

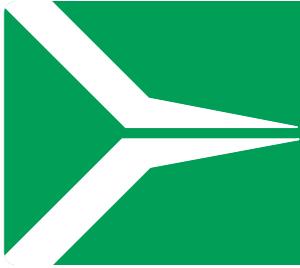
# Vapor Recovery Systems

# TAILORED TO YOUR REGION



**Engineered Concepts, LLC**

Quantum Leap Technologies



## RELIABLE VAPOR RECOVERY PAYS BIG AND PAYS QUICKLY

With the BTU values of tank vapors almost doubling those of typical natural gas streams, the ROI and profits compound very rapidly with effective and reliable vapor recovery. Since the development of the original VRSA (Vapor Recovery System Alternative), Engineered Concepts has developed vapor recovery systems for a wide variety of applications ranging from the Bakken in North Dakota to the Eagle Ford in South Texas. In most every case, we were called upon for environmental reasons, but as you can see on the opposing page the profit potential that would otherwise go to the atmosphere is now going to our customer's bottom line.

## EMISSION FREE DEHYDRATION COMBINED WITH VAPOR RECOVERY PAYS EVEN BIGGER

On locations where dehydration is required, Engineered Concepts can combine any of their VRSA vapor recovery models with their QLD emission free dehydration process to create an emission free well site. The QLD retrofits into existing dehydrators on locations requiring vapor recovery as well. Engineered Concepts began developing emission free production equipment technologies over 10 years ago. The first Engineered Concepts development was the only emission free dehydration process to be EPA verified, the patented QLD. The efficiency, effectiveness, and reliability of the QLD/VRSA combination are unmatched—primarily because no one else has the tools, technology and verification. PICT (Process Interstage Control Technology) and other patent pending processes puts Engineered Concepts customers well within the grasp of totally emission free-zero waste-production operations.



*Engineered concepts offers three basic vapor recovery methods that are fine-tuned to the particulars of your production requirements.*

*Precise temperature control is the key to reliable vapor recovery.*

### ANNUAL VAPOR RECOVERY PROFIT FROM RANDOM WELLS

SOUTH TEXAS .....	\$442,000
EAGLE FORD .....	\$1,464,000
GRANITE WASH .....	\$2,872,000
BAKKEN .....	\$276,000
PICEANCE .....	\$148,000
JONAH .....	\$113,000

Random "actual well" modeling results in various geographic regions measuring lost vapors calculated at \$4.00 per MM BTU.

### VARIETY OF VRSA SYSTEMS ZERO FAILURES

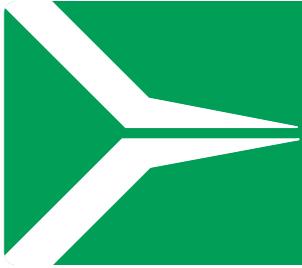
At the present, there are no "off the shelf" or "one size fits all" solutions to reliable vapor recovery. Climate, production content and numerous other factors are all critical elements in designing a reliable vapor recovery system. To accommodate very different climates, production contents/rates etc., Engineered Concepts has developed a diverse range of vapor recovery systems. Most systems can be retrofitted onto existing production facilities or well pads and all systems are custom designed to meet the production characteristics of your region or individual requirement. All Engineered Concepts systems feature patented and patent pending temperature control features... the key to reliable vapor recovery.

Like the original VRSA, each system virtually eliminates flaring and adds significant profit to your overall production efforts. All VRSA systems are scalable, skid mounted and easily relocated. Most important, Engineered Concepts has never had a system fail or require removal due to not delivering the promised results to a customer. Few, if any, packagers of VRUs can make this claim.

### DIFFERENT VRSA DESIGNS ADDRESS WIDE RANGE OF CONDITIONS

Currently Engineered Concepts offers three VRSA versions. All the designs substantially remove the effects of ambient temperature as a process variable to provide reliable year round operations. All systems can be configured to address potential slugging conditions, extreme weather and the full range of other field conditions described in the VRSA brochure. Each VRSA solves traditional VRU problems by employing processes to:

- **Control/Manage interstage recycles**
- **Control slugs**
- **Eliminate oxygen ingress into the pipeline from the tanks**
- **Operate reliably and continuously during wide ambient temperature swings**
- **Address special production contents such as saline, paraffin and H2S**



With each VRSA approach, all pressures and temperatures are closely controlled throughout the system, including the compressor interstage temperatures, which provides customers the highest degree of reliability and makes Engineered Concepts' patent pending technologies truly unique.

