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Homeland Security

United States
Coast Guard



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December 18, 2019

Gloucester County Office of Emergency Management
Attn: Dennis McNulty, OEM Coordinator
1200 N. Delsea Drive
Clayton, NJ, 08312

Dear Mr. Dennis McNulty:

I have determined, pursuant to Title 33 Code of Federal Regulations (CFR) part 127, that the Delaware Bay and River are suitable for an increase in marine traffic carrying Liquefied Petroleum Gas (LPG) and Liquefied Natural Gas (LNG) cargoes as outlined in a proposal dated November 16, 2017, by Repauno Port and Rail Terminal to operate a multi-use, single berth, deep-water port and logistics center. My determination is based on my review of the factors listed in 33 CFR 127.007 and 127.009, the Letter of Intent (LOI), the preliminary Waterway Suitability Assessment and the Follow-On Waterway Suitability Assessment (WSA) submitted by Repauno, and the review of safety and security working groups comprised of local subject matter experts and stakeholders.

My staff initiated the review of Repauno's WSA in November 2017 for the proposed modifications to increase LPG and LNG marine traffic. During the review, we assessed the navigation, safety, and maritime security risks that may occur should the facility be permitted. We also considered the existing and proposed risk-mitigation measures across the transit route and at the terminal, and the resources available to implement those risk-mitigation measures. In conducting this analysis, my staff consulted with members of the Area Maritime Security Committee, the Area Committee, state and local officials, and various law enforcement and emergency response agencies.

The attached Letter of Recommendation Analysis contains a detailed summary of the WSA review process that has guided this recommendation. It discusses details of potential vulnerabilities and operational safety and security measures that were analyzed during the review.

Based on this analysis, I have concluded that the waterway is suitable for the proposed increase in marine traffic carrying LPG and LNG cargoes provided the measures outlined in the Area Maritime Security Plan, the Vessel Security Plans, and the Repauno Port and Rail Terminal Facility Security Plans, Operations Manual, and Emergency Manual are implemented for each transit and transfer. As per 33 CFR 127.007 (e), if an owner or operator planning new construction to expand or modify marine terminal operations in an existing facility handling LNG or LPG, where the construction, expansion, or modification would result in an increase in the size and/or frequency of LNG or LPG marine traffic on the waterway associated with a

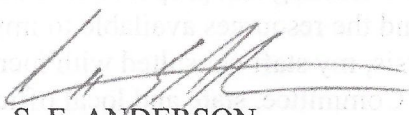
proposed facility or modification to an existing facility, must file or update as appropriate a WSA with the Captain of the Port (COTP) of the zone in which the facility is located.

This recommendation is provided to assist in Gloucester County's determination of whether the proposed facility should be authorized. This Letter of Recommendation is not an enforceable order, permit, or authorization that allows any party, including the applicant, to operate a facility or a vessel on the affected waterway. Similarly, it does not impose any legally enforceable obligations on any party to undertake any future action be it on the waterway or at the proposed facility.

As the Captain of the Port and Federal Maritime Security Coordinator, I am obligated to analyze and mitigate as necessary all navigational, safety, and security risks for the ports and navigable waterways affected by this proposal. I will continue to assess these risks, the availability of resources to implement the plans and risk-mitigation measures outlined above, and implement such controls as are necessary to safeguard the port. Where the aggregate risk in the port, or the non-availability of resources to implement risk-mitigation measures leads to excessive risk, I may issue orders to control vessel movement to protect the ports, waterways, and marine environment, pursuant to the Ports and Waterways Safety (Title 46 U.S. Code Chapter 700), among other authorities. Accordingly, my determination for suitability should not be construed as a blanket approval for specific vessel transits or operations. In the event I may need to issue orders to control risks, those orders will be separate and apart from this letter of recommendation, determination of suitability, and the processes specified in 33 CFR Part 127.

If you have any questions on this determination, my point of contact is Commander Jennifer Doherty, Chief of Prevention. She can be reached at the address listed above, by phone at (215) 271-4850, or by email at Jennifer.R.Doherty@uscg.mil.

