SmartPRV™: Wireless Pressure Relief Valve Monitoring

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New Wireless Technology

- Wireless Pressure Relief Valve Monitoring is here!

Farris SmartPRV™ technology is a simple, powerful solution to improve your ability to monitor critical safety valves and their effects on plant performance. Overpressure events are unpredictable, can go unnoticed and consequently can be difficult to estimate. Using the SmartPRV system, facilities are now able to record overpressure events.

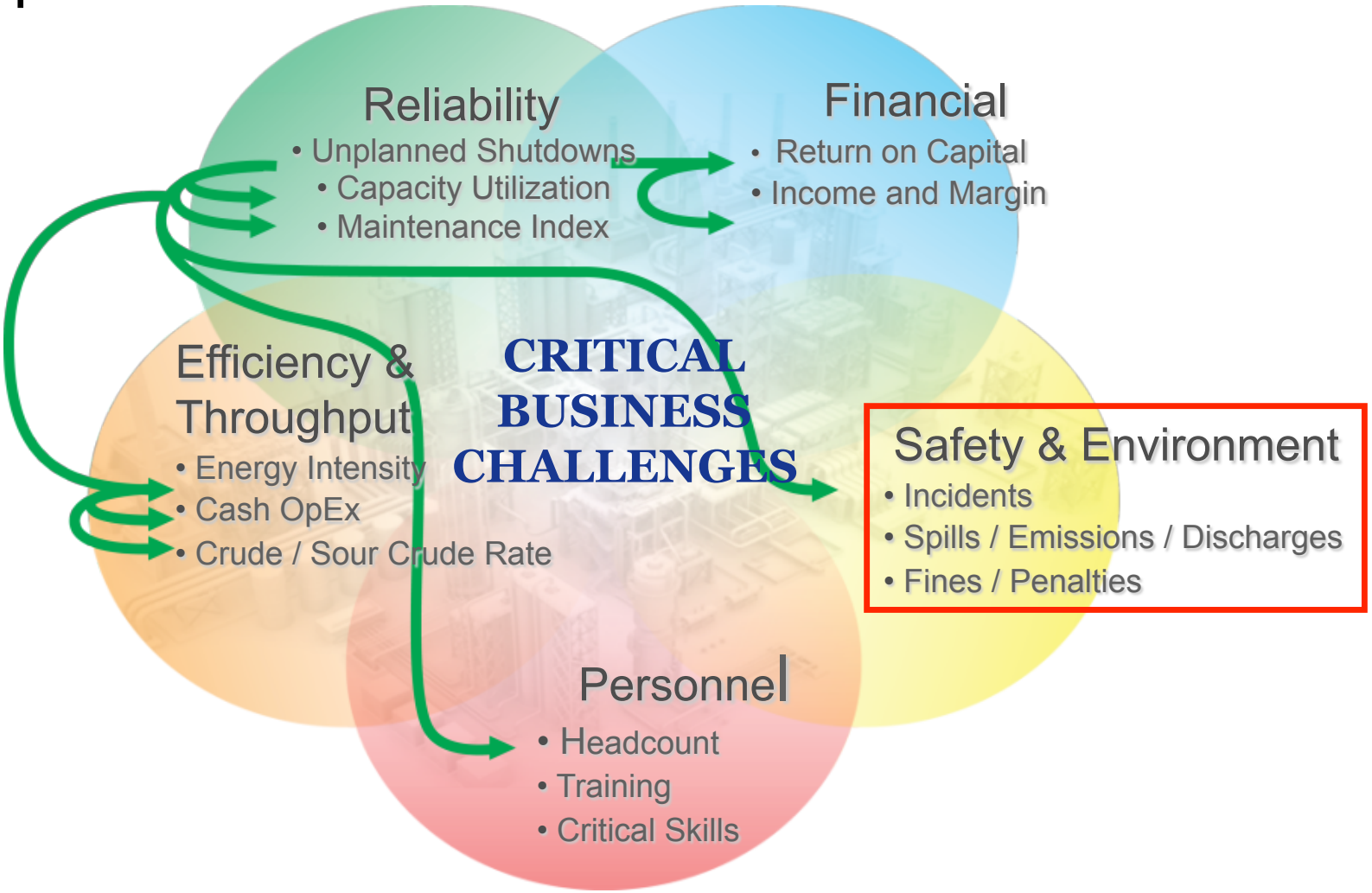
Why Plants need PSV's moritorized?

