TABLE OF CONTENTS

LIST OF TABLES

4.7 GREENHOUSE GAS EMISSIONS

Would the Proposed Project:	Potentially Significant Impact	Less-than-Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

4.7.0 Introduction

This section of the Proponent's Environmental Assessment describes the existing conditions in the area of the proposed San Diego Gas & Electric (SDG&E) and Southern California Gas Company—hereinafter referred to as "the Applicants"—Pipeline Safety & Reliability Project (Proposed Project), as well as the potential impacts relating to greenhouse gases (GHGs) associated with the construction and operation of the Proposed Project. The Proposed Project involves the construction, operation, and maintenance of an approximately 47-mile-long, 36-inch-diameter natural gas transmission pipeline that will carry natural gas from SDG&E's existing Rainbow Metering Station to the pipeline's terminus on Marine Corps Air Station Miramar. The construction and operation and maintenance phases will result in emissions of GHGs from the combustion of fossil fuels in construction equipment and occasional releases of natural gas. Because these emissions will be below all applicable thresholds, impacts from GHG emissions will be less than significant.

4.7.1 Methodology

The simulated GHG emissions presented in this section were developed using the South Coast Air Quality Management District's (SCAQMD's) California Emissions Estimator Model (CalEEMod) Version 2013.2.2. The analysis of GHG emissions evaluates the Proposed Project's potential to generate GHG emissions for the construction and operational phases of the Proposed Project. GHG emissions were calculated with the intent of identifying the biggest contributors of GHGs. Federal, state, and regional/local regulations and policies were then reviewed to determine the Proposed Project's level of compliance with—and potential impacts to—applicable climate action plans and/or GHG standards. Information for this section was obtained from federal, state, and regional/local websites.

4.7.2 Existing Conditions

Global climate change refers to changes in average climatic conditions on Earth as a whole, including temperature, wind patterns, precipitation, and storms. Global temperatures are

moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are known as GHGs. These gases allow solar radiation (i.e., sunlight) into Earth's atmosphere, but prevent radiative heat from escaping, thus warming Earth's atmosphere.

Gases that trap heat in the atmosphere are often called GHGs, analogous to a greenhouse. GHGs are emitted by both natural processes and human activities. The accumulation of GHGs in the atmosphere regulates Earth's temperature. Emissions from human activities, such as burning fossil fuels for electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere.

Different GHGs have varying global warming potentials. Global warming potential is the effectiveness of a gas or aerosol to trap heat in the atmosphere. According to the United States (U.S.) Environmental Protection Agency (EPA), global warming potential is a "measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide." (U.S. EPA, 2015) The reference gas for global warming potential is CO_2, which has a global warming potential of one. The other main GHGs that have been attributed to human activity are CH_4 and N_2O, which have global warming potentials of 21 and 310, respectively. Table 4.7-1: Global Warming Potentials and Atmospheric Lifetimes of GHGs presents the global warming potential and atmospheric lifetimes of common GHGs.

Table 4.7-1: Global Warming Potentials and Atmospheric Lifetimes of GHGs

GHG	Formula	Global Warming Potential	Atmospheric Lifetime (years)
Carbon Dioxide	CO_2	1	Variable
Methane	CH_4	21	12 ± 3
Nitrous Oxide	N_2O	310	120
Sulfur Hexafluoride	SF_6	23,900	3,200

Source: U.S. EPA 2014

In the California Greenhouse Gas Emission Inventory, the California Air Resources Board (CARB) compiled statewide anthropogenic GHG emissions and sinks, which include processes that uptake GHG emissions. The inventory includes estimates for CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The current inventory covers 1990 through 2008, and is summarized in Table 4.7-2: State of California Greenhouse Gas Emissions by Sector. Data sources used to calculate this GHG inventory include federal and California agencies, international organizations, and industry associations. Calculation methodologies applied are consistent with guidance from the Intergovernmental Panel on Climate Change. The 1990 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. CARB's original inventory was divided into the following seven broad sectors and categories: agriculture, commercial, electricity generation, forestry, industrial, residential, and transportation. The latest inventory includes GHG emissions from recycling and waste management, high global warming potential gas emissions, and forestry sinks (i.e., reductions in GHG emissions related to forestry).

