OCD-ARTESIA

Form 3160-5
(February 2005)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: March 31, 2007

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE – Other instructions on page 2.

5. Lease Serial No.
NMLC-029418A

6. If Indian, Allottee or Tribe Name

7. If Unit of CA/Agreement, Name and/or No.
NM 71030C

1. Type of Well
☑ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
Skelly #961

2. Name of Operator
Chevron

9. API Well No.
30-015-34324

3a. Address
15 Smtih Road, Midland, TX 79705

3b. Phone No. *(include area code)*
(432) 687-7112

10. Field and Pool or Exploratory Area
Fren

4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)*
Sections 14 & 22, Township 17 South, Range 31 East

11. Country or Parish, State
Eddy County, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☑ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Alternate method of measurement
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Per discussion about the GLCC (Gas Liquid Cylindrical Cyclone) test unit. This sundry is submitted in request for approval to use a 2" MicroMotion CMF200M Coriolis Meter to measure produced liquids separated via GLCC. This will be for test measurement only. The Skelly Unit/Fren Field will have a test GLCC at Satellite 961 scheduled to service wells: 961, 678, 682, 679, 672, 660, 767, 783, and a test GLCC at 940 Battery scheduled to service wells: 995, 980, 978, 849, 987, 635, 843, 710.

Please see attachment for details of GLCC. Factory reported accuracies are also included.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

SUBMIT INFO ON ITEM #10 ON COAs WITHIN 30 days

Accepted for record - NMOCD
3-9-11 DS

APPROVED
FEB 26 2011
/s/ JD Whitlock Jr
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)* Luke Salmans
Title Facilities Engineer
Signature Luke Salmans
Date 1/13/11

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by
Title
Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Office

RECEIVED
MAR 08 2011
NMOCD ARTESIA
ENTERED

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

Coriolis Meter
Conditions of Approval

1. **Approval is for meter number _____ and transmitter number_____.**

2. **The Coriolis meter shall be designed, installed and operated in accordance with all applicable API standards, including API 5.6, as may be amended or revised from time to time.**

3. **The metering facility shall include a temperature probe to monitor the actual oil temperature during custody transfer. This information will be recorded and used in calculating the volume of oil metered during each transaction.**

4. **The meter shall have a non-resettable totalizer.**

5. **The custody transfer meter shall be proven monthly and in conformance with Onshore Oil and Gas Order No. 4.III.D. The meter proving is to be witnessed by BLM, contact 575-361-2822; a minimum of 24 hours prior to meter proving. Meter proving records shall be maintained for a period of six years from the date of generation and will be made available for audit upon request.**

6. **A copy of the monthly meter proving will be submitted to the appropriate BLM office.**

7. **The run ticket associated with each oil transfer shall include the measured or calculated BS&W, oil gravity and temperature recorded during the transfer. Such records shall be maintained for a period of six years from the date of generation and will be made available for audit upon request.**

8. **Operator to maintain tank gauging data to be used as a comparison with the LACT meter readings.**

9. **All other provisions of the Onshore Oil and Gas Orders, especially No. 3 and No. 4 shall be met.**

10. **This approval may be subject to future review and if determined inadequate with regards to accurate measurement, the approval will be withdrawn.**

WWI 120909

OCD-ARTESIA

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Please see attachment for updated GLCC drawing and technical information (measurement form, advantages, accuracy, reliability, stability) concerning vortex meters.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

APPROVED
MAR 3 2011
/s/ JD Whitlock Jr
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

14. I hereby certify that the foregoing is true and correct. Name *(Printed/Typed)* Luke Salmans	Title Facilities Engineer
Signature Luke Salmans	Date 1/13/11

