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November 9, 2023

DELIVERED VIA EMAIL

U.S. Department of Energy
Office of Fossil Energy and Carbon Management
FE-34 - ROOM 3E-056
1000 Independence Avenue, S.W.
Washington DC 20585
Attention: Timothy J. Skone
Senior Environmental Engineer

Re: ***Mexico Pacific Limited LLC,*** **Docket No. 22-167-LNG**
Response to Informational Questions

Dear Mr. Skone:

On November 2, 2023, Mexico Pacific Limited LLC ("MPL") received correspondence from the Department of Energy ("DOE") seeking responses ("November 2 Request") to informational questions related to the Environmental Assessment[1] the DOE's Office of Fossil Energy and Carbon Management ("DOE/FECM") is preparing with respect to MPL's pending request for authorization to re-export U.S.-sourced natural gas in the form of liquefied natural gas ("LNG") from the proposed MPL Facility in Mexico to Non-Free Trade Agreement nations.[2]

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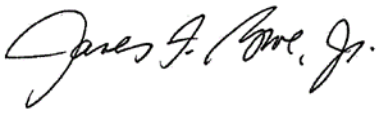
1 *Mexico Pacific Limited LLC*, Notice of Environmental Assessment, Docket No. 22-167-LNG (Oct. 23, 2023).

2 Application of Mexico Pacific Limited LLC for Additional Long-Term, Multi-Contract Authorization to Export Natural Gas to Mexico and to Re-Export Liquefied Natural Gas to Free Trade Agreement and Non-Free Trade Agreement Nations, Docket No. 22-267-LNG (Dec. 28, 2022) ("Application"). On April 28, 2023, DOE/FECM issued an order authorizing MPL to export U.S.-sourced natural gas by pipeline to Mexico and to re-export quantities of that natural gas not consumed in Mexico in the form of LNG to Free Trade

MPL is providing answers to the November 2 Request in Attachment A attached hereto. All capitalized terms used, and not defined, in MPL's answers shall have the meaning given them in the Application.

Please contact me if you have any questions.

Sincerely,



James F. Bowe, Jr.
Attorney for
Mexico Pacific Limited LLC

cc: Krysta De Lima
Amy Sweeney
Karl Lang

JFB:
Attachments

Agreement nations. *See Mexico Pac. Ltd. LLC*, DOE/FECM Order No. 4995, Docket No. 22-167-LNG (Apr. 28, 2023).

UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY AND CARBON MANAGEMENT

Mexico Pacific Limited LLC	**)**	**Docket No. 22-167-LNG**

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R. § 590.107, I, Tyler R. Brown, hereby certify that I caused the Response to Informational Questions dated November 9, 2023, to be served on the persons included on the official service list for this docket, as provided by DOE/FECM, on November 9, 2023.

/s/*Tyler R. Brown*
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UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY AND CARBON MANAGEMENT

Mexico Pacific Limited LLC	**)**	**Docket No. 22-167-LNG**

VERIFICATION

Pursuant to 10 C.F.R. § 590.103(b), I, Devendra Agrawal, hereby verify under penalty of perjury that I am authorized to execute this verification, that I have read the Response to Informational Questions dated November 9, 2023, and that the facts stated therein are true and correct to the best of my knowledge.

Electronically signed at Houston, Texas, on November 9, 2023.

/s/*Devendra Agrawal*
Devendra Agrawal
Senior Director, Engineering and Construction
Mexico Pacific Limited LLC

Attachment A

Mexico Pacific Limited LLC
Docket No. 22-167-LNG
November 2, 2023 Informational Questions – Responses

Question:

DOE requests information on the greenhouse gas emissions estimated to be released from liquefaction facility operations, representative of one year of operation for the requested (incremental) volume of 427.57 Bcf/year. (Data can also be provided for the full proposed capacity of the MPL Facility, if doing so reduces the burden in providing the information requested.)