Table 4.7-2: State of California Greenhouse Gas Emissions by Sector

Sector	Total 2008 Emissions ($MMTCO_2e$)	Percent of Total 2008 Emissions	Total 2012 Emissions ($MMTCO_2e$)	Percent of Total 2012 Emissions
Agriculture	38.0	7.8	37.9	8.3
Commercial	18.5	3.8	22.0	4.8
Electricity Generation (In-State)	54.5	11.2	51.2	11.2
Electricity Generation (Imports)	65.9	13.5	44.1	9.6
Industrial	97.5	20.0	100.7	22.0
Residential	31.2	6.4	31.6	6.9
Transportation	181.3	37.2	171.0	37.3
Unspecified	0.2	< 0.1	0.2	< 0.1
Total	**487.1**	**100**	**458.7**	**100**

Sources: CARB 2014b
Note: $MMTCO_2e$ = million metric tons of CO_2 equivalent (CO_2e)

Regulatory Background

Federal

Endangerment Finding

On April 17, 2009, the U.S. EPA issued its proposed endangerment finding report for GHG emissions. On December 7, 2009, the U.S. EPA Administrator signed the following two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

- Endangerment Finding: The U.S. EPA found that the current and projected concentrations of the six key well-mixed GHGs (i.e., CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The U.S. EPA found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to GHG pollution, which threatens public health and welfare.

The endangerment findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the U.S. EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the U.S. EPA and the U.S. Department of Transportation's National Highway Safety Administration on September 15, 2009.

State

According to the U.S. EPA, the most common GHGs that result from human activity, as defined by California Health and Safety Code Section 38505(g), are any of the following compounds: CO_2, CH_4, N_2O, SF_6, HFCs, or PFCs.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown signed Executive Order (EO) B-30-15. The EO establishes a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030, in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

Assembly Bill 32100.7

In September 2006, then-Governor Arnold Schwarzenegger signed California Assembly Bill (AB) 32, the Global Warming Solutions Act, into law. Pursuant to AB 32, CARB adopted a comprehensive AB 32 Scoping Plan in December 2008, which outlined programs designed to achieve the 2020 GHG reduction goal of 174 $MMTCO_2e$ through regulations, market mechanisms, and other actions.

State Standards Addressing Vehicular Emissions

California AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light-duty trucks. In September 2009, CARB adopted the regulations to reduce GHG emissions in new passenger vehicles through 2016. CARB has estimated that the regulations will reduce emissions from the light-duty passenger vehicle fleet by approximately 18 percent in 2020 and by 27 percent in 2030.

Local

Pursuant to Article XII, Section 8 of the California Constitution, the California Public Utilities Commission (CPUC) has exclusive jurisdiction in relation to local government to regulate the design, siting, installation, operation, maintenance, and repair of natural gas pipeline transmission facilities. Other state agencies have concurrent jurisdiction with the CPUC. Although local governments do not have the power to regulate such activities, the CPUC encourages, and the Applicants participate in, cooperative discussions with affected local governments to address their concerns where feasible. As part of the environmental review process, the Applicants have considered relevant regional and county, policies, and issues, and have prepared this evaluation of the Proposed Project's potential impacts to GHG emissions.

Local agency guidelines were reviewed for policies that apply to GHG emissions from the construction and operation of natural gas transmission lines. The applicable policies from this research are presented in the subsections that follow. No applicable polices for the City of Poway or Marine Corps Air Station Miramar were identified.

South Coast Air Quality Management District

In October 2008, the SCAQMD prepared its Draft Interim California Environmental Quality Act (CEQA) Greenhouse Gas Significance Threshold. To evaluate operational impacts of proposed

industrial projects, the SCAQMD recommended an interim threshold of 10,000 metric tons (MT) of CO_2e ($MTCO_2e$) per year. Per SCAQMD guidance, construction emissions should be amortized over the operational life of a project, which is proposed at 30 years. This threshold was invalidated in October 2014 in *Sierra Club v. County of San Diego*.