## EXCLUSIVE PICT\* TECHNOLOGY CONTROLS RECYCLES

High BTU (heavy) gases collected by the vapor recovery process have a dew point temperature higher than the interstage aftercooler temperature on air-cooled compressors. These overcooled hydrocarbon gases condense in the compressor interstage aftercoolers and can trigger out-of-control recycles. Condensed liquids can also contaminate the lube oil in the compressor - resulting in inevitable mechanical failure.

Process Interstage Controlled Temperature (PICT\*) is used in Engineered Concepts' vapor recovery systems to regulate the compressor interstage temperatures. There are two varieties of PICT technology the PICT-V and the PICT-L.

The PICT-V process utilizes unique temperature controlled valves that control recycles caused by the overcooling of the compressed gases (condensation) during cold weather operation in geographic regions that do not experience harsh extended cold weather.

The PICT-L is a self contained closed system that circulates coolant much like an engine cooling system to control interstage temperatures. The PICT-L can be used in all weather conditions.

During cold weather, the PICT-V and L maintain the optimum interstage temperature to keep recycles in check. With interstage temperatures controlled, a PICT equipped compressor is unaffected by cold weather.

*PICT technology controls compressor interstage temperatures to keep recycles in check and prevent lube oil contamination.*



\* PICT is a patent pending process.

*The VRSA combined with Engineered Concepts QLD  
Dehydration can make any site Emissions Free*

*The standard VRSA collects vapors  
off the storage tanks and routes  
them to the sales line.*

## MODEL 1: STANDARD VRSA

The standard VRSA captures the vapors from tanks and sends them to the sales line. To prevent oxygen ingress, the VRSA stops collecting vapors in the event of pressure loss in the tanks (due to opening the thief hatch etc.). When adequate system pressure is restored, the system routes vapors to the flare for a specified time (timer controlled) before capturing vapors continues.

The VRSA can be combined with other patented equipment to capture the vapors off the dehydrator still column and water tanks making the entire production site virtually emissions free.

- **The VRSA is an easy retrofit into existing sites with little modification to the existing process.**





*The HERO can also be combined with Engineered Concepts QLD dehydration technology to make an emission free well pad.*

*The Model H (HERO) captures the vapors for sales while stabilizing the fluids.*

**MODEL 2: VRSA MODEL H (HERO)**

Whereas the standard VRSA captures vapors from unstable condensate in the tank, the HERO (High Efficiency Recovery Option) stabilizes the condensate. Stabilizing has numerous advantages including.

- **Positively eliminates oxygen entering the compressor via the tank or other system components**
- **Eliminates flashing (vapor loss) during transport truck loading**
- **Eliminates vapor loss during transport**
- **No loss of vapors when the thief hatch is opened (also improves worker safety)**
- **Stable products have greater value**



The Engineered Concepts HERO offers significant advantages over other stabilizer designs that do not control compressor interstage recycles. In addition, the Engineered Concepts HERO provides is that it eliminates the need for a LPP (VRT Tower) and VRU compressor. The HERO is a 100% vapor recovery solution with a wide operating range to address almost any production scenario. The HERO is modular skid mounted, reusable and installs easily.



*A PICT equipped Model H vapor recovery system eliminates the need for the LPP (VRT Tower) and a VRU compressor.*

*The Model L employs a Liquid Pre-Storage Vessel upstream the tanks to capture the vapors for sales.*



*A short profile LPP enables the entire Model L vapory recovery system to be skid mounted and easily deployed.*

