

# Incident History

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# 2013 Incident - 239925

- Explosion at residence.
- Third party damage – Homeowner excavating with backhoe snagged gas service.
- Heat fusion joint at a 1” to ½” service line reducer failed and separated.
- Homeowner called the operator to report the damage.
- Operator employee was onsite investigating the leak when the explosion occurred.
- 2 fatalities and 1 injury.
- Homeowner called MISS DIG. Staking accurate. No evidence of hand exposure.
- \$361,435 damages.



# 2013 Incident - 239925

- Notice of Amendment:
- 192.603(c) The Administrator or the State Agency may...require the operator to amend its plans and procedures as necessary to provide a reasonable level of safety.
- Operator shall amend their procedures to require their first responders to understand what type of work order they are investigating (inside or outside gas leak).
- Operator shall amend their procedures to require their first responders to immediately conduct inside leak investigations when responding to any gas leak where the caller indicated gas odor inside a building, including third-party damages that may include a broken main or service.

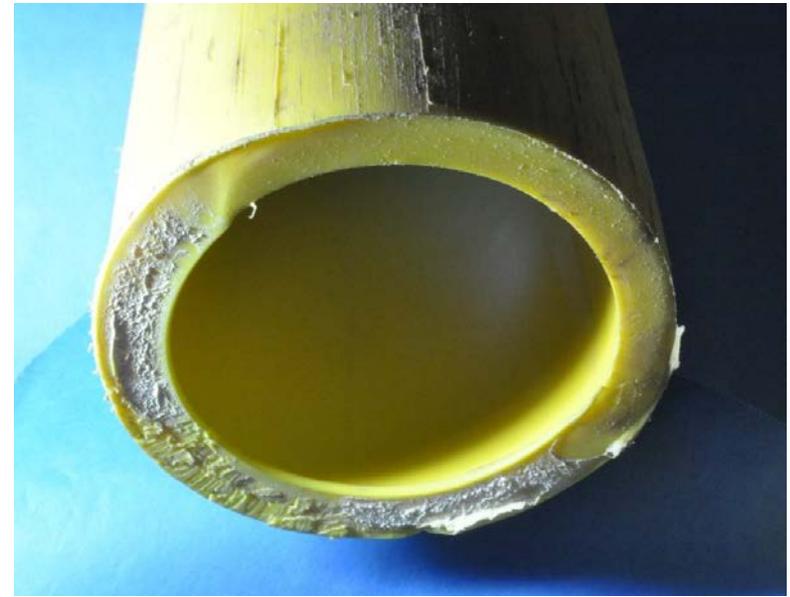


# 2013 Incident - 239925

- Recommendations:
- Recommend that operator evaluate the need for first responders to carry squeeze-off tools with a capacity larger than  $\frac{5}{8}$  inch.
- Recommend that operator accurately document perceptibility tests on the work order for tests related to incidents.
- Recommend that operator utilize a form/drawing to document leak investigations in response to a fire or explosion. Form/drawing should include enough details to clearly identify the scope and findings of the leak investigation.
- Recommend that operator's leak test of service lines involved in an incident are completed at operating pressure.

# 2013 Incident - 245325

- 6" plastic main that failed at a fused joint.
- Main was installed by directional drill two months prior by a contractor.
- Main extraction discovered a 6" plastic cold fuse.
- Pipe was cut on an angle and was not completely faced. Due to the improper facing, the heating element lacked contact.
- Fusers OQ suspended.
- \$85,000 damages.
- 0.7056 Mmcf gas released.



# 2013 Incident - 245325

A scenic photograph of a sunset over the ocean. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water. The sky is filled with soft, colorful clouds. In the foreground, a dark, silhouetted coastline with trees is visible on the left side.

- Compliance Actions:
- 192.13(c) - Not pressure testing a distribution main for the durations required by operator's O&M.
- 192.13(c) - Not checking alignment of the pipe as required by operator's O&M. Pipe ends involved in the failure were improperly faced.
- 192.13(c) - Not observing the proper melt bead size while the heater plate is in place as required by operator's O&M. Lack of melt bead on the interior and exterior circumference on one side of the failed joint.

# 2013 Incident - 245325

A scenic photograph of a sunset over the ocean. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water. The sky is filled with soft, colorful clouds. In the foreground, a dark, silhouetted coastline with trees and a small beach is visible on the left side.

- Recommendations:
- Recommend operator analyze its distribution system for the adequacy of system valves and consider using valves to shut the gas off in emergency situations. Gas blew for 5 hours.
- Recommend that operator develop an action plan to ensure integrity of other projects that this joiner was involved in. Joiner allowed to fuse other mains while incident was under investigation.
- Recommend that operator's procedure require actual surface temperature of the heater plate to be periodically checked with a pyrometer.
- Recommend operator provide increased oversight of contractors to ensure projects are constructed in accordance with the 49 CFR Part 192 and company procedures.

# 2013 Incident - 260723

- Leaking shaft seal on Biffi pilot assembly at regulator station caused a blowdown valve to open at a compressor station.
- Vent above shaft seal was plugged with ice after severe ice storm, preventing the gas leaking through the shaft seal from venting.
- This caused an increase in pressure above the seal, simulating a drop in pressure below the seal.
- Signaled blowdown valve to open.