- Increasing regulatory requirements are forcing hydrocarbon operating facilities to provide data regarding the nature and quantity of emissions produced by their vent-gas flaring operations
- The concern for industrial emissions of pollutants and their effect on the environment has been steadily increasing
- Many of the current operating process plants can be 50 plus years old with dated technologies
- Increasing corporate financial challenges, forces operations to the maximize their operating capabilities which will definitely increase potential relief events

Why Plants need PSV's moritorized?

- Plant relief events are common
- "Relieving RV's" can be the main source of emissions
- Today's environmental agencies specifically have a special interest in these relief events
- Industry requires better methods for monitoring, analyzing and accurate reporting emissions created during plant relief events

Corporate Drivers for Information



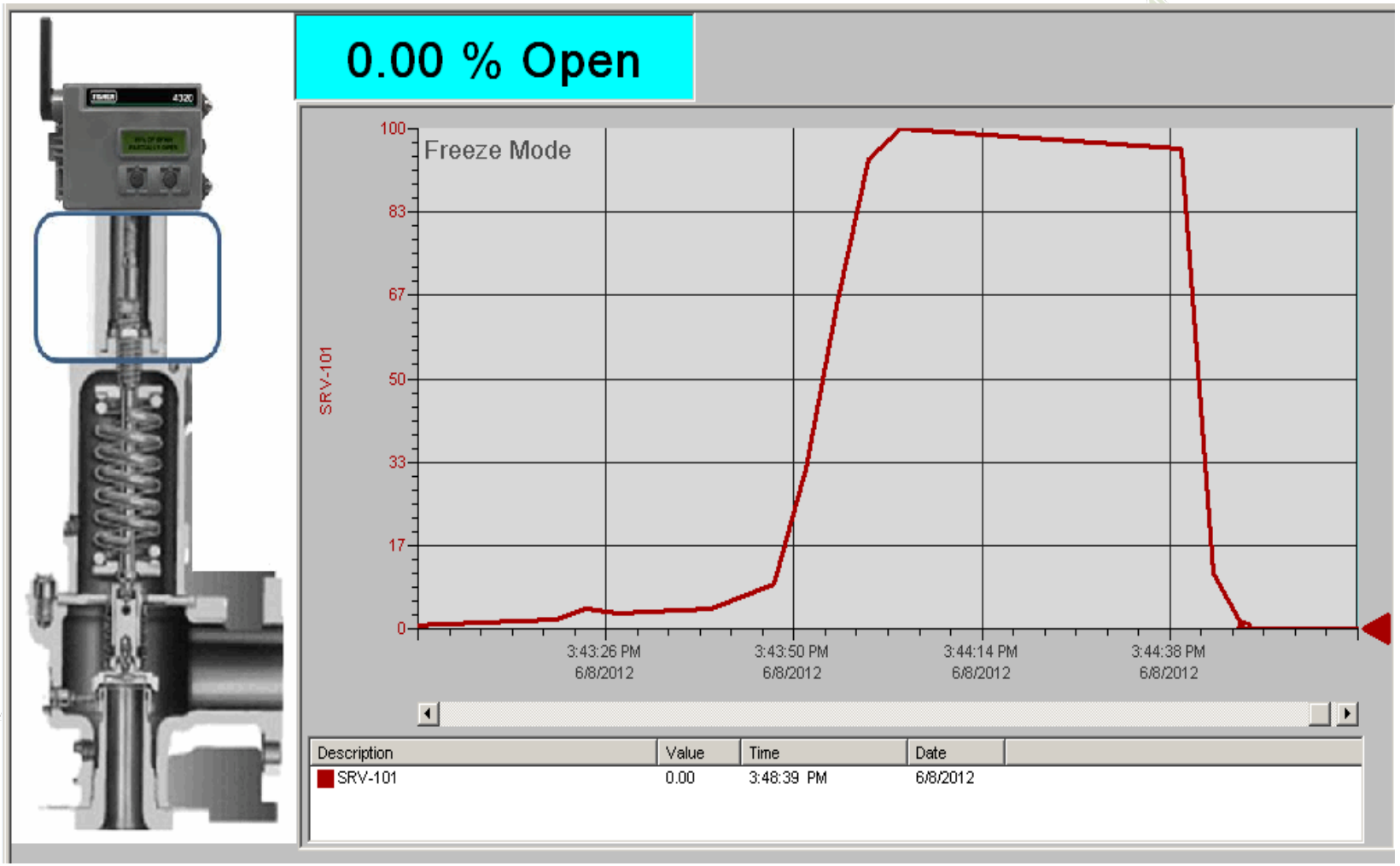
Benefits

- Wireless technology has allowed devices previously difficult to monitor to have monitoring capability
- A PRV is an example of this. Current technology for monitoring are limit or proximity switches that must be hard wired.
- Hard wiring has cost and/or location limitations.
- Data output is limited; valve open or closed.
- A spring loaded PRV's can be converted to a SmartPRV.

Benefits

- We will discuss the opportunities of monitoring, analyzing and accurate reporting of emission created during plant relief events.
- Until now, methods to monitor/analyze these critical components of a plant were difficult if not unfeasible for a myriad of reasons:
  - RV's by nature require mechanical operations (ASME UG-125)
  - Very rigid "hard wiring" hazard area approvals
  - Traditionally RV's are rarely connected to digital control systems

Wireless Solution



Wireless Solution

Typical Data from Digital Control System

Relief Device	Relief Date	Start Time	Reclose Time	Duration Time (minutes)	Fully Reclosed
10-PSV-301A	13-Oct-13	10:00:30	10:23:00	22.5	Yes
10-PSV-301B	13-Oct-13	10:00:30	10:23:00	22.5	Yes
10-PSV-301C	13-Oct-13	10:00:30	10:23:00	22.5	Yes
10-PSV-401	13-Oct-13	10:02:00	10:24:00	22	Yes
10-PSV-540	13-Oct-13	10:02:00	10:24:00	22	Yes
10-PSV-600	13-Oct-13	10:02:00	**	*	No

Communication to Integrated Pressure Relief System Database

SMARTPRV Reporting

Report Outlet

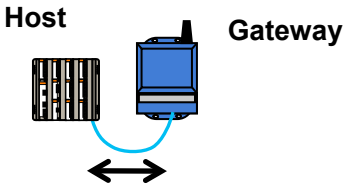
Relief Event Date:	13-Oct-13	10:00:30							
Equip ID #	Manufacturer	Model Number	Valve Type	Set Pressure (psig)	OVP Scenario	Fluid	Required Capacity (lb/hr)	Relief Duration (Minutes)	Relief Emission (lb/hr)
10-PSV-301A	Farris	26NB12L-120	Bellows	500	Blocked	HC	160,283	22.5	60,106
					Fire Vapor	HC	14,593	22.5	5,472
					CV Failrue	HC	82,900	22.5	31,088
10-PSV-301B	Farris	26NB12L-120	Bellows	525	Blocked	HC	160,283	22.5	60,106
					Fire Vapor	HC	14,593	22.5	5,472
					CV Failrue	HC	82,900	22.5	31,088
10-PSV-301C	Farris	26NB12L-120	Bellows	525	Blocked	HC	160,283	22.5	60,106
					Fire Vapor	HC	14,593	22.5	5,472
					CV Failrue	HC	82,900	22.5	31,088
10-PSV-401	Farris	26TB12-120/N1	Bellows	200	CV Failure	H2S	117,000	22	42,900
10-PSV-540	Farris	26RB12-120	Bellows	200	CV Failrue	HC	78,000	22	28,600
10-PSV-600	Farris	26QB12-120	Bellows	200	CV Failure	HC	68,000	**	**