County of San Diego

The County of San Diego adopted their Climate Action Plan in June 2012. The Climate Action Plan was developed to address the issues of growth and climate change within the County of San Diego. In November 2013, the County of San Diego released their Guidelines for Determining Significance for Climate Change which includes a framework for determining the significance of GHG emissions from development projects. More specifically, it indicates that a project will have a significant impact if it increases operational greenhouse gas emissions, either directly or indirectly, by 2,500 $MTCO_2e$ per year.[1] This threshold is designed for projects that included residential, commercial, civic, light industrial uses, or a mixture of these uses. In addition, construction-related emissions do not need to be separately analyzed or included as an assessment against this threshold as construction emissions for land use projects in San Diego County were incorporated into the threshold.

City of San Diego

In February 2014, the City of San Diego released its Draft Climate Action Plan, which identifies measures to effectively meet GHG reduction targets for 2020 and 2035. This plan was developed in response to the mitigation required as part of the 2008 General Plan and will also serve as a Qualified GHG Reduction Plan through 2020. In March 2013, the City of San Diego Development Services Department released draft GHG significance thresholds. As per the draft guidelines, and similar to the County of San Diego, the Bright Line Threshold (2,500 $MTCO_2e$ per year) may be used for all land use development projects other than stationary sources. When using the Bright Line Threshold, projects do not need to add construction emissions, as they were already included in the development of the threshold.

City of Escondido

On December 4, 2013, the City of Escondido adopted their Climate Action Plan, which has established goals and policies that incorporate environmental responsibility for management of residential, commercial, and industrial growth; education; energy and water use; air quality; transportation; waste reduction; economic development; and open space and natural habitats. The Climate Action Plan is designed to follow the state's adopted AB 32 GHG reduction target—to reduce GHG emissions back to 1990 levels by the year 2020. This plan also established guidance requiring a 2,500-$MTCO_2e$-per-year screening threshold for all projects. Projects exceeding this threshold would require additional mitigation to reduce impacts to the less-than-significant level.

San Diego Association of Governments' 2014 Regional Energy Strategy

The 2014 Regional Energy Strategy is an energy policy guide used to support decision-making by the San Diego Association of Governments (SANDAG) and its member agencies through 2050 with

[1] Though this threshold was invalidated through legal action in 2014, it was used as a reference for purposes of this analysis.

the goal of assisting the San Diego region in meeting the energy needs of a growing population, housing stock, and workforce, while maintaining and enhancing regional quality of life and economic stability. To accomplish these objectives, the Regional Energy Strategy calls for increased use of natural gas for certain transportation applications and the continued efficient use of electricity generation. A more detailed discussion of the strategy can be found in Section 4.3 Air Quality.

SDG&E Programs

The SDG&E natural gas distribution system has one of the lowest methane emission rates from its distribution system of any utility in the nation. SDG&E's overall methane emissions rate, the key component of natural gas, was approximately 0.04 percent of the total delivered through the system in 2013. A recent Washington State University study concluded that 0.10 percent to 0.22 percent of the natural gas delivered nationwide is emitted from local distribution systems. This would make SDG&E's system more than three times more efficient than the national average. This high level of system integrity promotes safety and lowers greenhouse gas emissions for the entire region. SDG&E's success in low emissions is in part due to the following:

- Designing, constructing, operating, and maintaining the natural gas system in accordance with state and federal pipeline safety regulations.
- Implementing a comprehensive gas pipeline safety program to verify the integrity of the gas system. This comprehensive program includes the use of odorant for the quick detection of natural gas and our crews routinely perform regular maintenance including patrolling, testing, repairing and replacing pipelines using specialized instruments to detect leaks.
- Utilizing robust plastic and steel pipes, which are less prone to leaks compared to cast iron.
- Ongoing maintenance and monitoring of natural gas lines that are regularly patrolled and the prompt repair of sources of emissions.
- Maintaining transparency with the public by developing a website that shows pending non-hazardous methane emissions.

These combined efforts help to verify that the natural gas system is running safely and reliably for our customers, reduce greenhouse gas emissions for the benefit of the environment, and improve safety, reliability and service to its customers.