# 2013 Incident - 260723

- Recommendations:
- Recommend that operator orient the newly installed pilots in a manner to reduce or eliminate the potential for ice and debris to accumulate on the pilot body vent.
- Recommend that operator develop a reoccurring preventative maintenance work order that meets or exceeds the manufacturer's recommendations for maintenance and testing of all newly installed pilots.
- Recommend that operator ensure that employees are knowledgeable with the operation, maintenance, and testing requirements associated with the newly installed pilots.
- Recommend that operator conduct a system-wide study to identify pilot assemblies that may have issues with vent orientation and internal seals and take any necessary remedial action.

# 2014 Incident - 268125

- House fire caused by gas migration from an outside main leak. Fire started in downstairs utility room.
- After the incident, gas was detected at an exterior building wall and inside the basement.





# 2014 Incident - 268125

- Recommendations:
- Staff requests that an incident be reported to NRC if the cause of the incident is unknown and damages are expected to exceed \$50,000.
- Recommend that operator reexamine all evidence and details in this investigation and submit a revised supplemental incident report to PHMSA. Staff recommends that operator ensure future incident investigations are thorough enough to determine the cause of the failure.
- Recommend operators leak testing records are consistent.
- Recommend that operator utilize a form/drawing to document leak investigations in response to a fire or explosion. Form/drawing should include enough details to clearly identify the scope and findings of the leak investigation.

# 2014 Incident - 282829

- Third party damage.
- 300 psi 8" main.
- Farmer was removing stumps with loader bucket.
- Emergency valve failed to close completely.
- Gas was blowing for approximately 18 hours.



# 2014 Incident - 282829

A background image showing a sunset over the ocean. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water. The sky is a mix of orange, red, and purple. In the foreground, there's a dark silhouette of a coastline or trees on the left side.

- Compliance Actions:
- 192.605(a) – Not monitoring for combustible gas before and during work. Combustible gas indicator was located approximately 15 feet away from the work area and the atmosphere near the employees was not checked prior to excavating.
- 192.605(a) – Not tightening bolts on a repair clamp to the specification listed in operator's field manual.
- 192.629(a) - Not purging a pipeline of air by releasing gas into one end in a moderately rapid and continuous flow.
- Rule 460.20501(2)(b) - Not maintaining an up-to-date schematic drawing of station piping at each aboveground pressure-regulating station containing buried station components.

# 2014 Incident - 263223

- ESD of Compressor Station
- No permanent heat-trace on pilot gas regulator.
- Pilot gas system over-pressured due to frozen regulator.
- Relief activated and then froze open as well.
- Pilot gas pressure bled down to zero psig which triggered the ESD.



# 2014 Incident - 263223

- One of two compressor blowdowns activated and vented to atmosphere.
- The other compressor blowdown valve had a frozen pneumatic pilot switch which prevented the blowdown valve from operating.
- The two station blowdown valves activated, but were unable to operate due to the presence of ice in the actuator gear boxes.



A scenic photograph of a sunset over the ocean. The sun is low on the horizon, casting a bright orange glow across the sky and reflecting on the water. The sky transitions from a deep orange near the horizon to a darker purple and blue at the top. The water is calm, with a clear reflection of the sun. On the left side, a dark, silhouetted coastline with trees is visible.

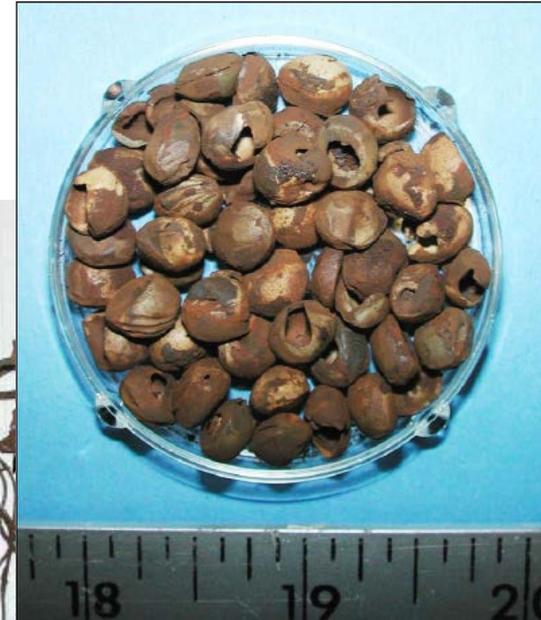
# 2014 Incident - 263223

- Compliance Action:
- 192.199(e) - Not having pressure relief devices discharge into the atmosphere without undue hazard. Pressure relief devices for the pilot gas system vented into enclosure boxes for the pilot gas regulator assemblies.
- Recommendations:
- Recommend operator implement a program to check for liquids in the gas piping upstream of the pilot gas systems at compressor stations.
- Recommend operator inspect heat trace wires at other stations to determine if similar pilot gas systems are properly hard-wired.
- Recommend all valves that have an actuator enclosure should be inspected for water throughout operator's system.

