TANK BARGE
CARGO TRANSFER PROCEDURES

BARGE SERIES
AEP 10001-10020

As required by 33 CFR 155.750(a)

Operator:

AEP River Operations
16150 Main Circle Dr
Suite 400
Chesterfield, MO 63017

REPORT ALL SPILLS TO:

U.S. Coast Guard National Response Center
(800) 424-8802
Barge Name: AEP 10001
Official Number: 1250921
Builder / Year: JEFFBOAT / 2014
Hull #: 13-2809
Home Port: ST. LOUIS, MO
Gross Tons: 735
Displacement Tons: 424
Length (Molded): 200'-00"
Breadth (Molded): 35'-00"
Depth (Molded, Deck at Side): 12'-06"
Cargo Tank Capacity (100%): 11,066 Barrels
155.750(a) (1) PRODUCTS TO BE TRANSFERRED:
A. The products carried by each barge are listed on the Certificate of Inspection for that particular barge. The Certificate of Inspection is available on the barge and a copy of each Certificate is available from the AEP River Operations office.
B. For loading operations consult loading plans or other instructions issued by the shore facility operator to determine the names of the petroleum or chemicals to be loaded. Before beginning transfer operations, obtain information on safety, fire and personnel protection from cargo information cards and Material Safety Data Sheets (MSDS) received from shore facility personnel. The information must be in written form and on board the vessel. Only products authorized by the Certificate of Inspection may be loaded.
C. For Unloading Operations consult the barge cargo manifest and / or shipping papers for the names of the petroleum or chemicals to be unloaded. For hazard and reactivity data see the Cargo Information Card and / or the MSDS.
D. These procedures do not apply to split loading. Contact the Barge Maintenance office in Chesterfield, MO for specific instructions if this barge is scheduled to receive a split load.

155.750(a) (2) DESCRIPTION OF TRANSFER SYSTEM:
A. The barge is a 200’X35’X12.5’ double hull, tank barge with 3 integral gravity cargo tanks. All transfer connection points are located near the bow.
B. PIPING & VALVES: The cargo tanks are fitted with below deck fixed piping connected to the cargo pump. The piping system can be isolated from the pump by closing the pump block valve located on the suction side of the pump. An isolation valve is located in each cargo tank near the suction bell. The cross header connecting to the below deck piping via risers is located above deck on the bow, near the pump engine. Each outboard end of the cross header is equipped with a valve. Each side of the crossover header can be isolated by closing the Cargo Header Block Valve, located near the centerline. The pump can be isolated from the discharge cross header by closing the block valve located on the discharge side of the pump (Pump Discharge Valve). The below deck piping can be isolated from the cross header by closing the Cargo Fill valve...
C. CARGO VENTING: A High Velocity Pressure Vacuum Relief valve (P/V valve) is mounted on the vapor collection header to provide the required venting when loading... This design considered the maximum loading and discharge rate of 3,500 gallons per minute (5,000 Barrels per hour). Vs. the flow rates of the P/V valve. The P/V valve is constructed with integral, internal, stainless steel, 30X30 mesh flame screens. They are set to relieve at +6.0 PSI Pressure and -2.0 PSI Vacuum. The settings are verified by bench testing annually. This model valve is equipped with a check feature to allow manual verification of the operation of the valve
D. Cargo Pump - The vessel is equipped with a fixed, vertical lift cargo pump driven by a diesel engine. The engine is located on deck and connected to the pump via a right angle drive gear system.
E. DISCHARGE CONTAINMENT: The discharge containment consists of two large semi-enclosed tanks; one located at each end of the header lines. Each tank has a capacity of at least 3 barrels and is equipped with a drain line for the removal of liquid collected in them. Prior to any transfer operation, check to ensure that containment areas are properly drained and the plugs or caps are installed. Never drain the containment on deck. The containment should be empty at the start of the transfer and before the barge leaves. All liquid must be stripped or drained off before the barge leaves the dock or vessel.
F. STRIPPING SYSTEM: The barge is equipped with 2” pipes led to the bottom of each tank and equipped with a valve and a blind flange. The purpose of the pipes is to facilitate stripping the cargo heels from the tanks
G. For details of this piping system, consult the attached piping diagram.
155.750(a) (3) PERSONS REQUIRED:
At least two qualified persons are required for cargo transfer. One person on the barge and one person on the dock. The person on the barge shall be the person in charge of the transfer. The person in charge of the transfer shall have a Merchant Mariner’s Credential issued by the U.S. Coast Guard, which is endorsed as Person in Charge for Dangerous Liquid Transfers.

When the terminal at which the barge is being loaded has received specific approval from the U.S. Coast Guard to do so, two barges may be loaded/unloaded simultaneously with one person in charge for both barges.

Special Requirements: The person in charge (PIC) shall ensure only necessary personnel who are properly trained and PPE equipped are on board during transfer of the following products: formic acid, amines, acrylonitrile, adiponitrile, acetonitrile, or aniline.

