## Executive Order G-70-165

## Exhibit 2

## Specifications for the Healy Model 600 System

Typical installations of the Healy system are shown in Figures 2A-1 through 2A-6.

**Nozzle**

1. A vapor guard shall be installed on the nozzle at the base of the spout, as shown in Figure 2C. Any nozzle with a vapor guard which is missing, or which is damaged such that a slit from the outer edge of the open end flange to the spout anchor clamp, or which has a equivalent cumulative damage, is defective and shall be immediately removed from service.

2. Failure mode testing demonstrated that blockage of vapor collection holes in the spout has negligible effect on the operation of the system until 4 or more of the 8 holes are blocked. Any nozzle which has fewer than four unblocked holes is defective, and shall be immediately tagged or locked out of service until repaired or replaced.

3. The Healy Model 600 nozzle has an integral vapor valve which prevents the loss of vapor from the underground storage tanks, ensures proper operation of the system and prevents the ingestion of air into the system. Any nozzle with a defective vapor valve shall be immediately removed from service. The integrity of the system shall be restored by replacing the nozzle or otherwise closing the vapor path as soon as practicable.

   Note: The Healy system generates a high vacuum level in the vapor return lines. Any leak which causes air ingestion into the system may cause increased pressure and excessive venting. Refer to the section entitled "Tank Pressure."

4. Nozzles shall be 100 percent performance checked at the factory, including checks of all shutoff mechanisms and of the integrity of the vapor path. The maximum allowable leak rate for the nozzle vapor path shall not exceed the following:

   0.038 CFH at a pressure of two inches water column (2" wc), and
   0.005 CFH at a vacuum of eighty three inches water column (approx 3 psi).

5. Leaded and unleaded spouts are interchangeable.

**Inverted Coaxial Hoses**

1. The maximum length of the hose shall be 13 feet.

2. The length of hose which may be in contact with the island and/or ground when the nozzle is properly mounted on the dispenser is limited to six inches (6") per loop.

**Breakaway Couplings**

1. Breakaway couplings are optional but, if installed, only certified breakaways with a valve which closes the vapor path when separated may be used.

   Note: The Healy system generates a high vacuum level in the vapor return lines. Any leak which causes air ingestion into the system may cause increased pressure and excessive venting. Refer to the section entitled "Tank Pressure."

**Central Vacuum Unit**

1. The Healy Model 600 system shall operate with at least one of the central vacuum units (pumps) specified in Exhibit 1 and illustrated in Figures 2B-1 through 2B-4, such as is necessary to ensure that the air to liquid (A/L) ratio of each nozzle shall be 1.10 plus or minus 0.10 (1.00 to 1.20). Because the pressure regulator in the nozzle responds differently to air than to vapor, the A/L ratio is not representative of the true V/L of this system; it does, however, provide an index of performance by which the performance of the system can be compared to the installation which passed the certification test. The air to liquid ratio of the system shall be measured at a flowrate between seven and ten gallons per minute (7 - 10 gpm). Any fueling point not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. The air to liquid ratio shall be determined by a CARB-approved or district-approved test procedure. (Draft procedure TP-201.5 may be used until an air to liquid ratio test procedure is adopted by CARB). Alternative test procedures may be used if they are determined by the Executive Officer to yield comparable results.

   NOTES:

   a. If the A/L test is performed such that the aspirator portion of the nozzle is included, the A/L ratios may be approximately 0.10 higher than those specified above.

   b. This test procedure returns air rather than vapor to the storage tank, and normally causes an increase in storage tank pressure which may result in vent emissions. This is a temporary condition due to the test and should not be considered an indication of malfunction or noncompliance.

2. No dispensing shall be allowed when the central vacuum unit is disabled for maintenance or for any other reason unless the facility is operating under a district variance or upset/breakdown rule provision.

3. A threaded tap at least 1/4" in diameter shall be provided on the inlet side of the central vacuum unit. The tap shall remain plugged and vapor tight except when test equipment is being connected or removed. The system shall not be allowed to operate when the tap is not vapor tight. A high-quality quick-connect fitting with a vapor-tight cap may be installed instead of a plug if specified by the local district.

