

Savannah Captain of the Port Zone



Port Hurricane Preparedness Guide

U. S. COAST GUARD

MARINE SAFETY UNIT SAVANNAH

PART I - INTRODUCTION

A. Background

From June 1st to November 30th of each year the communities and ports of the Atlantic Coast face the threat of hurricanes. Atlantic and Gulf Coast hurricanes routinely make landfall and adversely impact shoreline communities, killing over 50 people and causing more than \$100 million in property damage, on average, each year.

Situated on low and flat terrain, the Savannah Captain of the Port (COTP) zone is particularly vulnerable to the hazards associated with hurricanes. The flooding and gale force winds from these storms could cause substantial damage to bridges, vessels and waterfront facilities. Hurricane induced floods have been known to clog critical waterways with debris and undermine the structural integrity of piers, wharfs, and other structures located on the waterfront. Flooding usually extends well inland and can topple stacks of containers and storage tanks, or submerge cargo-handling equipment. Floating debris may damage pier support structures, and has been known to hole or otherwise damage moored vessels. The extreme tidal fluctuations which normally precede and follow the passage of hurricanes can beach even the largest commercial vessels. Finally, gale force winds often cause significant damage to cargo-handling equipment, storage tanks, pier-side warehouses and vessels at anchor. Threatened as we are with these hazards, it is important that the entire port community share a common understanding of the measures required to increase our hurricane readiness and mitigate potential hurricane consequences.

B. Authority

The provisions of Title 33, Code of Federal Regulations, Parts 160 and 165, mandate that Coast Guard COTP take the lead in ensuring the safety of ports. Specifically, COTPs are authorized to establish safety zones, direct the handling, loading, unloading, storage and movement of dangerous cargoes aboard waterfront facilities, in whatever manner is necessary, to protect life, property, and the environment.

C. Applicability and Purpose

This plan is applicable to all waterfront facilities, marinas and vessels within the Savannah COTP Zone as defined in Title 33, Code of Federal Regulations, Part 3.35-30. Its purpose is:

1. To advise the maritime community of the sequence and timing of COTP imposed requirements and actions during periods when the Port is threatened by a hurricane, and
2. To recommend actions that should be taken by vessels and waterfront facilities to minimize storm related death, injury and property damage.

D. Amendments

Amendments will be incorporated into this plan by U.S. Coast Guard MSU Savannah following a formal annual review. However, suggestions and changes may be offered at any time, but are especially valuable following the implementation of the plan during

exercises or actual hurricane emergencies.

PART II - COTP ACTIONS AND DECISIONS

A. General

1. Maritime Hurricane Port Readiness Conditions are set by COTP Savannah in advance of an arriving hurricane and are based on when gale force winds associated with tropical cyclone activity are predicted to arrive at a port within the Savannah COTP Zone. These predictions are based on information obtained from the National Weather Service. The intent of setting Port Readiness Conditions is to provide the marine community with sufficient time to make preparations in order to minimize damage from heavy weather. The four Port Readiness Conditions are:
 - a. **WHISKEY:** Gale force winds associated with tropical cyclone activity are predicted to arrive within 72 hours.
 - b. **X-RAY:** Gale force winds associated with tropical cyclone activity are predicted to arrive within 48 hours.
 - c. **YANKEE:** Gale force winds associated with tropical cyclone activity are predicted to arrive within 24 hours.
 - d. **ZULU:** Gale force winds associated with tropical cyclone activity are predicted to arrive within 12 hours.
2. The COTP will make information about changes in Port Readiness Conditions available to the port community in the following ways:
 - a. Vessels will be notified through a Broadcast Notice to Mariners (BNM). Hurricane BNMs will be broadcast on Channel 16 and Channel 22a VHF-FM.
 - b. Marine Safety and Security Bulletins (MSSBs) will be faxed to port stakeholders.
 - c. Press Releases will be sent to local media outlets.
3. Questions concerning hurricane conditions should be directed to the MSU Savannah at (912) 652-4353.