155.730 (4) DUTIES OF THE PERSON IN CHARGE:
A. Prior To Transfer:
1. Check all barge moorings to ensure that they are properly secured and in satisfactory condition. Reference section 155.750(a)(5) as to number and size.
2. Examine deck and hull. Open and look into all void spaces to ascertain that there are no abnormal conditions that could affect the safe transfer of the cargo. All man way hatches are to be secured upon completion of this examination.
3. Check to ensure the following documents are on board and are valid:
   (1) U.S. Coast Guard Certificate of Inspection (and endorsed for the product being transferred).
   (3) Vessel Response Plan required notification checklist and mitigation procedures to use in event of accidental discharge and notarized copy of the approval letter.
   (4) Vapor Tightness Certificate.
4. Examine the Cargo Information Card or MSDS to obtain information concerning cargo hazards, reactivity and safety and whether or not this cargo requires vapor control.
5. Confirm with the facility Person in Charge on whether or not a sample is to be drawn. If needed, the sample will be drawn at the ship or barge tanks prior to cargo entering a tank. If the sample is approved by the customer’s surveyor the cargo transfer can commence, if not then the cargo is to be slopped until a good sample is received and approved.
6. Review static electricity precautions and the initial transfer rate found at the end of these procedures.
7. Visually inspect cargo piping and containment systems for cleanliness, remaining cargo and abnormal conditions. PIC must not break seals (if installed) without approval of the facility/shipper and must wear appropriate PPE.
8. Place on board two, approved type, B-II portable fire extinguishers.
9. Connect cargo hoses or loading arms from dock to appropriate header on the bow of the barge. Use a full set of flange bolts and the proper size gasket for each connection. The connections must be securely bolted with a bolt in every hole.
10. Check the valve on the opposite (unused) side of the headers to ensure that they are closed and that a blind is secured on the flange using a full set of bolts.
11. Check the operation of the P/V valve.
   (1) Operate the handle on the side of the valve to check that mechanism is free and operating properly.
       Check the operation of both the pressure and vacuum side. Push down the handle to check the vacuum
       relief and lift the handle to check the pressure relief.
   (2) If the mechanism is not operating properly, the valve will require dismantling for cleaning or repair.
12. Check the grounding cable (if used) to ensure that it is properly connected or that an isolating flange has
    been properly installed.
13. Report all maintenance issues for resolution to AEP River Operations Tank Barge group: (636) 530–2123
14. Establish a means for continuous communications with the Person in Charge at the facility. The method
    selected must be effective during all phases of the transfer.
15. Consult with the Facility Person in Charge concerning details of the transfer and ensure that each person in
    charge understands the following details of the transfer operation:
       (1) The identity of the product to be transferred and approximate amount to be transferred
       (2) The sequence of transfer operations;
       (3) The transfer rate;
       (4) The name or title and location of each person participating in the transfer operation;
       (5) Details of the transferring and receiving systems;
       (6) Critical stages of the transfer operation;
       (7) Federal, state, and local rules that apply to the transfer of oil or hazardous material;
       (8) Emergency procedures;
       (9) Discharge containment procedures;
       (10) Discharge reporting procedures;
       (11) Watch or shift arrangement;
       (12) Transfer shutdown procedures;
16. Complete and sign the "Declaration of Inspection".
17. Open the cargo control valves at the cargo tanks.
18. Ensure a proper flame screen is in place on all tank openings.
19. Uncap the stick gauges and engage the stick gauge magnet with the float magnet.
20. Inform the facility Person in Charge that the barge is ready for transfer.
21. When the facility Person in Charge informs you that the facility is ready for transfer, open the cargo control
    valves on the headers.
22. Check all connections, including the blind flanges on the unused ends of the headers to insure that there are
    no leaks.
       (1) If leaks are detected, stop the transfer until the cause is determined and corrected.
       (2) Fully drain the system prior to disconnecting hoses to change out any defective gaskets
23. Confirm cargo is transferring to or from the proper cargo tanks.
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DUTIES OF THE PERSON IN CHARGE: (continued)

C. During Transfer:

1. Check mooring lines frequently, at intervals of not more than 30 minutes and adjust as necessary. In conditions where the barge is surging due to passing vessels or high winds, additional mooring lines will be used to ensure a secure mooring.

2. Monitor cargo levels in the tank by observing the ladder rungs and stick gauges at the gauging tubes. Make sure to inspect wing voids for any water accumulation during the loading process.

3. No cargo transfer operations will be conducted when electrical or thunderstorms are in the vicinity.

4. Constantly monitor cargo transfer operation to guard against an accidental discharge of oil. Minimize the number of tank openings to prevent contamination of cargo containment spaces.

5. When pumping cargo:
   (1) Check the pump drive engine:
      (a) inspect belts to insure they are tight and in good condition.
      (b) Check fluid levels including oil, water and fuel.
      (c) Insure emergency shut down mechanism is set and cable is free and operating properly.
      (d) Start the engine and allow it to warm up.
   (2) Prime the pump:
      (a) Opening the tank valve closest to the pump.
      (b) Open the burp valve to bleed air off the pump allowing the deep well to be filled with liquid.
   (3) After receiving agreement to begin the transfer:
      (a) Engage pump at a slow rate (about 1000 rpm)
      (b) Inspect for leaks at all valves, gaskets and pump
      (c) Shut down if leaks occur prior to tightening bolts to stop leaks.
   (4) Bring up to maximum discharge rate after inspection for leaks has occurred.
   (5) Establish the maximum rpm to operate your pump engine
   (6) Establish the maximum pump pressure (Approximately 100 psi at the pump pressure gauge)
   (7) Pump all tanks simultaneously until liquid level in each tank is reduced so the one meter stick has fully dropped, then begin the process of manipulating the cargo tank valves to complete unloading the tank furthest from the pump first, then empty tanks in sequence to the pump.

