

The VST ENVIRO-LOC[™] Vapor Recovery System



The Most Efficient, Lowest Cost Vapor Recovery System
Available in the World



Vapor Systems Technologies, Inc.

Why Enhanced Vapor Recovery (EVR) World Wide Now?

California Enhanced Vapor Recovery Stage II Standards require 95% efficiency levels and reduce the Fugitive and Vent Emissions and Ground Water Pollution

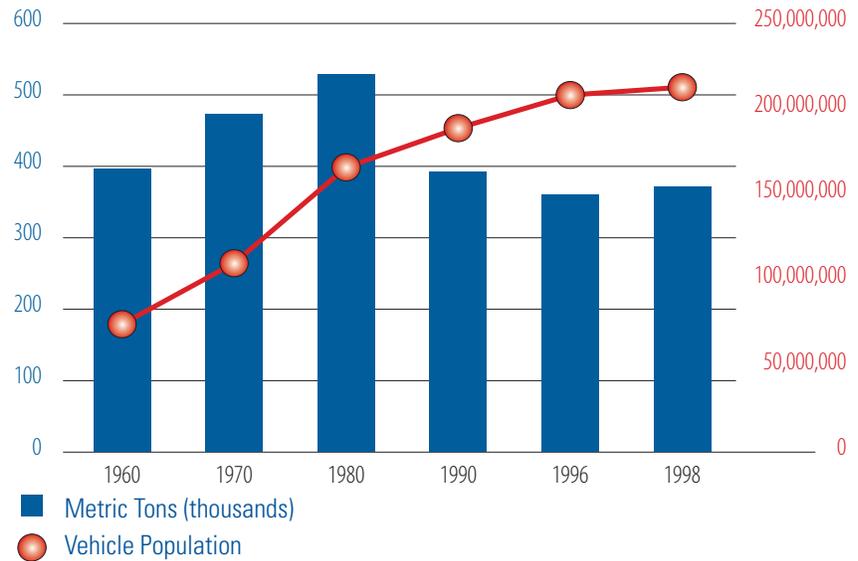
Prior to the 1971 Inception of the Environmental Protection Agency the US vehicle emissions were largely uncontrolled

- Stage I (fuel delivery) and Stage II (fuel dispensing) Vapor Recovery Controls became required in 1987 for all stations in California that pumped over 480,000 gal/year
- After examination of the in-use efficiency of Stage I and Stage II Systems, the California Air Resources Board implemented the Enhanced Vapor Recovery Program in 2009 to further reduce the Fugitive Emissions seen during refueling
- Enhanced Vapor Recovery includes dripless and spillage requirements for nozzles, and vent stack emission requirements for processors.

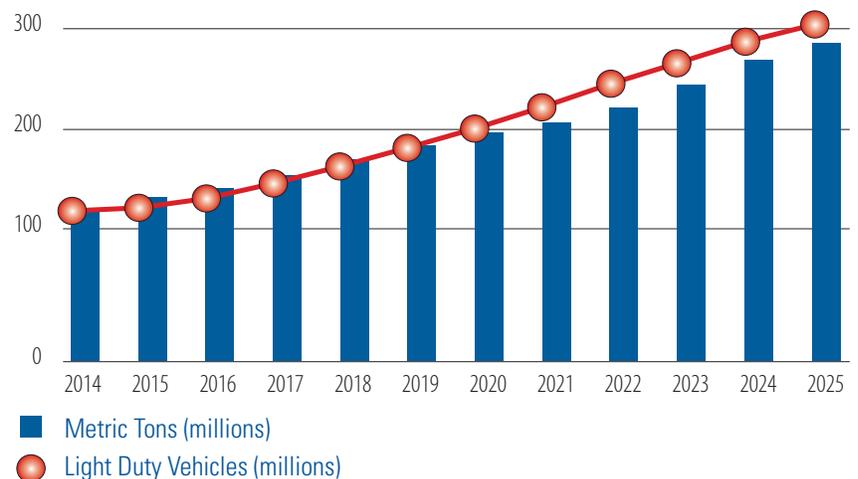
Other Countries are experiencing similar emission levels as the US saw in the 1970's and are evaluating the application of different technologies to reduce the uncontrolled fugitive emissions.

