Phase II EVR System Descriptions

Franklin Fueling Systems (Healy) Clean Air Separator (Executive Orders VR-201 and VR-202):

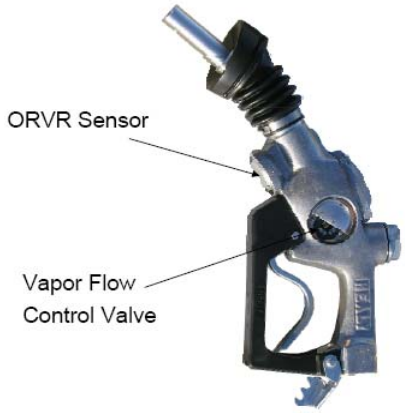
- **Assist System** – Each fueling dispenser has a vacuum pump installed to *actively* draw vapors back into the Underground Storage Tank (UST) that would otherwise escape into the air.

- **Model 900 Nozzle** – New nozzle designed specifically for EVR system:

  - Dripless, spitless and meets liquid retention specifications.

  - Has an integrated membrane that senses when car is equipped with ORVR, and reduces air flow through nozzle's vapor return path to UST.

  - Vapor to Liquid Ratio (V/L) can be adjusted on the nozzle via a vapor flow control valve, independent of the vacuum pump.



- **Clean Air Separator (CAS)** – Mechanical, passive management of UST pressure:

  - Outer tank with inner bladder connected to UST ullage.

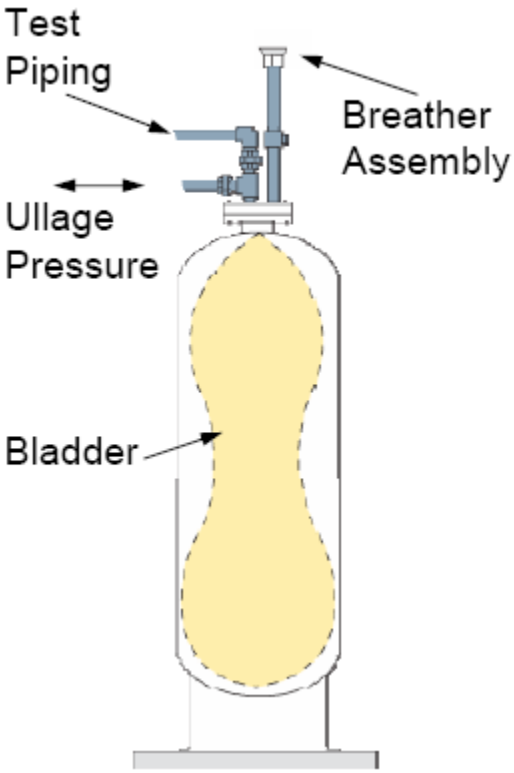
  - No wires or electrical connections.

  - When UST pressure nears atmospheric pressure, gasoline vapors flow into the bladder, and it expands inside the tank.

  - As bladder expands, the clean air surrounding the bladder inside the tank is released through the breather assembly.

  - When UST pressure goes negative, the bladder collapses inside the CAS, and gasoline vapors are returned to the UST.

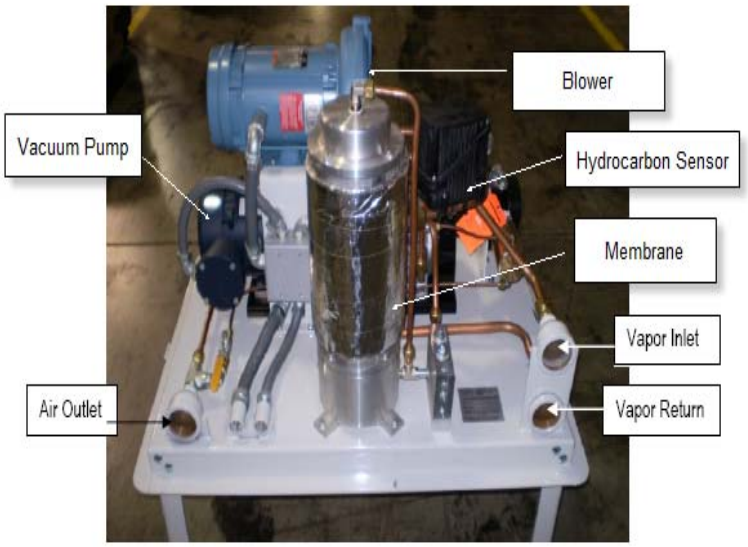
  - Zero emissions.



VST ECS Membrane Processor (Executive Orders VR-203 and VR-204):

- **Balance System** - Simple, passive system:
  - As fuel is pumped into a car's gas tank, a negative pressure is created in the UST where the gas is pumped from, and a positive pressure is created inside the car's gas tank where the gas is pumped to.
  - The vapors flow from the gas tank into the UST by the natural pressure differential. No pump necessary.
  - Inherently ORVR compatible, no vacuum pump to lower flow through.
  - Very important that nozzle boot makes tight seal with car and has no holes/tears.

- **VST ECS Membrane Processor** – Electronic, active management of UST Pressure:
  - Semi-permeable membrane with a vacuum pump and a blower motor.
  - Membrane allows clean air to flow through but filters out gasoline vapors.
  - Clean air is exhausted to the atmosphere, while gasoline laden vapors are returned to the UST.
  - When UST pressure reaches +0.2 in. WC, the vacuum pump and blower are activated to draw gasoline vapors from the tank and through the membrane. Clean air is exhausted, lowering the UST pressure.



  - Processor pump shuts off when UST pressure reaches -0.2 in. WC or after 30 minutes, whichever comes first.
  - Built in hydrocarbon sensor detects hydrocarbon emissions from the unit, and triggers an alarm when emission factor is greater than 0.64 pounds/1000 gallons dispensed over a 24 hour period.

Veeder-Root Vapor Polisher (Executive Orders VR-203 and VR-204):

- **Balance System** - Simple, passive system:
  - Uses all the same hanging hardware as the VST Membrane Processor
  - Every piece of equipment is the same, except instead of a VST Membrane Processor, a Veeder-Root Vapor Polisher is installed.
  - Same Executive Order, different option for equipment.

- **Veeder-Root Vapor Polisher** – Electronic, passive management of UST Pressure:
  - Active Carbon pressure management system.
  - Mounts directly to existing vent pipe, and gasoline vapors are routed and cleaned through the polisher instead of out the P/V Valve.
  - When UST pressure goes positive, the valve on the output port of the canister opens, allowing gasoline vapors to flow through canister. The active carbon inside captures the hydrocarbons, and allows clean air to exit the system, reducing the UST pressure.
  - When UST pressure goes negative, the valve on the output port of the canister opens, allowing fresh air to enter the canister. The fresh air desorbs the hydrocarbons from the active carbon, and the hydrocarbon vapors return to the UST.
  - System estimates hydrocarbon loading based on UST and polisher temperatures and UST pressure, and shuts off automatically when 80% of operational capacity of the active carbon is reached.
  - Polisher vent opens again if UST pressure reaches 1.3 in WC, and closes again when 100% of operational capacity is reached.
  - Active carbon lasts 15+ years.