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office	

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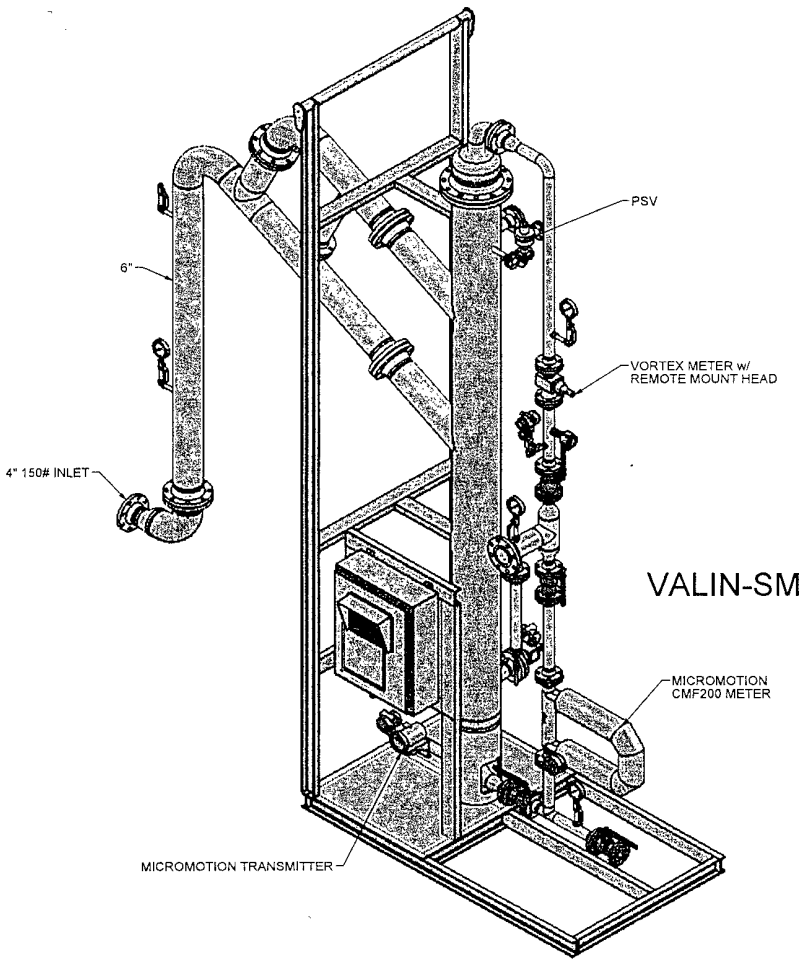
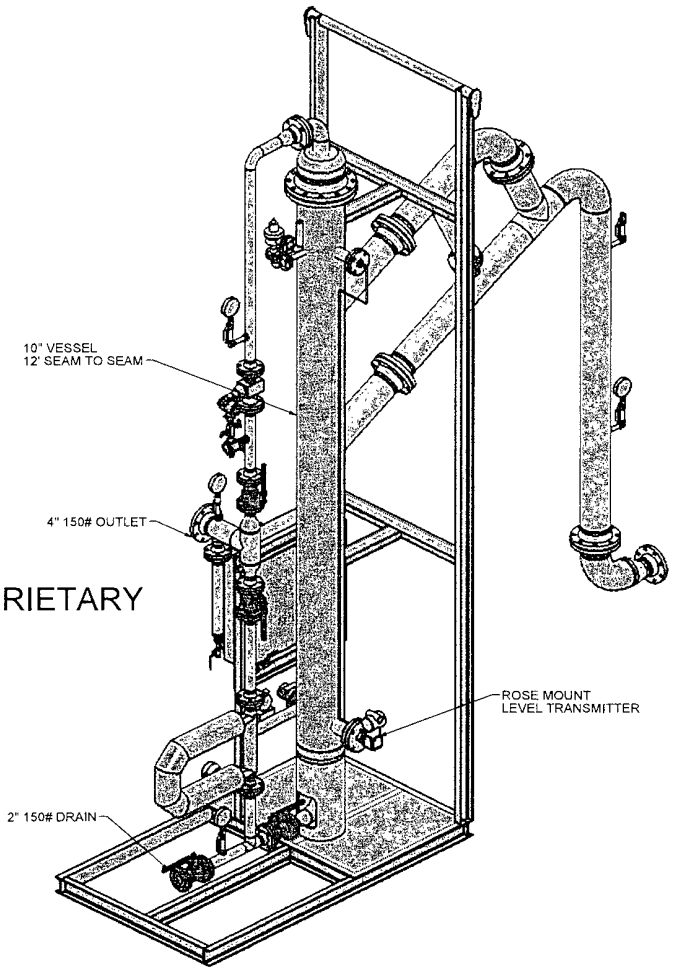
(Instructions on page 2)





VALIN-SMS PROPRIETARY

VALIN CORPORATION
SYSTEMS MEASUREMENT SERVICES

REVISIONS

REV NO.	DATE	REVISED DESCRIPTION (DESTROY ALL PRINTS BEARING EARLIER DATE)
A	04/27/10	ISSUE FOR QUOTE
B	05/11/10	ISSUE FOR QUOTE
C	06/09/10	ISSUE FOR QUOTE
D	10/07/10	ISSUE FOR APPROVAL
E	10/18/10	ISSUE FOR APPROVAL

APPROVED BY

BY: _____ DATE: _____
BY: _____ DATE: _____
BY: _____ DATE: _____
BY: _____ DATE: _____

VALIN-SMS

BAKERSFIELD, CA PHONE:(661) 589-7686
SOLID WORKS CONTROL
FILE: WEST TEXAS ASSEMBLY
ENG APPR: ERIC R.
CHECKED BY: ERIC R.
DRAWN BY: F.GERARD
DATE: 10/18/2010