- China, India and Mexico are all recognizing the benefits of EVR as a method of pollution reduction.

US Emissions Decline even as Vehicle Population Increases with Stage II EVR



China Combined VOC Emissions Projected to Increase Through 2025 without further Emission Reduction Measures



No Vapor Recovery In Place

Uncontrolled Emissions – Personal Exposure and Vapor Venting at Highest Levels

Many parts of the world have yet to adopt strict environmental regulations.

The Problem Defined:

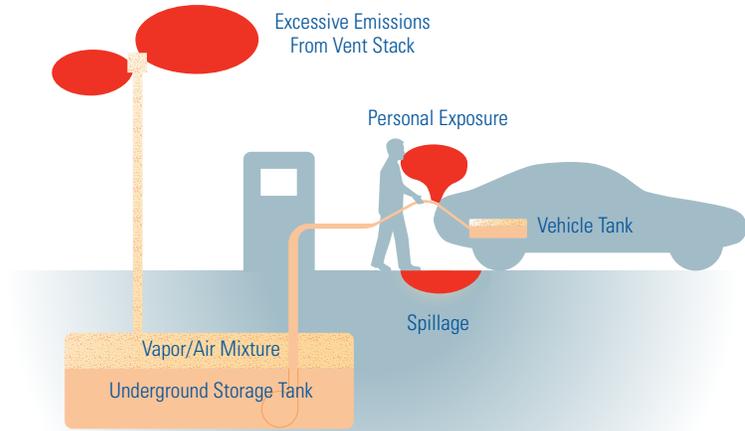
Causes for Emission Loss:

- Drips and spills at the nozzle
- Vapors permeating through hose
- Vent Stack emissions due to over pressurization of the Underground Storage Tank (UST)
- No implementation of Stage I Vapor Recovery
- Possible leakage into the ground water due to over pressurization or equipment that has not been maintained adequately

Reality:

- Non-Vapor Recovery equipment is the Lowest equipment cost
- BUT – Does not control any loss of vapors
- Polluting air and water creates health risks to the public

No Vapor Recovery



Excessive vent emissions, risk of spillage and customer exposure at nozzle

US Industry Unacceptable Pollution Levels	
Nozzle Emissions — Gallons lost	11.0 Million
Hose Emissions — Gallons lost	3.5 Million
Vent Stack Emissions — Gallons lost	215.0 Million
Total Unacceptable Emission Losses	229.5 Million Gallons

Note: 2015 Data



Pre-EVR Vapor Recovery

Pre-EVR Stage I and Stage II Equipment proven to be ineffective – Operating at only 62% efficiency – Driving CARB to develop EVR

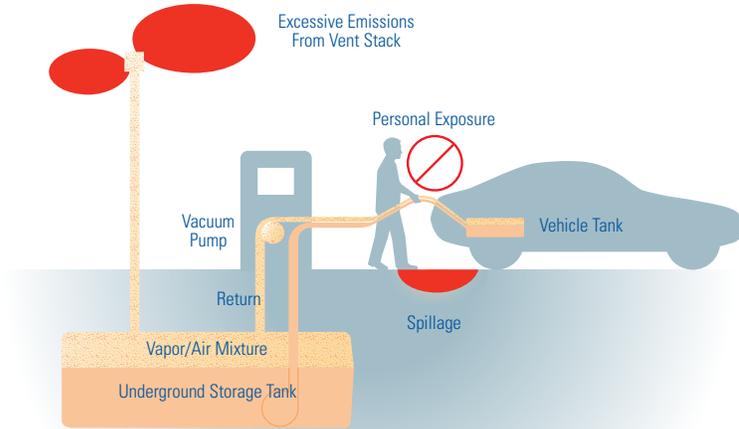
Vapor recovery systems collect vapors from the vehicle gasoline tank as gasoline is pumped into the vehicle and return them to the Underground Storage Tank (UST). Thus, preventing the Volatile Organic Compounds (VOC) from escaping into the atmosphere and being ingested by the customer.

