APPENDIX C
LEAK DETECTION PROCEDURE FOR BOTTOM-LOADED TRUCK TANKS BY BAG CAPTURE METHOD

1. PRINCIPLE

The volume of leakage from a truck tank during loading is measured directly by placing calibrated bags over all potential sources of leakage. This quantitative monitoring procedure is an enforcement tool to confirm the continuing existence of leak-tight conditions.

2. APPLICABILITY

This method is applicable to determining the leak-tightness of truck tanks during bottom-loading without taking the truck tank out of service. The method is applicable only if the vapor control system does not create back-pressure in excess of the pressure limits of the truck tank compliance leak test. This method cannot be applied to truck tanks during top-loading, vapor collection equipment on truck tanks, or vapor control systems at terminals, plants, or service stations.

3. DEFINITIONS

3.1 Truck tank. Any container, including associated pipes and fittings, that is used for the transport of gasoline.

3.2 Compartment. A liquid-tight division of a truck tank.

3.3 Truck tank vapor collection equipment. Any piping, hoses, and devices on the truck tank used to collect and route the gasoline vapors in the tank to the bulk terminal, bulk plant, or service station vapor control system.

3.4 Vapor control system. Any piping, hoses, equipment, and devices at the bulk terminal, bulk plant, or service station, which is used to collect, store, and/or process gasoline vapors.

4. APPARATUS

4.1 Manometer. Liquid manometer, or equivalent, capable of measuring up to 6250 pascals (25 inches H_2O) gauge pressure with ± 25 pascals (± 0.1 inches H_2O) precision.

4.2 Plastic bag. An air-tight bag, large enough to cover the truck tank's dome cover. One bag is needed for each compartment.

4.3 Bicycle tire. A bicycle innertube, or similar apparatus, modified to the appropriate diameter to fit over the truck tank's dome cover and lie flat on the top of the truck tank. One tire is needed for each compartment.

4.4 Dry gas meter.

4.5 Pump.

4.6 Calibration platform. A platform constructed such that air can be introduced through hole in the center of platform, and large enough for bicycle tire to lie flat on it.

5. BAG VOLUME CALIBRATION

5.1 Attach bag to innertube and seal with tape or other applicable sealant to ensure no leakage around interface.

5.2 Fill inner tube with water.

5.3 Place bag apparatus on the calibration platform so that the air inlet is situated under the bag.

5.4 Remove air from bag.

5.5 Connect pump to dry gas meter and dry gas meter to inlet on the calibration platform.

6. TEST PROCEDURE

6.1 Place a pressure tap in the terminal, plant, or service station vapor control system, as close as possible to the connection with the truck tank. Record the pressure periodically during testing.

6.2 During loadings, place a bag apparatus over the dome cover of each compartment in the truck tank being filled.

6.3 Remove air from bags.

6.4 Check to ensure there is a tight seal between the base of the bag apparatus and the top of the truck tank.

6.5 During loading, estimate volume of vapors collected in bags. If a bag fills before loading is complete, empty bag and resume testing.

6.6 Estimate total volume of vapors collected in the bags, making allowances in the volume for tank domes or other equipment.

6.7 Record capacity of truck tank.

6.8 Determine allowable volume of vapor leakage from truck tank as in Section 7.

6.9 Determine total loading time. This includes only time when filling is actually occurring, not breaks during the loading operation.

7. CALCULATIONS

7.1 Equation. The allowable volume of leakage from a truck tank can be determined from equation 7-1.

$$\mathbf{V_L = (0.5V)\ (T/t_p)\ (1\ -\ (P_f/P_i))} \qquad \text{(Equation 7-1)}$$

Where: V_L = allowable volume of leakage (liters)

V = capacity volume of tank (liters)

P_i = initial pressure for the compliance pressure test (absolute units)

P_f = final pressure for the compliance pressure test (absolute units)

t_p = time limit for pressure drop for the compliance pressure test (minutes)

T = total time for loading (minutes)

7.2 Example. A 20,000 liter tank is filled to capacity in 10 minutes. The compliance pressure test has an allowable pressure drop in five minutes from 4500 pascals (18 inches H_2O gauge, 425 inches H_2O absolute) to 3750 pascals (15 inches H_2O gauge, 422 inches H_2O absolute). The allowable volume of leakage is 140 liters.