

# **KIRBY INLAND MARINE**

## **CARGO TRANSFER PROCEDURES FOR THE BARGE**

### **KIRBY 20851**

***PLEASE NOTE:***

FOR PROPER VALVE ALIGNMENT AND SAFE CARGO TRANSFER GUIDANCE, PLEASE REFER TO KIRBY MARINE TRANSPORTATION'S CARGO HANDLING PROCEDURE MANUAL AND FOLLOW THE KIRBY TRANSFER PLAN.

IF YOU NEED A COPY OF THE PROCEDURE MANUAL, PLEASE CALL THE KIRBY DUTY LINE (713) 435-1618 OR (713) 435-1925 BEFORE CARGO OPERATION.

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155, 750 (g)(1)

# AMMONIA, anhydrous

AMA

## CAUTIONARY RESPONSE INFORMATION

Common Synonyms Liquid Ammonia	Liquefied compressed gas Colorless Ammonia odor Flicals and boils on water. Poisonous, visible vapor cloud is produced.
<p>Avoid contact with liquid and vapor. Keep people away. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Stop discharge if possible. Stay upwind and use water spray to "knock down" vapor. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>Combustible. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Stop flow of gas or liquid if possible. Cool exposed containers and protect men effecting shutoff with water. Let fire burn.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR POISONOUS IF INHALED. Irritating to eyes, nose and throat. Move to fresh air. If in eyes, hold eyelids open and flush with plenty of water. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Will burn skin and eyes. Harmful if swallowed. Will cause frostbite. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. DO NOT RUB AFFECTED AREAS. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.</p>
Water Pollution	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>

<p>1. CORRECTIVE RESPONSE ACTIONS</p> <p>Dilute and disperse Stop discharge Do not add water to undissolved material</p>	<p>2. CHEMICAL DESIGNATIONS</p> <p>2.1 CG Compatibility Group: Currently not available; Ammonia</p> <p>2.2 Formula: NH<sub>3</sub></p> <p>2.3 IMO/UN Designation: 11005</p> <p>2.4 DOT ID No.: 1005</p> <p>2.5 CAS Registry No.: 7664-41-7</p> <p>2.6 NAERG Guide No.: 125</p> <p>2.7 Standard Industrial Trade Classification: 52251</p>
<p>3. HEALTH HAZARDS</p> <p>3.1 Personal Protective Equipment: Gas-tight chemical goggles, self-contained breathing apparatus, rubber boots, rubber gloves, emergency shower and eye bath.</p> <p>3.2 Symptoms Following Exposure: 700 ppm causes eye irritation, and permanent injury may result if prompt remedial measures are not taken; 5000 ppm can cause immediate death from spasm, inflammation, or edema of the larynx. Contact of the liquid with skin freezes the tissue and then produces a caustic burn.</p> <p>3.3 Treatment of Exposure: INHALATION: move victim to fresh air and give artificial respiration if necessary. Oxygen may be useful. Observe for laryngeal spasm and perform tracheostomy if indicated. SKIN OR EYES: flush immediately with running water for 15 min. Treat subsequently as thermal burn.</p> <p>3.4 TLV-TWA: 25 ppm.</p> <p>3.5 TLV-STEL: Not listed.</p> <p>3.6 TLV-Ceiling: 35 ppm.</p> <p>3.7 Toxicity by Ingestion: Not pertinent</p> <p>3.8 Toxicity by Inhalation: Currently not available</p> <p>3.9 Chronic Toxicity: Not pertinent</p> <p>3.10 Vapor (Gas) Irritant Characteristics: Vapors cause severe eye or throat irritation and may cause eye or lung injury; vapors cannot be tolerated even at low concentrations.</p> <p>3.11 Liquid or Solid Irritant Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.</p> <p>3.12 Odor Threshold: 46.8 ppm</p> <p>3.13 IDLH Value: 300 ppm.</p> <p>3.14 OSHA PEL-TWA: 50 ppm.</p> <p>3.15 OSHA PEL-STEL: Not listed.</p> <p>3.16 OSHA PEL-Ceiling: Not listed.</p> <p>3.17 EPA AEGL: Not listed.</p>	

### 4. FIRE HAZARDS

- Flash Point: Not flammable under conditions likely to be encountered
- Flammable Limits in Air: 15.50%-27.00%
- Fire Extinguishing Agents: Stop flow of gas or liquid. Let fire burn.
- Fire Extinguishing Agents Not to Be Used: None
- Special Hazards of Combustion Products: Not pertinent
- Behavior in Fire: Not pertinent
- Ignition Temperature: 1204°F
- Electrical Hazard: Class I, Group D
- Burning Rate: 1 mm/min.
- Adiabatic Flame Temperature: Currently not available
- Stoichiometric Air to Fuel Ratio: 6.050 (Est.)
- Flame Temperature: Currently not available
- Molar Ratio (Reactant to Product): Currently not available
- Minimum Oxygen Concentration for Combustion (MOCC): Not listed