These pre-EVR vapor recovery components helped alleviate 118 tons of emission from the California South Coast Air Basin alone – this was more than the reductions for low emissions vehicles and cleaner burning gasoline. There were two types of systems introduced at this time: Balance and Vac Assist.

Balance systems use a tight seal from the nozzle to the vehicle fill pipe and the negative pressure of the empty vapor space in the UST to pull the vapors from the vehicle gasoline tank to the UST at the same time.

Vac Assist systems use a vacuum pump to pull the vapors left in the gasoline tank to the UST.

Pre-EVR Vapor Recovery



Deficiencies of Pre-EVR Stage II Vapor Recovery – 62% Efficiency	Proposed Solutions – Enhanced Vapor Recovery (EVR)	CARB Approved New EVR Technology
Durability and Reliability of the Equipment	Stricter Certification Testing and Compliance Testing – System Certifications	CP-201 was created with new Certification and Compliance Testing Procedures
Fugitive Emissions at the Underground Storage Tank	Required Vent Stack Processors – UST Pressure Limits	EVR Vent Stack Processors required
Efficiency requirement not enough	Added Emissions Requirement in addition to efficiency Emissions < 0.38 lbs/kgal dispensed and 95% Efficient	Systems Approach to Certifications
ORVR Compatibility	No increase in UST pressure caused by Phase II	Equipment must be ORVR Compatible
Needed Additional Emissions Requirements	New Requirement Liquid Retention and Nozzle Spitting	Interlock on Nozzles
Needed Control of Dripping	New Requirement No more than 3 drips	EVR Nozzles
More Control of Spillage	0.24 lbs/kgal dispensed	EVR Nozzles

1974
 1974, California Health and Safety Code 41954 adopted
 CARB required to certify VR systems

1981
 1981, First Spit Back and Spillage Standards adopted

1990
 1990, Stage II Vapor Recovery and Onboard Refueling Vapor Recovery (ORVR)

Vac Assist Enhanced Vapor Recovery (EVR)

Expensive to purchase and operate – Driving Owners Toward Balance Systems

Vac Assist systems were the first Stage II EVR systems approved by CARB in California.

Since Vac Assist systems were approved first, many GDF (Gasoline Dispensing Facility) owners chose to install Vac Assist Systems.

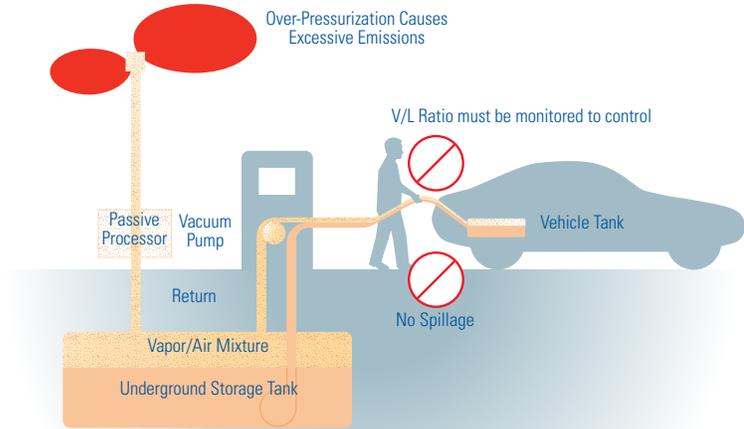
Many owners are now reconsidering this choice because of the high maintenance costs and ORVR compatibility issues with Vac Assist.