4. The normal vacuum levels observed during the efficiency testing of the Healy system with the three collection units are listed below (in inches of water column). The test was conducted at a site equipped with 4 multi-product dispensers (i.e., 8 fueling points). The facility shall contain no more fueling points than can be operated simultaneously within the specified A/L range. The local district may require demonstration of A/L with the maximum number of fueling points in operation. Based on the performance curves for each pump, the maximum number of fueling points which can be operated simultaneously within the normal operating range of vacuum levels, in inches water column (" wc) is as follows:

| Central Vacuum Unit | Maximum Number of Simultaneous Fueling Points | Normal Operating Range for Vacuum Level | Vacuum Level Observed During Testing |
|---|---|---|---|
| Model 2000C Blower (1 hp) | 9 | 65" to 85" wc | 75" to 85" wc |
| Thomas Industries VP 500 Vane Pump (1/2 hp) | 5 | 65" to 85" wc | 70" to 82" wc |
| 9000 Mini-Jet Pump | 4 | 65" to 85" wc | 68" to 79" wc |

The system shall operate within the vacuum level range specified above. Observation of vacuum level outside of the specified range, for more than three seconds, measured while dispensing is occurring, is considered a failure of the system.

5. A valve (such as a ball valve) shall be installed in the vapor return line such that the lines can be isolated from the underground storage tanks for the purpose of conducting the test in Exhibit 4. The valve shall remain open at all times except when the test is being conducted. No product shal be dispensed when this valve is closed.

6. OSHA acceptable access to the central vacuum unit shall be provided immediately upon request for inspection and testing.

**Vacuum Monitor**

1. The Healy Model 600 system shall have a vacuum monitor. The minimum vacuum level shall be set to light the "low" vacuum indicator when the vacuum level is sixty-five inches water column (65" wc).

2. The vacuum monitor shall have three system indicators (lights). One light shall be for indicating that the vapor recovery system has power, the other two shall indicate whether the system is operating with "normal" or "low" vacuum levels.

3. The vacuum monitor shall be located in an area that is visible to station personnel while at their common work site. The pressure sensor shall be capable of measuring the true vapor line vacuum and installed in a location that will not cause interference with normal flow characteristics.

## Testing/Monitoring System

1. The Healy system generates a high vacuum level in the vapor return lines. Any defect which compromises the integrity of the vapor lines from the nozzle to the central vacuum unit may cause the ingestion of large amounts of air. Excess air in the storage tanks causes excessive vent emissions when the pressure exceeds the pressure setting of the P/V valve and may cause observable product shrinkage. The Testing/Monitoring System which is required by July 1, 1996, shall, at a minimum, create a permanent record of system operation and ensure that leaks which may cause excess emissions will be detected.

## Inverted Coaxial Hose Adapters

1. Inverted coaxial hose adapters shall be 100 percent performance checked at the factory to verify the integrity of the vapor path. The adapters shall be tested to the same criteria specified for nozzles in the section above.

## Pressure/Vacuum Valves for Storage Tank Vents

1. A pressure/vacuum (P/V) valve shall be installed on each tank vent. Vent lines may be manifolded provided the manifold is installed at a height not less than 12 feet above the driveway surface used for Phase I tank truck filling operations. At least one P/V valve shall be installed on manifolded vents. If two P/V valves are desired, they shall be installed in parallel, so that each can serve as a backup for the other if one should fail to open properly. The P/V valve shall be a CARB-certified valve as specified in Exhibit 1. The outlets shall vent upward and be located to eliminate the possibility of vapor accumulating or traveling to a source of ignition or entering adjacent buildings.

## Vapor Recovery Piping Configurations

1. The maximum allowable pressure drop through the system, measured at a flow rate of 60 SCFH with dry Nitrogen gas, shall not exceed 0.02 inches water column. The pressure drop from the dispenser to the underground storage tank shall be measured so as to eliminate a blockage which may be caused by the central unit in one of the following ways:

    - If the central vacuum unit is located in the turbine pit, the pressure drop shall be measured from the dispenser riser to the central vacuum unit inlet;

    - If the central vacuum unit is not located in the turbine pit, the pressure drop shall be measured as indicated above and the pressure drop measured from the central vacuum unit outlet to the storage tank with the poppeted Phase I vapor connection open shall be measured and the results summed.

2. The dispenser shall be connected to the riser with either flexible or rigid material which is listed for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector,

including all fittings, shall not be less than five-eighths inch (5/8") for factory equipped dispensers. Exception: Healy Model series Z0XXX vapor recovery retrofit kits. The Z0XXX series retrofit kits consist of two 0.5" OD copper tube and flare fittings connecting all hose outlet fittings on one side of the dispenser to a 1/2" pipe running vertically from the canopy to the base of the dispenser where 0.5" OD copper tubing and flare fittings continue to make connection to the underground vapor return riser. This piping configuration is required on each side of the dispenser.