### 5. CHEMICAL REACTIVITY

- Reactivity With Water: Dissolves with mild heat effect
- Reactivity with Common Materials: Corrosive to copper and galvanized surfaces.
- Stability During Transport: Stable
- Neutralizing Agents for Acids and Caustics: Dilute with water
- Polymerization: Not pertinent
- Inhibitor of Polymerization: Not pertinent

### 6. WATER POLLUTION

- Aquatic Toxicity: 2.0 - 2.5 ppm/1-4 days/goldfish and yellow perch/LC 50 8.2 ppm/3 days/crayfish/LC 50 8.2 ppm/96 hr/threatened minnow/TL<sub>10</sub>
- Waterfowl Toxicity: 120 ppm
- Biological Oxygen Demand (BOD): Not pertinent
- Food Chain Concentration Potential: None
- GESAMP Hazard Profile:
  - Bioaccumulation: 0
  - Damage to living resources: 2
  - Human oral hazard: 1
  - Human contact hazard: 1
  - Reduction of amenities: X

### 7. SHIPPING INFORMATION

- Grades of Purity: Commercial, industrial, refrigeration, electronic, and metallurgical grades all have purity greater than 99.5%
- Storage Temperature: Ambient for pressurized ammonia; low temperature for ammonia at atmospheric pressure
- Inert Atmosphere: No requirement
- Venting: Safety relief 250 psi for ammonia under pressure. Pressure-vacuum for ammonia at atmospheric pressure.

(Continued)

### 8. HAZARD CLASSIFICATIONS

- 49 CFR Category: Poison gas
- 49 CFR Class: 2.3
- 49 CFR Package Group: Not listed.
- Marine Pollutant: No
- NFPA Hazard Classification:
 

Category	Classification
Health Hazard (Blue)	3
Flammability (Red)	1
Reactivity (Yellow)	0
- EPA Reportable Quantity: 100
- EPA Pollution Category: B
- RCRA Waste Number: Not listed
- EPA FWPCA List: Yes

### 9. PHYSICAL & CHEMICAL PROPERTIES

- Physical State at 15°C and 1 atm: Gas
- Molecular Weight: 17.03
- Boiling Point at 1 atm: -28.1°F = -33.4°C = 239.8°K
- Freezing Point: -108°F = -77.7°C = 265.5°K
- Critical Temperature: 271°F = 133°C = 406°K
- Critical Pressure: 1636 psia = 111.3 atm = 11.27 MN/m<sup>2</sup>
- Specific Gravity: 0.682 at -33.4°C (liquid)
- Liquid Surface Tension: Not pertinent
- Liquid Water Interfacial Tension: Not pertinent
- Vapor (Gas) Specific Gravity: 0.6
- Ratio of Specific Heats of Vapor (Gas): 1.3 at 20°C
- Latent Heat of Vaporization: 589 Btu/lb = 327 cal/g = 13.7 X 10<sup>3</sup> J/kg
- Heat of Combustion: -7992 Btu/lb = -4440 cal/g = -185.9 X 10<sup>3</sup> J/kg
- Heat of Decomposition: Not pertinent
- Heat of Solution: -232 Btu/lb = -129 cal/g = -5.40 X 10<sup>3</sup> J/kg
- Heat of Polymerization: Not pertinent
- Heat of Fusion: Currently not available
- Limiting Value: Currently not available
- Reid Vapor Pressure: 211.9 psia

### 7. SHIPPING INFORMATION (Continued)

- IMO Pollution Category: Currently not available
- Ship Type: 2
- Barge Hull Type: 2

## AMMONIA, anhydrous

9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour-square foot-F	Temperature (degrees F)	Centipoise
-105	42.070	-75	1.041		N		N
-100	42.200	-70	1.043		O		O
-95	42.310	-65	1.046		T		T
-90	42.410	-60	1.049				
-85	42.500	-55	1.052		P		P
-80	42.570	-50	1.054		E		E
-75	42.630	-45	1.057		R		R
-70	42.680	-40	1.060		T		T
-65	42.720	-35	1.063		I		I
-60	42.740	-30	1.066		N		N
-55	42.750				E		E
-50	42.750				N		N
-45	42.730				T		T
-40	42.700						
-35	42.660						
-30	42.600						