Causes for Efficiency Loss and Excessive Emissions:

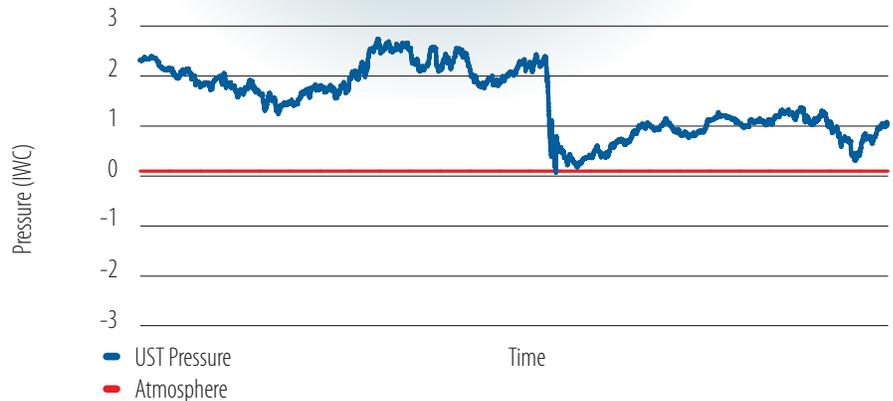
- Nozzle not sealed tight to fill pipe
- Incorrect Identification of ORVR vehicles
- Excessive air ingestion due to Vapor/Liquid (V/L) ratio being out of specification.

All lead to excessive vapors being pulled back to the UST and then stored in the passive processor; once the processor is full, these vapors are vented to the atmosphere.

Vapor Recovery EVR Assist System



Over-Pressurization on an EVR Assist Site — 24 Hour Time Period



Causes for Increased Costs...

- Expensive Maintenance Costs to keep V/L ratio in compliance
- Over-pressurization Alarms require service calls
- Non-compliance with CARB standards adds additional cost with potential regulatory fines.

1998

CARB establishes new Certification and Test Procedures and equipment Certification Program for Stage II

1998, First ORVR Vehicles sold

2000

1999, CARB/Districts Begin Testing Stage II Vapor Recovery sites to determine effectiveness

2000, CARB approved Enhanced Vapor Recovery

2005

August 31, 2005 Vac Assist EVR First EVR System Approved

With an April 2009 deadline, many GDFs chose to install the Assist Style system

The future belongs to VST Balance EVR

Due to the high maintenance cost and ORVR incompatibility with Assist Systems GDF owners in the California market are now converting to Balance EVR systems

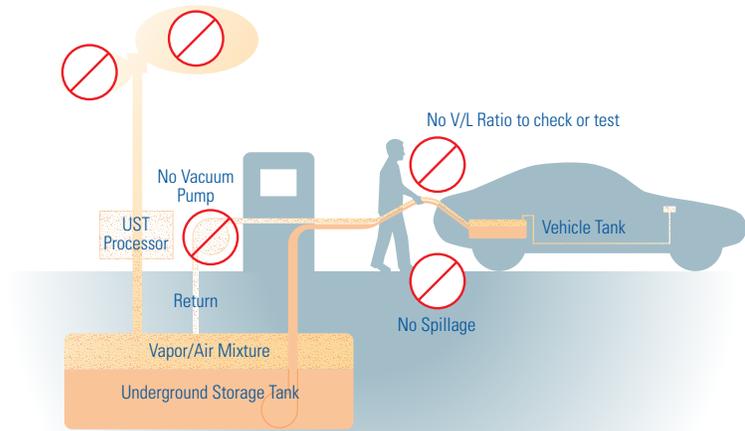
VST ENVIRO-LOC™ Balance system is simply less expensive to purchase, install, and especially to maintain than the Vac Assist systems. Balance systems are inherently ORVR compatible.

VST ENVIRO-LOC™ Balance Enhanced Vapor Recovery system eliminates moving parts, V/L testing and requires no nozzle adjustments.