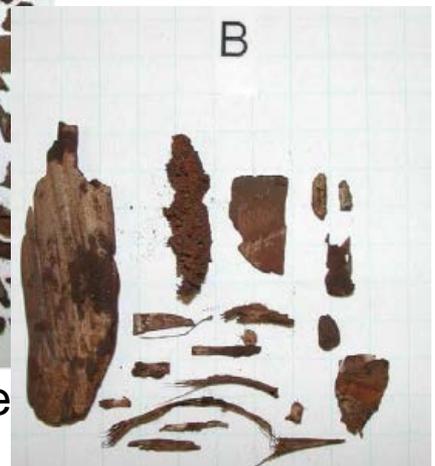
# 2014 Incident - 263423

- Debris moving through distribution system caused double regulator failure.
- Working-monitor regulator station.
- Caused 139 psig pressure on a 60 psig system.
- 120 miles of distribution main and 7,010 gas services overpressured.

Cherry pits



Weld splatter and twisted wire



# 2014 Incident - 263423

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- Compliance Action:
- 192.739(a)(4) - Not subjecting at intervals not exceeding 15 months, but at least once each calendar year, each pressure regulating station and its equipment to inspections and tests to determine that it is properly installed and protected from dirt, liquids, or other conditions that might prevent proper operation. There were not sufficient measures in place to protect the regulators from the debris, particularly considering that the regulator boots were replaced two weeks prior for damage.

# 2014 Incident - 263423

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- Recommendations:
- Recommend operator conduct a study to determine:
  - The need to install filters upstream of regulator stations where regulator boot wear from debris is periodically observed.
  - The need for additional safety measures to enable earlier detection of overpressure situations and mitigate the possible consequences.
  - The need for weekly regulator station pressure-recording chart inspections and replacements on stations that do not have relief valves or SCADA transducers located after each pressure cut.

# 2014 Incident - 263423



- Recommendations:
- Recommend operator perform a probable cause analysis when regulators/relief valves malfunction or fail and results in an overpressure situation.
- Recommend operator take measures to ensure that GMAW welding is conducted in a manner such that pieces of wire are not introduced into the gas stream.
- Recommend operator review construction practices related to sealing pipe ends prior to being tied together.
- Recommend operator review construction practices regarding pipeline cleaning prior to being entered into service.
- Recommend operator utilize appropriate length pressure-recording charts for regulator stations.

# 2014 Incident - 265023

- Snow/ice buildup on roof fell onto gas meter, causing a leak which led to ignition.
- Furnace located right inside wall from gas meter.



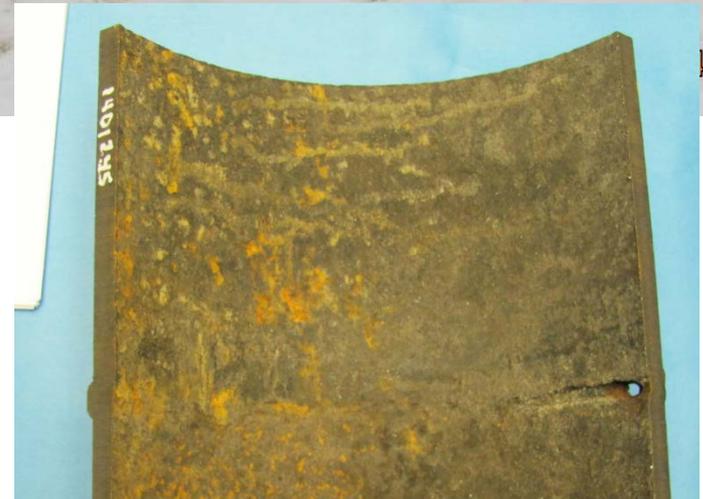
# 2014 Incident - 265023

A scenic photograph of a sunset over the ocean. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water. The sky is a mix of orange, red, and purple. In the foreground, there's a dark silhouette of a coastline or island on the left side.

- Recommendations:
- Recommend operator consider revising first responders' geographic area of responsibility to enable a 30-minute response time to be possible.
- Recommend additional precautions be taken when locating meters underneath steel roofs due to the greater possibility of snow and ice runoff.
- The meter assembly was located within three feet of the air intake for the furnace. It is not known whether the intake was installed before or after the meter assembly; however, the operator conducts meter readings and atmospheric corrosion and leak surveys at gas meters. As part of Rule 192.613 entitled "Continuing Surveillance," it is expected that details that could pose a hazard to the public would be reported and remediated.

# 2014 Incident - 271123

- Internal corrosion caused a leak on a storage field girth weld.
- Operating at 417 psig; was operating at 1350 psig 3½ months earlier.



# 2014 Incident - 271123

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- Recommendations:
- Recommend operator reevaluate the cleaning and corrosion inhibitor program at the Storage Field. This program should include a comprehensive review of corrosion history, in-line inspections, gas quality, operations and maintenance history, etc. This incident occurred when the Lateral was at a significantly lower pressure than what it had experienced earlier in the season; indicating accelerated corrosion growth from the beginning of the season until the failure.
- Operator must conduct a thorough cause analysis to prevent recurrence of similar internal corrosion incidents in accordance with 49 CFR 192.617. The laboratory analysis received by Staff did not determine a cause of the failure.

# 2014 Incident - 300825

A background image showing a sunset over the ocean. The sun is low on the horizon, creating a bright orange and yellow glow that reflects on the water. The sky is a mix of orange, red, and purple. The ocean is dark blue with some white foam from waves in the foreground.

