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LGC NCOE Field Notice 01-2017
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MEMORANDUM

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To: Distribution

Thru: R. J. Jenkins, CDR
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Subj: RECOMMENDED PROCESS FOR ANALYZING RISK OF SIMULTANEOUS OPERATIONS (SIMOPS) DURING LIQUEFIED NATURAL GAS (LNG) BUNKERING

Ref:
(a) CG-OES Policy Letter 01-15 – Guidance for Liquefied Natural Gas Fuel Transfer Operations and Training of Personnel on Vessels using Natural Gas as Fuel
(b) International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code), 2016 Edition
(c) The International Organization for Standardization/Technical Standard (ISO/TS) 18683:2015 "Guidelines for Systems and Installations for Supply of LNG to Ships"
(d) CG-OES Policy Letter 01-17 – Guidance for Evaluating Simultaneous Operations (SIMOPS) During Liquefied Natural Gas (LNG) Fuel Transfer Operations

1. PURPOSE: This field notice provides recommendations for the marine industry and U. S. Coast Guard (USCG) Captains of the Port (COTP) to follow when considering the risks of LNG Simultaneous Operations (SIMOPS). It includes guidance on an optional, formal operational risk assessment, if the vessel operator chooses to conduct one. While the recommendations contained in this field notice may assist, this notice is not a substitute for applicable legal requirements, nor is it a regulation itself. It is not intended to impose legally binding requirements on any person.

2. OVERVIEW: The COTP is responsible to ensure that operations are conducted safely within the port area (33 CFR §§ 160.109-111). One activity of concern is SIMOPS, a term used to describe multiple operations occurring on board vessels and in or around the marine transfer loading area of the facility where the vessel is moored. This term is increasingly brought up in connection with the use of LNG as a marine fuel and, more specifically, the associated bunkering operation in which LNG-fueled vessels receive fuel while other operations, such as cargo loading, occur simultaneously. Owners and operators of LNG-fueled vessels are allowed to conduct SIMOPS while conducting LNG bunkering in the United States. However, performing SIMOPS while bunkering LNG increases risk and complexity.

The USCG has serious concerns regarding conducting SIMOPS during LNG bunkering operations and wants to ensure they are conducted safely. To help reduce the risk, the Liquefied Gas Carrier (LGC) National Center of Expertise (NCOE) is encouraging vessel operators to conduct an optional, formal risk assessment of their SIMOPS. This field notice, including the flow chart in enclosure (1), can be used as a tool to walk the operator and the cognizant COTP through the thoughtful assessment and mitigation of SIMOPS risk.

Usually, these risk assessments are conducted by the supplier from which the LNG will be bunkered. However, it is important to recognize that this process should be conducted in close coordination with the receiving vessel, particularly on initial operations, and may also include other service providers (e.g., port terminal, bunker/stores barges, stevedore employers, emergency response organizations, etc.) depending on the size and complexity of the operation.

The USCG encourages LNG suppliers to engage early and often with the local COTP, who can help identify anticipated risks and mitigation measures. The USCG also encourages LNG suppliers to reach out to other waterway users such as local pilots, recreational and commercial vessel operators, adjacent facility representatives, and state and local agency officials. Early coordination with existing port-wide safety focused groups, such as harbor safety committees, and port authority information sharing meetings can identify local waterway users with an interest.

If the supplier chooses to conduct a Hazard Identification studies (HAZIDs), operational design meetings, and Hazard and Operability Studies (HAZOPS) involving potential SIMOPS, COTPs or representative staff should attend in order to gain a better understanding of the operations, risks, and mitigation measures being proposed. Per reference (d), it is recommended that the COTPs utilize the LGC NCOE for centralized technical support in understanding risk assessments. The LGC NCOE technical support will help alleviate the need for in-depth risk assessment expertise at the COTP level, reduce local workload, and increase national consistency. While the LGC NCOE is available to provide technical support, it is important to note that local unit involvement is essential, due to local knowledge and authority. Each COTP is tasked with ensuring all operations with his or her area of responsibility are conducted safely, and do not present a hazard to the surrounding waters, adjacent land, or structures. Should the COTP become aware of an operation that raises safety concerns, the COTP may direct the facility or vessel operator to cease operations (see, e.g., 33 CFR 160.109 and 160.111(c)).