Sincerely,


S. E. ANDERSON
Captain, U.S. Coast Guard
Captain of the Port Delaware Bay

Enclosure (1): Letter of Recommendation Analysis

Copy: Commandant (CG-OES), (CG-FAC), (CG-MSR), (CG-741), (CG-CVC), (CG-ENG)
Commander, Atlantic Area (LANT-54)
Commander, Coast Guard Fifth District (dp)
Detachment Chief, USCG LGC NCOE
U.S. Department of Energy
U.S. Environmental Protection Agency- Region Two
New Jersey Department of Environmental Protection
Greenwich Township
Repauno Port and Rail Terminal

LETTER OF RECOMMENDATION ANALYSIS

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1. INTRODUCTION

This analysis is to supplement my Letter of Recommendation (LOR) dated December 18, 2019, which conveys my recommendation on the suitability of the Delaware Bay, the Delaware River, and its approaches from the Atlantic Ocean for the increase in Liquefied Petroleum Gas (LPG) and Liquefied Natural Gas (LNG) marine traffic associated with Repauno Port and Rail Terminal, located in Gibbstown, NJ. It documents the processes followed in analyzing Delaware River Partners' (DRP) Waterway Suitability Assessment (WSA) submitted on April 24, 2018, with Follow-On supplemental documents submitted on October 5, 2018, November 28, 2018, and March 15, 2019, and the Coast Guard's assessment of the suitability of the waterway identified above for an increase in LNG and LPG marine traffic.

For the purposes of this analysis, the following assumptions were made:

- a. The applicant is fully capable of, and would fully implement, any and all risk mitigation measures identified in their WSA and measures referenced in this LOR Analysis (LORA).
- b. The conditions of the port area identified in the WSA fully and accurately describe the actual conditions of the port area at the time of the WSA submission.
- c. The conditions of the port area have not changed during the analysis process.
- d. The applicant will fully meet all regulatory requirements including the development and submission of a Facility Security Plan (FSP), Emergency Manual, and Operations Manual as listed in 33 Code of Federal Regulations (CFR) 127.019.

2. BACKGROUND

The data and information regarding the proposed increase of LNG and LPG export and modification to the terminal and storage facility detailed in this Letter of Recommendation Analysis (LORA) were derived from Delaware River Partners' Letter of Intent (LOI), WSA, and related correspondence, and input provided to the Captain of the Port (COTP) Sector Delaware Bay from regional stakeholders. The WSA is an applicant-prepared risk-based assessment designed to document and address all safety and security concerns related to the marine transportation of LNG and LPG for a U.S. port or waterway. The scope of the DRP WSA was based on 33 CFR Part 127. The DRP WSA considered the entire approach to the terminal, with particular attention focused on all safety and security aspects of the waterway within 15.5 miles of the proposed terminal location, as outlined in 33 CFR 127.007 and 127.009.

Included in this evaluation were density of deep-draft vessel traffic, aids to navigation (ATON), shoreline residential demographics, climatic weather, identification of environmentally sensitive areas and critical industrial infrastructure, detection of hazards to navigation, and the available response capabilities along the transit route.

There is one county government agency, the Gloucester County Office of Emergency Management, responsible for the permitting of this onshore export terminal and LNG and LPG handling facility. Information contained in the DRP's LOI and WSA enables me, as COTP, to provide specific input via my LOR, to the agency having jurisdiction for siting and construction as to the suitability of the waterway to support the increase in LNG and LPG marine traffic associated with the Delaware River Partners' LNG/ LPG Handling project. It should be noted that the LOR is based upon the Coast Guard's expertise in navigation safety and maritime security and neither the LOR nor this LORA impose conditions on the permits of the agency having jurisdiction for siting and construction. This LORA also does not impose any requirements on the applicant.

Regional stakeholders contributed to the information contained in this LORA through a working group formed by the Sector Delaware Bay Waterways Management Division. The group was divided into subgroups for safety and security. An initial meeting convened on October 10, 2018, at Delaware Emergency Services Training Center, followed by a series of discussions based on feedback from subject matter experts listed below on November 8, 2018, December 12, 2018, and May 20, 2019.

A balanced group of representatives were invited to participate, including:

- Coast Guard Sector Delaware Bay: Enforcement, Preparedness, Inspections, and Waterways Management Divisions
- Delaware Department of Natural Resources and Environmental Control
- Delaware Bay and River Cooperative
- Delaware Emergency Management Agency
- Delaware Valley Goods Movement Taskforce
- Gibbstown, New Jersey Fire Department
- Greenwich Township Police Department
- Maritime Exchange for the Delaware River and Bay
- National Oceanic and Atmospheric Administration
- New Jersey Department of Environmental Protection
- New Jersey Emergency Medical Services Task Force
- New Jersey Office of Homeland Security and Protection
- New Jersey State Police
- Pennsylvania Department of Environmental Protection
- Pennsylvania Office of Homeland Security and Protection
- Philadelphia International Airport Police
- Philadelphia Police Department Marine Unit
- Philadelphia Fire Department Hazardous Material Unit

- Pilots' Association for the Bay and River Delaware
- U.S. Army Corps of Engineers
- U.S. Department of Energy

Participants provided valuable input based on their expertise and regional familiarity to conduct a thorough review of potential risks to navigational safety and port security associated with the proposed project.

