



Freeport LNG Incident and Regulatory Response

PHMSA / FERC / USCG



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

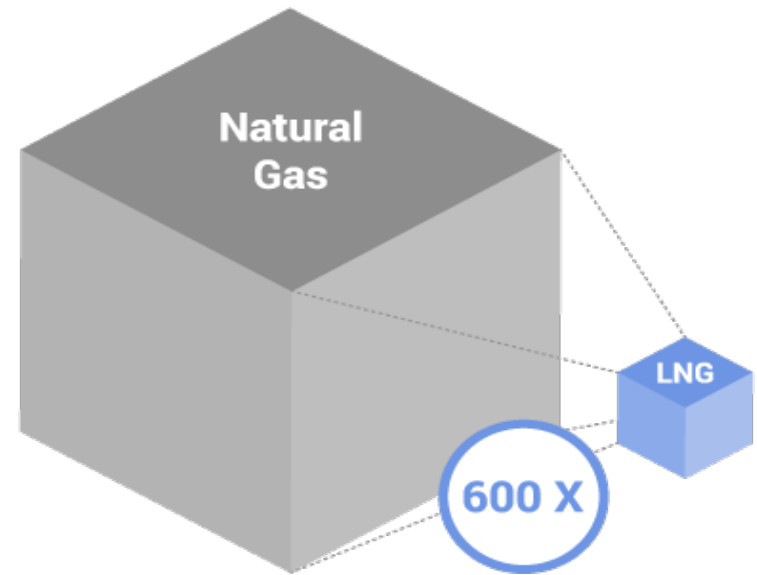
PHMSA: Your Safety is Our Mission



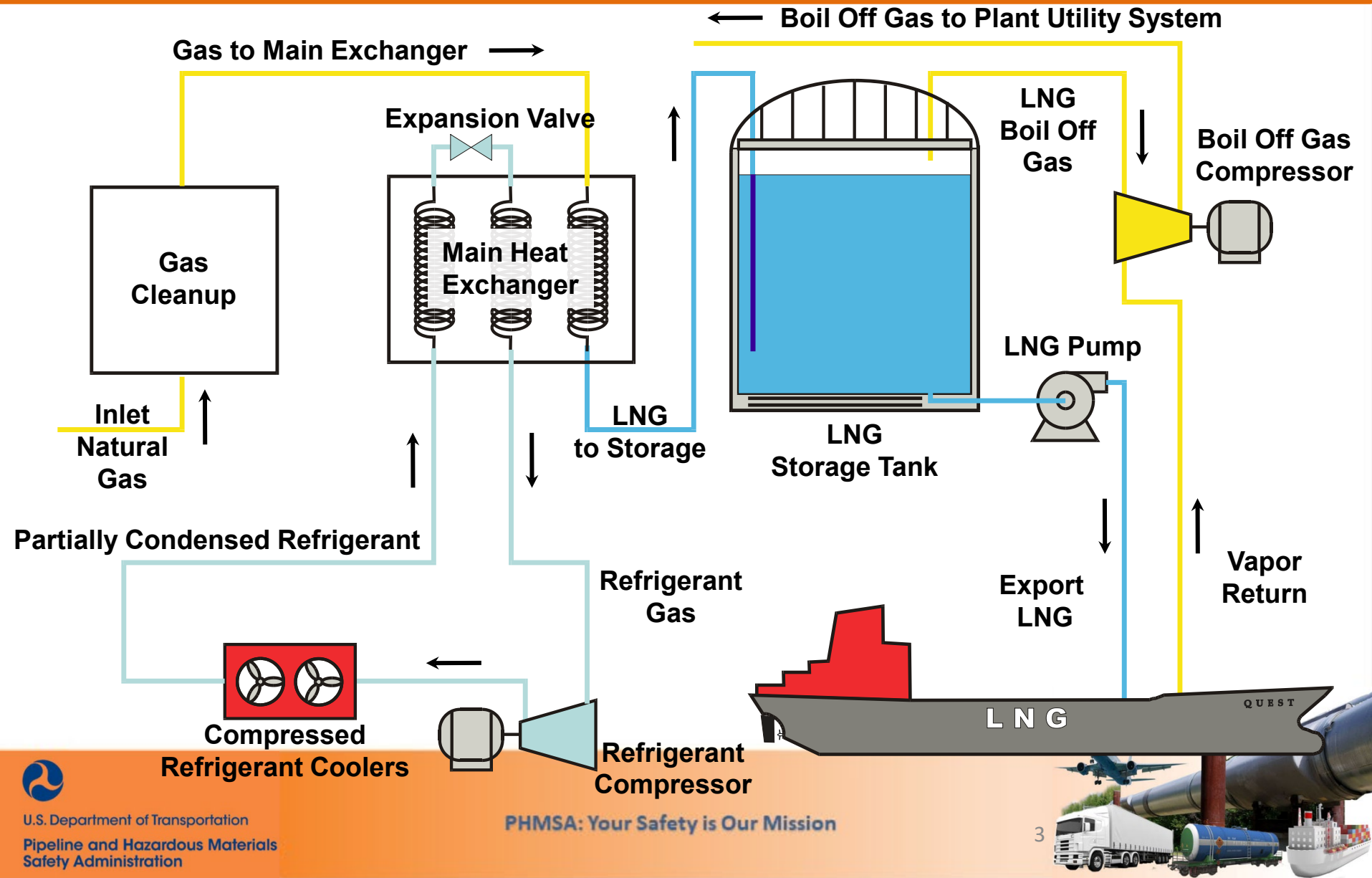
1

What is LNG?

- Cryogenic
- LNG is natural gas cooled to -260°F and becomes liquid
- Reduces volume 600x for easier storage and transportation
- Does not contain odorant
- Stored at atmospheric pressure



Typical Liquefaction Facility for Export



The Freeport Incident



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

Courtesy Quintana Beach County Park

PHMSA: Your Safety is Our Mission



The Freeport Incident



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

Courtesy Click2Houston.com

PHMSA: Your Safety is Our Mission



The Freeport Incident



Courtesy ABC 13 Houston



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission



■ June 8, 2022 Captain of the Port Order 2022-0074

U.S. Department of
Homeland Security
United States
Coast Guard



Coast Guard Captain of the Port
Houston-Galveston

13411 Hilliard St
Houston TX 77034-5635
Staff Symbol: spf
Phone: 409.882.1269
Email: MSUTexasCityFacilities@uscg.mil

16611 / 7452832
June 9, 2022

Freeport LNG (GALMS087)
Attn: Mr. Mike Quilty
1500 Lamar Street
Quintana, TX 77551

Subj: CAPTAIN OF THE PORT ORDER 2022-0074– SUSPENSION OF OPERATIONS

On June 08, 2022, U.S. Coast Guard Sector Houston-Galveston received notification of an explosion at Freeport LNG. Due to the nature of the incident and the effect on the facilities operations, you are directed to cease all transfer operations to or from any vessel, as well as all cleaning operations onboard any vessel moored to your facility until the completion of the below requirements.

1. Conduct a risk analysis of the cargo transfer system and related subsystems used in the movement of product to the marine transfer area and submit the finding to the Marine Safety Unit Texas City Facilities Inspection Branch; and
2. Request approval from the Marine Safety Unit Texas City Facilities Inspection Branch before conducting marine transfers.

This order is issued under the authority of the Ports and Waterways Safety Act (Title 46, United States Code (U.S.C.) 70011 et.seq) and the regulations promulgated there under Title 33, Code of Federal Regulations (CFR) §§ 160.109 and 160.111. In accordance with 46 U.S.C. 70036(a), failure to comply with this Captain of the Port Order is punishable by a civil penalty of not more than \$103,050 for each day the facility is in violation.

This order will remain in effect until you have been notified in writing by Marine Safety Unit Texas City.