3. BACKGROUND: The maritime industry and USCG field units have asked for more clarity, beyond what is provided for in reference (a); specifically regarding operations that should be included in a SIMOPS risk assessment and the type of risk assessment that should be conducted. To address these recurring requests, in October 2016, the USCG LGC and Cruise Ship NCOEs, with USCG Headquarters program support, convened a SIMOPS Workgroup. The SIMOPS Workgroup was charged with developing an optional framework for evaluating the risks of performing SIMOPS while bunkering LNG. The LGC NCOE recruited field and staff subject matter experts from units with current or anticipated future operations involving SIMOPS during LNG bunkering, as well as District office and USCG Headquarters staff as members of this workgroup.

The workgroup reviewed existing USCG policy, international regulations, industry standards, company procedures, and approval of previous LNG bunkering SIMOPS. Additionally, the SIMOPS workgroup witnessed various vessel SIMOPS and current vessel LNG bunkering operations to create and recommend a risk analysis process that would help both field units and industry. The LGC NCOE is disseminating the workgroup's recommendations in this field notice to help guide the maritime industry and USCG units in understanding LNG SIMOPS operational risk assessments. Conducting such assessments is an optional, recommended practice. For drafting clarity, the recommendations in this field notice assume the supplier has chosen to adopt this practice and seeks guidance on how to conduct an effective risk analysis; this assumption is consistent with USCG field unit interactions with industry, in which suppliers and others have asked for USCG recommendations on risk analysis. Suppliers with questions about the necessity, scope, content, or results of risk analysis for LNG SIMOPS should contact the cognizant COTP.

4. SIMOPS IDENTIFICATION: As part of assessing the risk of LNG SIMOPS, the LNG supplier is encouraged to identify all operations that may be conducted on board or in the vicinity of the vessel during the LNG bunkering operations that would increase risk. It is understood that when analyzing these operations, the supplier may not know all of the SIMOPS that future receiving vessels might conduct in conjunction with LNG bunkering. The scope of these operations and results of the risk assessment needed for each situation would inform the supplier's Operations Manual/transfer procedures, training, and Declaration of Inspection (DOI) restrictions; although these procedures are not legally required to be documented in all LNG SIMOPS situations, the USCG understands that most or all LNG suppliers develop transfer procedures and complete a DOI in the interest of safety.

The receiving vessel and supplier operations could account for multiple activities. Examples include: loading or unloading cargo, loading or unloading goods of any kind, ballasting, passenger embarkation or disembarkation, vehicle transfers, crane operations, chemical and other low flashpoint product handling, bunkering of fuels other than LNG, regulatory inspections, drills, maintenance, crew activity, LNG supplier activity or drills, LNG receiving vessel activity, or any other activity that can impact or distract from the bunkering operations.

Special care should be taken to identify unique SIMOPS conducted for specific vessel types as well. For example, passenger ships have SIMOPS occurring at various side shell openings throughout the length of the vessel, to include: loading and off-loading luggage via forklifts, passenger gangway locations, ship stores replenishment, off-loading of garbage and other wastes, and crew drills including the release of lifesaving equipment.

5. RISK ASSESSMENT DETERMINATION: When determining what type of risk assessment should be conducted for each SIMOPS identified, the supplier of LNG is encouraged to determine the complexity of all operations and establish areas of high, medium, and low risk around the bunkering operation. To ensure the SIMOPS analysis addresses all likely future operations that may be encountered, the supplier may need to project operations for which they do not yet have all the details, including other types of SIMOPS, and specific bunkering arrangements that may occur.