- SRC. Overpressure occurred at compressor when five suction and discharge valves on compression cylinder failed due to cracked plates. Causing gas temperatures to spike.
- Mechanic actuated a manual ESD of compressor engine, allowing a backfeed of pressures into the interstage piping.
- No SCADA alarms - Gas Control did not become aware of overpressure because they were not actively monitoring pressures.
- No overpressure protection on the interstage piping to protect it during a manual ESD.
- 900 feet of interstage piping experienced an overpressure of 1225 psig. (1000 psig MAOP)
- Pressures exceeded MAOP for 12-hours.





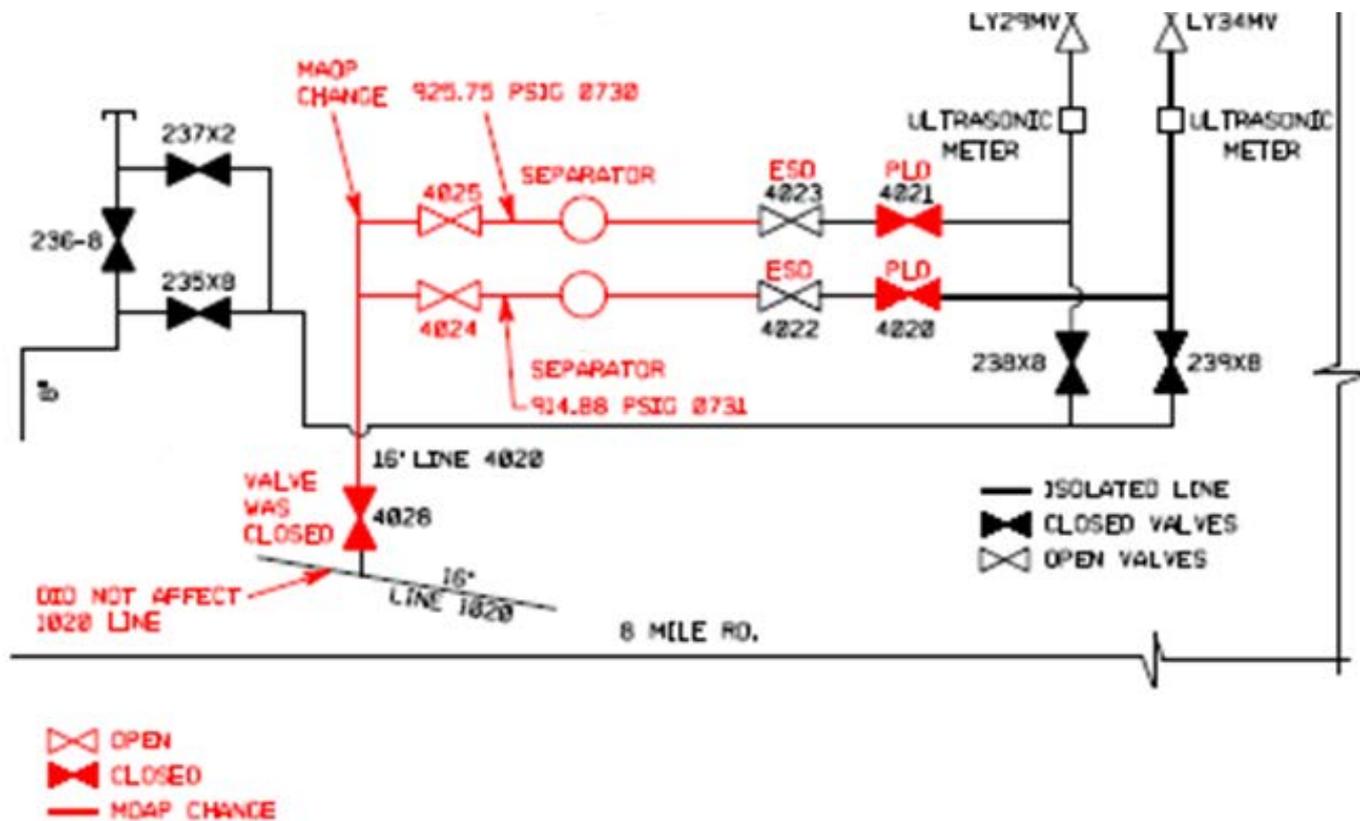
# 2014 Incident - 300825

- Recommendations:
- Recommend Gas Control establish SCADA alarms when equipment exists that is capable of actively monitoring safety-related pressures.
- Recommend operator provide overpressure protection on the interstage piping to protect it during a manual ESD.
- Recommend operator take steps to ensure factual information is communicated to PHMSA and MPSC. Return to service letter not accurate.

# 2014 Incident - 264511

- SRC. Overpressure within storage field due to equipment failure.
- Gas Control was gradually opening control valve to withdraw from storage.
- Downstream blockage – Manual valve closed.
- Gas Control interpreted pressure stabilization as line-packing and continued to open control valve.
- Gas Control's 4th command to gradually open the control valve
  - Control valve quickly jerked open and pressures increased near 800 psig MAOP.
- Gas Control recognized the downstream blockage.
  - Sent a command to close the control valve; took 20 minutes to close.
- ESD valve failed to provide OPP due to faulty solenoid.
- 802 feet of storage piping encountered an overpressure for 20 minutes in duration, reaching 925.75 psig.