4.7.3 Impacts

Significance Criteria

Standards for determining impact significance were derived from Appendix G of the CEQA Guidelines. Under these guidelines, impacts to GHGs would be considered significant if the Proposed Project:

- Generates GHG emissions, either directly or indirectly, that may have a significant impact on the environment

- Conflicts with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG

The SDAPCD has not established GHG thresholds under CEQA. The County of San Diego, City of San Diego, and City of Escondido have all drafted or adopted a significance threshold of 2,500 $MTCO_2e$ emissions annually for industrial sources; therefore, an industrial project that generates GHG emissions below this level would not have a significant impact on the environment.

Question 4.7a – Greenhouse Gas Emissions – *Less-than-Significant Impact*

The main source of GHG emissions associated with the Proposed Project will be fossil fuel combustion during construction and the anticipated natural gas releases during the planned cold tie-in activities. As described previously, the anticipated emissions from the Proposed Project were simulated using CalEEMod Version 2013.2.2. The estimated GHG emissions from construction equipment use are summarized in Table 4.7-3: Estimated Greenhouse Gas Construction Emissions. The Applicants anticipate that cold tie-ins will be used to complete the connection of the Proposed Project to existing natural gas infrastructure. This process will result in approximately 65,800 standard cubic feet of natural gas being released to the atmosphere. Because the primary component of natural gas is CH_4, the resulting emissions from this release have also been quantified and are accounted for in the data presented in Table 4.7-3: Estimated Greenhouse Gas Construction Emissions.

As described in Section 4.17 Utilities and Service Systems, the Applicants are currently developing a Major Projects Water Sourcing Plan that evaluates all potential sources of water for project construction needs, including potable, groundwater, surface waters and tertiary treated recycled water. Applicants-Proposed Measure (APM-) PUS-01 will require the Applicants and their contractors to identify available sources of recycled water in close proximity to the Proposed Project for use during construction. Table 4.7-3: Estimated Greenhouse Gas Construction Emissions evaluates the potential GHG emissions associated with the implementation of this APM. As shown, total amortized construction emissions will be approximately 727.70 $MTCO_2e$.

Operation and maintenance activities will include regular inspection of the pipeline and aboveground facilities. These activities will generate a minor amount of GHG emissions from vehicles and/or equipment used to inspect and maintain the facilities. As described in Section 4.3 Air Quality, emissions from the operation and maintenance phase of the Proposed Project were simulated using CalEEMod. As shown in Table 4.7-4: Estimated Greenhouse Gas Operation and Maintenance Plus Construction Emissions, when added to the amortized construction emissions and simulated emissions from the use of construction equipment and vehicles during operation and maintenance activities, the total annual emissions are anticipated to be approximately 950 $MTCO_2e$ regardless of the source of water used during construction of the Proposed Project. This level falls well below the SCAQMD's significance threshold of 10,000 $MTCO_2e$, and the County of San Diego, City of San Diego, and City of Escondido's significance threshold of 2,500 $MTCO_2e$ annually. Accordingly, impacts will be less than significant.

Table 4.7-3: Estimated Greenhouse Gas Construction Emissions

Category	GHG Emissions[2] (MT)		
	CO_2	CH_4	N_2O
Proposed Project			
Construction Vehicle Emissions	21,521.53	3.30	0.00
Cold Tie-In Emissions	0.03	1.19	0.00
Water Conveyance	42.74	< 0.01	< 0.01
Global Warming Potential	1	21	310
CO_2e	21,564.29	94.32	0.11
Total CO_2e	21,658.72		
Amortized Construction Emissions[3]	721.96		
Proposed Project with APM-PUS-01			
Construction Vehicle Emissions	21,521.53	3.30	0.00
Cold Tie-In Emissions	0.03	1.19	0.00
Recycled Water Import	215.23	< 0.01	0.00
Global Warming Potential	1	21	310
CO_2e	21,736.79	94.31	0.00
Total CO_2e	21,831.10		
Amortized Construction Emissions	727.70		

[2] The GHG emissions estimate does not include purging the pre-lay segment and providing a temporary portable natural gas system for the existing distribution pipelines connected to the pre-lay segment during construction. Therefore, the estimate may be lower than the actual emission rates, but it is not anticipated to affect the significance findings presented in this section.