a. To identify the "areas of risk," a maximum credible release would be determined using many factors, such as: hose/pipe size, flow rate, lag in emergency shutdown after activation, trapped LNG between emergency shutdown devices (ESD) when shutdown is activated, typical weather conditions, etc. For example, the supplier can use a hazard modeling program capable of conducting a vapor dispersion analysis that can help categorize hazardous locations into high, medium, and low risk areas where LNG vapor could exist if a leak or spill of LNG occurred. Alternately, a simplified but more conservative way to evaluate these factors is for the supplier to use relevant references to designate high-risk areas (e.g., gas dangerous areas) and identify all other areas as a medium-risk area. Relevant references for identifying risk areas include reference (b), the IGF Code; the International Gas Carrier (IGC) Code; and the National Fire Protection Association (NFPA) 59A, Standard for the Production, Storage, and Handling of LNG. The LNG Bunkering Risk Area Diagram in enclosure (2) demonstrates how the established risk areas help define what type of risk assessment should be conducted for SIMOPS within a given distance from the LNG bunkering operation. The following risk areas are consistent with the definition and methodology used in reference (c):

i. HIGH RISK AREA - SIMOPS within the LNG bunkering high risk area are those where ignitable concentrations of flammable gases or vapors are likely to occur in normal operation or in case of an accident or some unusual operating condition. This area should be considered the distance the lower flammable limit of a maximum credible release could reach. SIMOPS in the high risk area in conjunction with bunkering LNG are not recommended without a quantitative risk assessment that would demonstrate that the risk is As Low as Reasonably Practical (ALARP) or that mitigation measures would be put in place to reduce these risks to ALARP. For the purposes of this field notice, a quantitative risk assessment is a formal and systematic approach to calculating the likelihood and consequences of hazardous events (the risk). These results are expressed as a numerical value meant to quantify the risk to people, the environment, or the vessel/facility. Further guidance on these types of risk assessments can be found in chapter 7.2 of reference (c).

ii. MEDIUM RISK AREA - SIMOPS outside the high risk area but not within the low risk area are those where concentrations of flammable gases or vapors from a maximum credible release could reach at a level of 50% of the lower flammable limit in case of an accident or some unusual operating condition. Within this area, steps should be taken to minimize ignition sources and ensure that only essential personnel and activities are allowed. SIMOPS in medium risk areas in conjunction with bunkering LNG are not recommended without a qualitative risk assessment which would demonstrate that the risk is minimized and that sufficient mitigation measures would be put in place to reduce any remaining risks. For the purpose of this field notice, a qualitative risk assessment uses subjective judgment, sometimes based on unquantifiable data, and is largely based on experience and expertise. Further guidance on these types of risk assessments can be found in chapter 7.3 of reference (c).

Note: a quantitative risk assessment would be recommended if the complexity of the operation being evaluated creates additional risk as addressed in section 6.b of this document.

iii. LOW RISK AREA - SIMOPS within this area are those where concentrations of flammable gases or vapors may exist at a level of less than 50% of the lower flammable limit in case of an accident or some unusual operating condition. Within this area steps should be taken to limit access to personnel and to control external activities that can lead to incidents threatening the operation. SIMOPS in low risk areas may be appropriate without a risk assessment.

Note: a risk assessment would be recommended if the complexity of the operation being evaluated creates additional risk as addressed in section 6.b of this document.

b. The supplier can identify the complexity of these SIMOPS, by conducting a simplified job task analysis for each. This analysis would highlight the tasks, number of personnel, qualifications of personnel necessary to complete the SIMOPS, and the other duties these personnel are concurrently responsible for. If the analysis identifies a particular SIMOPS to be complex in conjunction with other SIMOPS and LNG bunkering, the type of risk assessment recommended above should be elevated. For example, a supplier plans to conduct LNG bunkering of a cruise ship while loading passengers and this operation has been analyzed in accordance with the above recommendation to be in the MEDIUM RISK AREA. If however, when identifying the complexity of these operations, they are determined to be complex, a quantitative risk assessment should be conducted.

6. CONDUCTING RISK ASSESSEMENTS: The supplier is encouraged to conduct relevant risk assessments for each operation. For example, for a given LNG bunkering operation with SIMOPS, if one operation (e.g., hot work) would justify a quantitative risk assessment using the guidance above, a second operation (e.g., container loading) would justify a qualitative risk assessment, and a third operation (e.g., ship stores replenishment) also would justify a qualitative risk assessment, then a risk assessment covering all three operations would be appropriate and recommended. Risk assessments completed for other purposes that identify and mitigate the risk of SIMOPS, may inform the SIMOPS risk assessment addressed in this field notice.

