



PHMSA OPS

Accident Investigation (AID)

Oklahoma Pipeline Safety Conference
Hazard Liquids

November 3, 2022



Investigate – Analyze – Prevent

"To protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives."





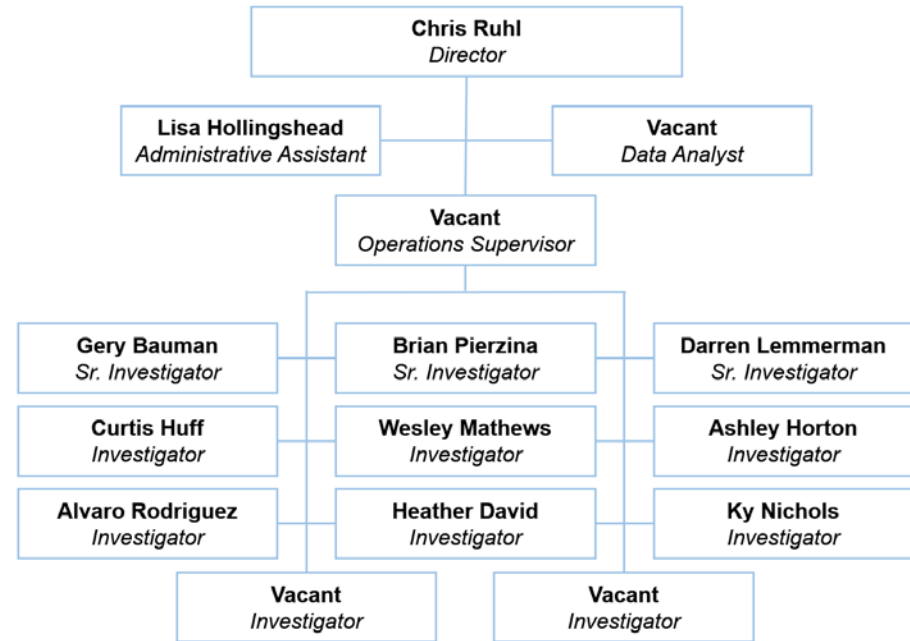
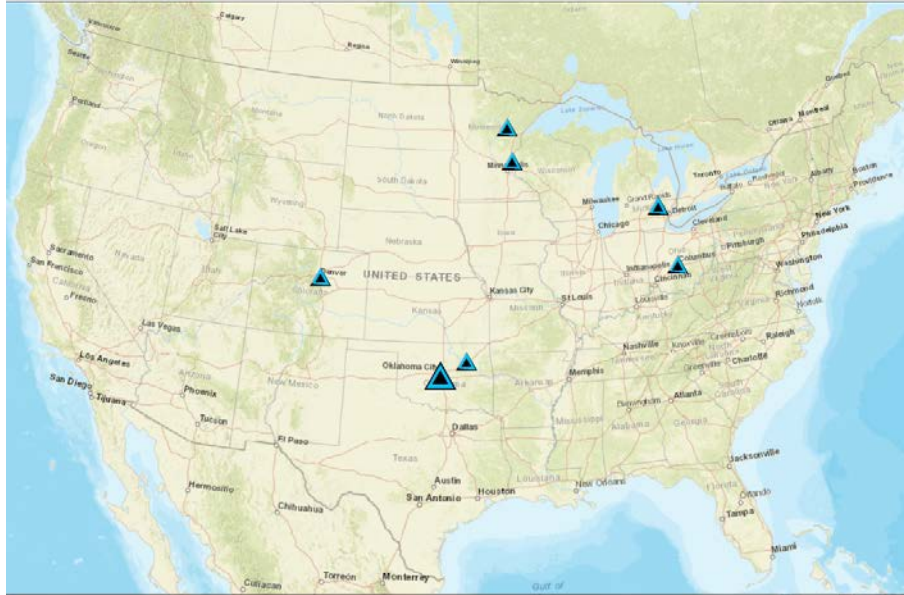
Discussion Topics

- Introduction of AID
 - NPIC
 - 30-Day Report
 - Deployment

- AID Update
 - Stats
 - Case Study



Accident Investigation Division



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Accident Investigation Division