155.750(a) (5) TENDING OF MOORING LINES

Upon boarding the barge, whether at anchorage or at a terminal, it shall be the responsibility of the Person-in-Charge to check the mooring lines to see that they are in good condition, adequate in number and properly secured. Present and expected conditions of wind, weather, tide, and draft changes due to cargo loading shall be taken into account when checking mooring lines. PIC shall meet all facility mooring requirements of number and size of lines before transferring cargo.

Promptly report any frayed or broken mooring lines so that they may be replaced. When shift boats other than AEP River Operations’ boats are used, be sure that they place sufficient lines on the barge before dismissing the shift boat. If for any reason the shift boat refuses to leave sufficient lines, notify the dispatcher (636- 530–2123) immediately.
DUTIES OF THE PERSON IN CHARGE: (continued)

155.750(a) (6) EMERGENCY SHUTDOWN AND COMMUNICATIONS

Emergency Shut Down:
This vessel is equipped with a pump driven by a diesel engine. In the event of an emergency during unloading operations, the flow of cargo may be stopped by pulling the remote shut down cable located near the center of the barge and marked with a sign. The tankerman must verify the shut down operates before each transfer.

The tankerman shall discuss emergency shutdown procedures with the vessel or facility prior to the transfer of cargo. This discussion should include:

1) Circumstances requiring the transfer to stop immediately,
2) Primary and secondary means of communication,
3) Valves to be closed, location of the shutdown cable, and other actions to be taken in the event of an emergency,
4) How long it will take for the shutdown to take effect (is it immediate or does it take several minutes in order to avoid rupturing lines)

Communications:
Communications shall be established, between the terminal (or vessel) and the barge before the transfer hoses are hooked up. Communications must be maintained until the transfer is complete and hoses are disconnected. PIC must routinely check communication at least every 2 hours. If portable radio devices are used, they must be intrinsically safe and meet the requirements of 46 CFR § 110.15-100(I) Class I, Division I, Group D as defined in 46 CFR § 111.80

If at any time during transfer operations communications are interrupted, STOP ALL TRANSFER OPERATIONS and do not resume until communications have been re-established.

C. 155.750(a) (7) PROCEDURES FOR TOPPING OFF TANKS

1. Person in Charge (PIC) of the loading will determine cargo compartment(s) and sequences to be used during the topping off procedures. The PIC must consider such factors as cargo compartment size, outage space, cargo amount to be topped off, vessel trim, vessel draft, cargo compartment openings before selecting the cargo compartment to be topped off. The topping off procedure must be done without spillage of any cargo outside the cargo compartment while maintaining proper vessel trim/draft.

2. Definite agreement with the shore personnel concerning the rate of flow for topping off and final shut down must be reached prior to the topping off operation.

3. When cargo tanks are nearing the desired loading, regulate the cargo rate using the cargo control valves at each tank. Advise the Facility Person In Charge (F-PIC) approximately 1 hour, 30 minutes, 15 minutes, and 5 minutes prior to competing top off

4. Do not load the tanks so as to exceed the loading restrictions on the Certificate Of Inspection. Adequate room to permit expansion of the product should remain in each tank. In no case should a tank be loaded above 10" from the deck (ullage) at the gauge point.
DUTIES OF THE PERSON IN CHARGE: (continued)

5. As each tank is topped off, the compartment and associated block valves should be closed.
6. When topping off is complete, close the header valves.
7. After the transfer is complete, gently push the sticks on the gauges back into their tubes and replace the cap.

WHEN COMPLETING PUMPING CARGO:

1. When cargo tanks are nearing empty, regulate the cargo rate using the cargo tank control valves at each tank. The tank farthest from the pump should complete first and the remaining tanks making empty sequentially, with the tank that the pump is located in finishing last.
2. Close the cargo tank control valve as the product begins to reach the bottom of each tank to prevent pulling too much air into the pump causing it to drop suction.
3. Slowing of discharge rate as the product level gets below the pipeline in the tank closest to the pump.
4. Fully close the last tank valve as the tank is fully drained and pump loses suction.
5. Allow the cargo surveyor to observe the tanks empty prior to draining cargo back to the last tank to empty the hose to prepare for hose disconnect.

D. 155.750(a) (8) PROCEDURES FOR ENSURING VALVES ARE CLOSED

1. Close and dog down all cargo hatch covers, ullage opening covers and gauge tube plugs.
2. Check all cargo control valves to ensure they are tightly closed.
3. Disconnect cargo hoses or loading arms from the headers and secure the ends with a suitable blind flange, gasket and full set of bolts.

155.750(a) (9) PROCEDURES FOR REPORTING DISCHARGES OR OIL OR HAZARDOUS MATERIAL

In the event of any irregularities, perceived unsafe conditions or emergencies on board this barge prior to, during or after cargo transfer operations, immediate notice must be given to AEP River Operations, 16150 Main Circle Dr, Suite 400, Chesterfield, MO 63017: AEP emergency contact number (855-286-1454)

In the event of a cargo spill into the water immediately notify:

1. The receiving vessel or facility to stop the transfer.
2. U.S. Coast Guard National Response Center (800) 424-8802
3. AEP 24 Hours Emergency Contact: 855-286-1454

Use the Emergency Notification Checklist (Appendix B of the Vessel Response Plan) to assist you with the notifications. It is located with the COI in the barge mailbox.
155.750(a) (10) PROCEDURES FOR CLOSING AND OPENING VESSEL OPENINGS

Only the Person-in-Charge of the transfer, or a person designated by the Person-in-Charge, may open or close any vessel opening that maintains the seaworthy condition of the tank vessel and prevents the inadvertent release of cargo in the event of an accident. All vessel openings must be closed after the cargo transfer is complete.