Should you be aggrieved by this order, you may request reconsideration of this order to me directly. If I do not rescind this order based on your request, you may appeal my decision to the Commander, Eighth Coast Guard District. While any request or appeal is pending, all provisions of this order remain in effect. All reconsideration requests or appeals must follow the procedures prescribed in 33 CFR § 160.7.



PHMSA

■ June 30, 2022 Notice of Proposed Safety Order



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

8701 S. Gessner, Suite 630
Houston, TX 77074

VIA E-MAIL TO: MSmith@freoportlng.com

June 30, 2022

Michael Smith
Chairman and Chief Executive Officer
Freeport LNG Development, LP
333 Clay Street, Suite 5050
Houston, Texas 77002

CPF 4-2022-051-NOPSO

Dear Mr. Smith:

Enclosed is a Notice of Proposed Safety Order (Notice) issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the above-referenced case. The Notice proposes that Freeport LNG Development, LP take certain measures with respect to its liquefied natural facility located on Quintana Island, Texas. The options for responding are set forth in the Notice. Service of this Notice by electronic mail is deemed effective upon the date of transmission, or as otherwise provided under 49 C.F.R. § 190.5.

We look forward to a successful resolution to ensure pipeline safety. Please direct any questions on this matter to me at 713-272-2847.

Sincerely,

MARY LOUISE
MCDANIEL

Digitally signed by MARY
LOUISE MCDANIEL
Date: 2022.06.30 09:29:57 -05'00'

Mary L. McDaniel, P.E.
Director, Southwest Region
Pipeline and Hazardous Materials Safety Administration

Enclosures: *Notice of Proposed Safety Order*
Copy of 49 C.F.R. § 190.239

cc: Ms. Linda Daugherty, Deputy Associate Administrator for Field Operations, PHMSA
Mr. Sigmund Cornelius, President & Chief Operating Officer, Freeport LNG
Development LP, SCornelius@freoportlng.com
Mr. Michael Stephenson, Regulatory Compliance Manager, Freeport LNG Development,
LP, MStephenson@freoportlng.com



- June 30, 2022
Letter requiring written authorization before placing any facilities back into service

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:

OEP/DLNG/LNG 2
Freeport LNG Development, L.P.
Docket No. CP03-75-000,
CP03-75-002, CP03-75-003,
CP03-75-004, CP05-361-000,
CP05-361-001, CP12-509-000 and
CP12-29-000
§375.308(x)

June 30, 2022

VIA Electronic Mail

Michael Stephenson, Regulatory Compliance Manager
Freeport LNG Development, L.P.
MStephenson@freeportlng.com

Re: LNG Terminal Operation

Dear Mr. Stephenson:

On June 30, 2022, the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) issued a Notice of Proposed Safety Order (CPF 4-2022-051-NOPSO) requiring Freeport LNG Development, L.P. (Freeport LNG) to take certain measures in response to an incident involving a failure of LNG piping at its facilities on June 8, 2022. In addition, on June 9, 2022, the U.S. Coast Guard issued an order (2022-0074) to Freeport LNG suspending all transfer operations to or from any vessel.

Under authority delegated to the Director of the Office of Energy Projects in the June 18, 2004, August 17, 2005, September 26, 2006, May 6, 2009, and July 30, 2014 Commission Orders authorizing construction and operation of the facilities (107 FERC ¶ 61,278; 112 FERC ¶ 61,194; 116 FERC ¶ 61,290; 127 FERC ¶ 61,105; and 148 FERC ¶ 61,076), Freeport must receive written authorization before restarting any non-emergency operations in existing facilities, constructing new or modified facilities, and commissioning and placing any facilities back into service. Such authorization will only be granted following a determination that the facilities are fit for service and acceptable measures have been put into place to safely return facilities to operation.



