.0
Pressure Limiting Stations	$5.8
Company Labor	$5.4
Total	**$47.7**