Tank Pressure Control Device Survey

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Agenda

- Tank Owner's Priorities and Challenges

- What is a Tank Survey?

- Tank Survey Steps

- Tank Survey Examples

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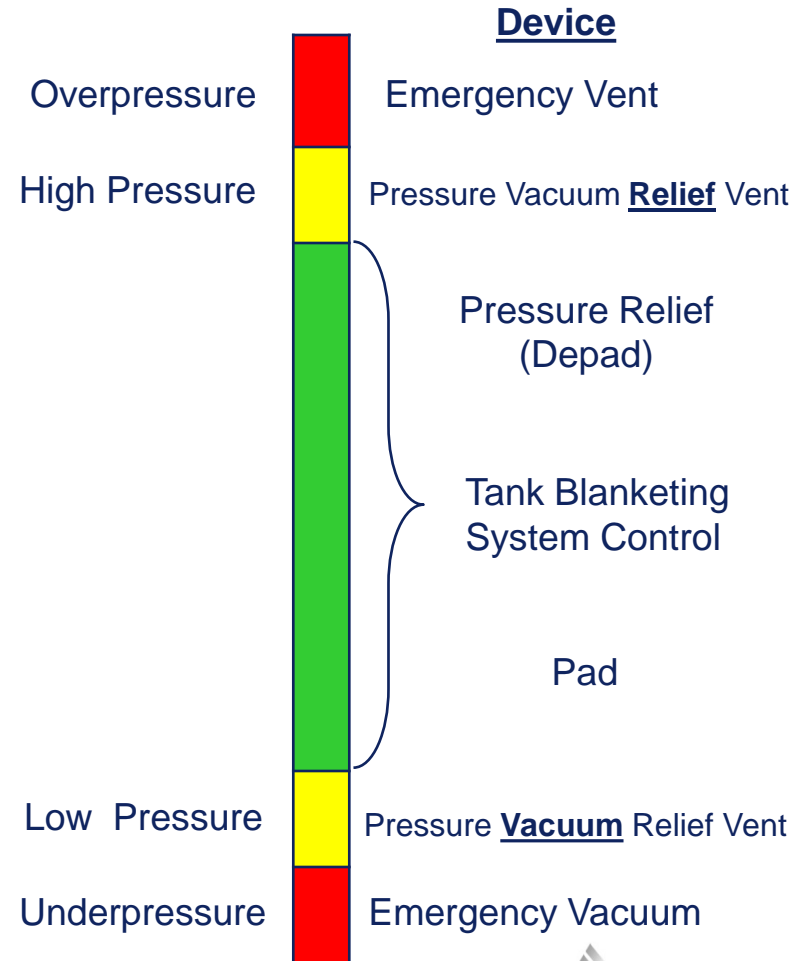
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Tank Owner Priorities

- Safety (i.e. undetected failures)
- Product Quality and Product Loss
- Environmental (i.e. emissions)
- Cost (i.e. maintenance, blanket gas)

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Tank Owner Pressure Control Challenges

Challenges:

- Very low pressures

- Multiple technologies used on tanks

- Inexperienced work force

- Lack of resources

> Low setpoints and multiple device interactions complicates troubleshooting and optimization

Device

Overpressure	Emergency Vent
High Pressure	Pressure Vacuum **Relief** Vent
	Pressure Relief (Depad)
	Tank Blanketing System Control
	Pad
Low Pressure	Pressure **Vacuum** Relief Vent
Underpressure	Emergency Vacuum

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Let Emerson Help You Optimize Your Tank Pressure Control with a Tank Survey

What is it?

A physical infield review by Emerson of your tank(s) existing tank pressure control solution.

What is the objective?

To identify areas of opportunity to improve safety, reliability and reduce cost associated with a tank(s) pressure control system(s).

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Tank Survey Steps

1. Survey Kick-off

2. Field Inventory and Survey

3. Develop and Prioritize Findings

4. Final Survey Summary

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Step 1: Survey Kick-off Meeting

A kick-off meeting is scheduled with the site team and Emerson 1-2 weeks prior to the tank survey.

Kick-off is intended to identify tanks to be surveyed, discuss current and past issues, and begin survey pre-work

												Customer Provided Information	
Tank #	Survey Date	P&ID Drawing	Tank Capacity (MBBLS)	Tank Product	Vapor Pressure (PSIA)	Specific Gravity	Avg. Storage Temp (DEGF)	Insulated	Vents Instulated	Heated / Chilled	Insulation Reduction Factor	Max Pump In Rate (GPM)	
Example 1	11/13/2014	123456	60	Styrene	0.2700	0.90	60.00	Yes	No	Chilled	1	3,500	
Example 2	11/13/2014	456789	35	Hexene	6.5010	0.67	Ambient	No	No	No	1	1,700	

								Emerson	
Max Pump Out Rate (GPM)	Blanketing Gas	Average Blanket Gas Usage (ccf/mo)	Allowable Tank Moisture	Allowable Tank O2	Blanket Gas Supply Pressure (PSI)	Required Tank Blanketing Pressure (inch W.C.)	API Required In-Breathing Capacity (SCFH)	API Required Out-Breathing Capacity (SCFH)	Customer Comments
1,000	None	no meter	N/A	N/A	70	0.5			
1,000	N2	no meter	N/A	50 PPM	70	0.25-0.75			

Survey Pre-work Forms

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Step 1: Survey Kick-off Meeting (Cont.)