[3] For the purposes of the analysis, construction emissions were amortized over 30 years in accordance with industry standards. The Proposed Project is anticipated to be in service for more than 30 years; therefore, the reported emissions are conservative.

Table 4.7-4: Estimated Greenhouse Gas Operation and Maintenance Plus Construction Emissions

Source	GHG Emissions[4] ($MTCO_2e$ per year)
Proposed Project	
Off-Road Equipment and On-Road Vehicle Use	218.31
Blowdown Emissions[5]	7.12
Amortized Construction Emissions	721.96
Total	**947.39**
Proposed Project with the Implementation of APM-PUS-01	
Off-Road Equipment and On-Road Vehicle Use	218.31
Blowdown Emissions	7.12
Amortized Construction Emissions	727.70
Total	**953.13**

Question 4.7b – Applicable Greenhouse Gas Plan Conflicts – *Less-than-Significant Impact*

The Proposed Project's GHG emissions will be below the significance thresholds, as recommended by the SCAQMD, the County of San Diego, City of San Diego, and the City of Escondido. Equipment and vehicles supporting construction, operation, and maintenance of the Proposed Project will comply with the requirements implemented by CARB to reduce GHG emissions and will be consistent with AB 32's goals. Accordingly, potential impacts associated with construction, operation, and maintenance of the Proposed Project will be less than significant.

4.7.4 Applicants-Proposed Measures

The Proposed Project will not generate GHG emissions that will have a significant effect on the environment, and it will not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. As such, no APMs are required.

4.7.5 References

California Air Pollution Control Officers Association. 2015. CalEEMod. Online. http://caleemod.com/. Site visited March 4, 2015.

[4] The GHG emissions estimate does not include purging the pre-lay segment and providing a temporary portable natural gas system for the existing distribution pipelines connected to the pre-lay segment during construction. Therefore, the estimate may be lower than the actual emission rates, but it is not anticipated to affect the significance findings presented in this section.

[5] Blowdowns are anticipated to occur at least once every seven years; therefore, emissions were averaged to obtain a yearly rate. However, blowdowns on a yearly basis are not expected. The analysis presented assumes that natural gas in the pig launcher/receiver barrel is released to the atmosphere at full capacity; however, because the natural gas in the barrel will not be at capacity, 7.12 $MTCO_2e$ per year represents a conservative estimate and actual emissions will be lower.

California Climate Action Registry. 2009. General Reporting Protocol, Version 3.1. January.

CARB. 2007. Staff Report – California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, November 16.

CARB. 2013. Clean Car Standards – Pavley, Assembly Bill 1493. Online. http://www.arb.ca.gov/cc/ccms/ccms.htm. Site visited March 4, 2015.

CARB. 2014a. Assembly Bill 32 Overview. Online. http://www.arb.ca.gov/cc/ab32/ab32.htm. Site visited March 4, 2015.

CARB. 2014b. California Greenhouse Gas Emission Inventory 2000-2012. Online. http://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-12_report.pdf. Site visited May 22, 2015.

City of San Diego. 2013. *Draft Significance Thresholds for Greenhouse Gas Emissions.*

County of San Diego. 2013. *Guidelines for Determining Significance and Report Format and Contents Climate Change.*

SANDAG. 2009. Regional Energy Strategy for the San Diego Region. Online. http://www.sandag.org/uploads/publicationid/publicationid_1476_10631.pdf. Site visited September 22, 2015.

SDAPCD. 2015. San Diego APCD Climate Regulations and Activities. Online. http://www.sdapcd.org/planning/GHG/SD_Climate_Regs.pdf. Site visited May 26, 2015.

U.S. EPA. 2013. Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act. Online. http://www.epa.gov/climatechange/endangerment/. Site visited April 2, 2014.

U.S. EPA. 2014. Greenhouse Gas Emissions. Online. http://www.epa.gov/climatechange/ghgemissions/. Site visited March 4, 2015.

U.S. EPA. 2015a. Greenhouse Gas Reporting Program. Online. http://www.epa.gov/ghgreporting/. Site visited April 2, 2015.

U.S. EPA. 2015b. Glossary of Climate Change Terms. Online. http://www.epa.gov/climatechange/glossary.html. Site visited May 26, 2015.