- Director, Chris Ruhl
- Operations Supervisor, Vacant
- Investigators, 2 Vacant
 - Brian Pierzina (MN)
 - Darren Lemmerman (MN)
 - Gery Bauman (OH)
 - Curtis Huff (OK)
 - Ashley Horton (OK)
 - Wesley Mathews (OK)
 - Alvaro Rodriguez (CO)
 - Heather David (MI)
 - Ky Nichols (OK)
 - Vacant Investigator
 - Vacant Investigator
- Data Analyst, Vacant
- Administrative Assistant
 - Lisa Hollingshead



What We Do



- Review, Evaluate, and Disseminate NRC Notifications
- Manage Investigation from Initial Notification through Cause Determination
- Conduct Onsite Accident Investigations: Support State Investigations
- Oversee Operator 30-Day Reports
- Analyze Data to Identify Emerging Trends



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National Pipeline Incident Coordinator (NPIC)



- Monitors/Evaluates/Coordinates all ongoing incidents 24/7/365
- Single Point for Operators, State Partners and Agencies

NPIC Hotline (888) 719-9033

PHMSAAID@dot.gov



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AID NPIC Duty

- Monday 12:00 noon to Monday 12:00 noon Central Time
 - From 6:00 AM to 10:00 PM local time- All NRC notifications will be reviewed
 - From 10:00 PM and 6:00 AM local time– NPIC receives calls through the NPIC Number



NPIC Responsibility



- Evaluate NRC reports to determine jurisdiction and determine appropriate PHMSA response
- For State regulated events, forward NRC notice to state
- For OPS regulated events, contacts operator and begin investigation





NPIC responsibility

- Serves as PHMSA distribution point
 - Incident updates
 - Daily Telephonic Report
- Serves as the lead investigator unless there is an AID deployment
 - 30-day report review



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30-Day Reports Review



- PHMSA required operator submitted reports
 - Original, Supplemental and Final
- AID's information collection begins upon notification of an incident
 - Considering updates to incident forms to clarify intent of data field and add an additional data field
 - Lead is normally the NPIC that was on duty when originally reported
- For State Regulated incidents, AID relies on state partners
 - AID Lead Investigator will provide comments to operator and state partner
- When initial 30-day report is received it is included in the following months SMARS/MARS reports
 - State Program managers will have a chance to review SMARS entries prior to SMARS distribution



When Do We Deploy



A release of product and one or more of the following:

- Death
- Injury
- Hazardous liquid spill > 500 barrels or spill reaches water
- Major transportation impact - highway, airport, rail
- Major supply impact
- Pipeline system/operator of interest
- Toxic release – ammonia, CO₂
- NTSB deploys
- Politically sensitive/high media interest
- State request



PHMSA Reporting requirements



- PHMSA has NRC reporting requirements for pipeline systems
 - Initial (within earliest practical moment following discovery but no later than 1 hour
 - Hazardous Liquids
 - An event involving the release of a liquid
 - » A death, or personal injury necessitating in-patient hospitalization
 - » Incident involved a fire or explosion
 - » Greater than \$50,000 property damage including the cost of the cleanup, value of product
 - » Resulted in pollution of any stream, river, lake, reservoir or similar body of water
 - » An event that is characterized as significant by operator
 - 48-hour
 - Must provide an update to confirm/revise initial information reported.





48-hr NRC Reporting

- 191.5(c) - Within 48 hours after the confirmed discovery of an incident an operator must revise or confirm:
 - the estimated amount of product released
 - an estimate of the number of fatalities and injuries
 - and all other significant facts that are known by the operator that are relevant to the cause of the incident
 - or extent of the damages
- If there are no changes or revisions to the initial report, the operator must confirm the estimates in its initial report

*Requirement as of 1/1/2018



Investigation of failures - 192.617, 195.402(c) Significant changes effective 10/5/22

Each operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the cause of the failure and minimizing the possibility of a recurrence.

Investigation of failures and incidents

(a) **Post-failure and incident procedures:** Each operator must establish and follow procedures for investigating and analyzing failures and incidents as defined in § 191.3, including sending the failed pipe, component, or equipment for laboratory testing or examination, where appropriate, for the purpose of determining the causes and contributing factor(s) of the failure or incident and minimizing the possibility of a recurrence.

(b) **Post-failure and incident lessons learned:** Each operator must develop, implement, and incorporate lessons learned from a post-failure or incident review into its written procedures, including personnel training and qualification programs, and design, construction, testing, maintenance, operations, and emergency procedure manuals and specifications.