CUSTOMER: CHEVRON
PROJECT: WEST TEXAS
LOCATION: TEXAS

DWG. NO. SMS-TX-040110-CHEVRON-P002

REV D

SCALE: NTS | WEIGHT: | SHEET 2 OF 2

Process Specifications

Gas Flow Rates	0.052 to .500 MMSCFD
Liquid Flow Rate	500 to 1200 BPD
Operating Pressure	45 PSIA
Operating Temperature	90 F
Water Cut	87 %
Water Specific Gravity	1.05 SG
Gas Specific Gravity	0.8 SG
API Gravity	36 deg API
Design Pressure	285 PSI @ 100°F
ANSI Rating	Class 150

925 Malta Ave • Farmington, NM 87401 • (505) 326-5428 • Fax: (505) 326-2890 • www.valin.com

GLCC Well Tester Separator Summary

INLET DIMENSIONS	= 4" Class 150 RF Customer Connection = 6" Class 150 RF Dual Connections to Vessel
OUTLET DIMENSIONS	= 4" Class 150 RF Customer Connection
GLCC DIMENSIONS	
Pipe Nominal Diameter (ND) [Inch]	= 9.75" ID x 11' S/S
LOOP DIMENSIONS	
Liquid Leg Pipe (ND) [Inch]	= 3" Class 150 RF Flanged
Gas Leg Pipe (ND) [Inch]	= 3" Class 150 RF Flanged
LIQUID FLOW METER INFORMATION	= 2" Class 150 RF Flanged
Meter Type	= Micro Motion CMF200M w/1700 MVD w/Display
GAS FLOW METER INFORMATION	= 2" Class 150 RF Flanged
Meter Type	= Rosemount Model 8800 Vortex Meter
LEVEL TRANSMITTER	
Level Transmitter	= Rosemount 2051L2, 3" Class 150 RF Flanged
Remote Seal	= Rosemount 1199, 2" Class 150 RF Flanged
CONTROL VALVES	
Gas Control Valve	= NA
Liquid Control Valve	= NA

GLCC Well Tester Separator Summary (cont'd)

RELIEF VALVE(S)	
ASME PSV	= 1" x 1" C.S., Threaded, Set @ 255 psi
BALL VALVES	
Liquid Line	= (2) 2" 150# Flanged Full Port Ball Valve
Gas Line	= (1) 2" 150# Flanged Full Port Ball Valve
Drain Line	= (1) 2" 150# Flanged Full Port Ball Valve
SKID BASE	
Dimensions (Estimated)	= 5'W x 7'L x 15'6" H
PLC	Quoted Separately

Rosemount 8800 Vortex Technology Leadership Delivers Value

Presenter

Title

ROSEMOUNT

EMERSON. Process Management

Agenda

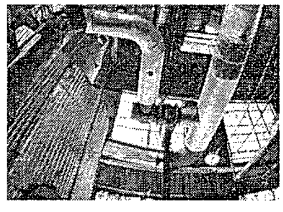
- Vortex advantages and limitations
- Rosemount delivers value by addressing historic limitations of vortex
- Rosemount 8800 MultiVariable™ Vortex increases customer value

The Promise of Vortex

- Vortex flowmeters were developed 25 years ago to reduce the installed cost and improve the reliability of traditional flowmeters.

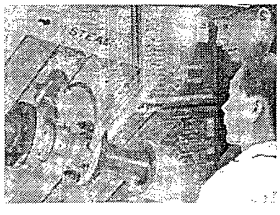
The Limitations of Vortex Meters

- Vortex meters had limitations
  - Ports and crevices that plug
  - Potential leak points and shutdowns for sensor replacement
  - Low flow cutoff
  - Difficult to verify and troubleshoot
  - Vibration



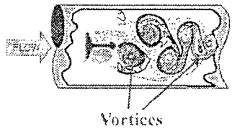
Emerson Delivers on the Promise

- Rosemount Vortex has innovative features that resolve the issues with other vortex meters
  - Non-clog, gasket-free meter body
  - Reducer™ Vortex
  - Internal meter verification
  - Mass Balanced Sensor and ADSP
  - MultiVariable™ Vortex



Vortex - Theory of Operation

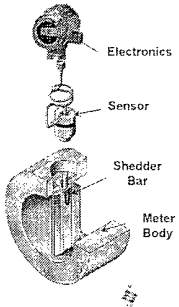
- Based on the von Karman Effect
  - Fluid alternately separates from each side of the shedder bar face
  - Vortices form behind the face and cause alternating differential pressures (DP) around the back of the shedder bar
  - The frequency of the alternating vortex development is linearly proportional to flow rate



Vortices

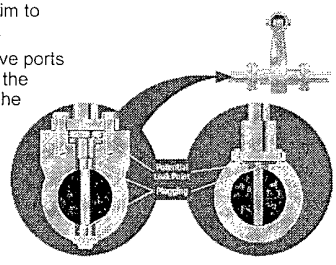
Model 8800 Sensing System

- How Rosemount Vortex works:
  - Alternating DP flexes a portion of the shedder bar
  - This flexing motion is sensed by the sensor outside the flow line
  - The sensor (piezoelectric element) senses the alternating forces and converts the forces to an alternating electric signal
  - The alternating electric signal is sent to the electronics
  - Frequency of electrical signal is vortex shedding frequency



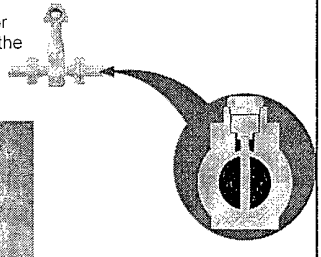
When plugging is a concern...