7. SIMOPS REPORT: After completion of the operational risk assessment, the supplier may choose to summarize the intended operation, how risks were assessed and mitigated to ensure safe operations, and how these mitigation measures (limitations and/or safeguards) would be implemented throughout the operation. This summary or report would memorialize the risk analysis. It also could be used to communicate relevant information to waterway stakeholders, including the COTP and the owner or operator of the receiving vessel, to ensure coordination of operations or address specific questions about SIMOPS. As the report is optional, there is no standard format. If the supplier chooses to create such a report, however, USCG recommends the supplier address the following areas:

a. Communication - There should be effective and immediate communication between all personnel involved with LNG bunkering and SIMOPS.

b. Emergency Response - A list of emergency response resources available (e.g., equipment, personnel, local emergency responders) could inform the risk assessment and also assist in an emergency.

c. Persons in Charge (PIC) Duties - The PIC in charge of the LNG bunkering operation should have no additional responsibilities outside of the LNG bunkering. The PIC's full attention should be on the bunkering operation and not other operations or issues that may arise.

d. Training & Drills - Training and drills regarding the approved SIMOPS should be conducted periodically.

e. Maintenance of Equipment in Hazardous Locations - If equipment maintenance is to be conducted in the hazardous locations, there should be protective measures in place to ensure safety.

f. SIMOPS Agreement on the Declaration of Inspection (DOI) - Any additional limitations or mitigation measures to conduct SIMOPS as identified in the assessment, and should be considered when creating a DOI if one is created. It also recommended that these items are discussed during pre-transfer meetings, which his supported by reference (b), section18.4.1, specifying "the master of the receiving vessel or their representative and the representative of the bunkering source (Persons in Charge, PIC) shall agree in writing the transfer procedures." Additional guidance for this supplier/receiver interface is addressed in chapter 15.1 of reference (c). Furthermore, if the risk area extends beyond the supplier and receiving vessel, creation of a tri-partite DOI agreement with neighboring stakeholders (the most likely scenario would include a LNG barge fueling a LNG fueled vessel where the risk area extends to the facility) should be considered.

g. Environmental Factors - The local area where the LNG bunkering and SIMOPS are being conducted should be evaluated to address applicable environmental factors (e.g., tide, currents, wind, rain, snow, etc.) to ensure the operation is conducted safely.

h. Neighboring Operations - Address all nearby operations that could affect LNG bunkering and SIMOPS, or that could be impacted in the event of a release of LNG.

8. ADDITIONAL RESOURCES: In addition to the references listed at the beginning of this document, the following list of publications and reports are tools available when conducting risk assessments, or when considering a higher level of risk assessment as outlined in section 6.a of this document:

a. DNVGL-RP-005:2014-01 "Development and Operation of LNG Bunkering Facilities"

b. International Association of Classification Societies (IACS) Rec. No. 142 "LNG Bunkering Guidelines"

c. American Petroleum Institute (API) Report No. PP142228-2 Rev. 3 “Considerations for Proponents when Conducting QRA for LNG Bunkering SIMOPS”

d. Chemical Transportation Advisory Committee (CTAC) “Recommendations on Safety Standards for the Design of Vessels Carrying Natural Gas or Using Natural Gas as Fuel”

e. International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)

9. Comments or questions regarding this field notice, the enclosures or the risk assessment review process should be directed to the LGC NCOE’s general email address at lgcncoe@uscg.mil.