(c) **Analysis of rupture and valve shut-off:** If an incident on an onshore gas transmission pipeline or a Type A gathering pipeline involves the closure of a rupture-mitigation valve (RMV), as defined in § 192.3, or the closure of alternative equivalent technology, the operator of the pipeline must also conduct a post-incident analysis of all of the factors that may have impacted the release volume and the consequences of the incident and identify and implement operations and maintenance measures to prevent or minimize the consequences of a future incident. The requirements of this paragraph (c) are not applicable to distribution pipelines or Type B and C gas gathering pipelines. The analysis must include all relevant factors impacting the release volume and consequences, including, but not limited to, the following:

- (1) Detection, identification, operational response, system shut-off, and emergency response communications, based on the type and volume of the incident;
- (2) Appropriateness and effectiveness of procedures and pipeline systems, including supervisory control and data acquisition (SCADA), communications, valve shut-off, and operator personnel;
- (3) Actual response time from identifying a rupture following a notification of potential rupture, as defined at § 192.3, to initiation of mitigative actions and isolation of the pipeline segment, and the appropriateness and effectiveness of the mitigative actions taken;
- (4) Location and timeliness of actuation of RMV's or alternative equivalent technologies; and
- (5) All other factors the operator deems appropriate.

(d) **Rupture post-failure and incident summary:** If a failure or incident on an onshore gas transmission pipeline or a Type A gathering pipeline involves the identification of a rupture following a notification of potential rupture, or the closure of an RMV (or those terms as defined in § 192.3), or the closure of an alternative equivalent technology, the operator of the pipeline must complete a summary of the post-failure or incident review required by paragraph (c) of this section within 90 days of the incident, and while the investigation is pending, conduct quarterly status reviews until the investigation is complete and a final post-incident summary is prepared. The final post-failure or incident summary, and all other reviews and analyses produced under the requirements of this section, must be reviewed, dated, and signed by the operator's appropriate senior executive officer. The final post-failure or incident summary, all investigation and analysis documents used to prepare it, and records of lessons learned must be kept for the useful life of the pipeline. The requirements of this paragraph (d) are not applicable to distribution pipelines or Type B and C gas gathering pipelines.

Before

After



Closer look at 192.617

- Post-failure and incident procedures
 - Must establish and follow procedures for investigating failures and incidents
 - Includes sending failed specimen to lab to determine cause and contributing factors
- Post-failure and incident lesson learned
 - Must develop, implement and incorporate lessons learned
- Analysis of rupture and valve shutoffs
 - When incidents cause the closure of RMV, operator must conduct a post incident analysis
- Rupture post-failure and incident summary
 - Required within 90 days of incident with quarterly status reviews until complete



Metallurgical Examination Protocol



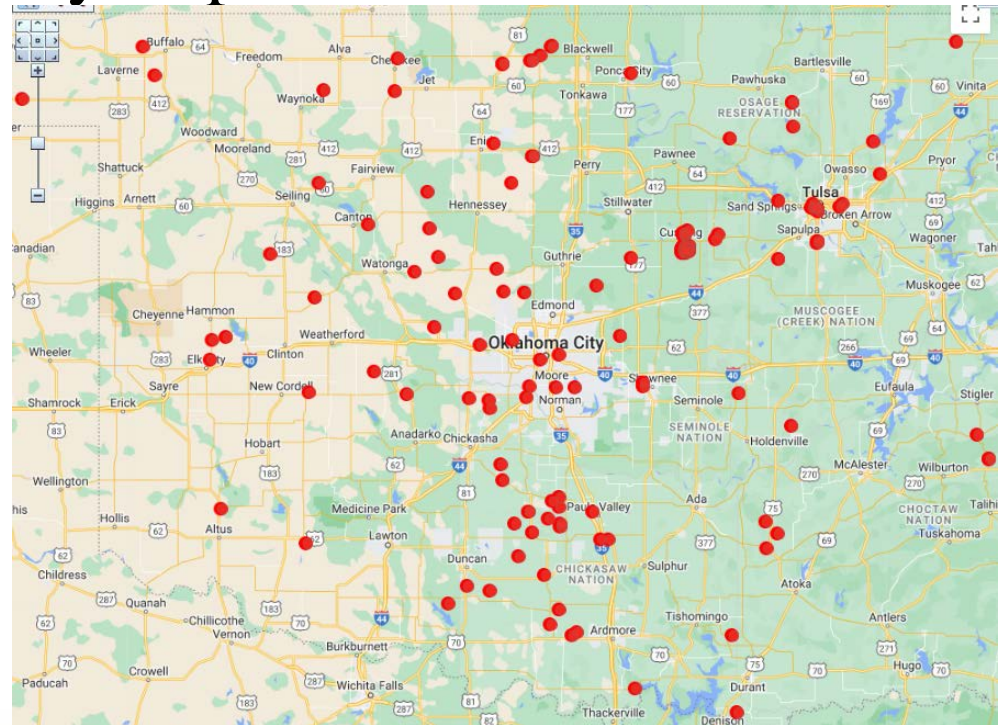
- Guidance metallurgical laboratory failure examination protocol
- Includes background information, evidence collection & preservation, chain of custody, material testing
- Revised March 2019 – Available on PHMSA AID's website
- www.phmsa.dot.gov/incident-reporting/accident-investigation-division/metallurgical-laboratory-failure-examination-protocol-pdf