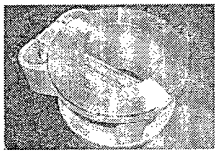
- Many vortex manufacturers claim to eliminate plugging
- These designs have ports or crevices where the process can limit the sensor's ability to measure flow



When plugging is a concern...

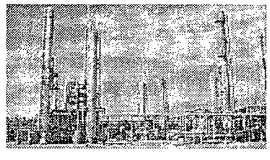
- Rosemount's unique vortex has no ports or crevices that impact the sensor's ability to measure flow





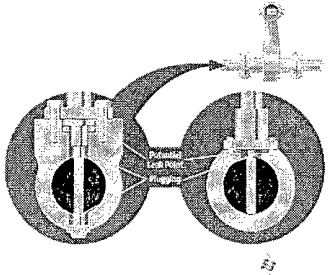
When reducing potential leak points is important...

- Many plants are working to reduce potential leak points to improve environmental compliance and personnel safety



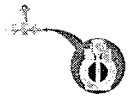
When reducing potential leak points is important...

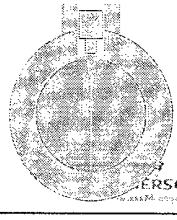
- Traditional flowmeter installations can have as many as 32 potential leak points
- Many vortex manufacturers claim to dramatically reduce it
- A gasket is still present at the wetted sensor
- Replacement of the sensor requires you to break the process seal
  - Shutdown



When reducing potential leak points is important...

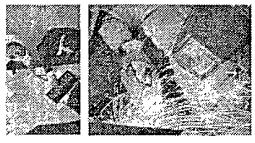
- The unique Rosemount design eliminates the sensor gasket.
- The Rosemount sensor is isolated from the process
- The primary process seal does not have to be broken for sensor replacement
- Sensor replacement does not affect calibration
- Rosemount also offers a weld-end vortex with absolutely **NO GASKETS**





When you need to reduce installation costs...

- Many plants have fewer personnel, shorter turnarounds, and need to be able to install flowmeters cost-effectively and quickly



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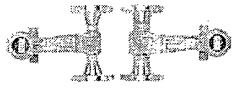
EMERSON.

When you need to reduce installation costs...

- Rosemount builds reducers into the flanges
- Same lay length as standard vortex
  - Not all vortex suppliers manufacture to the same lay length as their standard product
- Reduces cost when smaller vortex meter is required or preferred



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When easy verification is your need...

- Many plants need to have easy means of verifying flowmeters without having to shutdown and remove them from the line

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When easy verification is your need...

- Other vortex manufacturers claim to eliminate the need for calibration
- Many users still verify flowmeters for quality purposes
- Traditional vortex meters require separate, expensive pieces of equipment and significantly more time

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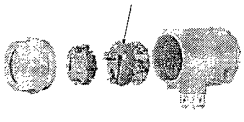
When easy verification is your need...

- Rosemount 8800 features an internal signal generator that allows you to take the sensor signal offline, generate an internal frequency, and verify output

Built-in Signal Generator



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When vibration immunity is your need...

- Many vortex meters are susceptible to vibration
- Rosemount vortex meters feature a mass balanced sensor and Adaptive Digital Signal Processing to provide vibration immunity

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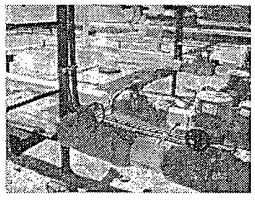
Results Delivered

- North American integrated oil and gas company selected Rosemount Vortex Flowmeters because existing flowmeters did not allow the low flow cutoff to be adjusted to measure very low steam flows in a steam injection process
- Visit www.rosemount.com for many examples of how other users have used the Rosemount Vortex Flowmeter to solve their tough vibration and filtering applications



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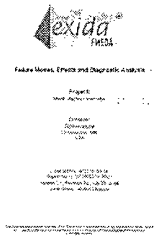
Safety

- Rosemount 8800 was evaluated by Exida for use in SIS applications
- 8800 Flanged/Wafer/Reducer
  - Safe Failure Fraction (SFF)
    - 85.8%
  - Probability of Failure on Demand (PFD)
    - 5.56 E-04
  - Standard Vortex can be used in SIL 1 applications, SIL 2 applications if "proven in use" is met by the user
- 8800 Dual
  - If Dual Vortex has two shedder bars, it's officially recognized by Exida to be two independent devices
  - Dual Vortex can be used in SIL 2 applications, SIL 3 applications if "proven in use" is met by the user