PHMSA Follow-Up

- August 3, 2022
Consent Order and
Consent Agreement



U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

August 3, 2022

VIA ELECTRONIC MAIL TO: MSmith@freportlng.com

Mr. Michael Smith
Chairman and Chief Executive Officer
Freeport LNG Development, LP
333 Clay Street, Suite 5050
Houston, Texas 77002

Re: CPF 4-2022-051-NOPSO

Dear Mr. Smith:

Enclosed please find a Consent Order incorporating the terms of the fully executed Consent Agreement between the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Freeport LNG Development, LP, which was executed on August 2, 2022. Service of the Consent Order and Consent Agreement by e-mail is deemed effective upon the date of transmission, or as otherwise provided under 49 C.F.R. § 190.5.

Thank you for your cooperation in this matter.

Sincerely,

ALAN KRAMER Digitally signed by ALAN
KRAMER MAYBERRY
MAYBERRY Date: 2022.08.03
09:28:49 -0400

Alan K. Mayberry
Associate Administrator
for Pipeline Safety

Enclosures: Consent Order and Consent Agreement

cc: Ms. Mary McDaniel, P.E., Director, Southwest Region, Office of Pipeline Safety, PHMSA
Mr. Michael Stephenson, Regulatory Compliance Manager, Freeport LNG Development,
LP, MStephenson@freportlng.com
Mr. Mark Mallett, P.E., Vice President of Operations and Engineering, Freeport LNG
Development, LP, MMallett@freportlng.com



Incident Direct Cause

- Thermal Expansion within an LNG line with an isolated pressure relief valve resulted in a Boiling Liquid Expanding Vapor Explosion and Loss Of Primary Containment
- The flammable vapor (methane) then met an ignition source resulting in a vapor cloud explosion, a fireball, a small secondary pool fire, and a short-term release of vaporizing LNG from damaged 3-inch piping





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission





U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission



Root Causes and Freeport Response

- Pressure Safety Valve Testing Procedure and Car Seal Program
- Safeguards to Warn Operators of Increasing Vacuum Insulated Piping Temperature and/or Pressure for Lines Routinely Isolated by Procedure
- Operating Procedures Allowed for Operators to Routinely Isolate a Section of LNG Line



Contributing Causes and Freeport Response

- Single Layers of Protection for Routine Operations Not Evaluated to Identify Potential Hazards
- Management of Change process for modifications to Procedure-Unit 18 Tank Management
- Abnormal Operating Conditions and Related Hazards
- Operator Fatigue



Freeport Incremental Request

- January 22, 2023
Commence cool down of the Loop 1 LNG transfer piping and reinstatement of Boil-Off Gas Management



January 22, 2023

Mr. Bryan Lethcoe
Director, Southwest Region
Pipeline and Hazardous Materials Safety Administration (PHMSA)
Department of Transportation
8701 S. Gessner Road, Suite 630
Houston, TX 77074

RE: Request to Cool Down Loop 1 LNG Transfer Piping and Reinstate BOG Management; CPF No. 4-2022-051-NOPSO

Dear Director Lethcoe,

Pursuant to the Consent Agreement executed on August 2, 2022 under CPF No. 4-2022-051-NOPSO (the "Consent Agreement"), Freeport LNG Development, L.P. ("Freeport") must obtain written approval from the Director in order to incrementally resume operations as part of its process to return Freeport's Export Facility to normal operations. As further described herein, Freeport has completed repairs to the Export Facility, performed safety reviews, revised various procedures, implemented new safety systems and performed necessary training in order to safely begin to resume initial operations at its Export Facility. As such, Freeport respectfully requests authorization from the Director to commence cool down of its Loop 1 transfer piping and reinstate the facility's boil off gas (BOG) management compressors and associated piping.