# 2014 Incident - 264511





# 2014 Incident - 264511

- Compliance Action:
- 192.709(c): Not retaining a record of each patrol, survey, inspection, and test required by subparts L and M of this part for at least 5 years or until the next patrol, survey, inspection, or test is completed, whichever is longer. Operator was unable to produce inspection records that included set points for pressure control valves.
- Recommendations:
- Recommend field personnel report all critical pipeline valve statuses (open/close) to Gas Control. Recommend valve status be documented by both operations and gas control.
- Recommend field personnel are adequately trained when a new withdrawal or injection procedure is developed.



# 2014 Incident - 264511

- Recommendations:
- Recommend storage field withdrawal procedure include the requirement for Gas Control to verify valve functionality prior to withdrawal operations.
- Recommend Gas Control's storage field withdrawal procedure require Gas Control to monitor the gas flow rate and valve position while opening valve. Recommends gas controller training focus on the gas controllers' ability to recognize and evaluate AOC's.
- Recommend that adequate notification be provided to verify valve statuses or to reconfigure valve positions in the event that the field needs to be utilized.
- Recommend Gas Control utilize technicians in the field to assist diagnosing abnormal operating conditions or in an emergency situation.
- Recommend operator conduct a study on storage fields to verify that all sectionalizing block valves are protected from tampering and damage.

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# 2014 Incident - 274829

- Overpressure of 5.25 miles of transmission line, 88.25 miles of distribution main, and 2,944 services.
- 1 hour and 7 minute transmission overpressure duration.
- Cause: A slug of compressor engine oil caused worker and monitor regulators to fail.
- Contributing factors: No filter separator. Liquids in transmission system.
  
- Recommendation:
- Recommend operator accelerate their plan to install filter separators at pressure regulating stations.

# 2014 Incident - 295127

- Pipeline rupture following operating pressure increase from approximately 720 to 805 psig.
- 200 evacuated homes
- Pipe characteristics:
  - 22” pipe
  - Coal tar enamel coating
- Failure origin:
  - 21 feet segment of pipe installed in 1960 (pipeline constructed in 1949)
  - Body of pipe
  - Saturated wet environment
- Cause: High-pH SCC.



# 2015 Incident - 329527

- Pipeline rupture while line was static at 634 psig (~58% SMYS at time of failure). MAOP is 650 psig.
- Between two compressor stations with bi-directional flow.
  - 3.8 miles from northerly
  - 17.8 miles from southerly
- Pipe characteristics:
  - 24-inch, 0.250 wall, X-52
  - A.O. Smith with EFW seam
  - Wax coating
  - Installed in 1950
- Cause: Near-neutral pH SCC.



# 2015 Incident - 329527

Hydrostatic testing of ~22.3 miles of pipe

- 2 test sections.
- 1 hour spike and 7 hour leak.



#1



#2



#3

# 2015 Incident - 320529

- Pipeline Rupture.
- 20-inch.
- 1949 AO Smith EFW.
- Wax coating with wrapper.
- Cause: near-neutral pH SCC.
- MAOP of 780 psig (60% SMYS).
- Operating at 650 psig (50% SMYS) when rupture occurred.



# 2015 Incident - 320529

- 60.6 miles of EMAT ILI.
- 37 Digs (54 crack-like anomalies).
- 2,700 feet new pipe at rupture.
- 545 feet replaced at 8 digs due to SCC similar to rupture.
- 2,893 feet replaced due to less severe SCC and other anomalies.
- 6.25 miles replaced immediately downstream of compressor station.
- ASME B31.8S, A3 “Spike Test” 54.35 miles, 6 segments, 1 failure.
- Total of 8.8 miles of the 60.6 miles replaced.



# 2015 Incident – 330130

- Cross-bore.
- Property owner was performing routine sewer cleaning when their equipment would not pass through the sewer.
- Property owner then used root-cutting equipment and tore open a 4” gas service, causing a release of gas.
- The gas service had been longitudinally laying inside the sewer for several feet.
- Gas service was installed via directional drill by the Operator’s contractor 2 months prior to damage.
- Contractor failed to hand expose the sewer prior to installing gas service.



# 2015 Incident - 326629

- Third-party damage.
- 5 hours, 6MMcf
- Contractor did not request re-stake; did not hand expose.
- Traffic was allowed to pass blowing gas.
- Unknown responsibility for road closure between fire department and the operator.
- Operator did not immediately dispatch a construction crew. Gas blew 1.5 hours before ignition.
- Two motorists injured.



# 2015 Incident - 316922

- Third Party Damage. Highway road construction.
- Occurred on a 5-lane highway that was already restricted to two lanes (one in each direction).
- Detour was several miles out of the way. Additional traffic delays and significant media attention.



# 2015 Incident - 316922

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- Compliance Action:
- 192.605(a) – Not following operators O&M regarding staking. Markings did not indicate a change in direction. Spacing between markings exceeded 50 feet.
- Recommendations:
- Recommend operator provide additional training to their field technicians that perform locating and marking.
- Recommend operator consider utilizing photos to document the results of field marking.