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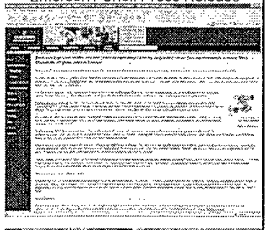
Results Delivered

- Shell Chemicals
  - Moerdijk Netherlands
  - 32 dual vortex installed on steam in SIS application
  - Naptha and steam mixed and cracked in furnace
  - Coke fines re-enter steam flow via recycled water and plugged existing flow measurement

Emerson / Shell Press Release



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Technology Leadership Delivers Value

- Plugging
  - Only Rosemount's unique meter body design solves tough plugging applications
- Reducing Potential Leak-Points
  - Only Rosemount has a non-wetted sensor that does not require the process seals to be broken for sensor replacement
- Reducing Installed Cost
  - Only Rosemount's Reducer Vortex keeps installed cost low by incorporating the reducing flanges in the meter
- Easier Verification
  - Only the Rosemount Vortex flowmeter has an internal signal generator for internal meter verification
- Vibration Immunity
  - Only the Rosemount vortex can provide high vibration immunity with flexibility in changing filter conditions for your application
- Improving Reliability of Redundant/SIS Flowmeters
  - Only the Rosemount dual vortex can deliver the benefits of two vortex meters in a single pipe penetration along with the standard features of the 8800
- High Pressure
  - Only the Rosemount high pressure vortex can deliver the benefits of the standard features of the 8800 in high pressure applications

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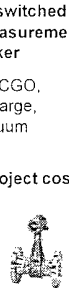
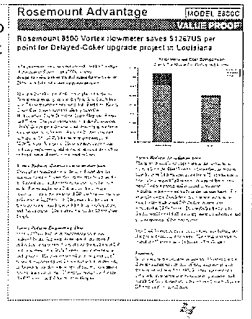
8800 Vortex Refining Application Example: Delayed-Coker Flow Measurements

- Louisiana Refinery switched to 8800 Vortex for 42 measurement points in Delayed-Coker
  - Heavy Slop Oil, HCGO, LCGO, Furnace Charge, HVGO, LVGO, Vacuum Residue
- Reduced up-front project cost by over $50K US





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Why Are Users Applying Vortex In Steam?

- Vortex Simplifies Installation, Reduces Costs, and Increases Rangeability
  - Improved Safety and Reliability
    - Fewer leak points
    - No Impulse Lines – no filling or zeroing
  - Reduced Cost
    - Cost-effective in steam lines, especially smaller than 6 inch
    - No periodic calibrations required
  - Improves rangeability
    - Steam often runs at high velocities
    - Vortex can measure to high velocities with single meter
    - Good accuracy over wide range
    - Excellent stability
- However, saturated steam density varies with process and boiler changes which makes a compensated mass flow for saturated steam desirable

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PERFORMANCE SPECIFICATIONS

The following performance specifications are for all Rosemount models except where noted. Digital performance specifications applicable to both Digital HART and FOUNDATION fieldbus output.

Flow Accuracy

Includes linearity, hysteresis, and repeatability.

Liquids - for Reynolds Numbers over 20000

Digital and Pulse Output
±0.65% of rate

Note: The accuracy for the 8800DR, line sizes 6 to 12-in. (150 to 300mm), is ±1.0% of rate.

Analog Output
Same as pulse output plus an additional 0.025% of span

Gas and Steam - for Reynolds Numbers over 15,000

Digital and Pulse Output
±1.0% of rate

Note: The accuracy for the 8800DR, line sizes 6 to 12-in. (150 to 300mm), is ±1.35% of rate.

Analog Output
Same as pulse output plus an additional 0.025% of span

Accuracy limitations for gas and steam:

For 1/2 and 1-in. (DN 15 and DN 25): max velocity of 220 ft/s (67.06 m/s)

For 1/2 to 4-in. (DN 15 to DN 200) Dual-style meters: max velocity of 100 ft/s (30.5 m/s)

NOTE
As the meter Reynolds Numbers decreases below the stated limit to 10,000 the accuracy error band will increase linearly to +/-2.0%. For Reynolds Numbers down to 5,000 the accuracy error band will increase linearly from +/-2.0% to +/-6.0%.

Process Temperature Accuracy

2.2 °F (1.2 °C) or 0.4% of reading (in °C), whichever is greater.

NOTE
For remote mount installations, add ±0.018 °F/ft. (±0.03 °C/m) of uncertainty to the temperature measurement.

Mass Flow Accuracy for Temperature Compensated Mass Flow

Digital and Pulse Output
± 2.0% of rate (Nominal)

Nominal conditions include temperature variation in saturation and superheat at 150 psig (10 bar-g) and above.