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	M	-40	10.470	-40	0.03957	0	0.487
	I	-35	12.080	-35	0.04514	25	0.494
	S	-30	13.900	-30	0.05132	50	0.501
	C	-25	15.940	-25	0.05816	75	0.508
	I	-20	18.220	-20	0.06573	100	0.515
	B	-15	20.760	-15	0.07406	125	0.523
	L	-10	23.590	-10	0.08322	150	0.530
	E	-5	26.730	-5	0.09326	175	0.538
		0	30.210	0	0.10420	200	0.546
		5	34.040	5	0.11620	225	0.554
		10	38.270	10	0.12930	250	0.562
		15	42.920	15	0.14340	275	0.571
		20	48.020	20	0.15880	300	0.579
		25	53.600	25	0.17540	325	0.588
		30	59.690	30	0.19340	350	0.597
		35	66.330	35	0.21270	375	0.606
		40	73.549	40	0.23350	400	0.615
		45	81.400	45	0.25590	425	0.625
		50	89.900	50	0.27980	450	0.635
		55	99.099	55	0.30550	475	0.645
		60	109.000	60	0.33290	500	0.655
		65	119.700	65	0.36210	525	0.665
		70	131.299	70	0.39320	550	0.675
		75	143.699	75	0.42630	575	0.686
		80	157.000	80	0.46150	600	0.697
		85	171.199	85	0.49870		

VAPOR PRESSURE - P.S.I.A.