155.750(a) (11) TRANSFER HOSES

If an oil or hazardous material transfer hose is used it must be marked with the test date and name of the product which it can be used for. If it is not specifically marked, then before it is hooked up the tankerman must verify the test date and compatible products which can be transferred through the hose. This is done by comparing the hose identification with a list of compatible products provided by the supplier of the hose. These documents may be found in the mailbox on the barge or the Pilot House of the attending boat. Hoses are to be tested annually in accordance with 33 CFR 156.170.

STATIC ELECTRICITY PRECAUTIONS

Precautions against static electricity may be necessary when the cargo being transferred is known as an accumulator of static electricity. Clean oils (distillates) are generally accumulators of static electricity. They require precautions at the beginning of transfers. These oils are: natural gasoline, kerosene, white spirits, motor and aviation gasoline, jet fuels, clean diesel oils, heating oils, heavy gas oils, naphtha, and lubricating oils. When any of these products are being transferred these procedures shall be followed:

1. At the beginning of cargo flow into EACH cargo tank the flow rate should not exceed 730 bbls/hr:
2. After you determine that there is no more splashing and surface turbulence in a cargo tank the flow rate can be increased to the maximum allowable transfer rate.
3. During - and for 30 minutes after completing the loading - ullaging and sampling equipment must not be put into the tank. Ropes or lines used to lower equipment into the cargo tank must be only NATURAL fiber-cotton, sisal, hemp or flax. Synthetic line such as nylon or something similar must NEVER be used.
4. Operations performed through restricted gauging tubes are permissible at any time during transfer unless not allowed by vapor emission restrictions.
5. If the cargo tank atmosphere is maintained inert no anti-static precautions are necessary.
155.480 (b) (2) OVERFILL DEVICES

Stick Gauge Overfill Devices:

A. 1 Meter stick gauges are located approximately six feet forward of each ullage hatch. They provide a visual indication of high level and overfill in the cargo tank. Follow these checks before a transfer:

1. Uncap the stick gauges
2. Grasp the gauge firmly and pull it up carefully to the fully raised position.
3. Lower the stick until it engages the float magnet. This will be near at the bottom of the stick's travel. The stick must engage the magnet in each tank in order to begin the transfer.
4. When the cargo in each tank reaches approximately 1-meter ullage, the float and gauge stick will begin to rise. It is important to make sure that the stick continues to rise as the tank fills. This will help provide the best indication of the internal cargo level.
5. The gauge sticks are marked with a green band which extends to the 6" before overfill level, followed by a 6" yellow band extending to the overfill level. The remainder of the stick is colored red. When loading cargo, the green color on the stick indicates the normal loading of the tank, the yellow indicates near over fill (high level) and the red means a dangerous over fill condition and the compartment cargo valve should be closed immediately.

B. ALARM SYSTEM: Each cargo tank is equipped with cargo tank High Level/Overfill Shutdown sensors. The High Level sensors will activate when the product level reaches 96.5 percent of its capacity. This will occur when the product level in the tank is approximately 10" below the deck. The Overflow Shutdown System will activate at 98 percent capacity or 60 seconds before the tank becomes 100% full at the maximum transfer rate. This will occur when the product level in the tank is approximately 6" below the deck. These sensors must be connected to the appropriate system before a visual or audio alarm will activate.

C. GAUGE TREE

1. Each cargo tank is equipped with a gauge tree located directly under each sight glass. This tree will indicate the product level while the vessel is being loaded. The top rung of the gauge tree is at deck level. The space between each descending tab is 6" with the bottom rung being 6" above the deck level.
2. Each cargo tank is also equipped with a High Level and Overfill “Paddle” located so as to be visible from each sight glass. The tree lower paddle indicates the product level at the “High Level” setting of the alarm and the upper paddle indicates the product level at the “Overfill” setting of the alarm.
SPECIAL OPERATIONS – Tandem loading operations

The vapor control system of this barge is acceptable for dual (tandem) loading operations. Tandem loading is limited to simultaneous collection of those cargoes listed in the vessels’ Cargo Authority Attachment (CAA) to the barge’s Certificate of Inspection (COI), at a maximum vapor-air mixture density of 0.247 lbm/ft³, and a maximum combined liquid transfer rate of 5,000 bbl/hr.

The following additional procedures will apply:

1) Read the COI and CAA and verify the following information:
   a) The product listed on the CAA.
   b) Tandem loading is authorized by the Facility’s Operation Manual
   c) Continuous communication is maintained between both Vessel Persons In Charge and the Person in Charge at the facility. The method selected must be effective during all phases of the transfer.
   d) Determine any special requirements for topping off (e.g. May the tankerman top off the outboard barge while loading the inboard barge continues).

2) Comply with standard Cargo Transfer Procedures in this document.

3) One Vessel Person In Charge (VPIC) is required to be on board each barge.

4) Use a minimum of six (6)-mooring lines with fenders between the barges to absorb any shock in case the barges slam together. At least three mooring lines should be led forward and three led aft. The mooring lines must be examined frequently during transfer operations and tended accordingly.

5) There shall be no sharp bends in the crossover hoses that would cause undue strain on the connecting flanges.

6) Where possible, the crossover hoses should be supported by a boom or davit.