Oklahoma PHMSA reported incidents



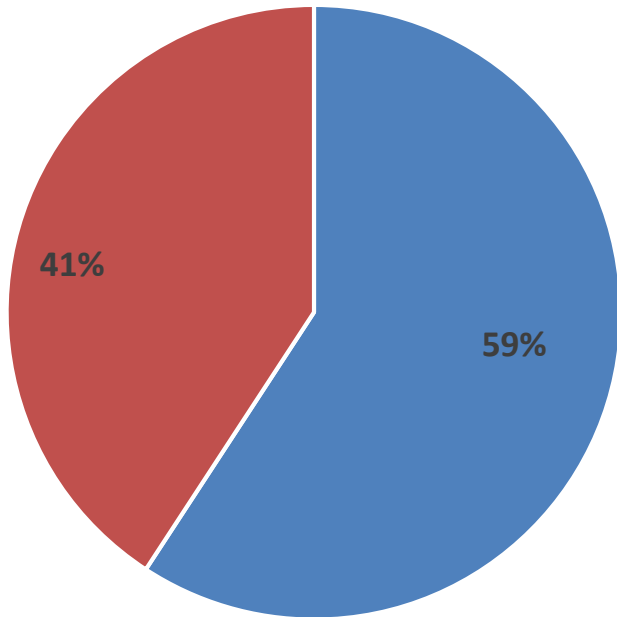
- January 2018 through October 2022
- 179 events requiring 30-Day Reports
 - Gas Transmission
 - Gas Distribution
 - Hazardous Liquid