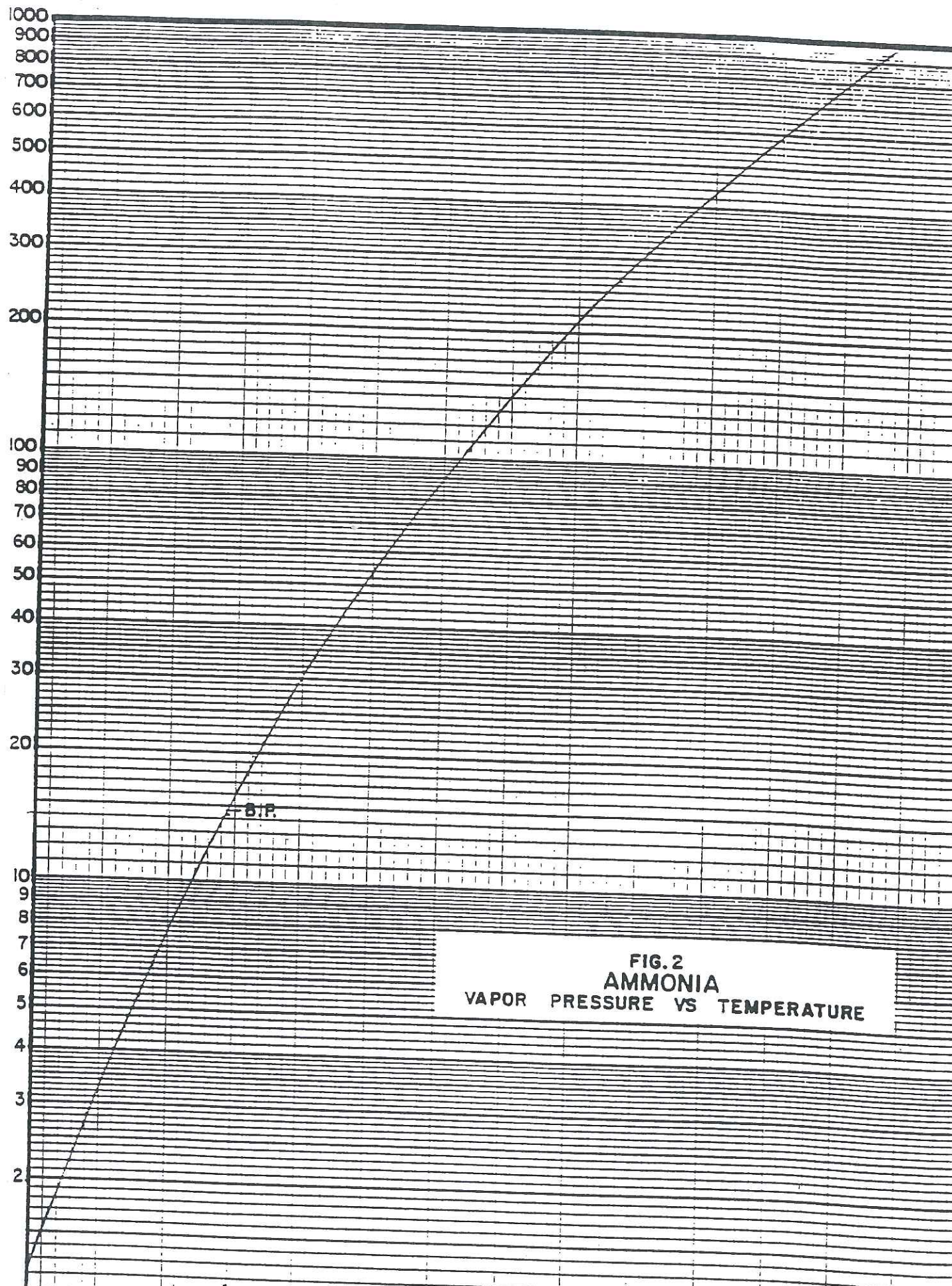


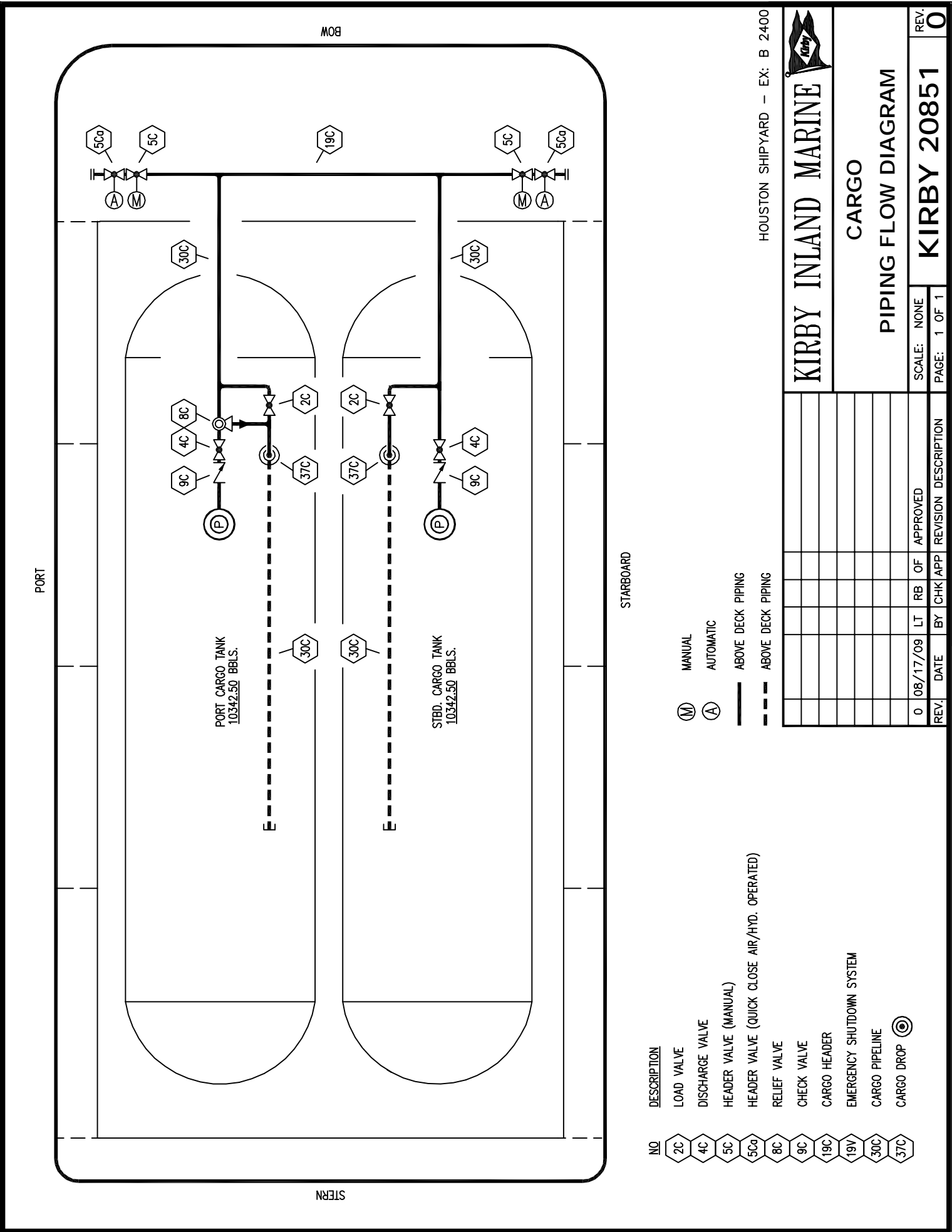
FIG. 2  
AMMONIA  
VAPOR PRESSURE VS TEMPERATURE

## **SECTION 155.750 (a) (2)**

### **PIPING DIAGRAM**

This section compiles with 33 CFR 155.750 (a) (2) with regard to the piping diagram. It includes the following:

1. Piping Diagram
2. Explanation of Symbols to Piping Diagram



HOUSTON SHIPYARD - EX: B 2400



**KIRBY INLAND MARINE**

**CARGO**

**PIPING FLOW DIAGRAM**

REV.	DATE	BY	CHK	APP	LT	RB	OF	APPROVED	REVISION DESCRIPTION	SCALE: NONE	PAGE: 1 OF 1	REV.	0
------	------	----	-----	-----	----	----	----	----------	----------------------	-------------	--------------	------	---

- NO DESCRIPTION
- 2C LOAD VALVE
- 4C DISCHARGE VALVE
- 5C HEADER VALVE (MANUAL)
- 5Ca HEADER VALVE (QUICK CLOSE AIR/HYD. OPERATED)
- 8C RELIEF VALVE
- 9C CHECK VALVE
- 19C CARGO HEADER
- 19V EMERGENCY SHUTDOWN SYSTEM
- 30C CARGO PIPELINE
- 37C CARGO DROP
- (M) MANUAL
- (A) AUTOMATIC
- ABOVE DECK PIPING
- - - ABOVE DECK PIPING

## **SECTION 155.750 (a) (3)**

### **NUMBER OF PERSONS ON DUTY**

No person shall act as the person in charge of anhydrous ammonia cargo transfer operations on more than one vessel at a time during transfers between vessels or between two or more vessels and a facility. The person in charge shall be a certified tankerman who must hold a USCG tankerman (PIC-LG) endorsement. The person in charge shall be aboard the barge at all times unless he is properly relieved or the cargo transfer operations have stopped.



## **SECTION 155.750 (a) (4)**

### **DUTIES OF TANKERMAN (PERSON IN CHARGE)**

The tankerman (PIC-LG) is responsible for transferring anhydrous ammonia cargo and carrying out related operations on board in an efficient, safe, and pollution free manner.

The tankerman (PIC-LG) shall:

1. Have on board a valid merchant marine credential endorsed as a tankerman (PIC-LG), who is certified to handle Liquid Gases.
2. Make a thorough inspection of the barge prior to the start of the transfer and check the following:
  - a. Hull condition
  - b. Pressure and temperature gauge accuracy
  - c. Any valve or safety valve for leakage
  - d. Fire extinguisher condition and number
  - e. Piping diagram and strappings for correctness and completeness
  - f. Warning signs, flag, night warning light, shut down sign
  - g. Condition of shutdown devices including air control system valves and regulators
  - h. Operability of cargo tank magnetic stick gauges and digital float gauge (DFG)
  - i. Self-Contained Breathing Apparatus (SCBA) readiness
3. In addition the tankerman shall ensure that:
  - a. The barge moorings are strong enough to hold during all expected conditions of surge, current and are long enough to allow for changes in draft, drift, and tide.
  - b. The cargo hose/arm is long enough to allow the barges to move within the limits of its moorings without placing a strain on the cargo hose, loading arm or piping system.
  - c. Each cargo hose/arm is supported to prevent chaffing, kinking, or other damages to the hose/arm or couplings.
  - d. Each transfer system is aligned to allow the proper flow of cargo.
  - e. Part of the transfer system not in use is securely blanked and shut off.

- f. Each end of hose or loading arm that is not use is securely blanked by using a bolt in every hole and a new gasket.
- g. Each cargo hose has no loose covers, kinks, bulges, soft spots, gouges, cuts, or slashes that penetrate the first layer of reinforcement.
- h. All connections in the barge cargo transfer system are leak free...
- i. The communications require for the cargo transfer systems are adequate and tested.
- j. Tankerman (PIC-LG) is at the site of the cargo transfer and immediately available.
- k. Tankerman (PIC-LG) confirms the transfer procedures are on the barge.
- l. Transfer is conducted in accordance with the barge transfer procedure.
- m. Tankerman and facility dock person in charge (PIC-LG) both speak English.
- n. A pre-transfer conference is held with the person in charge of the dock facility and both PICs understand the following details of the transfer:
  - 1) The identity of the product being transferred
  - 2) The sequence of cargo transfer operations
  - 3) The cargo transfer rate, pressure, and temperature
  - 4) The name, or title, and location of each person involved in the transfer operations
  - 5) Details of the facility and barge transferring and receiving systems
  - 6) Critical stages of the transfer operations
  - 7) Federal, state, and local rules that apply to the transfer
  - 8) Emergency procedure
  - 9) Cargo spill or release mitigation and containment procedures
  - 10) Cargo spill and/or release reporting procedures
  - 11) Watch or shift arrangements
  - 12) Cargo transfer shutdown procedures
- o. The persons in charge of cargo transfer operations for the vessel and facility must agree on the transfer operations prior to transfer.
- p. The cargo transfer operation is lighted between sunset and sunrise.
  - 1. Energized proper illumination, proper navigation & warning lights

## **SECTION 155.750 (a) (5)**

### **TENDING VESSEL MOORINGS DURING TRANSFER OPERATIONS**

Proper mooring of the barge is essential for both safety and pollution prevention. You may not transfer cargo to or from a barge unless their moorings are strong enough to hold in expected conditions of surge, current, and weather. The mooring lines must be long enough to allow for changes in draft, trim, surge and tide during transfer operations.