B. Specific Pre-storm Actions

In addition to setting Port Readiness Conditions, the COTP will take the following actions commensurate with each hurricane condition:

1. **WHISKEY** (72 hours):
 - a. Meet with representatives of the Savannah Maritime Association, Savannah and Brunswick Pilots Associations, and local tugboat companies to identify and address concerns over port status, activities and emergency preparations.

- b. Advise vessel and facility operators of any conditions noted that require correction.
 - c. Ensure all pre-approved hurricane moorings are located and prepared.
 - d. Require owners, operators or certified agents of all self propelled oceangoing vessels over 500GT and all barges and their supporting tugs to report their intention to depart or remain in port to the COTP.
 - e. Require owners, operators or certified agents of all self-propelled oceangoing vessels over 500 GT or more and all barges and their supporting tugs remaining in port to submit a Remaining In-Port Checklist in Annex A and the information in Appendix 3 of Annex A **within 24 hours of setting Port Readiness Condition Whiskey.**
2. **X-RAY** (48 hours):
- a. Contact waterfront facilities to determine the intentions of the facility and any vessels moored thereto.
 - b. Contact deep draft vessels at anchor and determine their intentions.
 - c. Inspect wharf and pier areas with waterfront facility representatives during harbor patrols.
 - d. Spot-check marinas and waterways to determine the status of hurricane preparations.
3. **YANKEE** (24 hours):
- a. The COTP shall review requests to enter the Ports of Brunswick and Savannah by all inbound commercial vessel traffic (Note: both ports may not be in Port Readiness Condition YANKEE at the same time). Vessel traffic control measures may be implemented by the COTP if necessary.
 - b. Port closure may not apply to vessels that are capable of completing the cargo load/discharge cycle in less than 12 hours. **(Note: There are no approved hurricane anchorages in the Savannah COTP Zone).**
4. **ZULU** (12 hours):
- a. Close the ports to all commercial vessel traffic (including vessel transits within the ports). This prohibition will not apply to vessels that have requested and received approval from the COTP to transit the port. The approval of the COTP will only be granted if the transit can be made safely and mooring space has been identified; or if the vessel is departing to sea, only if the vessel can reach safe water prior to encountering severe weather.
 - b. Suspend cargo operations unless permission is requested and an approval is received from the COTP for each such operation (on a "case-by-case" basis). This includes bunkering and lightering operations as well. This special approval provision does not apply to operations involving Cargoes of Particular Hazard or Certain Dangerous Cargo, which in every case, must be suspended (a definition of Cargoes of Particular Hazard and Certain

Dangerous Cargo is found in Annex C of this plan).

C. Specific Post-Storm Actions

1. As soon as practicable following the passage of the storm, the COTP will:
 - a. Cancel or amend all Port Readiness Conditions, as appropriate. The port may remain closed to vessel traffic until the navigation channels can be surveyed and declared safe for passage.
 - b. Coordinate completion of channel surveys.
 - c. Conduct maritime damage and risk assessment emphasizing bridges, wharves, piers, channels, and anchorages.
 - d. Organize a post-hurricane meeting with senior representatives from the following organizations to assess, outline, and prioritize the recovery effort for the Savannah COTP Zone:
 - 1) Army Corps of Engineers
 - 2) Savannah Maritime Association
 - 3) Local emergency management agencies
 - 4) State emergency management agencies
 - 5) State Department of Transportation
 - 6) State Police
 - 7) Local Police
 - 8) Other appropriate USCG units

PART III - RECOMMENDED STORM PREPARATIONS

A. General

1. This part contains general recommended precautionary measures that vessels and waterfront facilities can take to reduce the potential for loss of life, injury, or property damage from a hurricane. The safety precautions contained in this part are not the only precautions that may be necessary to fully prepare a vessel or facility. The unique characteristics of the vessel or facility, and the attributes of the storm may dictate the need for additional measures and/or modifications to the measures contained in these recommendations.
2. The COTP will continuously review the status of all hurricane preparations (vessel and facility) and direct the correction of dangerous conditions. The COTP will issue orders, as necessary, to those vessels or facilities that fail to initiate appropriate actions.
3. Nothing in these recommendations shall be construed as relieving the masters, owners, operators, and agents of vessels or the owners, operators, and persons-in-charge of waterfront facilities from their primary responsibility for the safety of such vessels or waterfront facilities.