Members of the working group were provided printed copies of the initial follow-on WSA, dated April 24, 2018; they then reviewed and commented on subject areas commensurate with their vocation, expertise, and regional familiarity. After the initial review, specified issues, concerns, and/or risks relating to the proposed project were reviewed by participants for further consideration. The participants discussed perceived risks at length and then posed questions to DRP to provide corresponding mitigating measures. Mitigating measures were captured in edits and addendums to the second, third and fourth editions of the follow-on WSA, submitted by DRP on October 18, 2018, November 28, 2018, and March 15, 2019. The changes include the updated lead agency with jurisdiction over the project, maritime traffic characterization and navigational issues, marine simulation studies, a passing ship study, maneuvering studies, defining the risk to be mitigated, interpretation of the Navigation and Vessel Inspection Circular (NVIC) Zones of Concern, resources needed for safety/security, list of routine marine events, and a re-evaluation of the LPG vapor dispersion risk based on the Sandia National Laboratories 2018 report.

As COTP, based on my review of the WSA, completed on December 18, 2019, after conferring with state and local port stakeholders, I am recommending to the agency having jurisdiction for siting and construction that the waterway in its current state be considered suitable for an increase in LNG and LPG marine traffic with appropriate risk mitigation measures, such as those contained in section 8 of this document.

3. PROJECT OVERVIEW

Delaware River Partners LLC proposes to site, construct, and operate a multi-use, single berth, deep-water port and logistics center that may include a variety of separate uses including handling of imported and exported automobiles, other bulk freight and liquid energy products including, but not limited to LNG and LPG. The project would be operated at the site of the existing Repauno Port & Rail Terminal, which is located on a 218-acre portion of a 1630-acre tract formerly known as the Dupont Repauno Works.

The project will provide transloading of LNG and LPG for export. LNG would be delivered to the Repauno Facility by truck and pumped directly from a transportation tank truck to an LNG vessel. The Repauno Facility will have an LNG export capacity of 1.5 MTPA (20 million barrels per year). The expected LNG vessel size is expected to be 830,000 barrels, with an estimated loading time of 15 days. The LPG operations will maintain an export capacity of approximately 9,600,000 barrels per annum. The 400,000 barrels refrigerated LPG vessel will dock for approximately 11-12 days for loading

operations. Notably, LNG, LPG, or other hazardous or non-hazardous cargo operations will not run concurrently, as the single berth wharf only permits one vessel to dock at a given time for a single commodity.

4. MARINE TRANSPORTATION OF LIQUEFIED HAZARDOUS GAS

Liquefied petroleum gas is a byproduct of raw oil refining and/or natural gas separation and consists of propane, butane, or a mixture of the two. LPG is a subset of a larger grouping, termed liquefied hazardous gases (LHG), which includes butane, propane, butadiene, propylene, vinyl chloride monomer and anhydrous ammonia. In general, deep draft or ocean-going "gas carriers" are categorized by the hazard potential of the cargo or cargoes they carry and are divided into (1) those that carry LHG cargoes and (2) those that carry LNG. As per the International Maritime Organization (IMO) Gas Carrier Code, they are further broken down into three types: IG, IIG, or IIIG, depending on vessel size, cargo tank design/placement, and level of protective measures intended to prevent the escape of cargo. Type IG is used for chlorine, ethylene oxide, methyl bromide, and sulfur dioxide cargoes; type IIG is used for LHG or LNG and applies to vessels over 150 meters (492 feet) in length, and type IIIG is intended for cargoes of nitrogen and refrigerant gases. While the marine transportation of liquefied gases incurs its own special hazards, some of the features are less hazardous than those of the heavier petroleum cargoes.

Hazards peculiar to the carriage of LNG/LPG cargoes include:

- Cold from leaks and spillages can affect the strength and ductility of a vessel's structural steel. Likewise, skin contact with the liquids or escaping gases can produce frostbite and inhalation of the cold vapor can permanently damage certain organs, such as the lungs, or cause asphyxiation due to lack of oxygen.
- Rupture of a pressure system containing LNG/LPG could release a flammable vapor cloud that will rapidly vaporize at normal atmospheric pressure and temperature. The vapor cloud will readily disperse in the air and will burn within its flammable range. LPGs have flammable ranges between 2.1% and 12.5% and LNGs have flammable ranges between 5.3% and 14%.