Sample Kick-off Meeting Agenda

- Review of Tank Survey Process **(Emerson/LBP)**
- Facility Overview / Tour **(Customer)**
- Priorities and Expectations **(Emerson & Customer)**
- Tank List Development **(ALL)**
- Specific Tank Discussion **(ALL)**
  - Existing pressure control setup
  - Current pressure control issues
  - Current maintenance practices
  - Instrument accessibility considerations
  - Safety considerations (i.e. PPE, training, etc.)
  - Additional considerations
- Finalize Survey Date

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Step 2: Tank Inventory

The tank inventory involves gathering information from all tank connected control devices such as:
- Level Transmitters
- Pressure Transmitters
- PVRVs
- Gage Hatches
- Regulators

De-Pad				
	Regulator	**Transmitter**	**Controller**	**Control Valve**
Tag #	O-PCV-6156	N/A	N/A	N/A
Manufacturer	Fisher			
Model	1290			
Serial #	123456789			
External Pilot Operated	Yes			
External Pilot Model	Y291A			
External Sensing Line	Yes			
External Sensing Line Size	1"			
External Sensing Line Length	5 Feet			
Pressure Setpoint	2" WC			
Local Inlet Pressure Gauge	Yes			
Local Outlet Pressure Gauge	Yes			
Inlet Pressure (P1)	1.6" WC			

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Step 2 (cont.): Field Survey

The field survey is a non-intrusive inspection of the tank devices focused specifically on:

- Physical Condition
- Installation
- Device Attributes (i.e. sizing, material, etc)

#	Observation		Yes/No	Observation Comments
	Step Down Regulator			
1.1	The regulator is controlling to the required pressure.		Yes	
1.2	The regulator is in an acceptable physical condition.			
1.21		The regulator is free of marks on the body and spring case indicating it has been struck with a wrench or hard object	Yes	
1.22		The regulator spring case bolts are not worn, stripped, or damaged.	Yes	
1.23		The regulator spring case, body, and process connections are free of rust and body damage from the surrounding environment.	No	Regulator is an older model and looks worn. The valve is not maintained on a regular basis and the valve does not appear to have been worked on or repaired recently.
1.3	Regulator is the proper size and range for the application.			

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Step 3: Develop and Prioritize Findings

After the survey the Emerson team will develop a tank survey report that will explain their findings, provide a recommendation for each finding, and propose a priority for each recommendation.

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Tank Survey Summary Report		

Customer Name: ABC Refinery
Attention: John Refiner
Address

Survey Date: 7/25/14
Prepared By: Michael Calaway
Telephone:
Email:

Tank #	Finding	Issue	Priority	Recommendation(s)
Example 1	PVRVs currently undergo weekly maintenance to remove product from the seats and pallets of the current PVRVs. Product build up causes the PVRVs to stick becoming unreliable.	PVRV	B	Install PVRVs with polyphenylene sulfide thermoplasic seats and pallet to reduce vapor adhesion due to stored product.
Example 2	A compressed air filter was found in poor physical condition on the regulator sensing line. Filters are not recommended on blanketing regulator sensing lines due to the low pressure being measured. Filters can cause pressure drop in the sensing line resulting in regulator inaccuracy and regulators can become slow and unresponsive as the filter becomes contaminated.	Regulator	A	Remove the filter from the sensing line of the blanketing regulator.

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Step 4: Final Survey Summary

After the findings have been developed a final survey summary presentation will be used to provide additional information on the recommendations.

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Tank Survey Example 1

A global chemical company noticed a significant rise in nitrogen costs at one of their facilities on the Texas gulf coast. Emerson's local business partner was asked to evaluate the site's tank blanketing regulators to identify potential N2 savings.

- More than 40 tanks surveyed

- Survey included step-down, pad and de-pad pressure regulators

- More than 20 tanks were found with opportunities

- **>$500K** customer N2 savings expected

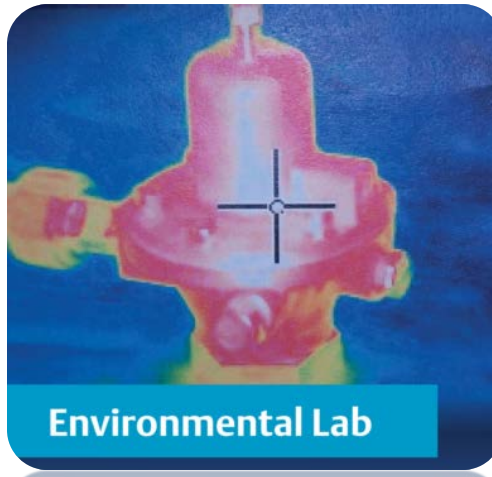**EMERSON**
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Tank Survey Example 2

A leading tank farm operator wanted help identifying improvement areas on selected tanks with high blanketing gas usage and multiple present and historical tank pressure control issues.

- 5 tanks surveyed

- Survey included PVRVs and blanketing regulators

- More than 15 improvement recommendations were provided to reduce PVRV maintenance cost, increase PVRV reliability and eliminate product quality issues due O2 ingress.

- > $40,000/year of reduced maintenance cost expected

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Flow Lab

Environmental Lab

Materials Lab

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