# 2015 Incident - 335222

- Compliance Action:
- MCL 460.727(1): Excavator damaged a 6" steel gas main while drilling a well. The utility location was mismarked by approximately 41'. The staker located and marked a phone line (photo provided by operator).



# 2015 Incident - 310925

- Third-party damage causing multi-unit condo fire.
- Electrician hit 1-1/8" copper service line with a grounding rod 6.5' from bldg wall. 60 psig MAOP.
- Electrician waited 2 hours before notifying operator.



# 2015 Incident - 310925

- Technician detected gas inside building and was evacuating when fire started.
- Witness observed flames exiting floor drain near furnace.
- Supervisor told technician not to shut gas off at the master meter.
- Technician had poor communication with fire department.
- Damages \$304,423



# 2015 Incident - 319725

- Farmer hits 2" threaded nipple on above grade valve cluster.
- Leak on 10" steel distribution main. Operating at 315 psig.
- Gradual pressure reductions prevented interruptions.
- 22 hours to shut off gas and make repair.
- 12.525 MMcf gas lost.
- Valve cluster installed in December 2013.
  - Not protected from damage.
  - Girth welds were not coated.



# 2015 Incident - 329125

- Third-party damage causes ignition.
- Milling the road 10-inches deep. Hit a plastic service line. 60 psig MAOP.
- MISS DIG ticket called by general contractor. Facilities were staked.
- No injuries.
- \$304,923 damages.



# 2015 Incident - 343425

- Lighting strike causes damage to gas service line.
- Resident reported an outside gas leak.
- Service Worker detects 100% gas under roadway prior to explosion.
- Distribution crew arrives to excavate service line tee.
- Explosion occurs.
- No injuries.
- Positive gas reads detected above the gas main and extending through the front yard following explosion.
- \$102,840 damages.



# 2015 Incident - 343425





# 2015 Incident - 343425

- Compliance Actions:

- 192.603(b) – Not keeping records to administer the procedures established under 192.605. Records were not adequate to demonstrate the scope and extent of the leak investigation before and after the explosion.
- 192.605(a) – 4 counts of not following the operator’s leak investigation procedures before and after the explosion. Specifically regarding bar testing over the pipelines, mains, and services in the area. \$40,000 fine.

- Recommendations:

- Recommend Service Workers notify their appropriate Field Leader that a leak survey is needed if they identify evidence of a lightning strike.

# 2015 Incident - 343425

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- Recommendations:
- Recommend that service workers continue to monitor the area of an immediate action leak until gas is shut off or conditions are deemed safe. Service workers should continuously perform bar hole testing to confirm that gas is not migrating.
- Recommend Service Workers avoid making assumptions that a resident is not home. Service Workers should make a conscious effort to gain access into a building to check for gas infiltration, such as knocking on doors.
- Recommend operator perform a road closure if there is an unsafe amount of gas escaping near a roadway, which could cause ignition from a passing vehicle.
- Recommend operator reexamine all evidence and details in this investigation and submit a revised supplemental incident report to PHMSA. Recommend operator ensure future incident investigations are thorough enough to determine the cause of the failure.

# 2015 Incident - 332622

- Outside force damage. Resulting in a house fire.
- Homeowner struck meter with lawn mower.
- House fire spread to garage and to the neighboring structure. 2 homes were destroyed.
- No injuries.
- Damages exceeded \$50,000.
- Operator failed to notify the MPSC. Resulting in late reporting to PHMSA.



Photo by Media.

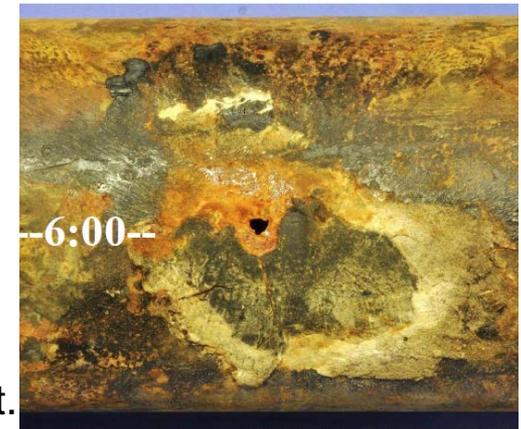


Photo from Operator Report.

# 2015 Incident - 332622

- Outside Force Damage. Regulator Station.
- Car damage to Regulator Station.
- Resulted in school closure for two days following the event.
- According to media, the 2nd closure resulted in the School district exceeding their number of closures for the year.
- Damages exceeded \$10,000.