LNG/LPG transportation hazards are mitigated through the following measures:

- Loading or ballasting does not eject gases to the atmosphere in the vicinity of decks and superstructures. Gas freeing is rarely performed and does not release gas on deck.
- Liquefied gas compartments are never within flammable limits throughout the cargo cycle. Within a cargo tank the vapor space above the liquid cargo is virtually 100% rich with cargo vapor and thus far above the upper flammable limit. Static electricity and other in-tank ignition sources are isolated and pose no hazard at this concentration.

- There is no requirement for tank cleaning; therefore, the hazards associated with that operation are eliminated.
- Gas carriers are designed using international standards from the IMO in accordance with the International Gas Code and U.S. regulations to mitigate hazards associated with the transport of LPG and LNG.

5. WATERWAY TRANSIT CONSIDERATIONS

Transit Route

The intended transit route for the deep-draft LNG/LPG carriers, from sea to the project site, includes the Delaware Bay and Delaware River. The Repauno Facility would be accessed by LNG/LPG carriers from the Territorial Sea via the Southern Delaware Lane to the Pilot Board Area at the mouth of the Delaware Bay, offshore from Lewes, Delaware. The LNG/LPG carriers would then transit 86.5 nautical miles through the Delaware Bay and River, traveling past the cities of Wilmington, DE and Chester, PA and passing under the Delaware Memorial and Commodore-Barry Bridges before berthing parallel to the eastern bank of the Delaware River at the Repauno Facility. The route is reversed for outbound LNG/LPG carrier transits, with the exception of the outbound traffic lane being used once passing the Pilot Boarding Area.

All aspects of the 86.5 nautical mile transit route, including the mouth of the Delaware Bay and River and the Repauno Facility, were evaluated including tides and currents, prevailing weather, density and character of marine traffic, deep draft vessel management, recreational boating, navigational aids (buoys, markers etc.), surrounding community impacts, and relevant environmental considerations. Applicable navigation charts are National Oceanic and Atmospheric Administration (NOAA) #'s 12214, 12304, 12311, and 12312. Deep draft vessels utilize the Delaware River main channel. LNG/LPG carriers arriving from overseas would normally enter the Delaware Bay from the Atlantic, utilize the designated pilot embarkation area to receive a Delaware state-licensed pilot and proceed north up the Delaware River to Gibbstown, NJ. (Pilotage is compulsory for foreign vessels and U.S. vessels under register in the foreign trade.)