Cool down of the Loop 1 LNG transfer piping includes the slow and deliberate introduction of LNG into the piping system to allow the piping to cool down to cryogenic temperatures necessary for circulation of LNG within the Loop 1 piping system and to transfer LNG to Dock 1 of the Export Facility. An overview of the piping associated with the Loop 1 cool down and reinstatement of BOG management is attached hereto. (Please note that this attached drawing is being filed Privileged and Confidential.) The cool down will be done slowly and methodically over a period of approximately 11 days to ensure that the temperature rate change does not exceed thermal shock tolerances. During this time, Freeport will closely monitor the cool down progress, including temperature changes, pipe movement, pipe support performance, flange integrity, etc. Daily reports will be developed and filed with PHMSA (as Privileged and Confidential) to provide continuous updates on the progress of the cool down. As a result of the cooldown of Loop 1, boil off gas (BOG) production within the facility will increase as the movement of cold vapor and subsequently, LNG increases. As opposed to directing this increased BOG production to the facility flare, the BOG can be routed to the facility BOG management compressors and transported via pipeline to the upstream Pretreatment Facility for use as fuel gas.

As PHMSA is aware, Freeport has performed repairs to the Export Facility in accordance with the damage assessments and remedial work plans filed with PHMSA pursuant to Paragraphs 15 and 19 of the Consent Agreement. Freeport has also implemented numerous improvements at the Export Facility in the wake of the June 8th incident and the findings and recommendations of IFO Group in their Loss of Primary Containment Incident Investigation Report. For example, Freeport has developed and implemented a new pressure safety valve (PSV) testing standard and new car seal procedure and audit program and provided training, as applicable, on both to Freeport employees and third-party service technicians. As part of the PSV testing standard, all PSVs at the Export Facility have been functional

Freeport LNG Development, L.P.

333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903



USCG Response

- January 23, 2023
Recission to the Captain
of the Port Order
2022-0074

U.S. Department of
Homeland Security
United States
Coast Guard



Commander
United States Coast Guard
Sector Houston-Galveston

13411 Hillard Street
Houston, TX 77034
Staff Symbol: spf
Phone: (409)682-1269
Email: MSUTexasCityFacilities@uscg.mil

16611
January 23, 2023

Freeport LNG (GALMS087)
Attn: Mr. Mike Quilty
1500 Lamar Street
Quintana, TX 77551

SUBJ: RESCISSION-CAPTAIN OF THE PORT ORDER 2022-0074

On November 9, 2022, our office received the Hazard and Operability (HAZOP) study performed by Freeport LNG and Sphera Solutions, which included actions taken to satisfy the risk analysis requirement of COTP Order 2022-0074. My staff has reviewed the HAZOP and has determined that it addresses all requirements of COTP Order 2022-0074. Your facility will be allowed to begin the planned Phase 0, Phase I and Phase II partial operations as described in the HAZOP following satisfactory completion of all Federal Environmental Regulatory Commission (FERC) and Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) requirements listed in docket number CP12-509-000 and CPF 4-2022-051-NOPSA, respectively. As such I am hereby rescinding COTP order 2022-0074.

Sincerely,

K.M. DONOHUE
Captain, U.S. Coast Guard
Acting Captain of the Port
Houston-Galveston, TX