Oklahoma Reportable Events

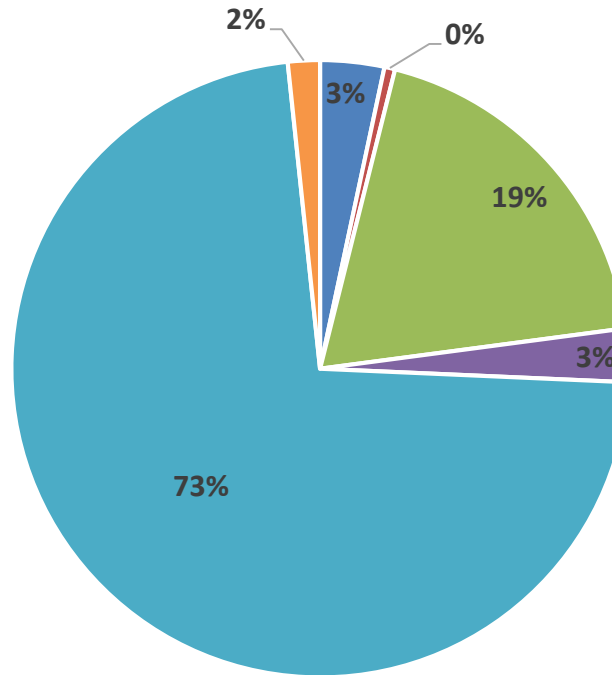


Incident / Accident Jurisdiction



■ OPS Regulated ■ State Regulated

Incidents / Accidents By System Type



- GAS DISTRIBUTION
- GAS GATHERING
- GAS TRANSMISSION
- GRAVITY AND REPORTING-REGULATED GATHERING
- HAZARDOUS LIQUID

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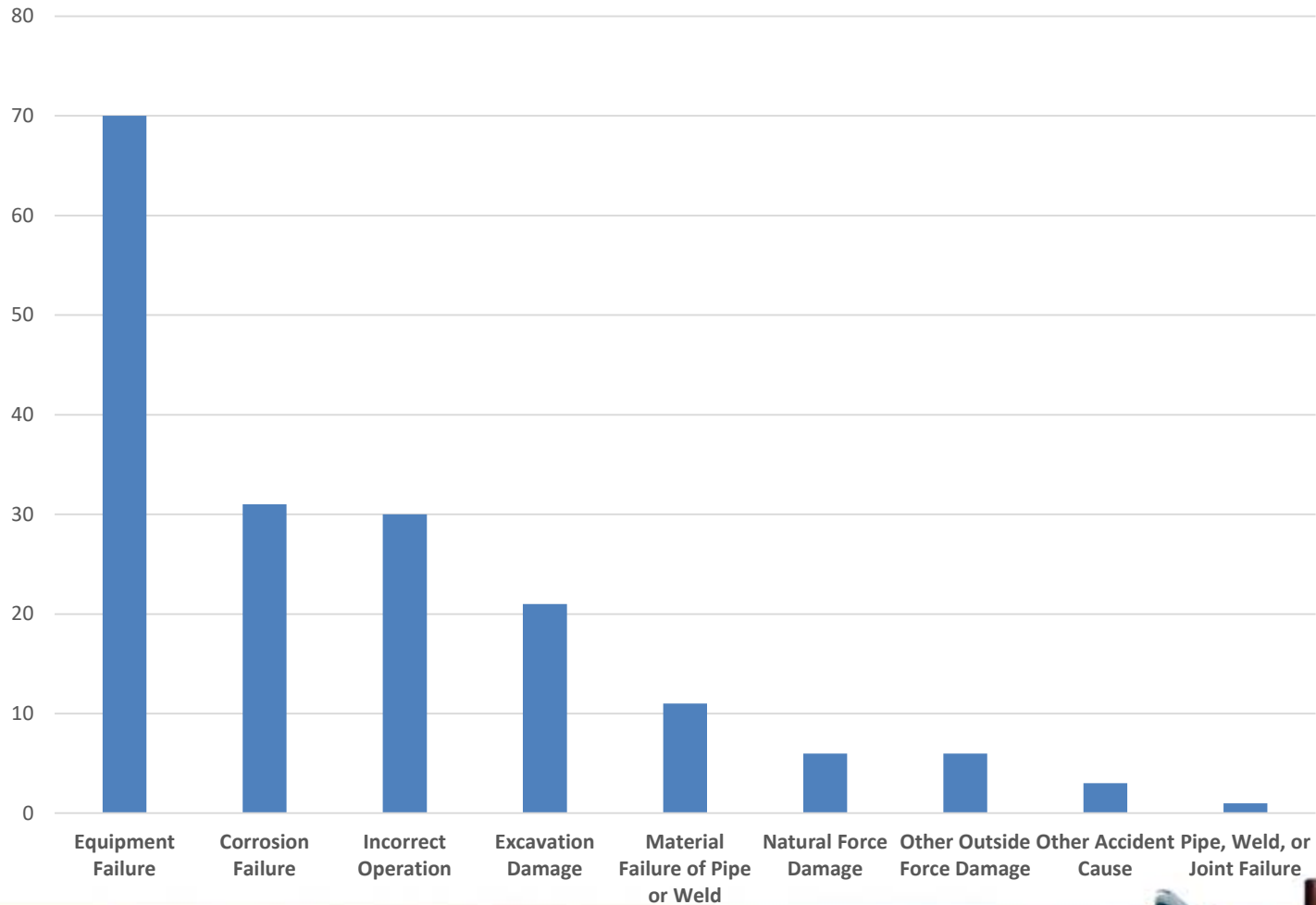
U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration



Oklahoma Reported Events



Cause Type - All Incidents / Accidents



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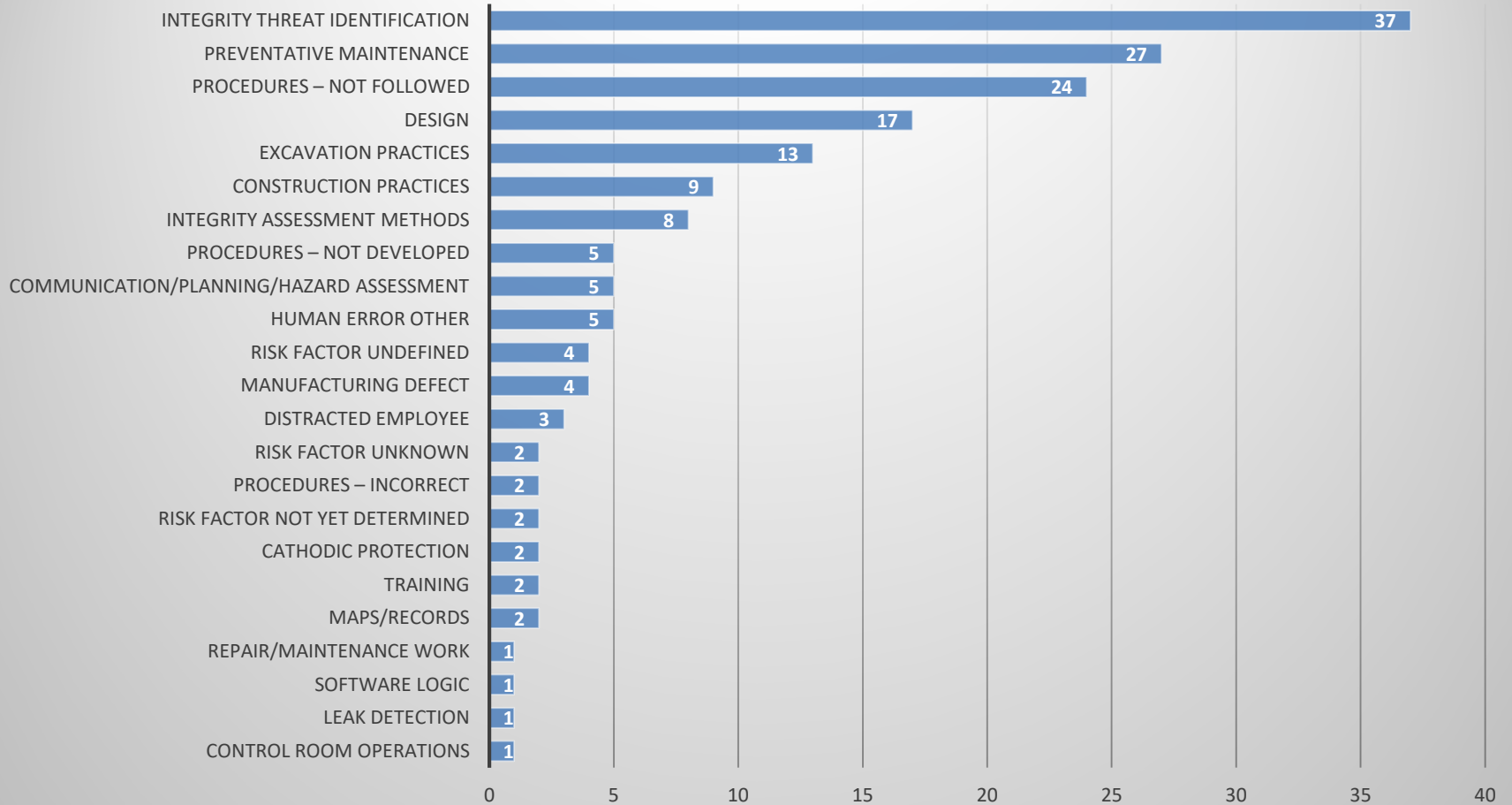
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Oklahoma Reportable Events



AID assigned Risk Factors from 2018-2022





Control Room Response Issues

THINK LEAK FIRST



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Recent Examples

December 4, 2020 – Commerce City, Colorado - 487 Barrels of Diesel

- 6-Inch pipeline failure due to Selective Seam Weld Corrosion and fatigue cracking
- Flow and pressure alarms along with unintentional shutdown of downstream pump station
- Controller shutdown the pipeline, but then re-started for 8 minutes before shutting down