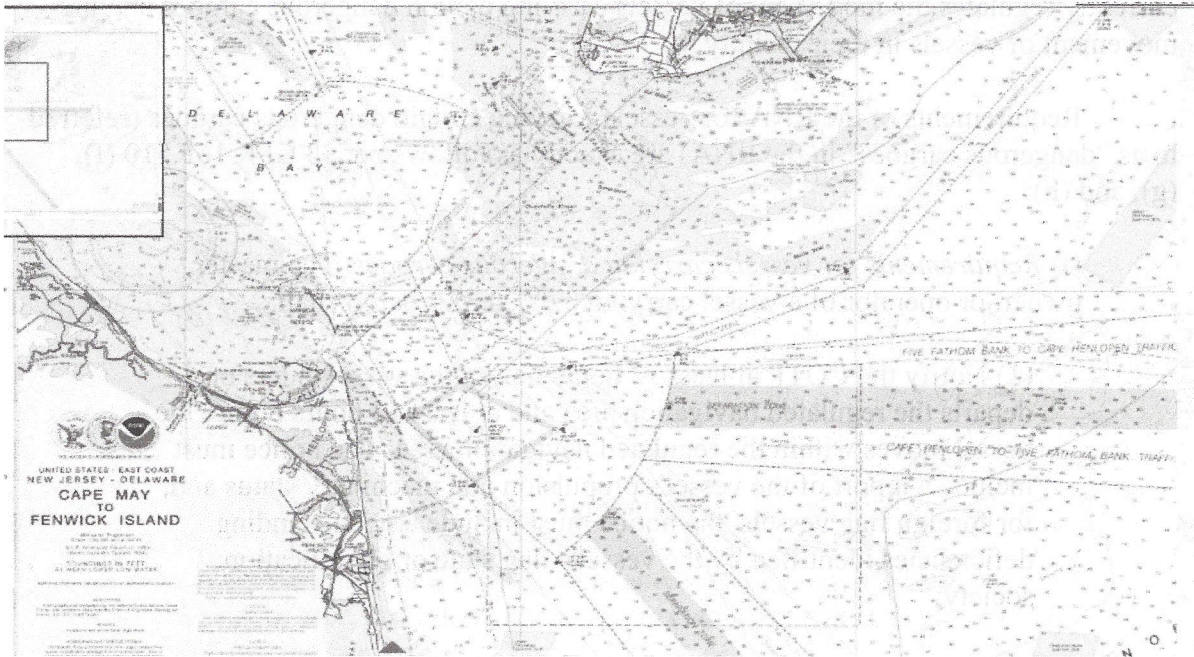
Deep Draft Traffic

The Delaware River is a mixed use marine thoroughfare of regional and national significance. Year-round deep-draft commercial, tug and barge combinations, ferry vessels, and recreational boats all share this waterway going to, and from, port communities along its entirety. The waterway has historically been, and continues to be, a vibrant shipping channel for commercial vessels going to the ports of Wilmington, DE, Philadelphia, PA, and Camden, NJ. Deep-draft vessel routes are limited to two-way traffic up and down the Delaware River, with intersections of deep draft vessel traffic at the Salem River, the Chesapeake and Delaware (C&D) Canal, the Christina River, and the Schuylkill River. The C&D Canal provides a direct connection between the Delaware River and the upper Chesapeake Bay, leading to the Port of Baltimore. Collectively, ports and the 17 anchorages along the Delaware River received approximately 2,400 commercial vessels in 2018. Of those, 675 arrived to ports in New Jersey, 1,398 went to Pennsylvania, and 529 went to ports in Delaware. Arriving cargoes ranged from

petroleum products to fruit and juice, containers, cocoa beans and break bulk commodities (data provided by the Maritime Exchange for the Delaware River and Bay).

Hydrographic Characteristics

The Delaware Bay and its approaches are relatively deep and wide with two designated traffic separation lanes titled "Cape Henlopen and Delaware" and "Five Fathom Bank and Cape Henlopen". A two-way traffic zone approaches Delaware Bay from the North along the New Jersey coastline. (See image below)



The entirety of the Delaware Bay and River federal project channel is maintained to a depth of 40 feet by the U.S. Army Corps of Engineers. A channel deepening project increasing the depth to 45 feet is in progress, with an estimated scheduled completion of 2020. The width of the channel from the mouth of Delaware Bay to Liston Range is 1,000 feet. There, it narrows to 800 feet and continues at that width upriver. Along the LNG/LPG transit route from the entrance to Delaware Bay to Gibbstown, NJ there are 9 anchorages.

Vessel Traffic Management

There is no Coast Guard Vessel Traffic System (VTS) for the Delaware River and Bay and its approaches; however, as previously noted, vessel routes (traffic lanes) have been established for these waters. Pilotage is compulsory for all foreign-flagged and U.S. deep-draft vessels under register in foreign trade when transiting, and therefore fall under the operational control of the Pilots Association of the Bay and River Delaware. Using radio communications via VHF-FM channels 13 and 16 and the Automatic Identification System (AIS), vessel arrivals and departures are coordinated for the pilot pickup area (vicinity of Big Stone Anchorage) for all port destinations within the Delaware River. The existing communications network (and associated interoperability) has operated well and to date provided the level of safety and security required for the port area.

Additionally, the Physical, Oceanographic Real Time System (PORTS) provides valuable and timely tide and current information for pilotage on the Delaware River. The pilots' use sound judgment in employing all navigational means available to aid in the transit of deep-draft vessels for the safety of all water way users and abutting shore-side communities along the intended route.

Certain dangerous cargo, as defined in 33 CFR 160.202, includes butane, methane, and propane. To further provide for the safety of navigation of certain dangerous cargoes, a Restricted Navigation Area (RNA), as defined in 33 CFR 165.510, currently regulates the movement of vessels carrying certain dangerous cargoes and the movement of vessels in their vicinity.