All conditions at the facility dock must be considered to determine the adequate size, proper lead and the number of lines necessary. Be sure that all mooring lines have the proper lead and are secure.

Be particularly mindful of facility docks with high and low mooring dolphins, etc. It may be necessary to shift from lower mooring supports to higher or vice versa, as the barge draft or deck level height changes due to cargo or tides.

When mooring the barge, as a MINIMUM standard, the Barge PIC should ensure that no less than (6) (six) adequate mooring lines are used in the following manner:

- (1) Towing lines
- (2) Backing lines
- (3) Spring lines
- (4) Breast lines

# **ANHYDROUS AMMONIA TRANSFER PROCEDURES**

## **LOADING CARGO**

1. Check the barge and all components of the cargo refrigeration system prior to arrival at the terminal. Make sure that the barge is ready to be loaded, the system is fully operational, and the barge is capable of refrigerating the incoming cargo. Check the accuracy of cargo tank pressure gauges.
2. Check the liquid level gauge and high level indicator for each cargo tank. Note the maximum loading level of each cargo tank, so you will be aware as you approach the topping-off level.
3. Check all the cargo transfer system valves. Make certain that all discharge valves are closed and the loading valves are open.
4. Have all the necessary nuts, bolts, gaskets, hand tools, and quick action spill kit assembled near the cargo header when you reach the terminal.
5. Have all the PPE, respiratory protection, portable radio and approved flashlights readily available when you reach the cargo transfer terminal.
6. Put on correct PPE. Connect cargo crossover hose, if required. Hook up the cargo hose or loading arm. Make certain you have two persons to make the cargo transfer hose/arm flange connections. Request additional assistance if necessary. When handling cargo hoses/arms always stay upwind and on the inboard side of the hose/arm.
7. With the facility dock operator (PIC), check the dock emergency shutdown switches to make sure they are in the correct ON position. Open the air actuated emergency shutdown valves. Make sure that each valve is fully opened. Check the barge emergency shutdown system by activating the system in the presence of the terminal PIC operator. Both PICs must make certain that the system works and that all barge header valves close. Check every barge shutdown station for each cargo transfer. Any malfunction must be repaired prior to starting cargo transfer.

8. Layout, on the barge, a water hose that is capable of providing a water spray in the area of the cargo transfer pipeline header. The hose should have an adjustable nozzle and must be charged with water during cargo transfer operations. Do not allow a water hose to leak water onto the deck where you will be walking during transfer. This water is provided for emergency decontamination.
9. If the water hose is provided by the terminal, it must be long enough to reach the transfer header and pumps. If more than one barge is being transferred the water hose must be capable of reaching the outside or most distant barge.
10. The tankerman (PIC-LG) shall discuss the cargo transfer procedure with the facility dock person in charge. Both PICs must understand what they are about to do and are ready to commence the cargo transfer.
11. Establish a communication system that enables you to talk with the facility dock operator (PIC) throughout the anhydrous ammonia cargo transfer. Make periodic checks of the system to ensure that everyone is on station and monitoring the cargo transfer. Make certain all portable radios are on same frequency and have adequate battery power.
12. Have respiratory protection equipment on your person, immediately available at all times, during cargo transfer. The respirator mask and ammonia canister must be ready for use and adequate for the service. Do not leave personnel protective equipment in an area where it could be inaccessible in the event of an emergency. The SCBA (30 minute air pack) shall be positioned upwind/cross wind and away from the barge pipeline header and/or cargo pumps. Ensure you can safely reach and don the equipment in the event of an emergency.
13. The initial stages of an anhydrous ammonia cargo transfer are extremely important. You must maintain a leak free cargo transfer. Start loading at a slow rate. Check barge liquid line flange connections for leaks. Monitor the tank pressure gauge until the cargo tank internal pressure stabilizes within safe limits up to 7.5 PSI. Take into account the cargo tank head pressure rate increase and the ability of the tankerman to regulate the rate of cargo tank pressure change. Ensure the barge safety relief valve setting of 10 PSI is not reached. Make

certain that the cargo transfer is proceeding safely before you allow the facility dock operator (PIC) to increase cargo liquid transfer to the normal cargo load flow rate. Make sure tankerman (PIC-LG) and the facility dock operator (PIC) both understand what the agreed upon maximum cargo transfer rate will be. Confirm the maximum anhydrous ammonia liquid level for each barge cargo tank. Once barge cargo tank pressure has stabilized within safe limits, begin checking cargo liquid levels.