7) The hoses must never rest on a drip pan edge.

8) If the barges are different sizes, the smaller of the two barges should be the outboard barge.
SPECIAL OPERATIONS - Transferring Between Two Barges and a Facility Using One PIC

If an approved Letter of Alternate Compliance (LOAC) from the local Coast Guard Captain of the Port is attached to these procedures (it should be in the barge mail box), then one (1) person may serve as Person-in-Charge of transfer operations between two barges and a facility if the following procedures are followed.

The following additional procedures will apply:

1. Read the LOAC and verify the following information:
   a. Is the letter still valid?
   b. Is the product covered (some apply only to oil)
   c. Is the transfer operation covered (some apply only to discharges)
   d. Is the facility approved for a one tankerman-two barge transfer?
   e. Are there any special requirements in the letter, for example a four hour notice?
   f. Are there any special requirements for topping off or stripping: May the tankerman top off or strip the outboard barge while discharging or loading the inboard barge.

2. Only persons trained for dual barge transfers with one PIC operations may serve as the Vessel Person In Charge.

3. Comply with standard oil transfer procedures.

4. Ensure that the tankerman can easily and rapidly get from one barge to the other in the event of an emergency.

5. Use a minimum of six (6)-mooring lines with fenders between the barges to absorb any shock in case the barges slam together. At least three mooring lines should be led forward and three led aft. The mooring lines must be examined frequently during transfer operations and tended accordingly.

6. There shall be no sharp bends in the crossover hose that would cause undue strain on the connecting flanges.

7. Where possible, the crossover hose should be supported by a boom or davit.

8. The hose must never rest on a drip pan edge.

9. The smaller of the two barges should be the outboard barge.

10. Begin the discharge operation by lowering the cargo level in each tank of barge one barge at a time. Lower the product level to at least a point where the one meter gauge stick is fully lowered.

11. Complete the unloading of the outside barge first.
   a. The outboard barge should keep approximately one foot (draft) ahead of the inside barge.
   b. Close the header valve on the outboard side of the inside barge once the outside barge is completed to prevent the crossover hose from being pressurized.
SPECIAL OPERATIONS - Benzene Requirements  
(and cargo mixtures containing benzene such as: prolysis gasoline, gasoline, cracked naphtha and hardcut reformate)

Federal Regulations (46 CFR 151.50-60) concerning benzene require that the licensed officer, certified tankerman or Person-in-Charge of a barge ensure no person on the barge is exposed to an airborne concentration of benzene in excess of one part per million (1 PPM) as an eight hour time weighted average (TWA) or five parts per million (5 PPM) TWA over any 15 minute period. Since these limits may be exceeded during barge loading, it is AEP River Operations’ requirement that the following precautions be taken while sampling cargo, connecting or disconnecting a hose, opening a cargo tank, butternworth hatch, ullage opening, sounding tube or any other opening if the product contains more than 0.5% (1/2 of 1%) benzene.

1. Respirators meeting 29 CFR 1910.134 must be worn. See the specific requirements for the particular operation involved. Cartridges must be changed every eight hours, at the end of a shift, when the wearer experiences “break through”, or if they become difficult to breathe with - whichever comes first.

2. Connections, disconnections, or any other operation with the possibility of a splash hazard must be done only by personnel with at least a half- mask respirator, “splash suit” or slicker jacket, rubber gloves, rubber boots and goggles or face shield (unless a full face respirator is used). In addition, if the product contains 50% or more Benzene, the tankerman should wear a slicker suit.

3. Post a sign stating:  
**BENZENE CANCER HAZARD IN THIS AREA**  
**PROTECTIVE EQUIPMENT MAY BE REQUIRED**  
**AUTHORIZED PERSONNEL ONLY**

4. Observe safe work practices by remaining upwind of the tanks, pumps, and piping system whenever possible. Use commonsense to minimize exposure.

5. Restrict visitor access during the transfer.

6. **LOADING:** When loading products containing more than 5% benzene a half-mask is to be worn during the entire operation. These products are normally loaded using vapor recovery equipment. If the MSDS indicates the product contains 5% or more benzene and the customer does not require vapor recovery loading, the tankerman shall load the barge closed hatch. All tanks will be vented through the vent stack located on the end of the vapor header.

7. **DISCHARGING:** When discharging products containing more than 5% benzene a half-mask is to be worn during the entire operation. Products containing more than 5% benzene will normally be discharged closed hatch and all tanks will be vented through the vent stack located on the end of the vapor header. Products containing more than 50% Benzene will be discharged closed hatch. All tanks will be vented through the vent stack located on the end of the vapor header. The tankerman performing the transfer must wear a full-face respirator.

Further detail on benzene cargo handling is available in AEP River Operations' Benzene Program.
SPECIAL OPERATIONS - Ethylene Dichloride (EDC)

Ethylene Dichloride (EDC) will be loaded using the Vapor Recovery System. Nitrogen is used to minimize the amount of moisture that comes in contact with cargo. As an added benefit, it reduces the amount of cargo vapors to a minimum. In addition to this precaution and normal cargo loading procedures, the measures listed below will also be taken:

1. Empty tanks will be purged with Nitrogen after every discharge.
2. Once the tanks are loaded, a nitrogen pad will be added on top of the cargo.
3. All hose connections and disconnections will be performed by a tankerman wearing the following personal protective equipment:
   a. Respirator (provided)
   b. Chemical resistant gloves (provided)
   c. Rain slicker
   d. Rubber boots
4. Cargo hoses will be blown back to the barges using nitrogen.
5. Since EDC is heavier than water, barges will be loaded to a maximum draft of 10' 6" and tanks will not be full.
6. Stainless Steel covers will be provided for drip pans. Pans will be kept covered when not loading cargo.
7. The dispatcher will be notified every time stripping is performed since the slops are considered hazardous waste and must be disposed of at an approved facility.
8. No person shall enter any cargo tank or void of a barge that has been loaded with EDC or purged with Nitrogen until the barge is cleaned and gas-free!