Requirements of the RNA for vessels carrying certain dangerous cargoes (referred to as "dangerous cargoes" in the RNA) are exactly as follows per 33 CFR 165.510 (f), (g), and (h):

(f) Requirements for vessels carrying dangerous cargoes. The master, owner, or operator of a vessel carrying a dangerous cargo shall:

(1) Notify the COTP at least 72 hours before the vessel enters or departs the regulated navigation area and at least 12 hours before the vessel moves within the regulated navigation area. The notice must include a report of the vessel's propulsion and machinery status and, for foreign flag vessels, the notice must include any outstanding deficiencies identified by the vessel's flag state or classification society;

(2) Not enter, get or remain underway within the regulated navigation area if visibility is or is expected to be less than two (2) miles. If during the transit visibility becomes less than two (2) miles, the vessel must seek safe anchorage and notify the COTP immediately;

(3) Not anchor in any area within the regulated navigation area unless in times of emergency or with COTP permission;

(4) Not transfer dangerous cargo while the vessel is at anchor or bunkering;

(5) Maintain a manned watch in the steering compartment whenever the vessel is underway within the regulated navigation area unless the vessel has two separate and independent steering control systems with duplicate pilothouse steering gear control systems which meet the requirements of 46 CFR 58.25-70;

(6) When anchored within the regulated navigation area and:

(i) Sustained winds are greater than 25 knots but less than 40 knots, ensure the main engines are ready to provide full power in five minutes or less; and

(ii) Sustained winds are 40 knots or over, ensure that the main engines are on line to immediately provide propulsion;

(7) While moored within the regulated navigation area, ensure that at least two wire cable mooring lines (firewarps) are rigged and ready for use as emergency towing hookups fore and aft on the outboard side of the vessel;

(8) While underway or anchored within the regulated navigation area, ensure that at least two wire cable mooring lines (firewarps) are rigged and ready for use as emergency towing hookups fore and aft on the vessel; and,

(9) Proceed as directed by the COTP.

(g) Requirements for vessels operating in the vicinity of a vessel carrying dangerous cargoes.

(1) Except for a vessel that is attending a vessel carrying dangerous cargo with permission from the master of the vessel carrying dangerous cargo or a vessel that is anchored or moored at a marina, wharf, or pier, and which remains moored or at anchor, no vessel may, without the permission of the COTP:

(i) Come or remain within 500 yards of the port or starboard side or within 1,000 yards of the bow or stern of an underway vessel that is carrying dangerous cargo; or

(ii) Come or remain within 100 yards of a moored or anchored vessel carrying dangerous cargo.

(2) The master, owner, or operator of any vessel receiving permission under paragraph (g) (1) of this section shall:

(i) Maintain a continuous radio guard on VHF-FM channels 13 and 16;

(ii) Operate at "no wake" speed or the minimum speed needed to maintain steerage; and

(iii) Proceed as directed by the COTP.

(3) No vessel may overtake a vessel carrying dangerous cargoes unless the overtaking can be completed before reaching any bend in the channel. Before any overtaking, the pilots, masters or operators of both the overtaking vessel and the vessel being overtaken must clearly agree on the circumstances of the overtaking, including vessel speeds, time and location of overtaking.

(h) *Additional restrictions above the C&D Canal.* When operating on the Delaware River above the C&D Canal:

(1) A vessel carrying dangerous cargo must be escorted by at least one commercial tug; and

(2) Meeting situations shall be avoided on river bends to the maximum extent possible.

The Delaware River route for LPG marine traffic is well-established. An increase in numbers of deep draft vessels does not pose a challenge to navigation in the port as the numbers of vessel transit still remains well below historical numbers. Approaches to the Delaware Bay, the federally-maintained Delaware River Channel, the anchorages along the river, and the regulations governing use of the waterways provide the critical maritime infrastructure necessary to facilitate the increased movement of deep draft vessels carrying dangerous cargoes, including LNG/LPG.

6. PORT LEVEL CONSIDERATIONS

Environmental Impact

An accidental spill or release of LNG/LPG consequent to a marine casualty could pose potential hazards to the public, waterway, and surrounding environment. The nature and severity of the spill, climatic and sea conditions, and whether or not oil pollutants were also spilled, are all factors that must be taken into consideration in order to mount a rapid and effective response.

The National Environmental Policy Act (NEPA) requires Federal agencies to ensure any and all potential impacts, whether social, economic, or environmental consequent to projects licensed or permitted by the Federal Government, have been carefully considered and evaluated. Per 33 CFR 127.009(b) an LOR is not considered an agency action by the Coast Guard. Thus, the Coast Guard is not performing a NEPA analysis. Compliance with NEPA and other environmental planning laws surrounding Repauno Port & Rail Terminal rest with the permitting agencies.

Equally essential to the NEPA assessment is the individual state permitting/application review process. Project applicants must demonstrate compliance with applicable federal and state laws and regulations regarding environmental protection to receive the necessary approvals needed to construct their respective project.