For pressure below 150 psig (10 bar-g), add 0.08% of uncertainty for every 15 psi (1 bar) below 150 psig (10 bar-g).

Analog Output
Same as pulse output plus an additional 0.025% of span

Repeatability

± 0.1% of actual flow rate

Stability

± 0.1% of rate over one year

Process Temperature Effect

Automatic K-factor correction with user-entered process temperature.

Table 18 indicates the percent change in K-factor per 100 °F (55.5 °C) in process temperature from reference temperature of 77 °F (25 °C).

Table 18. Process Temperature Effect

Material	Percent Change in K-Factor per 100 °F (55.5 °C)
316L @ < 77 °F (25 °C)	+ 0.23
316L @ > 77 °F (25 °C)	- 0.27
Nickel Alloy C < 77 °F (25 °C)	+ 0.22
Nickel Alloy C > 77 °F (25 °C)	- 0.22

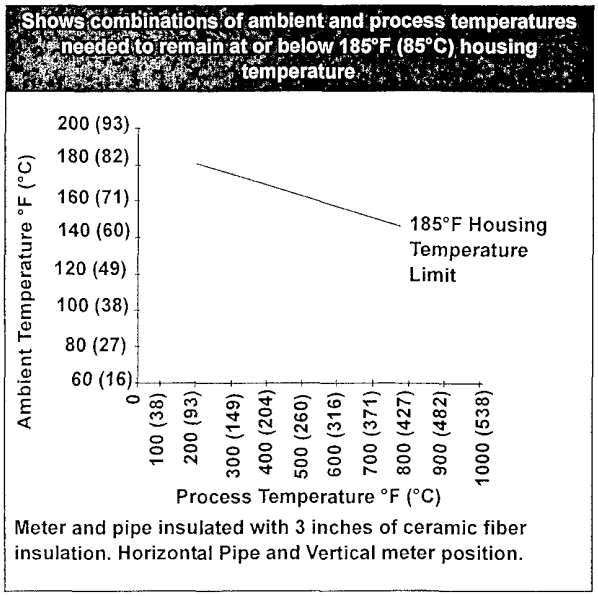
Ambient Temperature Effect

Digital and Pulse Outputs
No effect

Analog Output
±0.1% of span from –58 to 185 °F (–50 to 85 °C)

Temperature Limitations for Integral Mounting
The maximum process temperature for integral mount electronics is dependent on the ambient temperature where the meter is installed. The electronics must not exceed 185°F (85°C). The following is for reference, please note that the pipe was insulated with 3 inches of ceramic fiber insulator.

Figure 1. Rosemount 8800 Vortex Flowmeter Ambient/process temperature limits



Pipe Length Requirements

The vortex meter may be installed with a minimum of ten diameters (D) of straight pipe length upstream and five diameters (D) of straight pipe length downstream.

Rated Accuracy is based on the number of pipe diameter from an upstream disturbance. No K-factor correction is required if the meter is installed with 35 D upstream and 10 D downstream. The value of the K-factor may shift up to 0.5% when the upstream straight pipe length is between 10D and 35D. Please see Technical Data Sheet (00816-0100-3250) on Installation Effects for optional K-factor corrections. This effect can be corrected in the electronics.
Tagging

The flowmeter will be tagged at no charge, according to customer requirements. All tags are stainless steel. The standard tag is permanently attached to the flowmeter. Character height is 1/16-in. (1,6 mm). A wired-on tag is available on request. Wire on tags can contain five lines with up to 28 characters per line.

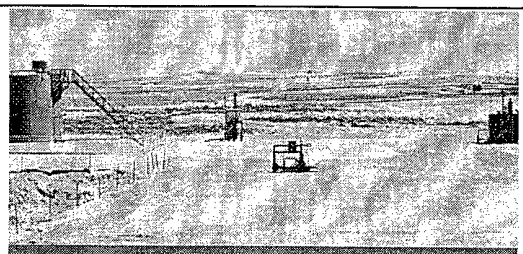
Flow Calibration Information

Flowmeter calibration and configuration information is provided with every flowmeter. For a certified copy of flow calibration data, Option Q4 must be ordered in the model number.

Leading Oil & Gas Producer Reduced Production and Operating Expenses with Vortex Technology

RESULTS

- Decreased oil and gas field production and operating expenses
- Improved reliability of well test and production data
- Improved the health of personnel, safety of assets, and protection of the environment by lengthening maintenance intervals



Well test data is now more readily available to help determine if the well is producing as expected.

APPLICATION

Production & test separator liquid flow lines

Application Characteristic: 20 - 1400 psi, 70 - 150 °F

CUSTOMER

A leading independent oil and gas producer with operations primarily focused in the United States & Canada.