SPECIAL OPERATIONS - Hydrogen Sulfide (H2S)

Certain products loaded on AEP River Operations barge may contain hydrogen sulfide; this can most easily be determined when checking the Material Safety Data Sheet during the initial pre-transfer conference. H2S is commonly found including crude oils, residual oils (#6 fuel oil, asphalt, VGO, PGO, Slurry Oil, Naptha) If the tankerman thinks that H2S may be present the following procedures will be followed:

1. Carry a half mask respirator and Hydrogen Sulfide monitor on your person, the monitor is set for 10 PPM. The monitor must be worn on the front of your body within one foot of your face; this area is called the “breathing zone.” Do not place the monitor inside cargo hatches or lower it into tanks. If you do you may burn out the sensor and not get an accurate reading later on.
2. While preparing to commence the transfer take note of wind speed and direction. During the transfer you must be aware of any change, such as a passing vessel blocking the wind.
3. Look for escape routes beforehand. Identify the safe routes that you will follow to get access to the dock or adjoining vessels. If in an escape situation go crosswind from the source of the H2S exposure.
4. Make sure that the monitor is in place and turned on throughout the transfer, continuously check it.
5. Observe safe work practices by remaining upwind of the tanks, pumps, and piping system whenever possible. Use commonsense to minimize exposure.
6. Restrict visitor access during the transfer.
7. Because H2S is flammable all ignition sources must be eliminated and No Smoking Rules strictly observed.
8. If the monitor alarm goes off immediately put on your mask and move crosswind until out of the H2S. Remember that H2S can kill your sense of smell. In a safe area (one without (H2S) clear the alarm - this should happen automatically as the H2S level drops - then carefully return to the barge watching the readings as you proceed. **If the level rises to or remains at 10 PPM or above a second time STOP THE TRANSFER AND CALL FOR A TANKERMAN WITH SUPPLIED AIR EQUIPMENT.** The air purifying respirators are approved for ESCAPE ONLY.
USING THE VAPOR RECOVERY SYSTEM

DESCRIPTION:

The vapor recovery system on this vessel consists of the following:

1. An eight-inch longitudinal header with a drop into each cargo tank that joins a transverse header positioned forward of the cargo headers at the bow.
   a. The outboard end of each side of the transverse header is equipped with a rising stem gate valve.
   b. The last 3.3 feet of vapor piping before the vessel vapor connection is painted red/ yellow/ red bands and labeled “VAPOR” for ease of identification in the manner required by federal regulations.
   c. Each vapor connection flange is equipped with a 0.5-inch diameter, 1-inch long stud to prevent connecting a cargo hose or loading arm to the vapor system.

2. A six-inch High Velocity P/V valve mounted at about the mid-point of the longitudinal header. These valves are set at +6.0 PSI Pressure and – 2.0 PSI Vacuum.

3. Each cargo tank is equipped with a high level and overfill alarm sensor. The Overfill alarm set point is at least 60 seconds before the tank is liquid full when loading at the maximum rate. The High-Level alarm set point is at least 120 seconds before the tank is liquid full when loading at the maximum rate. The sensors connect to the facilities alarm system by a Hubbell connector located near the bow.

4. Each cargo tank is equipped with a stick gauge overfill warning device. This system consists of a magnetic stick gauge that measures the top 1-meter of the tank.

5. Each cargo tank is equipped with a full tank depth gauge tree with paddles indicating each 6 in. increments of tank innage and paddles indicating high level and overfill conditions.

6. An ERL, model SGM -1, sight glass is located on each cargo dome in such a position so as to permit viewing both the gauge tree and the sump at the end of the cargo piping. The #1 cargo tank is equipped with 2 sight glasses. One is located on the cargo dome and one forward of the expansion dome.
155.750 (c) (1) VAPOR COLLECTION SYSTEM LINE DIAGRAM
155.750 (c)(2) LOCATION OF SPILL VALVES
This vessel is not equipped with Spill Valves.

155.750 (c)(6) RELIEF SETTINGS FOR VALVES AND P/Vs
This Barge has P/V Valves set at +6.0 PSI Pressure and – 2.0 PSI Vacuum.

155.750 (c)(3) MAXIMUM ALLOWABLE TRANSFER RATE
The vapor collection system installed on this vessel is recommended for a maximum loading rate of 3,500 gallons per minute (5,000 Barrels per hour).

55.750 (c)(4) INITIAL TRANSFER RATES

1. The initial flow rate should not exceed 730 bbls/hr;
2. Vessel Person In Charge of the Transfer must monitor pressure/vacuum gauges at the vapor connection to ensure pressure and/or vacuum are normal.

When it has been determined that there is no surface turbulence in a cargo tank and the systems are operating properly, the flow rate can be increased to the maximum allowable transfer rate.