Information and data concerning environmentally sensitive areas, endangered species, wildlife refuges and general areas of environmental significance, which could be impacted in one way or another by the increase in LNG/LPG marine traffic resulting from modifications to Repauno Port & Rail Terminal, are taken into consideration. To reiterate, this environmental impact analysis, as it relates to the issuance of an LOR, falls under the purview of the agencies having jurisdiction for siting and construction. The Coast Guard's regulatory role is to ensure that Repauno Port & Rail Terminal complies with the requirements of 33 CFR, Part 127, "Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas." This includes serving as a subject matter expert to permitting agencies in regards to waterway safety and security and to provide them with a recommendation as to the suitability of the waterway to support LNG/LPG marine traffic in connection with the proposed project.

Representatives that participated in the WSA workgroup facilitated by Coast Guard Sector Delaware Bay Waterways Management Division, reviewed the April 24, 2018 submission of the follow-on WSA and recommended that an emergency response resource list, a desktop simulation study, and a mooring analysis study be provided for the WSA review process in accordance with Enclosure (4) to NVIC number 01-2011, Checklist for Reviewing a Waterway Suitability Assessment for LNG Marine Traffic.

In April 2018, during the WSA review process, Sandia National Laboratories (Sandia) released a report titled, "Guidance on Hazard and Safety Analyses of LPG Spills in Water" (SAND2018-10338). This report was an extension of two prior Sandia reports released in 2004¹ and 2008² that addressed hazard outcomes arising from spills from LNG tankers. These two reports were used as references for the development of NVIC 01-2011. Although there was no guidance to apply the 2018 Sandia report to the evaluation of the DRP WSA, the COTP felt it was prudent to do so based on the direct applicability to the WSA risk assessment and relationship to the Sandia reports referenced in NVIC 01-2011.

The 2018 Sandia report provided thermal hazard distances for LPG spills that were analogous to Zones of Concern 2 and 3 established in NVIC 01-2011 as follows:

	NVIC 01-2011 (LNG)	2018 Sandia Report (LPG) ³
Zone 2 / 5 kW/m ² heat flux	1,600 m	519 m
Zone 3 dispersion risk area	3,500 m	4,500 m

Since the vapor cloud dispersion modeling for LPG was roughly 29% larger than the NVIC Zone 3 area, the Coast Guard requested a re-evaluation of Zone 3 in the WSA.

¹ "Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill over Water," SAND2004-6258, (2004)

² "Breach and Safety Analysis of Spills Over Water from Large Liquefied Natural Gas Carriers," SAND2008-3153, (2008)

³ Based on the nominal near shore case.

Noting that the LPG vessel used in the 2018 Sandia report is significantly larger (80,000 m³) than the largest LPG vessel expected to service the DRP facility (63,600 m³), DRP contracted with AcuTech to conduct modeling to determine the dispersion risk area (Zone 3 equivalent) for the smaller LPG tanker. AcuTech conducted modeling using the DNV-GL PHAST model, version 8.0, and the same assumptions as those used in the 2018 Sandia LPG Report for the near shore nominal intentional breach:

Repauno Facility LPG Vessels

Parameter	
Material	Propane
Vessel Volume	63,600m ³
Number of Tanks	4
Number of Tanks Breached	1
Percent of Tank Spilled in Breach	50%
Maximum Spill Volume	7,950 m ³
Breach Size	7 m ²

The final result of the modeling of vessels expected to call at Repauno are shown in the table below, which is commensurate with NVIC 01-2011 Zone 3.

Repauno Proposed Vessels (PHAST Modeling with Sandia Modeling Assumptions) Zone 3

	Hazard Zone
Distance to ½ Lower Flammable Limit	3,200 m

Cultural/Economic Impact

The port area has a long history of maritime commerce and petrochemical refining. While this project does represent an increase in deep-draft vessel traffic, the increase does not exceed historical levels of deep draft vessel transits. The LNG/LPG carriers transit the same established shipping lanes already being used by other deep draft tankers and freighters. A LPG marine industry is well established in the Delaware River and holds an excellent 50-year safety record. LNG/LPG ships are built to specific regulatory standards and are operated only by specially trained and proficient captains and crews with competencies linked to the internationally required "Standards of Training, Certification and Watchkeeping" (STCW).

Despite an existing port culture of LPG familiarity, knowledge, infrastructure, and risk management, there are risks of accidental spills from any deep-draft ship. However, through continual risk identification and the implementation of robust risk-mitigation measures and strategies in collaboration with regional port partners and stakeholders these risks can be reduced to an acceptable level without unduly compromising safety and security. Continual risk identification and risk management processes should be conducted by Repauno Port & Rail Terminal in cooperation with appropriate

stakeholders and government agencies in the event of future additional increase in LNG/LPG marine traffic.