The information requested includes:

- **the mass of each pollutant (methane [CH4], carbon dioxide [CO2], and nitrous oxide [N2O]) in metric tonnes per year for each source of emissions;**
- **the quantity of natural gas used for fuel (received and internal boil of gas if recycled for power use); and**
- **the quantity of feed gas entering the liquefaction operation.**

Response:

The mass of each pollutant (methane [CH4], carbon dioxide [CO2], and nitrous oxide [N2O]) in metric tonnes per year for each source of emissions for the representative one year of operation for the requested (incremental) volume of 427.57 Bcf/year of the MPL liquefaction Facility is provided in the table below:

	GHG EMISSIONS		
	CH_4	CO_2	N_2O
EMISSION SOURCE	tpy	tpy	tpy
Refrigeration Compressor Gas Turbines	213	1,226,638	1.63
Power Generation Gas Turbine (Holding)	25.232	145,028	0.193
Power Generation Gas Turbine (Loading)	20.136	115,737	0.154
Acid Gas Thermal Oxidizer	0.0337	24,978	0.0885
Flares			
a) Warm/Wet and Cold/Dry Flares	1,133	70,522	8.11E-04
b) Marine Flare	29.7	57,820	8.22E-04
Total Fugitive Emissions	-	-	-
Emergency Generators	-	-	-
Diesel Firewater Pumps	-	-	-
Total Routine Emissions	**1,422**	**1,640,723**	**2.07**

The mass of each pollutant (methane [CH4], carbon dioxide [CO2], and nitrous oxide [N2O]) in metric tonnes per year for each source of emissions for the full proposed capacity of the MPL liquefaction Facility is provided in the table below:

EMISSION SOURCE	GHG EMISSIONS		
	CH_4	CO_2	N_2O
	tpy	tpy	tpy
Refrigeration Compressor Gas Turbines	640	3,679,914	4.89
Power Generation Gas Turbine (Holding)	63.08	362,570	0.482
Power Generation Gas Turbine (Loading)	50.34	289,342	0.384
Acid Gas Thermal Oxidizer	0.0674	49,957	0.1771
Flares			
a) Warm/Wet and Cold/Dry Flares	2,267	141,044	1.62E-03
b) Marine Flare	29.7	57,820	8.22E-04
Total Fugitive emissions	495	-	-
Emergency Generators	0.088	106	0.0217
Diesel Firewater Pumps	0.00629	10.88	0.00309
Total Routine Emissions	**3,545**	**4,580,763**	**5.96**

The quantity of natural gas used for fuel at the MPL Facility will be 108.63 Bcf/yr.

The quantity of feed gas entering the MPL Facility will be 1020.85 Bcf/yr.

The table provided in response to the question below includes additional information on the fuel used at the MPL Facility and the feed gas received into the MPL Facility.

Question:

Please provide this information in the form of a carbon balance depicting the quantity of gas received at the facility, quantity consumed, quantity emitted to the atmosphere, and quantity exported.

Response:

The requested data is provided in the following table:

	MMSCFD	Bcf/Y	MTPA
Quantity Exported from the US to Mexico	2867.3	1046.57	
Quantity estimated as pipeline fuel	70.446	25.72	
Quantity of gas received at the LNG facility	2796.86	1020.85	
Quantity Consumed as fuel at LNG facility	297.627	108.63	
Quantity emitted to atmosphere at LNG facility	See emissions table Q1		
Quantity exported as LNG from Mexico	2499.23	912.22*	17.627

* 912.22 Bcf/Y (*621 Bcf/Y in Export Authorization # 18-70-LNG + 291.22 Bcf/Y in pending DOE Application)

Question:

Please describe the liquefaction technology, power production technology and expected energy conversion efficiency, compression equipment type and seals, loading arm emissions management, and boil off gas management practices.

Response:

The MPL Facility will utilize the ConocoPhillips Optimized Cascade Process to liquefy natural gas. The Optimized Cascade Process is based on three multi-staged, cascaded refrigerant circuits using pure refrigerants, propane, ethylene and methane. This liquefaction technology provides exceptional reliability and availability, efficiency, and operational flexibility. MPL's configuration and design will minimize unnecessary flaring due to the MPL Facility's ability to continue to run (and thereby avoid associated flaring) in the event of partial train shutdowns or system trips.