155.750 (c)(5) VAPOR COLLECTION SYSTEM PRESSURE DROP CALCULATIONS
Transfer rates and pressure drop calculations and charts are included in these procedures. The top chart shows the anticipated maximum pressure drop in the vessels piping system for the various cargo transfer rates. The top curve line represents the maximum pressure drop for all cargoes approved for vapor collection on this vessel (gasoline). There are also representative curves for specific cargoes typically carried on ACL’s vapor barges.

To read this chart, find the cargo transfer rate on the horizontal chart line, and then read up the chart vertically to the appropriate curve. This point indicates the expected pressure drop from the farthest point in the vapor piping system to the shore vapor connection point. The shore’s vapor piping pressure setting should then be reduced by the pressure drop. Under no circumstances should the vessel vapor connection point be greater than 80 percent of the vessel’s pressure/vacuum relief valve set point.

The bottom chart can also be used to find pressure drop without the need of calculations. For any given facility vapor connection pressure, the corresponding liquid transfer rate is given. The chart applies to all cargoes listed for vapor recovery on the vessels Certificate of Inspection. It was prepared using the cargo that created the biggest pressure drop in the vapor piping. You must know the facility vapor connection pressure and the liquid flow rate to the barge. Cargo vapor growth rate, cargo vapor specific gravity, and cargo saturated vapor pressure are not required. To read the chart, simply find the facility vapor connection pressure on the left side of the chart and follow the corresponding line across the chart. Then find your anticipated liquid transfer rate on the bottom of the chart, follow the corresponding line up. Any combination of liquid transfer rate and facility vapor connection pressure below the specific cargo curve is within the barge limitations. Any combination of liquid transfer rate and facility connection pressure above the specific cargo curve is in excess of barge limitations.

Charts are included for Single vessel loading, Tandem Loading using a Common Header with a 6” x 25’ Hose Between Barges, Tandem Loading using a Dummy Header with a 6” x 25’ Hose Between Barges, Tandem Loading using a Common Header with an 8” x 25’ Hose Between Barges and Tandem Loading using a Dummy Header with an 8” x 25’ Hose Between Barges.
Vapors are dispersed and disposed of through hose connections to shore facilities. Vapor hose connections at either side of the transverse header vent vapors to shore during loading operations.

PERIODIC TESTING REQUIRED:

A. Vapor and cargo piping will be visually inspected quarterly. This should be done when personnel exposure is below STEL for the specific cargo to be transferred. If the level is not below the STEL then the inspection will be deferred until the next gas free. If a non-gas free inspection must be made before the next gas free because of suspected polymerization, appropriate steps will be taken to reduce personnel exposure below STEL limits. These steps may include vapor vacuuming, respiratory devices, transparent barriers or other sufficient means.

The inspection is to be accomplished in the following manner:

1. Remove the P/V valves from the flanges and examine the internal of the pipe and valves.
2. Remove the blind at the top of the "T" at the drop into each cargo tank and examine the transverse section using a mirror and flashlight.
3. Remove the blinds at the ends of the transverse header, open the valve and examine the interior of this section.
4. Any polymer build up found shall be removed or the effected section replaced.

B. Annually, the vapor piping will be presented to a Coast Guard Inspector for inspection. Precaution shall be taken to ensure that the personnel exposure is below the STEL. This may be accomplished by providing a gas free certificate, or other means such as vapor vacuuming, transparent barrier, remote camera, etc.

1. During this inspection, all blinds are to be removed and piping shall be visually inspected for obstructions. This vessel has 4" inspection ports located in the vapor piping to facilitate and provide for a complete inspection of the vapor collection system.

BEFORE TRANSFER:

Before a transfer using this vessel’s vapor recovery system the following steps must be followed:

1. Complete the Pre-Transfer tests and Inspections required by 1455.750 (e) (2).
2. Confer with terminal personnel to determine that the initial loading rate, maximum loading rate and vapor pressures are acceptable.
OPERATING PROCEDURES:

When transferring cargo using the vapor recovery system, in addition to following the "Cargo Transfer Procedures", which are posted on board the vessel, the following procedures are also to be adhered to:

1. All cargo hatches and ullage ports are to be kept closed and dogged at all times during the transfer.

2. Cargo levels may be monitored by looking through the sight glass that is located in each expansion dome. The depth of the cargo may be measured by observing the markings on the gauge tree located in each tank.

3. Throughout cargo and vapor transfer and especially at the initial loading, the Vessel Person In Charge of the Transfer must monitor pressure/vacuum gauges at the vapor connection to ensure pressure and/or vacuum are below the maximum design of the vessel.

4. After discharging cargo and before disconnection of shore line, the vapor header shall be purged of vapors. Manually depress the farthest vapor header pressure relief valve for approximately 1.5 minutes to clear header of all vapors. To equalize atmospheric pressure inside the cargo tanks, depress pressure relief valve.

5. After the transfer is complete, the following steps are to be taken:
   a. Gently push the sticks on the gauges back into their tubes and replace the caps.
   b. Close and latch the covers on the sight glasses.
   c. Disconnect overfill alarms cable at Hubbell connection.
   d. Close the valve at the vapor connection and bolt a blind on the flange.

155.750(e) OVERFILL PROTECTIONS SYSTEM

Stick Gauge Overfill Devices:

1 Meter stick gauges are located approximately six feet forward of each ullage hatch. They provide a visual indication of high level and overfill in the cargo tank. Follow these checks before a transfer:

1. Uncap the stick gauges

2. Grasp the gauge firmly and pull it up carefully to the fully raised position.

3. Lower the stick until it engages the float magnet. This will be near at the bottom of the stick's travel. The stick must engage the magnet in each tank in order to begin the transfer.