14. Monitor the mooring lines as cargo transfer operations progress. Keep the barge securely moored in place but do not allow a heavy strain on mooring lines or transfer equipment.

15. Continue to closely monitor cargo tank pressure and liquid level throughout the loading process. As the cargo liquid approaches within one foot (1 ft.) of maximum level, advise the facility dock operator (PIC) to reduce the cargo transfer rate so cargo tanks can be safely topped off.

16. Upon a completion of the barge cargo tanks top-off, secure all the necessary barge loading valves. Cargo hoses/arm and headers must be drained to the barge cargo tanks or the dock facility prior to disconnecting the hose/arm. All necessary PPE must be worn throughout the hose/arm disconnect phase of transfer operations. Disconnect the cargo hoses, replace all blind flanges, and store all equipment. Monitor the cargo tank pressures and cargo liquid level closely.

17. During the barge cargo transfer, when a tankerman relief is required, the oncoming tankerman must verify the barge cargo transfer status, and sign the DOI prior to assuming control of the cargo transfer. Communication systems between the barge and facility shall be checked at every PIC watch change.

18. In the event of any emergency, the anhydrous ammonia cargo transfer shall be stopped, the situation made secure, and the emergency response plan implemented. Assure that all notification of appropriate personnel and agencies are completed. On scene barge cargo release response shall be governed by the vessel emergency response plan.

## **ANHYDROUS AMMONIA TRANSFER PROCEDURES**

### **CARGO DISCHARGE**

1. Approximately two (2) hours before arrival at the facility dock, the barge fuel oil tanks must be topped off. Transfer fuel to the ammonia barge according to the vessel fuel oil transfer procedures.
  
2. Check the pump engine oil, start the engine and allow it to warm up with the cargo pump PTO disengaged. Check for the leaks in the barge fuel oil system, look for lube oil leaks, and watch for unusual vibration as the barge engine idles. In cold weather, (temperatures below 45 degrees) start this procedure six (6) hours before arrival at the cargo discharge terminal.
  
3. Check the cargo tank liquid levels and high level indicator prior to arrival at the facility dock. While the barge pump engine is warming up prior to cargo discharge point arrival, check the barge air actuated emergency shutdown device (ESD), pump engine emergency shutdown, and pipe line header quick closing valves. Report any emergency shutdown system failures to the towing vessel Captain.
  
4. Have all the necessary barge cargo transfer hand tools assembled at the barge pipeline header flange connections.
  
5. Check your barge pipeline headers and make certain that they are ready for the specific dock facility. Have the correct pipeline reducer or elbow securely in place prior to the facility dock arrival. The correct PPE must be worn by barge personnel during barge pipeline flange connection work.
  
6. Make certain that you have an adequate supply of the correct size bolts, nuts, and gaskets.
  
7. Protective clothing, respiratory protection, portable radio, and approved flashlights must be assembled on the barge and ready to use.
  
8. The cargo transfer DOI must be completed together with the facility dock operator (PIC) and the barge tankerman (LG-PIC). With the facility dock

operator (PIC), check the barge and dock emergency shutdown switches to make sure they are in the correct ON position. Open barge header valve(s). Make sure that each valve is fully opened. Check emergency shutdown system by activating the system in the presence of the terminal operator. Both PICs must make certain that the ESD system works. All header valves must close as well as the barge pump engine shutdown. Check every barge shutdown station each time. Any ESD malfunction must be repaired prior to starting cargo transfer. Implement the vessel emergency procedures. Notify the vessel Captain of any ESD malfunction.

9. Put on PPE appropriate for anhydrous ammonia. Hookup barge cargo crossover hose, if necessary. Make certain that two crewmembers are on hand to assist in cargo hose hookup
10. Hookup dock cargo hose or arm. Request additional assistance, if necessary. When handling a cargo hose/arm always stand upwind and on the inboard side of the cargo hose/arm.
11. When an independent cargo surveyor takes pressure and temperature readings, the tankerman (PIC) must record separate pressure and liquid level measurements at the same time.
12. Layout a fresh water hose that is capable of providing a water spray in the vicinity of the barge cargo pipeline header. The hose should have an adjustable nozzle and must be charged during transfer operations. Do not spray water on liquid ammonia. When the hose is provided by the anhydrous ammonia terminal, it must be long enough to reach the barge pipeline header and cargo pumps. If more than one barge is being transferred the hose must be capable of reaching the outside or more distant barge. The water hose is provided for emergency decontamination.
13. Have respiratory protection equipment on the tankerman at all times during cargo transfer. The respirator mask and ammonia vapor canister must be ready for use and adequate for the service. The self-contained breathing apparatus (SCBA) shall be stored away from the cargo pipeline headers and cargo pumps and up or cross wind. This enables the SCBA to be safely donned in the event of an emergency.