B. Vessels

1. When the port is threatened by gale force winds and severe storm surge from tropical cyclone activity, the recommended course of action for all seaworthy vessels is evasion at sea. Departure to sea should commence well before the expected arrival of gale force winds. Late departure could threaten to endanger life, the port, or the environment and may not be allowed by the COTP. Vessels will not be permitted to move (including shifting berthing) during the 12-hour period immediately prior to the predicted arrival of gale force winds from a hurricane (i.e., during Port Readiness Condition ZULU) without the prior approval of the COTP. Following storm passage, vessel movement will be permitted only with permission of the COTP until a full assessment of the waterway can be completed.
2. Only ships incapable of operating under their own power and barges under 500 gross tons will be permitted to remain moored to wharves, piers or other fixed structures. A more detailed discussion of the issues associated with this last resort option is contained in paragraph C.4 of this Part. Nothing in this paragraph is meant to limit the right of a facility owner, operator, and/or person-in-charge to deny a vessel permission to remain moored to his/her facility during a hurricane. All vessels, which intend to remain in port, should consider the appropriateness of taking on additional ballast or cargo as a special precaution to ensure their safety and the overall safety of the port, since vessels in a fully loaded condition normally fare better than light vessels in heavy weather and high winds.
3. Annex A contains a checklist of detailed vessel recommendations.

C. Waterfront Facilities

1. Waterfront facilities should secure hazards and halt cargo operations in advance of the storm's arrival to prevent unnecessary damage to life, property or the environment.
2. The COTP will require facilities to suspend operations when weather conditions threaten to reduce safety to an unacceptable level and the facility does not voluntarily suspend cargo operations.
3. When Port Readiness Condition ZULU is set, as discussed in Part II of this plan, the COTP will suspend cargo operations unless specific approval is granted.
4. Facilities that do not intend to allow vessels to remain moored at their facility during the storm must provide sufficient notice to the vessel to allow time for the vessel to move to a safe mooring or depart to sea. It must be understood that the initial decision to allow a vessel to remain moored to a facility for the duration of a hurricane rests primarily with the facility owner, operator, and/or person-in-charge. Oceangoing vessels and barges over 500 gross tons vessel must request permission and receive approval from the COTP to remain at the facility. The owner, operator and/or person-in-charge of a facility and the masters, owners, operators, and/or agents of a vessel are primarily responsible for the safety and security of their facilities and vessels. The COTP **will not** arbitrate disputes between facilities and vessels. The COTP **will** continuously review the status of all hurricane preparations (vessel and facility) and direct the correction of dangerous conditions. The COTP will issue orders only to those vessels or facilities that fail to initiate appropriate actions.
5. Annex B contains a checklist of detailed waterfront facility recommendations.

Annex A - Storm Preparation Check List for all Vessels

Appendix 1 – Additional Recommended Precautionary Measures for Ships

Appendix 2 – Additional Recommended Precautionary Measures for Barges

Appendix 3 – Information Required from Each Vessel Requesting to Stay In-Port

Annex B - Storm Preparation Check List for Waterfront Facilities

Annex C - Cargoes of Particular Hazard

ANNEX A to the Savannah COTP Zone Port Hurricane Preparedness Guide

STORM PREPARATION CHECKLIST FOR ALL VESSELS

1. MARITIME HURRICANE PORT READINESS CONDITION WHISKEY - 72 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS

TIME/INITIALS

	(a) Review vessel's operational schedule.
	(b) Review vessel heavy weather plans and take appropriate action.
	(c) If unable to get underway, evaluate the safety of the present berth. If necessary, develop plans to shift to an alternate location or berth. The plans should include the number and source of tugs, the permits required and the agency responsible for approving them, and safety/security arrangements appropriate to the new mooring/berth.
	(d) Set a continuous Channel 16 VHF-FM radio watch.
	(e) Vessels over 500 GT or more and all barges and their supporting tugs requesting to remain in port must submit a written request including all information in Appendix 3 of Annex A within 24 hours of setting Port Readiness Condition Whiskey.