PHMSA Response

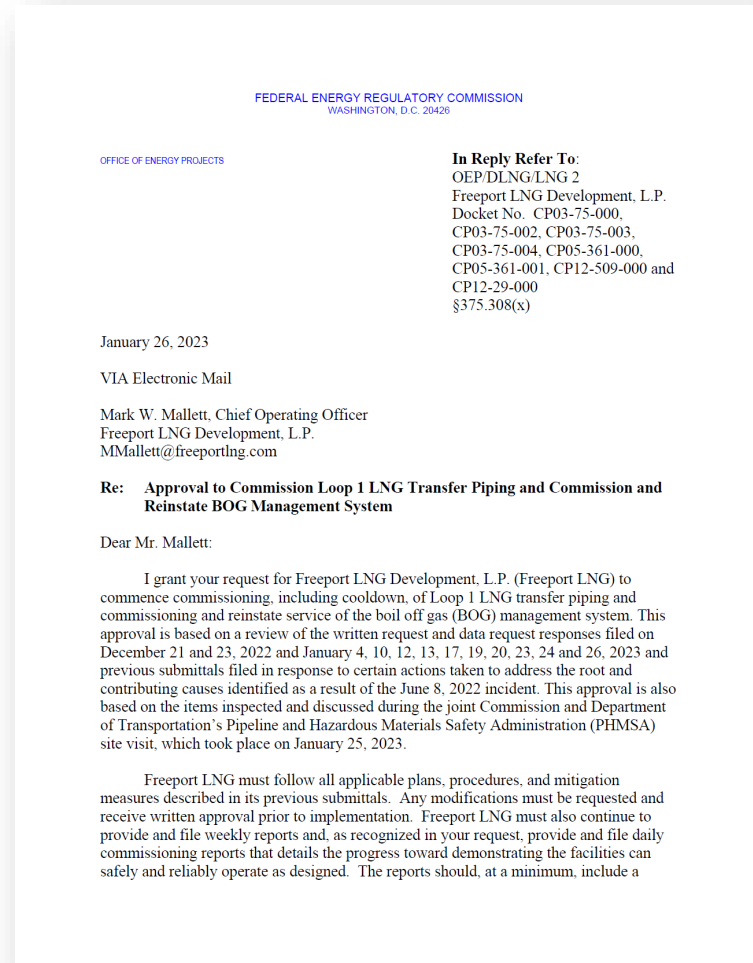
- January 26, 2023
Approval of 3rd party
evaluations and
assessments

Approval for Freeport to
cool down Loop 1 LNG
transfer piping and
reinstate Boil-Off Gas
Management



FERC Response

- January 26, 2023
Commission Loop 1
LNG transfer piping and
commission and the
reinstate Boil-Off Gas
Management System



Freeport Incremental Request

- January 30, 2023
Commence nitrogen
cooldown of LNG
rundown piping system
and introduction of
hydrocarbons into LNG
Train 3 for
commissioning and
cooldown



January 30, 2023

Mr. Bryan Lethcoe
Director, Southwest Region
Pipeline and Hazardous Materials Safety Administration (PHMSA)
Department of Transportation
8701 S. Gessner Road, Suite 630
Houston, TX 77074

RE: Request for (1) Nitrogen Cooldown of LNG Rundown Piping System and (2) Introduction of Hydrocarbons to Unit 13 (Train 3) for LNG Train Commissioning and Cooldown; CPF No. 4-2022-051-NOPSO

Dear Director Lethcoe,

Pursuant to the Consent Agreement executed on August 2, 2022 under CPF No. 4-2022-051-NOPSO (the "Consent Agreement"), Freeport LNG Development, L.P. ("Freeport") must obtain written approval from the Director in order to incrementally resume operations as part of its process to return Freeport's Export Facility to normal operations. Having completed the repairs to its Export Facility on Quintana Island, Texas, and having performed other remedial actions as further set forth in our letter to you dated January 22, 2023, Freeport obtained PHMSA's approval to commission its Loop 1 LNG transfer piping and reinstate its BOG management system on January 26, 2023. Since obtaining this approval, Freeport has successfully and safely progressed the cooldown of the Loop 1 transfer piping and reinstatement of BOG management. In order to continue Freeport's sequential plan to return the Export Facility to commercial operations, Freeport LNG now respectfully requests authorization from PHMSA for (1) the nitrogen cooldown of the LNG rundown piping system and (2) the introduction of hydrocarbons to Unit 13 (Train 3) for LNG train commissioning and cooldown. The activities included in the foregoing requests are further described herein.

With respect to the nitrogen cooldown of the LNG rundown piping system, this cooldown would be performed in accordance with the N2 Cooldown Procedure¹ previously submitted to PHMSA on December 8, 2022. This procedure would be used to cool down the 26" main LNG rundown line from the liquefaction trains to the LNG tank area. The 6" and 8" LNG recirculation lines to the trains and the individual train rundown branch segments that connect to the main rundown line would also be cooled down as part of this process. Pages 43 through 51 of the N2 Cooldown Procedure identify the piping systems involved in the nitrogen cool down process.