4. When the cargo in each tank reaches approximately 1 meter ullage, the float and gauge stick will begin to rise. It is important to make sure that the stick continues to rise as the tank fills. This will help provide the best indication of the internal cargo level.

5. The gauge sticks are marked with a green band which extends to the 6" before overfill level, followed by a 6" yellow band extending to the overfill level. The remainder of the stick is colored red. When loading cargo, the green color on the stick indicates the normal loading of the tank, the yellow indicates near overfill (high level) and the red means a dangerous overfill condition and the compartment cargo valve should be closed immediately.
155.750(e)(1) ALARM SYSTEM

Each cargo tank is equipped with cargo tank High Level/Overfill Shutdown sensors. The High Level sensors will activate when the product level reaches 96.5 percent of its capacity. This will occur when the product level in the tank is approximately 10” below the deck. The Overflow Shutdown System will activate at 98 percent capacity or 60 seconds before the tank becomes 100% full at the maximum transfer rate. This will occur when the product level in the tank is approximately 6” below the deck. These sensors must be connected to the appropriate system before a visual or audio alarm will activate.

155.750(e)(1) GAUGE TREE

Each cargo tank is equipped with a gauge tree located directly under each sight glass. This tree will indicate the product level while the vessel is being loaded. The top tab of the gauge tree is at deck level. The space between each descending tab is 6” with the bottom tab being 6” above the deck level.

Each cargo tank is also equipped with a High Level and Overfill “Paddle” located so as to be visible from each sight glass. The tree lower paddle indicates the product level at the “High Level” setting of the alarm and the upper paddle indicates the product level at the “Overfill” setting of the alarm.

THE ALARM SYSTEM OR GAUGE TREE DOES NOT RELIEVE THE PERSON-IN-CHARGE FROM ANY OF THEIR RESPONSIBILITIES OR DUTIES, BUT ARE TO BE USED AS ADDITIONAL SAFEGUARDS ONLY.

155.750 (e)(2) PRE-TRANSFER INSPECTION AND TEST REQUIREMENTS

Before a transfer using this vessel’s vapor recovery system the following steps must be followed:

1. Test operation of the alarms in accordance with the testing procedures. Instructions are also posted on the top of each alarm unit.

2. Check the operation of the P/V valves.
   a. Operate the handle on the side of the valve to check that mechanism is free and operating properly. Check the operation of both the pressure and vacuum side. Push down the handle to check the vacuum relief and lift the handle to check the pressure relief.
   b. If the mechanism is not operating properly, the valve will require dismantling for cleaning or repair.

3. Check vapor collection hose (if a hose is used) condition.
   a. No unrepaired loose covers, kinks, bulges, soft spots, or other defect which would permit the discharge of vapor through the hose material and no external gouges, cuts or slashes that penetrate the first layer of hose reinforcement.

4. All valves on cargo and vapor line shall be tested for free operation. Any stiff operating valves shall be inspected for damage, failure, or polymerization and repaired prior to transferring vapors.

5. Check vapor connection.
   a. Insure that a gasket is placed between the flanges at the hose / header connection.
   b. Use a full set of flange bolts, all securely tightened.
   c. Check valve at the vapor connection to insure that it is in the open position.
6. Check that the required periodic tests have been conducted in accordance with 33 CFR 156.170.
   a. Hoses are to be tested annually and must not leak under static liquid pressure at least 1.5 X MAWP
   b. Each transfer system relief valve must open at or below the pressure at which it is set to open.
   c. Each loading arm and each transfer pipe system to be tested annually and must not leak under static liquid pressure at least 1.5 X MAWP.
   d. Each tank level alarm, or emergency shutdown device to be tested annually and must perform its intended function.

7. Vapor and cargo manifold shall be inspected for polymerization by removing blind flanges and examining the manifold with explosion proof lighting before making cargo and vapor hose connections.

8. Ullages and domes shall be inspected for product polymerization prior to vapor collection. This should be done when personnel exposure is below STEL for the specific cargo to be transferred.

9. Check stick gauges. Stick gauges are located approximately two feet forward of each ullage hatch. They provide a visual indication of the level in the cargo tank. Follow these checks before a transfer:
   a. Uncap the stick gauges
   b. Grasp the gauge firmly and pull it up carefully to the fully raised position.
   c. Lower the stick until it engages the float magnet. This will be near at the bottom of the stick's travel. The stick must engage the magnet in each tank in order to begin the transfer.
   d. When the cargo in each tank reaches approximately 39 inches Ullage, the float and gauge stick will begin to rise. It is important to make sure that the stick continues to rise as the tank fills. This will help provide the best indication of the internal cargo level.

10. Test the High Level / Overfill Alarm System for proper operation.
    a. Connect the system to the terminal alarm system at the Hubbell connection.
    b. Activate the alarm on each tank by operating the manual float lifting device until each alarm has activated in both the High level and overfill positions.

11. All sight glasses into cargo tanks shall be inspected to ensure glass is clear and unobstructed. This inspection includes the checking of wipers.

12. The initial loading rate shall be slowed while the Person-in-Charge and shore facility personnel ensure the return of vapors back to the shore facility.

All points outlined above are part of this vessel’s transfer procedures. The declaration of inspection must be reviewed and verified by the Person-in-Charge before starting the transfer.