2. MARITIME HURRICANE PORT READINESS CONDITION X-RAY - 48 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS

TIME/INITIALS

	(a) Vessels intending to remain at their moorings during the hurricane should obtain the permission of the owner, operator, or person-in-charge of the waterfront facility and determine the conditions the facility will require. Submit written request and checklist in accordance with (e) of condition Whiskey listed above.
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NOTE: Ultimate responsibility for the safety of a vessel and its crew rests with the vessel's master. Normally commercial vessels that can safely evade or ride out a storm at sea will voluntarily leave port in advance to avoid being trapped in port while channels are surveyed and Aids to Navigation restored. Vessels of 500 GT or under normally cannot safely ride out a hurricane at sea and should not be required to depart port or denied entry in the face of an approaching hurricane. For all vessels, unless a thorough assessment of the situation indicates a greater level of risk to the safety of life in the port, COTPs should respect a master's decision to remain in port or to seek entry into the port. COTPs should advise facility operators that he/she will not order vessels to depart the facility if doing so would unduly hazard the vessel.

3. MARITIME HURRICANE PORT READINESS CONDITION YANKEE - 24 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS (or 24 hours before the Pilots Association will discontinue service – whichever is earlier)

TIME/INITIALS

	(a) Vessels intending to weather the hurricane at sea should prepare to depart the port prior to port closure.
	(b) Vessels intending to remain moored at a waterfront facility during the hurricane should prepare to proceed to the facility if not already there. <i>NOTE: For vessels remaining in port during a hurricane, it is incumbent upon the vessel's master or owner to make all appropriate arrangements for berthing, mooring or anchoring, including tug service or any other precaution, as necessary to ensure the safety of the vessel and to prevent damage to the port. All heavy weather mooring and anchoring arrangements are subject to the acceptance of the COTP.</i>

4. MARITIME HURRICANE PORT READINESS CONDITION ZULU - 12 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS

TIME/INITIALS

	(a) Ensure the vessel is securely moored or anchored and prepared for hurricane conditions.
	(b) Suspend cargo transfer operations as required by weather conditions or the COTP as stated in section II.B.4 of this plan.
	(c) Discontinue all transits of the port as required by the COTP.
	(d) Report any hazardous conditions or breakaways of vessels directly to the COTP as soon as possible.

APPENDIX 1 TO ANNEX A to the Savannah COTP Zone Maritime Hurricane Contingency Plan

ADDITIONAL RECOMMENDED PRECAUTIONARY MEASURES FOR SHIPS

Applies to ships:

Moored	Anchored		
X		1.	Mooring lines doubled up with due consideration given to the effects of predicted storm surge.
X		2.	Outboard anchor rigged at short stay.
X	X	3.	Sufficient number of officers and crew onboard to tend mooring lines, an/or get underway.
X	X	4.	Vessel ballasted to ensure maximum safety.
X	X	5.	All side ports, hatches, portholes, and other openings are closed and secured.
X	X	6.	Bilge pumps and manifolds are ready for immediate use.
X	X	7.	All fire fighting equipment is ready for immediate use.
X	X	8.	At least one (1) pilot ladder is rigged on each side of the vessel.
X		9.	A gangway, or other suitable means of accessing the vessel from the pier, is rigged.
X	X	10.	At least one (1) fire warp is rigged on the bow and another on the stern. In order to expedite the establishment of an emergency tow, a portion of each fire warp should be draped overboard and allowed to hang no more than six (6) feet above the waterline.
X	X	11.	Spare mooring lines and or wires should be readily available.
X	X	12.	A continuous radio watch should be maintained on Channel 16 VHF-FM (156.8 MHZ) by a person who speaks English fluently.
	X	13.	At least two anchors should be set.
	X	14.	Vessel should remain ready to get underway in 15 minutes.