With respect to the introduction of hydrocarbons into Unit 13 for LNG train commissioning and cooldown, this process would entail flowing treated natural gas from Freeport's upstream natural gas pretreatment facility through the feed gas pipeline into the Export Facility in order to perform remaining system purges in Unit 13, re-pressurize Unit 13 piping systems, derive the Unit 13 main cryogenic heat exchanger (MCHE), restart Unit 13's refrigeration compressors, perform the cooldown of the Unit 13 MCHE and related refrigeration and LNG piping, and begin the initial production of LNG within Unit 13 for transmission through the nitrogen-cooled LNG rundown piping and into LNG Tanks 1 and 2.

¹ When submitted, the N2 Cooldown Procedure was requested to have confidential treatment afforded to it and was marked "CUI/PRIV—PRIVILEGED AND CONFIDENTIAL—DO NOT RELEASE."

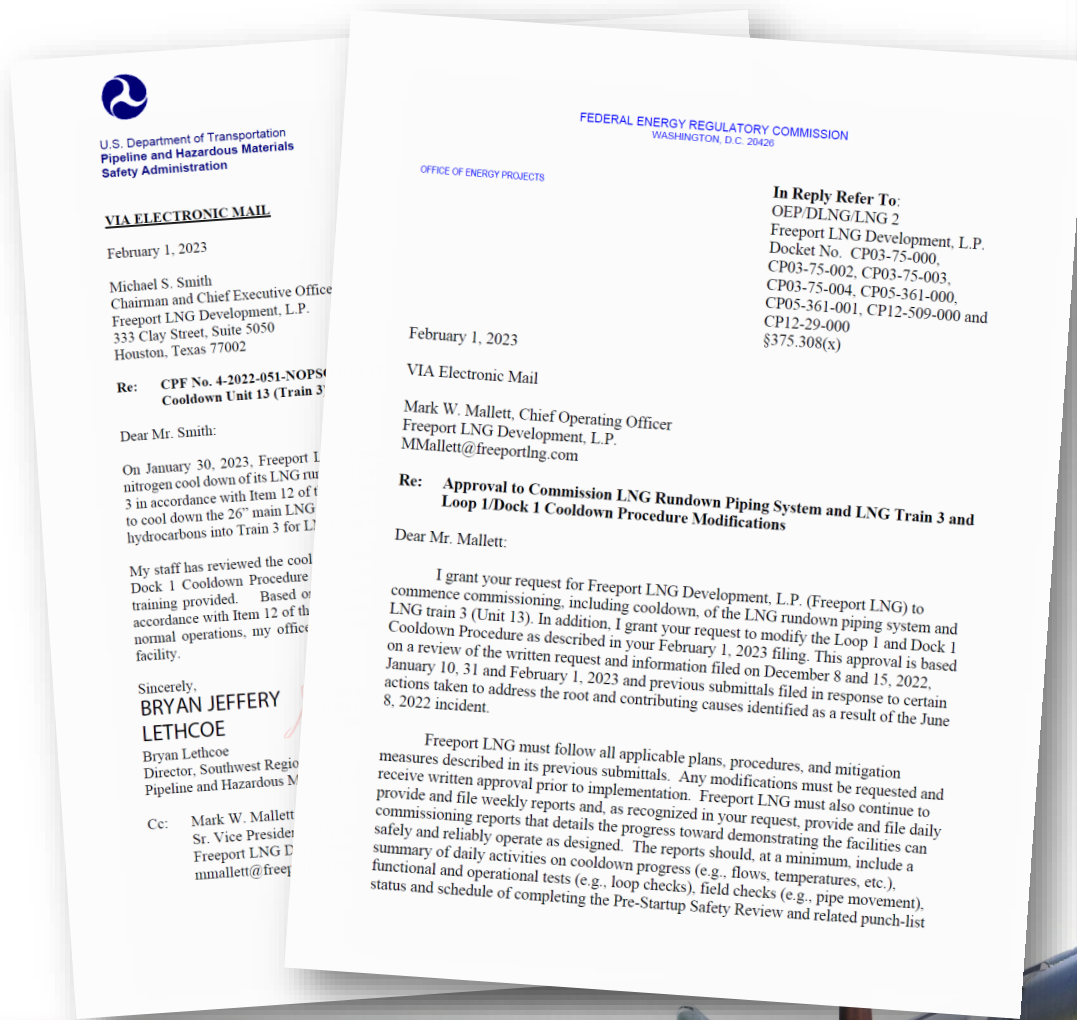
Freeport LNG Development, L.P.