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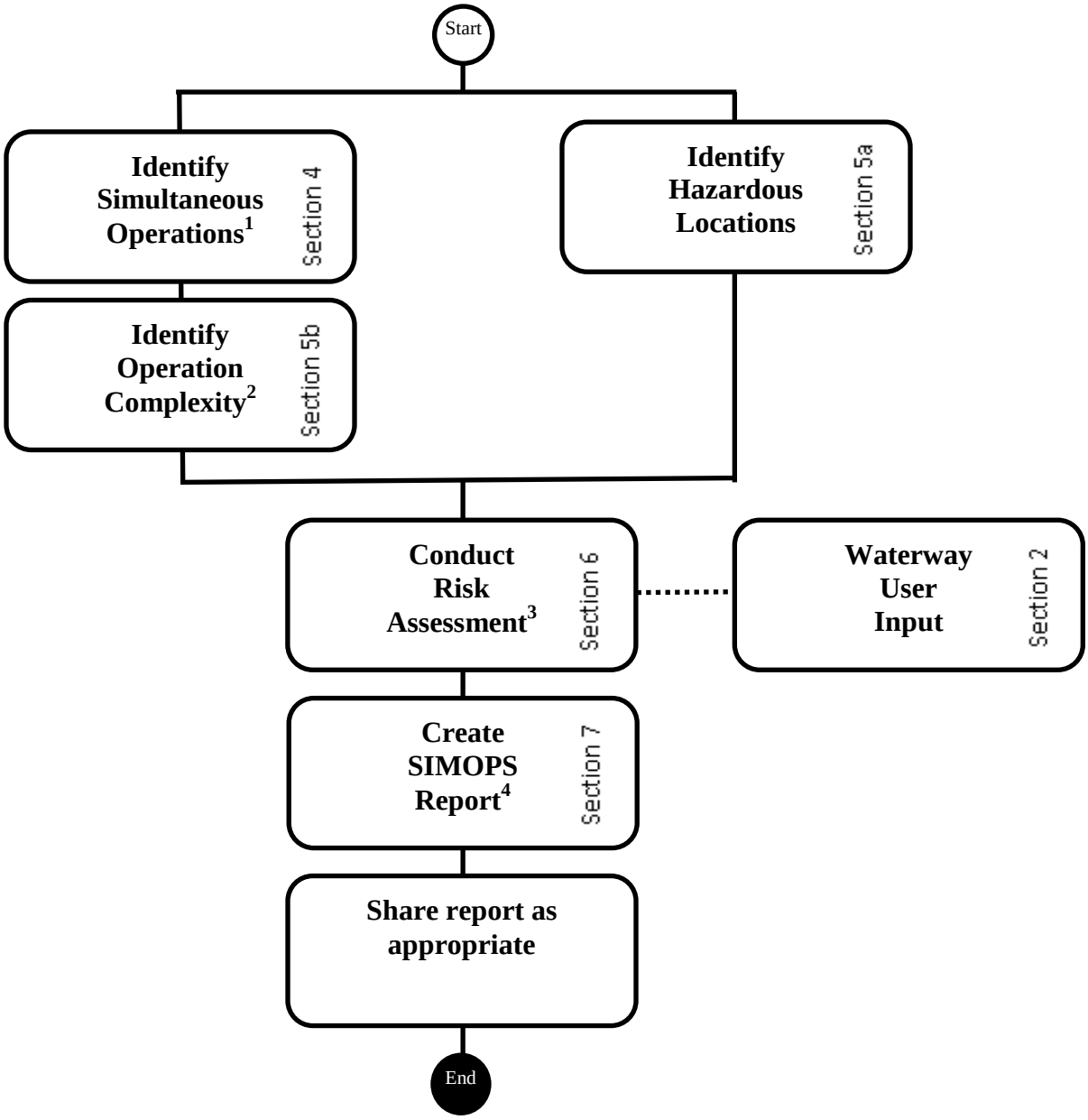
Enclosure: (1) SIMOPS Review Flow Chart
(2) LNG Bunkering Risk Area Diagram

Dist: Sectors
Marine Safety Units
Marine Safety Detachments
District (p)
Area (p)
CG-5P-TI
CG-ENG
CG-FAC
CG-OES
CG-CVC
MSC