Relief Event Summary By Overpressure Scenario

OVP Scenario	Fluid	Flow	
Blocked Flow	HC	180,318	lb/hr
Fire	HC	16,417	lb/hr
CV Failure	HC/H2S	164,763	lb/hr

Note:	10-PSV-600 did not fully reclose

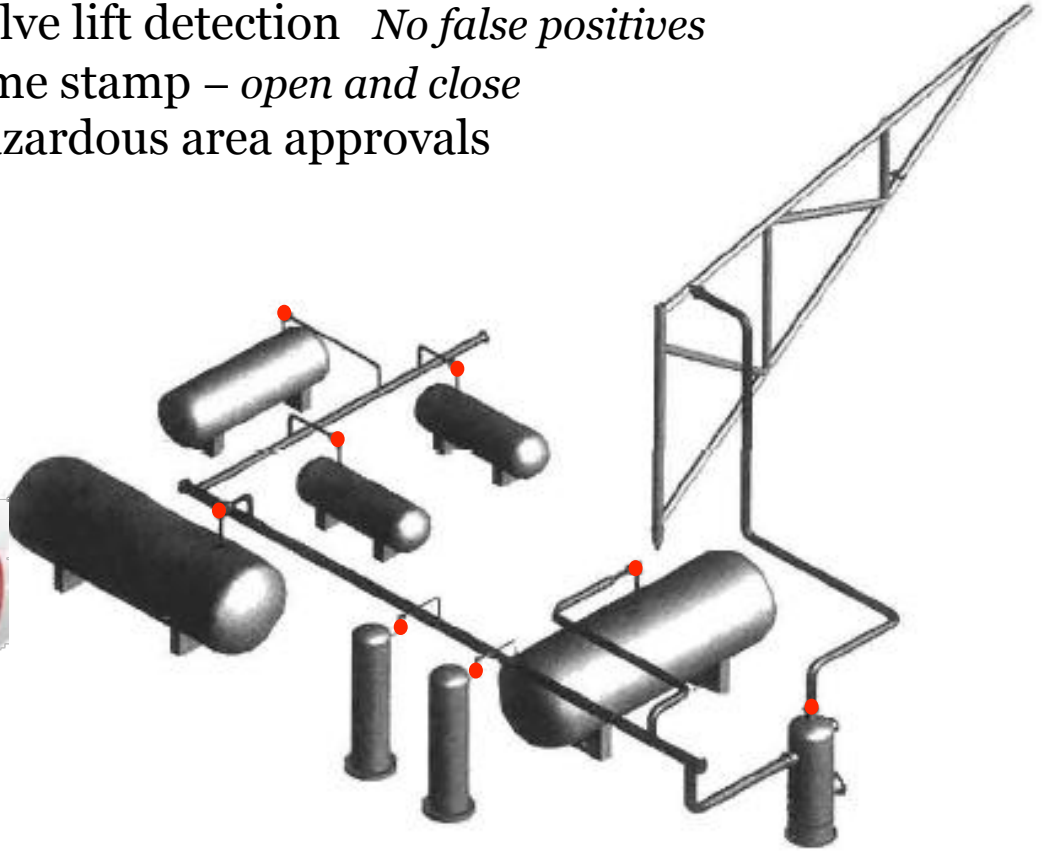
Target Application



Deliverables

- Valve lift detection *No false positives*
- Time stamp – *open and close*
- Hazardous area approvals

Refining and Chemical



Schematic of a relief valve system showing pressure vessels, relief valves, relief header, vent scrubber and vent boom. Process piping has been omitted for clarity.

SUMMARY

- Pressure Relief Valve monitoring is easy with the advances of SmartPRV™ technology, all you need is:
  - Pressure Relief Valve
  - Wireless Network
  - Data Historian
- Valve stem movement with timestamp data directly entered into data historian improves your reporting capabilities.
- Improve environmental reporting accuracy

SUMMARY

- Allows mounting locations that would make wired solutions very expensive or impossible
- Built-in data reporting capabilities for items such as time and valve identification
- Built-in self diagnostic capability – they can alert the network immediately when something goes wrong
- Easily scalable for adding or removing devices in the future