333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903



PHMSA & FERC Responses

- February 1, 2023
Commence nitrogen
cooldown of LNG
rundown piping system
and introduce
hydrocarbons into LNG
Train 3 for
commissioning and
cooldown



Freeport Incremental Request

- February 1, 2023
Return to Service LNG
Loop 1 and Dock / Load
LNG ships from Dock 1
LNG berth



February 1, 2023

Mr. Bryan Lethcoe
Director, Southwest Region
Pipeline and Hazardous Materials Safety Administration (PHMSA)
Department of Transportation
8701 S. Gessner Road, Suite 630
Houston, TX 77074

RE: Request for Loop 1 LNG Circulation and Ability to Load LNG Ships from Dock 1; CPF No. 4-2022-051-NOPSO

Dear Director Lethcoe,

Pursuant to the Consent Agreement executed on August 2, 2022 under CPF No. 4-2022-051-NOPSO (the "Consent Agreement"), Freeport LNG Development, L.P. ("Freeport") must obtain written approval from the Director in order to incrementally resume operations as part of its process to return Freeport's Export Facility to normal operations. Having completed the repairs to its Export Facility on Quintana Island, Texas, and having performed other remedial actions as further set forth in our letter to you dated January 22, 2023, Freeport obtained PHMSA's approval to commission its Loop 1 LNG transfer piping and reinstate its BOG management system on January 26, 2023. Since obtaining this approval, and as noted in the daily reports being issued to PHMSA, the Loop 1 cool down is progressing safely and successfully and all temperature rate changes and pipe movement measurements remain within acceptable ranges. As final cooldown and re-inventorying of LNG within the Loop 1 piping is obtained, initial LNG circulation and normal pump operation can be established. At that point, Freeport will be in a position to recommence normal LNG ship dockage and loading operations out of its Dock 1 LNG berth. In accordance with the foregoing proposed sequence of activities, Freeport now respectfully requests authorization from PHMSA for Loop 1 LNG return to service and the ability to dock and load LNG ships from its Dock 1 LNG berth.

The Loop 1 LNG lines utilized for LNG circulation will be the same Loop 1 LNG lines identified in our request to cool down Loop 1.¹ Reestablishing LNG circulation will allow for LNG tank stratification management as well as continuous cooling of the LNG loop and tank piping systems to avoid thermal cycling. Reinstatement of Dock 1 LNG loading services will allow Freeport to recommence normal LNG ship dockage and loading operations from Dock 1 with initial loadings intended to create inventory space within Tanks 1 and 2 in anticipation of obtaining agency authorization for commercial operation of Unit 13.

Freeport notes that any authorization pursuant to this request will be limited to LNG circulation in Loop 1 and the ability to dock and load LNG ships from its Dock 1 LNG berth. A subsequent approval will be necessary to transition Unit 13 into full, commercial operations. Freeport will continue providing daily reports summarizing the status of the authorized activities.

¹ See Loop 1 and BOG Management Cool Down drawing enclosed with Freeport's letter dated January 22, 2023, filed as "CU/PRIV-PRIVILEGED AND CONFIDENTIAL-DO NOT RELEASE."

Freeport LNG Development, L.P.

333 Clay Street, Suite 5050 • Houston, Texas 77002-4173
Phone: 713-980-2888 • Fax: 713-980-2903



Questions