APPENDIX 2 TO ANNEX A to the Savannah COTP Zone Maritime Hurricane Contingency Plan

ADDITIONAL RECOMMENDED PRECAUTIONARY MEASURES FOR BARGES

Applies to barges:

<u>Moored</u>	<u>Anchored</u>		
	X	1.	All available anchors are deployed.
X		2.	Mooring lines doubled up with due consideration given to the effects of predicted storm surge. Special attention should be paid to barges moored in the proximity of bridges.
X		3.	Personnel are available to be notified in the event of emergencies. <i>Note: In no way should this recommendation be understood as the COTP advocating personnel being placed in life threatening situations. Mandatory evacuations should be heeded.</i>
X	X	4.	All hatches, portholes and other openings are closed and secured.
X		5.	Fire fighting equipment is available and ready for immediate use.
X	X	6.	At least one (1) fire warp is rigged on the bow and another on the stern. In order to expedite the establishment of an emergency tow, a portion of each fire warp should be draped overboard and allowed to hang no more than six (6) feet above the waterline.
X	X	7.	Spare mooring lines and/or wires should be readily available.

APPENDIX 3 TO ANNEX A to the Savannah COTP Zone Maritime Hurricane Contingency Plan

INFORMATION REQUIRED FROM EACH VESSEL REQUESTING TO REMAIN IN-PORT

1. Name, call sign, and official number of vessel.
2. Nationality of the vessel.
3. Name of the master.
4. Name, address, and phone number of the agent, charter or operator, and owner.
5. Reason why the vessel is not leaving port.
6. Provide full vessel characteristics that would be needed to effect salvage.
7. Provide a full stowage plan and manifest to determine particular cargo and pollution hazards.
8. Provide 24 hour contact and information on qualified individuals who have been empowered in writing by the owners to make on-site decisions and authorize expenditures for any required pollution response or salvage.
9. Provide full insurance disclosure to the Captain of the Port, and if moored to a facility, to the facility.
10. Vessel particulars as applicable (length, breadth, draft, air draft, gross tonnage, hull type, horsepower, single or twin screw).
11. Number of personnel to remain on the vessel and their qualifications.
12. Amount of ballast the vessel may hold.
13. Amount of bunkers, lube oil, and diesel oil on board.
14. Estimated draft with the vessel in ballast.
15. Name of berth and location.
16. Depth of water in the vessel's berth at mean low tide.
17. Availability of vessel's main propulsion.
18. Describe how the vessel will be secured to the berth.
19. Submit a diagram showing the mooring arrangements with the size, length and lead of mooring lines or wire.
20. Operational status of machinery on board (i.e., engines, generators, fire fighting pumps, bilge pumps, anchors and number of anchors, and mooring machinery, etc.).
21. Any unusual conditions affecting the vessel's seaworthiness.

**STORM PREPARATION CHECK LISTS
FOR WATERFRONT FACILITIES**

**1. MARITIME HURRICANE PORT READINESS CONDITION WHISKEY - 72 HOURS
BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS**

TIME/INITIALS

	(a) Review facility contingency plans. The contingency plans for barge fleeting facilities should contain procedures for recovering breakaway barges and specifically include the location or availability of tugs/towboats. Barge fleeting facilities should also evaluate measures to reduce the size of their fleets. <i>Note: Plans to nest barges with other vessels or to anchor barges must be approved by the COTP.</i>
	(b) Review vessel arrival schedules.
	(c) Review operational schedules to identify shipments of Cargoes of Particular Hazard, Hazardous Material, and/or Dangerous Cargoes arriving via highway or rail vehicles.