3. All vapor return lines shall slope a minimum of 1/8 inch per foot. A slope of 1/4 inch or more per foot is recommended wherever feasible.

4. The recommended nominal inside diameter of the underground Phase II plumbing is as indicated in Figures 2A-1 through 2A-6. Smaller vapor lines are not recommended but may be used provided the pressure drop criteria specified above are met. The vapor return lines shall be manifolded below grade at the tanks as indicated in the figures.

5. All vapor return and vent piping shall be installed, at a minimum, in accordance with the manufacturer's instructions and all applicable regulations.

**Underground Storage Tank (UST) Pressure**

***WARNING***: Phase I fill caps should be opened with caution because the storage tank may be under pressure.

1. The Healy Model 600 system was observed to have normal operating tank pressures less than 1 inch water column. Pressures that are consistently above the normal tank pressure levels, particularly pressures which correlate with periods of vehicle fueling, may indicate system malfunction. In the event that high pressures in the storage tank are observed consistently, or that product shrinkage is observed, the owner or operator of the installation shall conduct, and pass, the test procedure in Exhibit 4 of this Order. Test results shall be made available to the district upon request within fifteen days after the test is conducted, or within fifteen days of the request. Alternative test procedures may be used if determined by the Executive Officer to yield comparable results. The local district may require the facility to cease operations when the integrity of the vapor lines is compromised.

2. The local district may require the installation of a threaded tap at least 1/8" in diameter at which storage tank pressure may be monitored. The tap may be located at the outlet side of the central vacuum unit, or may be located in the vent line no less than six feet and no more than eight feet above grade. The tap shall remain plugged and vapor tight except when test equipment is being connected or removed. The system shall not be allowed to operate when the tap is not vapor tight. A high-quality quick-connect fitting with a vapor-tight cap may be installed instead of a plug if specified by the district.

**Phase I System**

1. The Phase I system shall be a CARB-certified system which is in good working order and which demonstrates compliance with the static pressure decay test criteria contained in Exhibit 4 of this Order. Coaxial Phase I systems shall not be used with new installations

of the system. Replacement of storage tanks at existing facilities, or modifications which cause the installation of new or replacement Phase I vapor recovery equipment, are considered new installations with regard to this prohibition. An exception to this prohibition may be made for coaxial Phase I systems CARB-certified after January 1, 1994, as compatible for use with Phase II systems which require pressure/vacuum vent valves.

Where installation of the Healy Model 600 system is made by retrofitting previously installed equipment, local districts may elect to allow existing coaxial Phase I systems to remain in use for a specifically identified period of time provided the following conditions are met:

- the existing coaxial Phase I system is a poppeted, CARB-certified system capable of demonstrating compliance with the static pressure decay test as specified above; and

- installation of the Phase II system requires no modification of the UST(s) and/or connections.

2. Spill containment manholes which have drain valves shall demonstrate compliance with the static pressure decay criteria with the drain valves installed as in normal operation. Manholes with cover-actuated drain valves shall not be used in new installations (as defined above) after May 1, 1995. Manholes with cover-actuated drain valves may remain in use in facilities where installation of the Healy Model 600 system does not require modification of the tank fittings provided the facility demonstrates compliance with static pressure decay test criteria both with the cover open and with the cover closed. The local district may require the removal of drain valves provided an alternate method of draining the spill container is specified (i.e., a hand pump maintained at the facility and/or on the product delivery trucks).

3. The Phase I vapor recovery system shall be operated during product deliveries so as to minimize the loss of vapors from the facility storage tank which may be under pressure. There shall be no less than one vapor return hose connected for each product being delivered. Provided it is not in conflict with established safety procedures, this may be accomplished in the following manner:

   - the Phase I vapor return hose is connected to the delivery tank and to the delivery elbow before the elbow is connected to the facility storage tank;

   - the delivery tank is opened only after all vapor connections have been made, and is closed before connection of any vapor return hoses;

   - the existing coaxial Phase I equipment is in good working order and has demonstrated compliance with static pressure decay test criteria when tested with all fill caps removed; and

   - the vapor return hose is disconnected from the facility storage tank before it is disconnected from the delivery tank.

4. Storage tank vent piping shall be maintained white, silver or beige. Colors which will similarly prevent heating of the system due to solar gain may also be used, provided they are listed in the EPA AP-42 as having a factor the same as or better than that of the colors listed above.

5. Manholes shall be maintained a color which minimizes solar gain, as specified above. Manhole covers which are color coded for product identification are exempted from this requirement.