



Best Practices: Wellhead Visual Inspection

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USDOT / PHMSA



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

PHMSA: Your Safety is Our Mission



Regulation

- API RP 1171 Section 9.3.1
 - The operator shall evaluate the mechanical integrity of each active well, including each third-party well, that penetrates the storage reservoir and buffer zone or areas influenced by storage operations.
 - Well integrity evaluation methods typically used by operators include but are not limited to review of design, completion, and well work records, **wellhead** and downhole **inspection**, **well pressure monitoring and testing**, and gas sampling.
- API RP 1171 Section 9.3.2
 - The operator shall visually inspect each wellhead assembly at least annually for leaks.



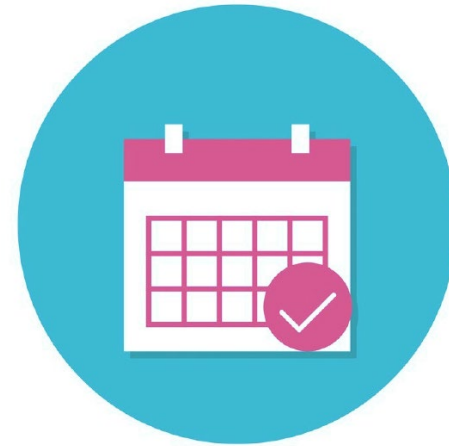
Personal Protective Equipment

- Hard Hat
- Reflective Vest
- Eye / Hearing Protection
- Flame-Resistant (FR) Clothing
- Insect Repellent
- Safety-Toed Boots
- Protective Gloves
- FR Rain Coat
- Vehicle Safety Kit



Frequency, Procedure and Notes

- Frequency of Weekly to Quarterly Inspections
- Review Procedure
 - Operation and Maintenance
 - Most Recent
 - Trained
- Follow-up from previous inspection or issue



Electronic Record



- Electronic handheld device
- Accessibility, Reporting, Upload
- Software
 - Upgrade, Changes, Easy to Use

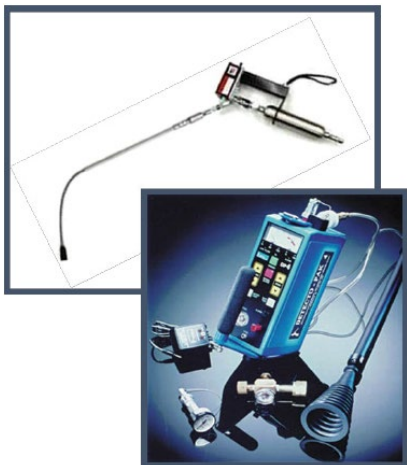


Digital Pressure Gauge

- API RP 1171 Section 9.5.5
 - The operator should calibrate pressure gauges and document the calibrations according to operator's procedures.
- API RP 1170 Section 9.4.1
 - Wellhead gauges, transmitters, and safety devices should be tested and calibrated at least annually to ensure they are properly calibrated and function as intended.
- Procedure (Operation & Maintenance)
 - Manufacturer recommendations
 - Training
 - Calibration / Verification
 - Record / Document



Leak Detectors



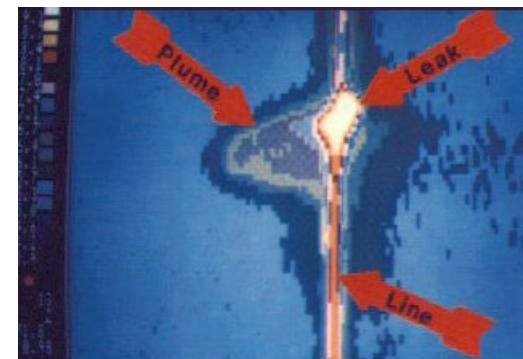
Flame
Ionization
Instrument

Combustible
Gas Indicator



Remote
Methane
Leak
Detector

Infrared
Leak
Detector



Leak Detector

- Applicability
 - Manufacturer (correct instrument / model #)
 - Range, Sensitivity, Limitations, Usage consistency
- Procedure
 - Operation of the Instrument
 - Calibration
- Training
- Document
 - What/When Equipment being used
 - When Calibrated

Technology	Typical Application	Sensitivity ^a	Range ^a	Sampling Method	Advantages	Limitations
Flame Ionization	2, 3	1 ppm	0-10,000 ppm	Vacuum pump	Fast response. Vacuum pump system will draw residual gas from soil surface or cavity.	<ul style="list-style-type: none"> • Venturi draw systems are slower responding. • Will detect all volatile organic compounds (VOCs) unless special filters are used. • Requires external hydrogen fuel. • Calibration affected by temperature and humidity. • High concentration gas will cause sensor flame out. • Requires warm-up time to become stable.



Wellhead Visual Inspection Checklist

- 360 Degree (visual + leak detector)
 - Corrosion, dents, leaks
- Flanges, Joints, Welded connections
- Valves
 - Master, Wing, Swab, Surface Safety / Emergency Shutdown, Annular Vent
 - If multiple valves under same label, use lettering or numbering differentiation
 - Pressure Rating
- Annular Vent Ports
 - No blockage
 - Check Pressure



Wellhead Visual Inspection Checklist

- Well Sign
 - Close to well and within well pad
 - Big font size and reflective
 - Information on it (Storage facility name, Well name and identification number, Operator name and 24-hour emergency contact number)
 - Physical appearance and Installation
 - Installed prior to well back in service
- Notes / Surroundings
 - Casing within well cellar / pit
 - Within 20 feet of wellhead, Tall trees



Lockout and Tagout (LOTO)

- Purpose of Lock and Tag
 - Informs personnel
 - Prevent accident
 - Protect employees
- Red Lock (lockout device)
 - Ensure equipment not usable unless lock removed
- Red Tag (metal)
 - Do not operate or remove
 - Name, Date, Reason for tag
- LOTO Procedure
 - Calibration, Maintenance, Well Workover



Upload and Follow-ups

- Record
 - Required items
 - Upload
 - Supervisor review
- Issue
 - Document
 - Notification
 - Work Maintenance Program



DOCUMENTATION





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