**2. MARITIME HURRICANE PORT READINESS CONDITION X-RAY - 48 HOURS
BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS**

TIME/INITIALS

	(a) Determine the special needs and intentions of vessels moored at the facility.
	(b) Determine whether vessels desiring to remain moored to the facility during the hurricane will be allowed to do so. Notify the vessel master, vessel agent, and the COTP of the facility's decision. <i>NOTE: The COTP may direct the vessel or facility to take certain precautions to correct conditions that threaten the port or the environment (e.g. the COTP may direct a vessel to proceed to sea or may direct a facility to accept a vessel to be moored).</i>
	(c) Set a time for the voluntary suspension of cargo handling operations. In doing so, ensure that vessels have ample time to hire and schedule labor, arrange pilots, contract tugs/towboats, and safely complete the transit to sea prior to the setting of Port Readiness Condition ZULU. Notify COTP of time established.

3. MARITIME HURRICANE PORT READINESS CONDITION YANKEE - 24 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS

TIME/INITIALS

	(a) Secure missile hazards and clear nonessential equipment and loose gear from all wharves and piers.
	(b) Secure or move hazardous material and dangerous cargo to a safe location. Individual drums of hazardous material should be palletized and banded. When palletized drums are stowed inside, they should be elevated off the floor in a well-ventilated warehouse. When stowed outside, palletized drums should be sheltered from the weather as much as possible, and in no case stacked more than two high. Stacked pallets of drums should also be braced and dunnaged to prevent shifting and/or toppling. <i>(NOTE: Title 49 of the Code of Federal Regulations Parts 171-178 should be used as a stowage and segregation guide, if the drums to be consolidated contain hazardous materials from different Hazard Classes/Divisions).</i> Grounded containers should be stacked no more than 3 high. Empty containers should be moved to less flood prone areas if possible.
	(c) Advise the COTP of any dangerous cargo which cannot be secured or moved to a safe location.
	(d) Prepare to secure cargo operations involving liquid bulk dangerous cargoes in advance of the COTP setting Port Readiness Condition ZULU, unless permission is requested and an approval verification number is received from the COTP. Operations involving Cargoes of Particular Hazard will be secured, without exception, at Port Readiness Condition ZULU.
	(e) Ensure all commercial, oceangoing vessels and barges over 500 gross tons have departed moorings (unless permission has been granted by the COTP to remain in port at the facility moorings).

4. MARITIME HURRICANE PORT READINESS CONDITION ZULU - 12 HOURS BEFORE ANTICIPATED ARRIVAL OF GALE FORCE WINDS

TIME/INITIALS

	(a) Secure cargo operations involving liquid bulk dangerous cargoes, unless permission is granted by the COTP. Cargoes of Particular Hazard will be secured in all cases.
	(b) Oil transfer terminals should drain all loading arms and transfer hoses of product, blank off hoses, empty and clean small discharge containment.
	(c) All small craft owned by the facility that can be hauled out or trailered should be removed from the water and secured well away from the effects of possible storm surge and high winds.

CARGOES OF PARTICULAR HAZARD

Cargo of Particular Hazard is defined in section 126.3 of Title 33 of the Code of Federal Regulations. These regulations are updated daily and reprinted on an annual basis. A copy of the most recent version of 33 CFR Parts 125 to 199 along with applicable copies of the Federal Register should be consulted when a precise definition of the term **Cargoes of Particular Hazard** is required. **Cargoes of Particular Hazard** is a term of art meaning a cargo meeting any of the following descriptions:

1. A Division 1.1 or 1.2 explosive. Division 1.1 explosives cause a mass explosion hazard. Division 1.2 explosives present a projection hazard but not a mass explosion hazard. The following cargoes are examples of Division 1.1 and Division 1.2 explosives:
 - a. Cord, Detonating, Flexible (UN0065)
 - b. Explosives, Blasting Types A-D (UN0081 thru UN0084)
 - c. Explosives, Blasting Type E (UN0241)
 - d. Flares, Surface (UN0418 or UN0419)
2. Oxidizing material and blasting agents for which a Coast Guard permit is required when the cargo is offered for shipment by water (primarily ammonium nitrates and ammonium nitrate fertilizers). The following cargoes are examples of these products:
 - a. Ammonium Nitrate - Fuel Oil Mixture (containing only prilled ammonium nitrate and fuel oil) (NA0331).
 - b. Ammonium Nitrate, with not more than .2 per cent of combustible substances, including organic substance calculated as carbon, to the exclusion of any other substance (UN1942).
3. Highway route controlled quantities of Class 7 hazardous materials (Radioactive Material). The highway route controlled quantity is based on the kind and aggregate activity level associated with the shipment of radioactive material. Each shipment of Class 7 hazardous material should be carefully evaluated to determine whether this definition applies.
4. Division 2.3 and 6.1 poisonous inhalation hazard products as defined in 49 CFR 173.115 and 173.132, respectively.
5. Fissile Class III shipments of Plutonium-238, 239, or 241 or Uranium-233 or 235. Fissile Class III shipments are shipments of fissionable radionuclides, which require the most restrictive controls during shipment.

CERTAIN DANGEROUS CARGO DANGEROUS CARGOES GUIDELINES

EXPLOSIVES

Division 1.1 or 1.2 explosives as defined in 49 CFR 173.50, and that is in a quantity in excess of 100 metric tons

BLASTING AGENTS

Division 1.5D blasting agents for which a permit is required under 49 CFR.415, for which a permit is required as condition of a RSPA (Research and Special Programs Administration) exemption, and that is in a quantity in excess of 100 metric tons per barge

POISONOUS GAS

Division 2.3 poisonous gas as listed in 49 CFR 172.101 that is also a "material poisonous by inhalation" as defined in 49 CFR 171.8, and that is in a quantity in excess of 1 metric ton per barge

AMMONIUM NITRATE

Division 5.1 ammonium nitrate and certain ammonium nitrate fertilizers for which a permit is required under 49 CFR 176.415, or for which a permit is required as a condition of a RSPA exemption

POISONOUS MATERIAL

A liquid material that has a primary or subsidiary classification of Division 6.1 poisonous material as listed in 49 CFR 172.101 that is also a material poisonous by inhalation, as defined in 49 CFR 171.8 and that is in bulk packaging, or that is in a quantity in excess of 20 metric tons per barge when not in a bulk packaging

RADIOACTIVE MATERIAL

Class 7 highway route - controlled quantity radioactive material or fissile shipment - controlled material as defined in 49 CFR 173.403

46 CFR 154.7 – FLAMMABLE LIQUIFIED GASES

Butadiene	Butylene
Ethane-----Subchapter D cargo (LFG)	Ethylene -----Subchapter D cargo (LFG)
Methane-(LNG)-----Subchapter D cargo (LFG)	

46 CFR 154.7 – FLAMMABLE LIQUIFIED GASES (cont.)

Methyl Acetylene – Propadiene Mixture	Propane-----Subchapter D cargo (LFG)
Propylene-----Subchapter D cargo (LFG)	

46 CFR 154.7 – TOXIC LIQUIFIED GASES

Anhydrous Ammonia	Sulfur Dioxide
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46 CFR 154.7 – FLAMMABLE AND TOXIC GASES

Acetaldehyde	Dimethylamine
Ethylamine---- <i>Not listed in 46 CFR 151, but listed in 46 CFR 153</i>	
Ethyl Chloride	Ethylene Oxide
Methyl Bromide	Methyl Chloride
Vinyl Chloride	

BULK LIQUIDS LISTED IN 46 CFR 151 OR 153

Acetone Cyanohydrin	Allyl Alcohol
Chlorosulfonic Acid	Crotonaldehyde
Ethylene Chlorohydrin	Ethylene Dibromide
Methacrylonitrile	Oleum (fuming sulfuric acid)
Propylene Oxide	

DIVISION 2.3 – POISONOUS GAS- LISTED IN 46 CFR 151 NOT LISTED ABOVE

Chlorine

SUBCHAPTER D CARGO NOT LISTED IN 46 CFR 151 OR 153

Butane (LFG)