14. Barge tankerman (PIC-LG) shall discuss the cargo transfer with the facility dock person in charge. Making sure everyone understands the procedures and the facility is ready for the cargo transfer to begin.
15. Establish a communication system enabling to the barge (PIC-LG) to communicate with the facility dock operator PIC throughout the cargo transfer. Make periodic communications checks to ensure that everyone is on station and monitoring the cargo transfer. The initial barge cargo discharge stages are extremely important. Maintain a leak free transfer. Make frequent cargo tank liquid level checks. Be certain that you are discharging cargo from each tank. Do not allow liquid cargo back flow from one barge tank into another.
16. Start barge pump engines, engage the PTO, and slowly increase pump engines speed to normal operating RPM. Check the entire barge transfer system for cargo or fuel leaks. If leaks are present, shut down the cargo transfer, don necessary PPE, and stop all leaks safely.
17. Check with facility dock operator for cargo flow into the facility.
18. Monitor the mooring lines as cargo transfer operation progress. Keep the barge securely moored in place but do not allow a heavy strain on the mooring lines or transfer equipment.
19. If any cargo tank liquid level stops going down or begins to increase, shut down the cargo transfer and close barge header valve. Determine why there is cargo liquid back flow into the tank. Failure to monitor engine RPM, barge tank levels, and pump pressure can allow a liquid cargo backflow. Maintain a level barge draft during the cargo discharge operation.
20. The barge tankerman (PIC-LG) shall maintain radio contact with the standby vessel wheel house watch stander and the facility dock operator (PIC) at all times during barge cargo transfer.
21. Any relief of personnel during the transfer requires the oncoming watch to verify the cargo transfer status, and sign the Declaration of Inspection (DOI) prior to assuming control of the barge cargo transfer. Cargo transfer

communication systems to the standby towing vessel and the facility shall be tested at every tankerman (PIC-LG) watch change. When cargo discharge operations are completed, the cargo hoses/arm and headers must be drained to the cargo tanks or back to the dock before hoses are disconnected. Make certain all cargo vapor pressure is bled off the piping/hose/arm prior to loosening nuts on flange bolts. Respiratory protection and personnel protective equipment must be worn throughout the hose/arm flange disconnect.

22. In the event of any barge/facility emergency, the cargo transfer shall be stopped and the situation made safe for personnel. Report any emergency or barge system failures to the towing vessel Captain immediately. Implement the vessel standard operating emergency procedures.

## **SECTION 155.750 (a) (9)**

### **PROCEDURES FOR RESPONDING TO AND REPORTING CARGO DISCHARGE**

1. In the event of an anhydrous ammonia cargo spill or release during cargo transfer operations, the most important consideration is personnel safety. When possible, locate the source of the release, isolate the area, evacuate the downwind vapor release zone, and safely stop or limit the discharge.
2. Notify dock facility person in charge.
3. Once immediate initial response actions have been carried out, initiate the Kirby Inland Marine standard operating procedures for emergency notification.
4. Ensure that the National Response Center is notified.
5. Contact the local USCG.

## **SECTION 155.750 (a) (10)**

### **PROCEDURES FOR CLOSING & OPENING THE VESSEL OPENINGS**

The anhydrous ammonia barge hull and hopper have voids, which could provide a great deal of space for the influx of water from rain or the waterway. This could compromise barge load limits and barge stability. Hatches over the barge void spaces shall only be opened for void inspection purposes. During the cargo transfer, void hatches need not be totally dogged down since the tankerman (PIC-LG) conducts frequent barge void inspections. After the barge cargo transfer, and while in transit, the void hatches must be totally secured. When voids or rakes are opened periodic for inspection during transit or in fleets, the hatches must be re- secured properly.

## **SECTION 155.750 (a) (11)**

### **HOSES**

1. Cargo hoses for LG service, whether provided by the barge/boat or terminal, must be made of flexible metal and fabricated of seamless steel pipe and flexible joints of steel or other suitable material resistant to the action of the cargo.
2. The Maximum Allowable Working Pressure (MAWP) of the hose shall be marked on it. The pressure as marked shall at least be 150 psig for use with this barge. Most will be marked with a 150 psig MAWP rating.
3. In addition to the MAWP, the date of manufacture and date of the biannual (2 yrs.) required pressure test should be marked on the hose. Further the cargo hose must be either marked for Liquefied Gas service or for the cargo specific liquefied gas. Ensure that the pre-transfer inspection procedures for hoses as outlined in Section 155.750 (a) (4) are met.

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