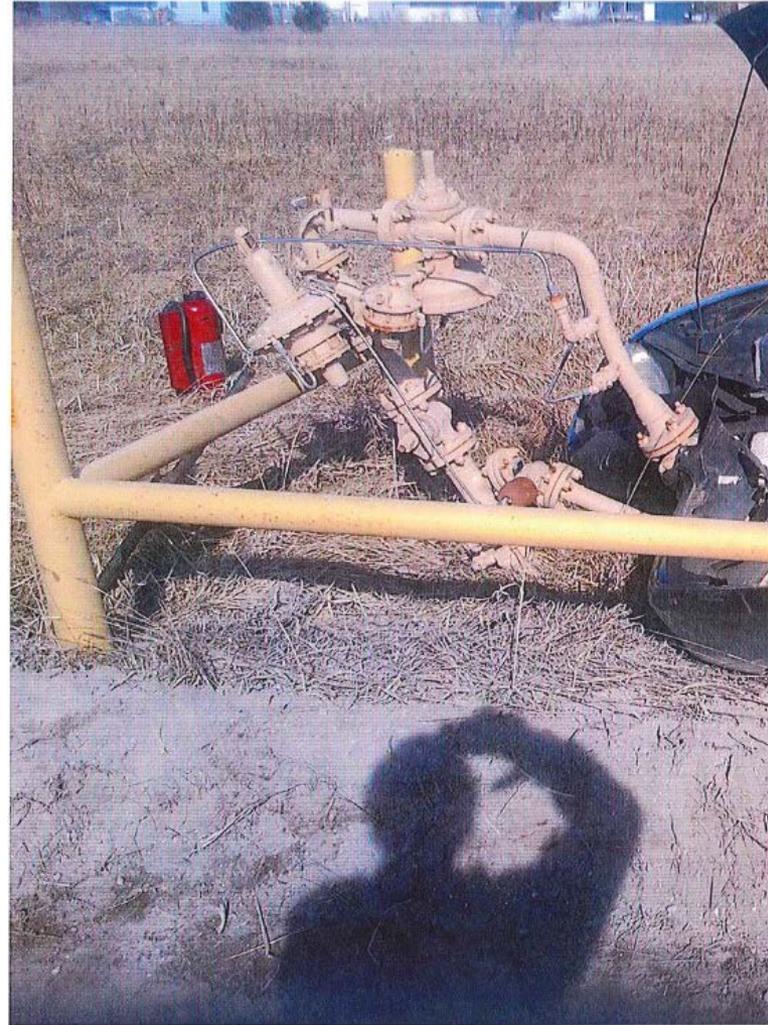
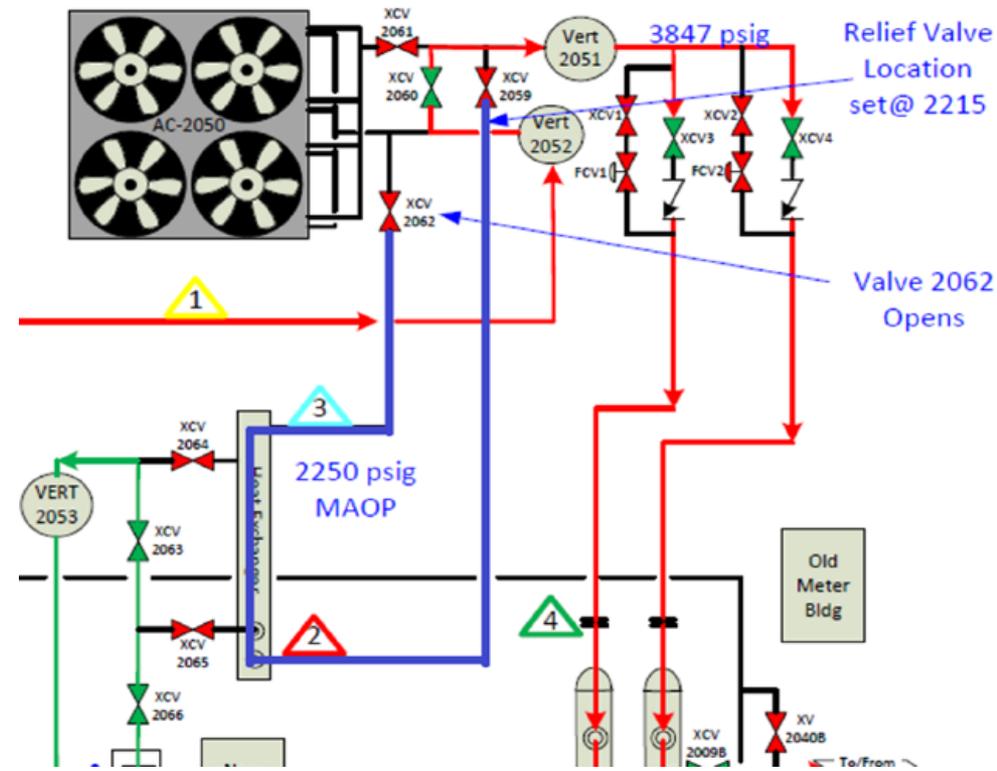


Photo by Operator.