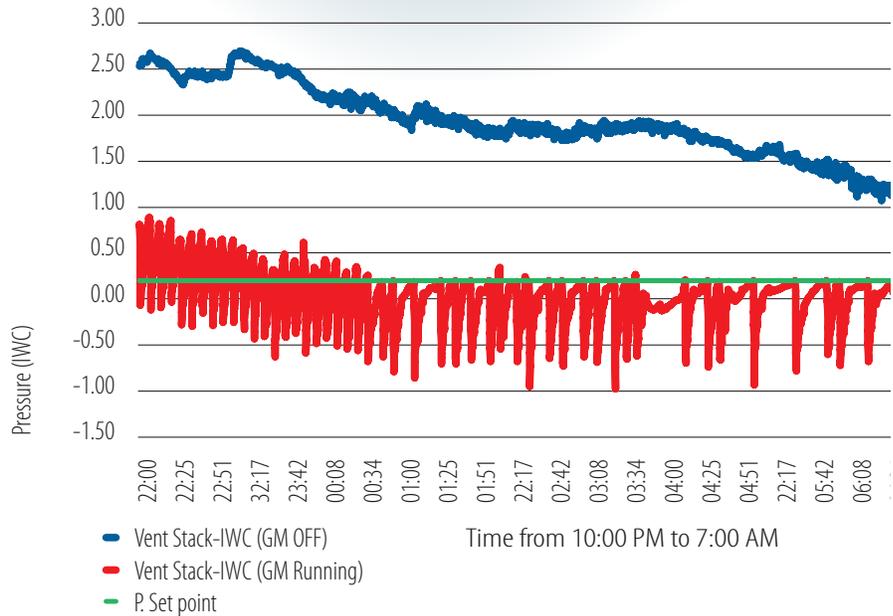
The VST ENVIRO-LOC™ Balance system not only saves money, but reliability is increased because it has fewer potential failure points. The GDF owner can replace hanging hardware so you save even more in reduced service and downtime costs.

VST GREEN MACHINE™ works with any front end hanging hardware system to keep the pressure in the UST below the pre-determined set point. Reducing vent emissions and thus air and ground pollution.

Balance Enhanced Vapor Recovery System



Balanced UST Pressure



2008
 April 1, 2008
 VST Balance EVR approved by CARB and VST is able to begin selling California Market
 80% Assist/
 20% Balance

2009
 April 1, 2009
 Deadline for all EVR systems to be installed in GDFs

2014
 Due to the various issues surrounding Assist Style EVR systems, GDF owners in California begin converting their systems back to Balance Style EVR systems

VST ENVIRO-LOC™ Balance EVR System

VST Balance ENVIRO-LOC™ system exceeds CARB EVR Standards of greater than 95% system efficiency by providing 98% efficiency



VST Balance ENVIRO-LOC™ Hanging Hardware

- VST's Dripless/Spitless Nozzle Technology exceeds CARB front end emissions specifications
- Patented safety interlock nozzle design
- Only Nozzle with a Secondary Safety Mechanism that renders the nozzle inoperative if the Interlock were to become damaged
- Field Reattachable Breakaway

VST GREEN MACHINE™ Active Processor

- Measures tank pressure and only operates when exceeding a predetermined threshold.
- Vapor Filtration Cartridge strips hydrocarbons from the UST vapors
- Returns Saturated Vapors back to the UST
- Vents Clean Air to Atmosphere
- Prevents VOCs from escaping into the atmosphere and ground water



Vapor Systems Technologies, Inc.



VST began in 1989 with the vision of One Company – Integrated Solutions.

Today, that philosophy is still in place and getting stronger. Recognizing that a healthier environment is a need and not an option, VST has dedicated its undivided attention to the ever changing, stringent regulations that govern fugitive vapors at gasoline dispensing facilities (GDF). To this challenge, VST is committed to a continual R&D campaign of developing the most current, technologically advanced solutions to service not only the United States, but also the world.

VST specializes in the development, engineering, manufacturing and sale of products that are sold into the GDF segment of the petroleum industry. The VST focus provides our customers and users with exceptional products, services, and innovative solutions for improving the fueling station experience as well as the world's air quality.

VST's product offering includes; curb pump and vapor recovery hoses, safety breakaways, nozzles, and underground storage tank pressure management processors. The ENVIRO-LOC™ vapor recovery product offering represents the most innovative concept in the industry for trapping fugitive vapors from the front end (vehicle refueling) to the back end (vent stacks) of a GDF site.



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One Company – Integrated Solutions

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