CHALLENGE

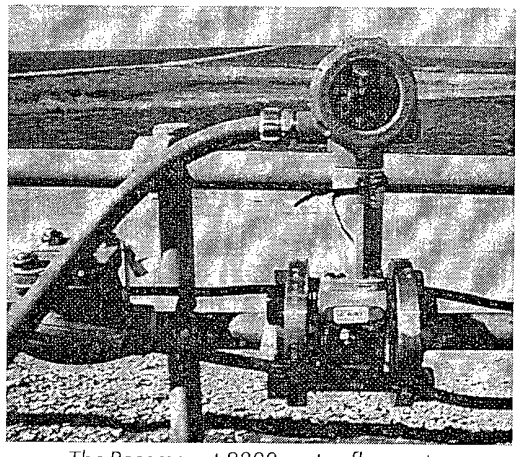
This oil and gas producer has seen its production and operating expenses skyrocket the past 10 years, increasing almost 700%. This is not only due to the increased activity in the upstream segment and rising inflation costs within the industry, but the utilization of older technology such as mechanical meters.

All of their producing wells flow into either a production or test separator to separate gas from liquids. Then, the liquids flow out of the separator where the flow rates have traditionally been measured by turbine meters.

Due to debris in flow lines, mechanical meters required extensive maintenance to replace or clean the rotating blades. When these meters failed on test or production separators, the liquid production flow rates are not measured and must be inferred.

This resulted in unknown daily volumes until the next time it was placed on a scheduled well test. This failure is very costly, especially when the well experienced high water or low oil production and well intervention was required.

Replacement or cleaning of internal parts required mechanical meters to be removed from the line, typically once per year. Maintenance personnel would spend more time near open production lines, resulting in increased safety, health, and environmental risks.



The Rosemount 8800 vortex flowmeter

ROSEMOUNT®

For more information:
www.rosemount.com

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SOLUTION

The Rosemount 8800 vortex flowmeter helped solve the pains associated with this separator application. Production and operating costs were reduced with vortex technology with its longer operation lifetime relative to mechanical meters. Because the Rosemount 8800 has no moving parts, no routine replacement or cleaning is necessary. This reduced the amount of time maintenance personnel spent near open production lines, decreasing the risk involved with safety, health, and environmental concerns. In addition, it has a unique meter body design, which reduces plugging from sand and other material and also comes in a variety of connections and sizes, creating a drop-in replacement of most turbine meters.

The ease of replacement and long life of the Rosemount 8800 allowed for better availability of production and well test data for this producer. Production engineers now have the well performance data to determine if the well is producing as expected, or if it is producing excessive water. Field operations were also improved by reducing the time spent maintaining mechanical meters and reallocating this time towards other tasks, which increased production.

RESOURCES

http://www.emersonprocess.com/rosemount/industry/oil_gas/index.html
http://www.emersonprocess.com/rosemount/products/flow/m8800c.html

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00830-1600-4004, Rev AA

User Information

- **User:** PDVSA O&G
- **Location:** West Venezuela (Off Shore Oil Production Facilities)
- **Product:** Wet Natural Gas
- **Application Details:** Gas production in oil wells is one of the variables that needs to be monitored constantly. Engineers measures the gas of each well at the Test Separator during each well test performed. The amount of gas produced regarding to the amount of crude oil is the GOR (Gas Oil Ratio). This valuable information, as well as other production variables, are used by:
  - Reservoirs Engineers to understand the behavior of the reservoirs, monitor remaining reservoir energy, take decisions about work over activities, etc. (Reservoir Management).
  - Optimization Engineers to design production lifting methods and take decisions about the actual lifting methods used to produce each well.
  - Operation Engineers to close gas mass balances at their facilities (gas to the compression plants, gas to flares, gas for lifting
- **Additional Notes:** The natural gas at the top the Test Separator usually is wet and carries small amounts of crude oil. The drag of crude oil at the top of the separators is due to the fact that those probably are very old and/or badly operated as well.

User Information

- **Traditional Technology Used / Competitor Displaced:** Orifice Plates in Daniel Boxes (Orifice Fittings) with Barton Flow Recorders and a lot of impulse lines.
- **Why Rosemount was Selected:** Vortex technology makes the measurement system more simple and accurate:
  - No impulse lines needed minimizing the possible leaking points and avoiding lost of measurement caused by the obstruction of the impulse lines with the oil and condensates
  - Less pressure drop that minimize the risk of over pressure in the separator caused by sudden high flow batches coming from the well. Over pressure opens the relief valve of the separator causing lost of production and environmental problems.
  - Vortex eliminates the dangerous operation of the Daniel Box, that needs to be depressurized and open to change the size of the orifice plate every time that a well is tested depending on the amount of gas expected.
  - The amount of liquid carried by the gas almost do not affect the measurement of the Vortex when Liquid Volume Fraction is less than 1% (1% LVF cause ± 5% error @ 870 psi).
  - Liquids dragged by the gas do not accumulate in the pipe just as occurs with the orifice plates if the Vortex is installed at 3 or 9 o'clock position.
  - The accuracy of the Vortex measuring gas is ± 1,35% instead of at least ± 5 to10% caused by the primary element + wrong orifice plate used + liquid accumulated + obstruction on the impulse lines + bad readings at the Barton Flow Recorder + Barton bad manipulation, etc.