# 2015 Incident - 350622

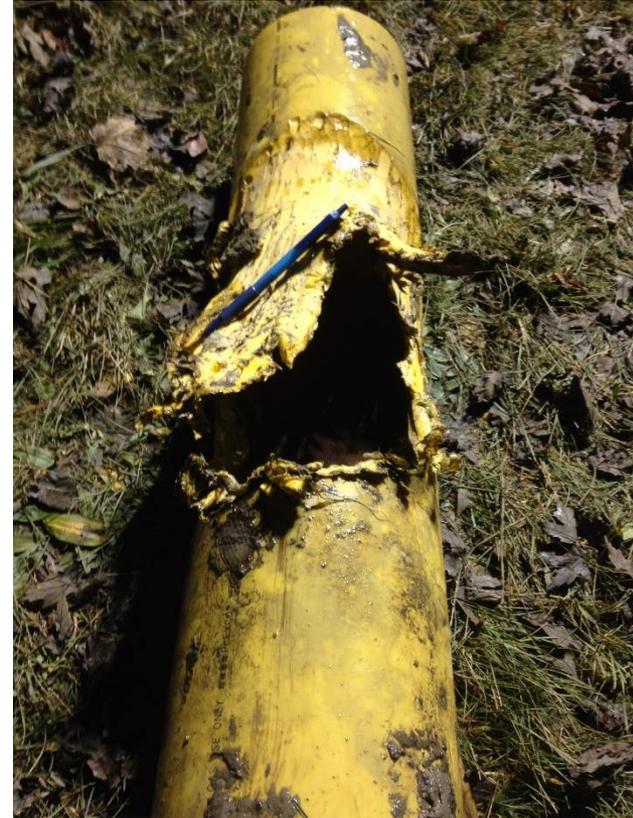
- Overpressure – SRC. Within a Compressor Station that is tied to storage.
- Station was in injection mode.
- PLC commanded a normally closed valve to open. 3847 psig gas entered 2250 psig MAOP piping. Relief valve activated but was unable to prevent the pressure surge.
- Cause still being determined.



Schematic by Operator.

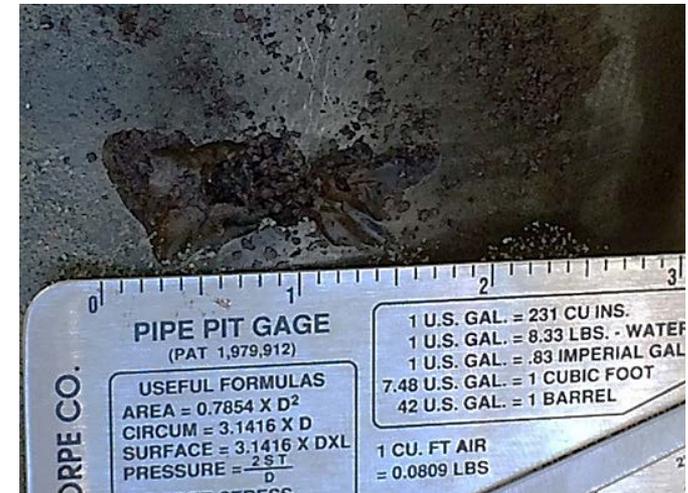
# 2015 Incident - 353630

- Third-party damage.
- Contractor installing watermain hit 6" plastic gas main during directional bore pull back of a reaming tool.
- 7.99 Mmcf gas released. Gas blew for 13 hours.
- \$85,416 damages.



# 2015 Incident – 323722 / 351335

- First event:
  - Pipeline Leak. Storage Field Lateral. 3.6 MMcf gas loss.
  - Lab analysis determined cause to be internal corrosion.
  - The lateral was shut down, repaired, and returned to service.



- Second event (5 months later):
  - Pipeline Leak. Storage Field Lateral. 3.7 MMcf gas loss.
  - Lab analysis determined cause to be internal corrosion.
  - Lateral remains shut-in and scheduled for replacement.

# 2016 Incident - 359125

- First event:
- Regulator failure causing 4.2 Mmcf gas to vent from relief.
- Fisher EZR regulator had a damaged filter screen and diaphragm.
- Regulator overhauled and placed back into service.
- Regulator was also overhauled one week prior because of a defect identified in the cage during an inspection.



# 2016 Incident - 359125

- Second event (following day):
- Regulator and relief failure caused 1 mile of transmission line to experience 113% MAOP exceedance.
- SRC indicates hydrates entrained in the gas stream were found to have precipitated out and froze in the relief valve's pilot control loop resulting in delayed activation.
- Fisher EZR regulator filter screen deformed and diaphragm damaged again (1 day in service).
- Regulator taken out of service.



# 2016 Incident - 374429

- Vehicle exits the road and strikes a pedestal containing both gas and electric meters.
- Escaping gas ignited causing damage to a home.
- One injury.
- Drug/alcohol suspected to be involved.
- Driver did not apply brakes before or after meter was hit and the vehicle proceeded past the house and into woods.
- \$19,301 damages.



# 2016 Incident - 357730

- Restroom building explodes in a public park.
- Prior to explosion, operator investigated leak call and found no gas.
- After explosion, operator discovers a gas leak on a 6" cast iron main several blocks away from the explosion.
- Gas migrated through the nearby sanitary sewer to the location of the explosion.
- Leak repaired with a repair clamp.
- \$233,398 damages.



# 2016 Incident - 333930

- Vehicle exits the road and strikes an above grade transmission pipeline.
- Escaping gas ignited causing damage to vehicles, gas facilities, and operator's buildings.
- Two injuries.
- 540 psig MAOP.
- 1,000 evacuated.
- 24 Mmcf gas lost.
- Extensive damages.



# Questions or Comments?



**MPSC**

**Michigan Public Service Commission**



**Thank You!**



**2016** Pipeline  
Safety  
September 26-28 **Conference**