Exhibit T: Response to 1.4.3-3

GHG Emissions from Natural Gas Releases

As described on pages 4.7-7 through 4.7-9 of the Proponent's Environmental Assessment, occasional releases of natural gas will be required to construct and operate and maintain the Pipeline Safety & Reliability Project. The planned releases are as follows:

1. Purging an existing approximately one-mile-long pre-lay segment of pipe
2. Purging existing segments of pipe to allow for cold tie-in
3. Blowing down sections of pipe to allow for the inspection process (i.e., pigging)

The calculation methods and assumptions used to determine the greenhouse gas (GHG) emissions from these activities are discussed in the paragraphs that follow.

Methane (CH_4) and carbon dioxide (CO_2) were the two GHGs that were calculated from the anticipated releases of natural gas. For each release, the molar fraction and density of these two compounds were used to convert the total volume of natural gas (in standard cubic feet [scf]) to pounds of each compound. These values are presented in Table 1: Natural Gas Compound Constants.

Table 1: Natural Gas Compound Constants

Compound	Molar Fraction	Density (pounds/scf)
CH_4	0.94	0.042
CO_2	0.0075	0.116

Table 2: GHG Emissions from Natural Gas Releases provides the resulting GHG emissions from the planned releases during construction and operation and maintenance. Each GHG was multiplied by its global warming potential (GWP) to generate its CO_2 equivalent (CO_2e) emission.

Table 2: GHG Emissions from Natural Gas Releases

Activity	Release Volume (scf)	CO_2 Emission (metric tons)	CH_4 Emission (metric tons)	N_2O Emissions (metric tons)	CO_2e (metric tons)
Pre-Lay	1,020,000	43.301	18.397	0.001	429.8
Cold Tie-Ins	65,800	0.026	1.187	0.000	24.9
Pigging	18,775	0.007	0.339	0.000	7.1

Notes: There are eight sections of pipe that would need to be blown down in order to complete the pigging process. These eight sections contain approximately 131,425 scf of natural gas. Because this process will occur every seven years, an annual average release from pigging was used for this calculation. The following GWPs were used: CO_2 = 1, CH_4 = 21. The pre-lay emissions also include the installation and operation of a natural gas facility.

Exhibit T: Response to 1.4.7-1 and 1.4.7-2

Table 4.7-3: Estimated Greenhouse Gas Construction Emissions

Category	GHG Emissions[1] (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
Pre-lay Purge and Portable LNG Site	11.54	18.40	< 0.01
Water Conveyance	42.74	< 0.01	< 0.01
Global Warming Potential	1	21	310
CO_2e	~~21,564.29~~ 21,575.83	~~94.32~~ 480.66	~~0.11~~ 0.30
Total CO_2e	~~21,658.72~~ 22,088.55		
Amortized Construction Emissions[2]	~~721.96~~ 736.28		
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
Pre-lay Purge and Portable LNG Site	11.54	18.40	< 0.01
Recycled Water Import	215.23	< 0.01	0.00
Global Warming Potential	1	21	310
CO_2e	~~21,736.79~~ 21,780.09	~~94.31~~ 480.68	~~0.00~~ 0.19
Total CO_2e	~~21,831.10~~ 22,260.93		
Amortized Construction Emissions	~~727.70~~ 742.03		

[1] 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.

[2] 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[3] ($MTCO_2e$ per year)
Proposed Project		
Off-Road Equipment and On-Road Vehicle Use		218.31
Blowdown Emissions[4]		7.12
Amortized Construction Emissions		~~721.96~~ 736.28
Total		**~~947.39~~ 961.72**
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~~ 742.03
Total		**~~953.13~~ 967.46**

[3] 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.

[4] 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.