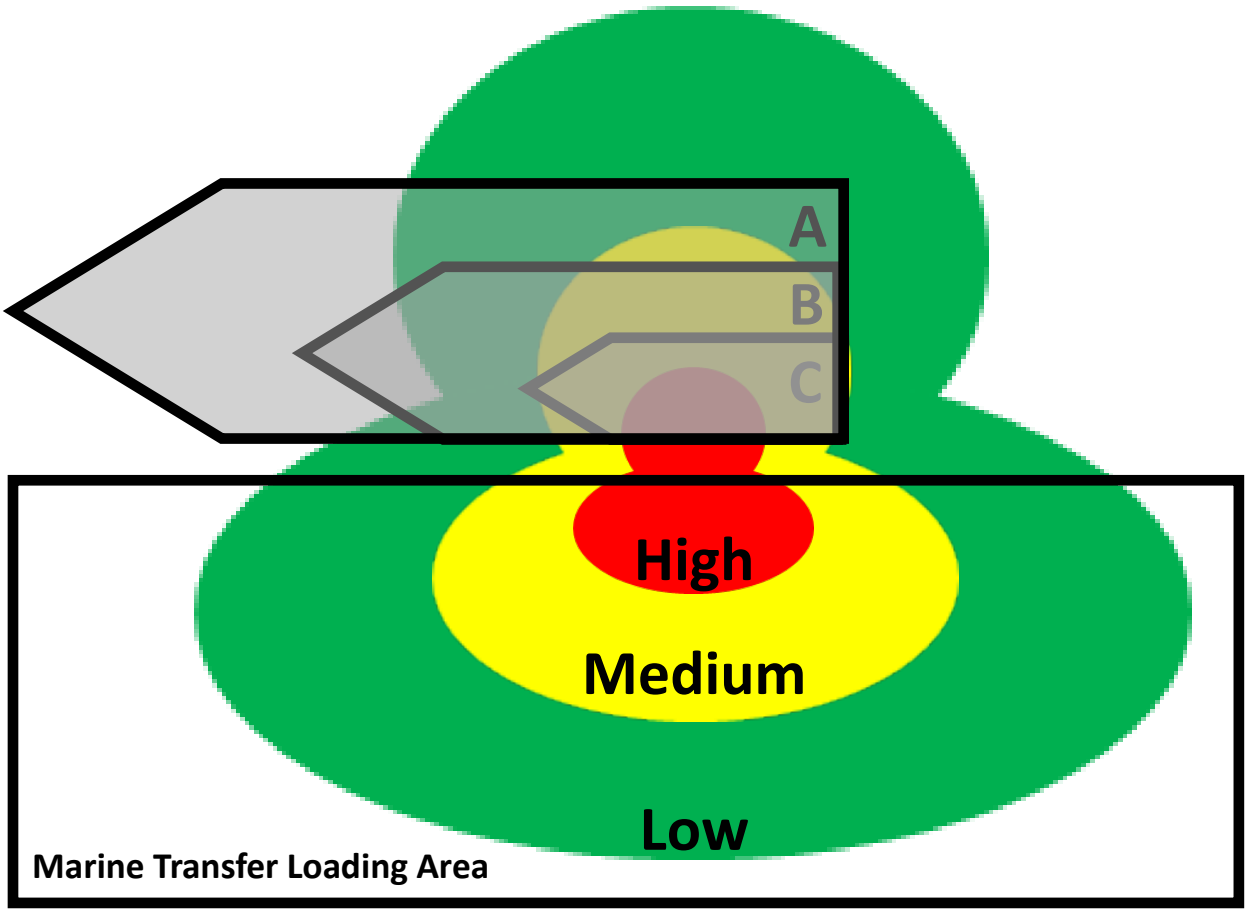
Recommended SIMOPS Risk Analysis Flow Chart



Footnotes:
1 – Recommended to be conducted with use of HAZID with input from waterway users
2 – Conducted for each SIMOPS identified
3 – Conducted only if quantitative or qualitative risk assessments are needed
4 – Created to provide summary of the SIMOPS analysis

Encl: (1)

LNG Bunkering Risk Area Diagram



The diagram above geographically demonstrates how the established risk areas (low, medium, and high) help define what type of risk assessment should be conducted for SIMOPS within a given distance from the LNG bunkering operation. This methodology should be used in determining if SIMOPS can be allowed and if allowed, where additional mitigation measures are necessary. The receiving vessel's footprint (A, B, or C) within these risk areas may impact the ability to conduct SIMOPS in certain areas on the vessel and influence the application of their associated mitigation measures.

Encl: (2)