The primary power for liquefaction at the MPL Facility is provided by direct gas turbine driven refrigeration compressors. The auxiliary electrical power required for the MPL Facility is generated by simple cycle gas turbine drivers. The expected energy conversion efficiency as quoted by the gas turbine manufacturer Baker Hughes is 40.5%.

The compression is performed by multi-stage centrifugal compressors with dual dry gas seals.

Once ship loading is completed, the loading arm is drained into the LNG drain drum located below the jetty. LNG from this drum vaporizes and flows into the vapor return line that joins the boil off gas ("BOG") system in the terminal for reliquefication. Nitrogen connection is also provided to purge the loading arms.

BOG from the LNG tanks and the LNG ship is compressed by BOG compressors and sent to the liquefaction process for reliquefication into LNG.

Question:

Please also describe any best management practices employed at the facility to reduce greenhouse gas emissions to the atmosphere and any plant efficiency actions to assist the DOE in understanding the greenhouse gas emissions performance of the liquefaction facility.

Response:

MPL is pleased to have undertaken significant value engineering and design activities throughout the pre-construction development phase to achieve improvements to facility reliability and availability, efficiency, and operational flexibility. Improvements to facility design also will result in reduced GHG emissions.

MPL has incorporated specific process design and equipment selection details into its project plans, having most recently selected gas turbines, heat exchangers, and cold boxes that comprise the integral components of a natural gas liquefaction facility. For example, MPL will utilize state-of-the-art turboshaft aeroderivative dry low emission (DLE) gas turbines with 40.5 percent thermal efficiency, resulting in less natural gas used as fuel and lower GHG emissions per unit of LNG produced.

Through other equipment MPL has selected, the MPL Facility will have continuous emissions and ambient air quality monitoring and reporting capabilities across all of its key equipment, as well as fiber-optic technology for real-time operating data transmission. The liquefaction trains will be capable of stable operation at 50 percent capacity without flaring. MPL will further limit impacts of unavoidable flaring activity by install ground flares to mitigate visual and light pollution impacts upon residents and marine life.

Other key design elements that will contribute to strong environmental performance and reduced GHG emissions include:

- *Waste Heat Recovery:* The liquefaction trains will capture waste heat from the exhaust of refrigeration gas turbines, with recovered heat used to elevate the temperature of hot oil employed in the liquefaction process.
- *Boil-Off and Ship Vapor Recovery:* The MPL Facility will recycle boil-off gas for re-liquefaction instead of flaring it.
    - *Compressor Seal Gas Recovery:* Systems will be installed on refrigerant compressors to reduce the volume of refrigerant leaks to flare.
    - *Acid Gas Recovery:* The MPL Facility will separate CO_2 from the feed gas and send it to the thermal oxidizer.
    - *Flaring Minimization:* The MPL Facility is designed to keep the hydrocarbons contained within the equipment in the event of a trip or plant upset. Flaring is initiated only when necessary to protect the plant and personnel, or during planned maintenance activities which have been further optimized relative to other LNG Facility designs (drier beds, online molecular sieve changes, etc.).

Beyond engineering, design, and construction best practices, MPL has already hired LNG facility operations personnel with significant experience around the world. MPL intends to extend its best practices culture into the operations phase, with an array of programs, policies, and systems, several of which also will contribute to strong environmental performance and reduced GHG emissions.

- Flange and Valve Management to maintain tightness and reduce potential fugitive emissions
- Turbine Emission Stack Testing (Regulatory Emissions Testing)
- Fugitive Emissions Testing including Leak Detection and Repair (LDAR)
- Process Safety Management Program
- Preventive and Reliability-Centered Maintenance (RCM)
- Risk-Based Inspection (RBI) Program
- Health, Safety, and Environment (HSE) Programs
- Governance, Compliance, and Auditing Programs