User Information

- **Key Issues to Keep in Mind:** Internal Use Only
  - All the wells goes to the same Test Separator and consequently each of those wells will be measured by the same Vortex meter.
  - The amount of gas produced depends on the lifting method and the characteristics of the reservoirs. Gas flow at the top of the separator can goes from 50 MSCFD to 2,5 MMSCFD
  - The turndown of the Vortex is approximately 20:1. Remember that Vortex has a Low Flow Cutoff, and below that value it shows zero flow although there is flow.
  - Good sizing is the key to success. Make sure that all the range will be measured by the solution provided.
- **Contact Information:**
  - José Zea / zeaj@pdvsa.com
  - Pedro González / gonzalezpar@pdvsa.com

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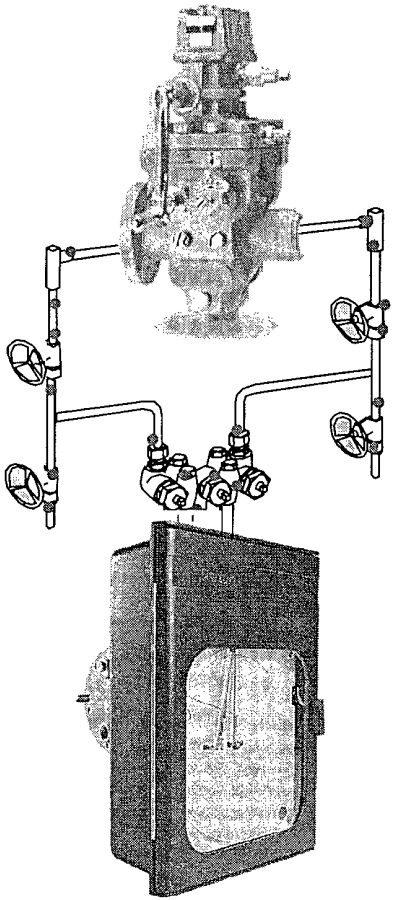
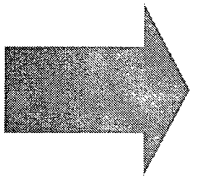
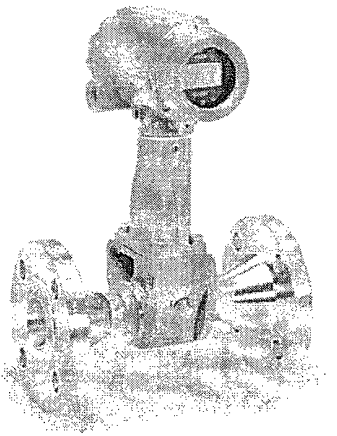
User Information







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Rosemount 8800 Vortex Meter
Conditions of Approval
Skelly #961 NM71030C 3001534324

1. **Approval is for meter and/or transmitter number** _____.
   Chevron To Submit Within 30 days of Approval
2. **The Vortex meter shall be designed, installed and operated in accordance with all applicable API standards as may be amended or revised from time to time.**
3. **The meter shall include a continuous temperature recorder / temperature monitor. This information will be used in calculating the volume of gas metered during the flow period.**
4. **The meter shall have a non-resettable totalizer.**
5. **The meter shall have a minimum of ten diameters of straight pipe length upstream and five diameters of straight pipe length downstream.**
6. **The proving frequency shall be the same as in Onshore Order #5 III, C.17**
7. **A 24 Hour notice shall be given to the authorized officer prior to conducting the tests and calibrations required by Onshore Order #5.**
8. **The meter proving is to be witnessed by BLM, contact 575-361-2822; a minimum of 24 hours prior to meter proving. Meter proving records shall be maintained for a period of six years from the date of generation and will be made available for audit upon request.**
9. **A copy of the meter proving shall be submitted to the appropriate BLM office within 30 days following any proving.**
10. **If an inaccuracy of measuring is found during any meter proving or if for any reason the measuring equipment is out of service or malfunctions, the operator shall follow Onshore Order #5 III, C. 19 & 20**
11. **Volumes of gas delivered shall be determined according to the flow equations specified in API and AGA.**
12. **Requirements in Onshore Order #5 III, C. 22 thru 26 will still be required.**
13. **All provisions of the Onshore Oil and Gas Orders # 3 shall be met.**
14. **This approval may be subject to future review and if determined inadequate with regards to accurate measurement, the approval will be withdrawn.**

JDW 3/2/2011