7. OPERATIONAL CONSIDERATIONS

Shore Side Emergency Response

Law enforcement, public safety, and emergency response capabilities within the immediate region along the transit route were compiled in an Emergency Response Resource Gap Analysis dated March 15, 2019, from Haines Fire & Risk Consulting Company.

Marine Firefighting Capabilities

LNG/LPG carriers' onboard firefighting capabilities must be in compliance with requirements established by the International Gas Carrier (IGC) Code under the International Convention for the Safety of Life at Sea (SOLAS) 1974. Firefighting resources aboard a vessel are physically limited, and therefore, prevention is critical. For this reason, an international safety system, known as the Fire Safety System Code (FSS Code,) was promulgated under SOLAS and became mandatory by Marine Safety Committee (MSC) resolution 99 (73). The FSS Code provides specific standards of engineering for fire safety systems onboard these vessels, to include fixed gas, foam, water pressure and spray extinguishing systems, personal protection equipment, and detection and alarm systems.

Every waterfront facility regulated under 33 CFR Part 127 is required to maintain an updated Emergency Manual, which is reviewed by the US Coast Guard. In the event of a dockside emergency, personnel will follow the emergency manual by notifying local emergency response agencies and utilize available firefighting resources onboard the ship.

Hazard Zones, Population, and Impacts at the Dock

Operational considerations regarding hazard zones, population, and impacts at the dock are contained in enclosure (1) to this Letter of Recommendation Analysis. Enclosure (1) contains Sensitive Security Information (SSI); therefore, it is not subject to public disclosure. If disclosed, the SSI could be used to subvert or exploit the security programs of vessels, facilities, or ports. SSI material requires appropriate handling in accordance with 49 CFR Part 1520 and Navigation and Vessel Inspection Circular No. 10-04, Guidelines for Handling of Sensitive Security Information (SSI), COMDTPUB P16700.4. **Members of the maritime industry, members of federal, state, or local government agencies, and other parties who can demonstrate a need to know should contact the Coast Guard Sector Delaware Bay Chief of Prevention for information on how to submit a request for enclosure (1).**

8. SECTOR DELAWARE BAY RISK MITIGATION RECOMMENDATIONS

Sector Delaware Bay risk mitigation recommendations are contained in enclosure (2) to this Letter of Recommendation Analysis. Enclosure (2) contains SSI; therefore, it is not subject to public disclosure. If disclosed, the SSI could be used to subvert or exploit the security programs of vessels, facilities, or ports. SSI material requires appropriate handling in accordance with 49 CFR Part 1520 and Navigation and Vessel Inspection Circular No. 10-04, Guidelines for Handling of Sensitive Security Information (SSI), COMDTPUB P16700.4. **Members of the maritime industry, members of federal, state, or local government agencies, and other parties who can demonstrate a need to know should contact the Coast Guard Sector Delaware Bay Chief of Prevention for information on how to submit a request for enclosure (2).**

9. CONCLUSIONS

The hydrographic characteristics and existing port infrastructure of the Delaware Bay, Delaware River, and its tributaries suitably support deep draft marine traffic. Based on review of the information contained in the Delaware River Partners' WSA as per 33 CFR 127.007 and 33 CFR 127.009, and evaluation of the waterway in consultation with a variety of port stakeholders, the COTP has determined that the proposed transit route is suitable for the proposed increase in LNG/LPG marine traffic with appropriate risk mitigation measures.

The Coast Guard's evaluation focused on the navigation safety, environmental safety, and maritime security aspects of LNG/LPG vessel transits along the intended waterway and included analyses of safety and security risk methodologies and corresponding risk mitigation measures. These risk mitigation measures are recommended tools intended to enhance maritime safety and security and effectively manage waterway priorities and are not intended as specific conditions of the LOR. Resource requirements and associated operational procedures are based on existing USCG authorities and policies. These policies take into account a changing threat environment and the potential for unknown threats. If the conditions of the waterway change and/or situational awareness dictates the need, the COTP may reconsider this determination.

Pursuant to authority under the Ports and Waterways Safety (Title 46 U.S. Code Chapter 700), among other authorities, the COTP will continue to assess the Delaware Bay and River to determine and implement controls and safeguards as necessary for the protection of the public's health and welfare, regional infrastructure and marine environment. Any orders to this effect may be separate and apart from this LOR process.