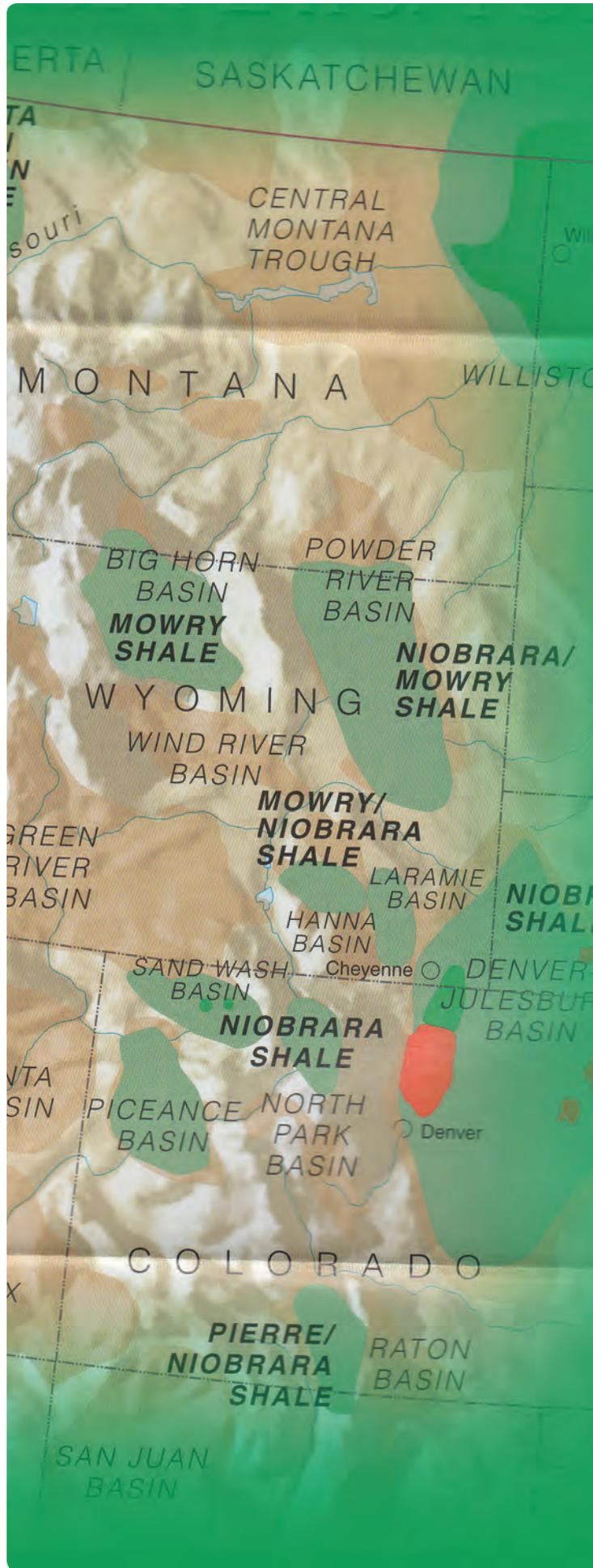
- **The LPP eliminates potential oxygen ingress from the tanks due to a thief hatch being left open etc.**
- **Reduces storage tank vapors emissions to essentially zero.**
- **Can be intergrated with Engineered Concepts' QLD emission free dehydration process to reduce VOC, BTEX and other HAP emissions to virtually zero.**

### MODEL 3: VRSA MODEL L

The MODEL L VRSA employs a Liquid Pre Storage Process (LPP) located between the flash separator and the tank. The standard LPP (aka. West Texas Tower, boot, LVT, VRT) is a vertical vessel whose height exceeds the height of the tanks by about 8 to 10 ft. The LPP feeds into the tanks via hydrostatic head at pressures as low as 6 oz. The LPP vapors are captured and sent to a VRU. The VRU sends the vapors to a flash gas compressor that has the interstage compression temperatures controlled by PICT technology.

Engineered Concepts' short profile LPP (approximately 10 ft. tall) can be supplied for locations with height restrictions. This skid mounted version employs a pump to move the liquids to the tank.





## LET ENGINEERED CONCEPTS HELP YOU ANTICIPATE YOUR PRODUCTION NEEDS!

Although Engineered Concepts specializes in maximizing profits through emission elimination technologies, you will not find a more experienced oil and gas production equipment company. Read our history on our website. As your field is developed Engineered Concepts can assist you in determining the best means to maximize your profits with a wide range of reliable, long-term trouble-free solutions and equipment including production units, heaters, dehydrators and treaters. Engineered Concepts can also custom fabricate to meet your performance requirements. The sooner you contact Engineered Concepts in your production planning, the more lucrative your operations will become with fewer problems.

### Engineered Concepts' systems are not off the shelf items.

We carry a 60-day money back guarantee that the system performs as promised and full customer support. We have never had any system removed from the field for not performing as promised.



For more information about Engineered Concepts vapor recovery and other emission free/reduction technologies visit: [www.engineeredconcepts.com](http://www.engineeredconcepts.com)