March 16, 2021 – Linden, New Jersey – 353 Barrels of Unleaded

- 12-Inch pipeline rupture due to external corrosion
- Uncommanded shutdown due to low suction pressure
- High-High flow rate alarm and LDS Alarm
- Controller suspected a control valve issue
- Controller started booster pump but stopped after 30 seconds



Recent Examples

December 27, 2021 – Chalmette, Louisiana – 8325 Barrels of Diesel

- 16-Inch pipeline rupture due to external corrosion
- Uncommanded shutdown due to low suction pressure, multiple alarms
- Controller suspected a control valve issue
- Operations and troubleshooting w/ multiple alarms and restarts continued most of the day
- Pipeline was finally shutdown and rupture location was identified almost 3 hours later



Recent Examples

April 12, 2022 – Perrysburg, Ohio – 1225 Barrels of Gasoline

- 10-Inch pipeline rupture due to external corrosion
- Uncommanded shutdown – Unexplained pressure drop – Immediate spike in flow rate
- Controller was concerns with LPG flashing at the end of the pipeline
- Controller restarted the pipeline for 5 minutes before shutting down and isolating the pipeline

May 15, 2022 – Midland, Texas – 4800 Barrels of Crude

- 10-Inch pipeline rupture due to a fillet weld failure on a split tee – likely due to bending stress
- Volume imbalance was detected, but operations continued for almost 7 hours
- Controller eventually shutdown the pipeline based on SCADA data and LDS alarm



Recent Examples

June 19, 2022 – Alcova, Wyoming – 500 Barrels of Crude

- Tubing failure on a pump unit for a 10-inch pipeline
- Atmos LDS alarm was received on June 19– Controller thought it was a “false alarm”
- Controller thought it was due to start-up of an intermediate pump
- Pipeline was not shutdown until 8 hours later

July 7, 2022 – Cushing, Oklahoma – 5768 Barrels of Crude

- 20-Inch pipeline rupture due to a longitudinal seam defect
- Pipeline was restarted after an uncommanded shutdown on low suction pressure



Earth Movement and Pipelines

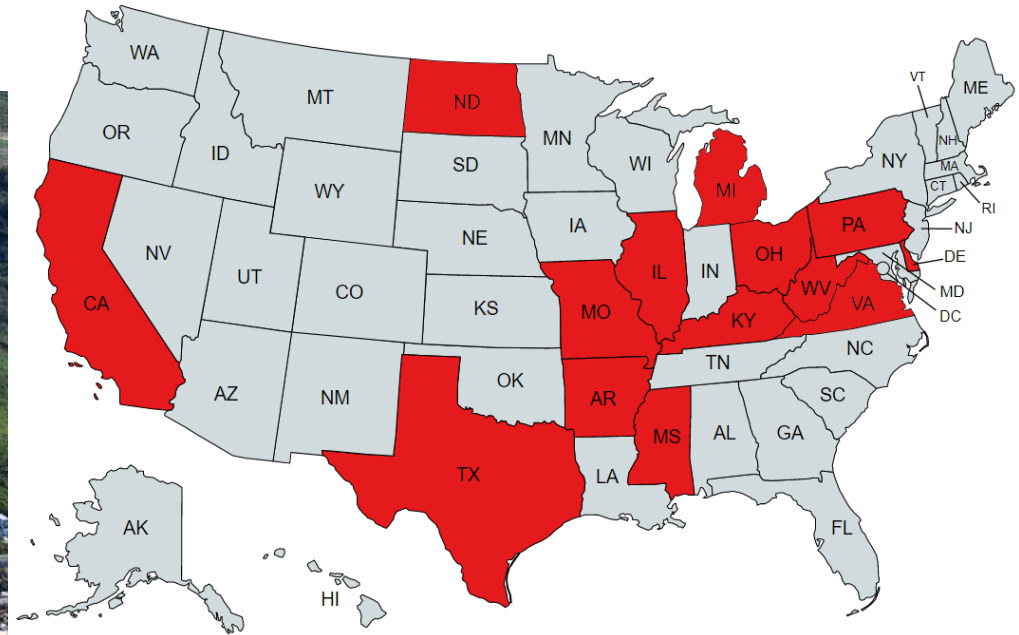


Hillsboro, Kentucky

Satartia, Mississippi



Land Movement Failures



States with reportable incidents and accidents due to earth movement since 2004.



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

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Signs of earth movement



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Hillsboro, Kentucky



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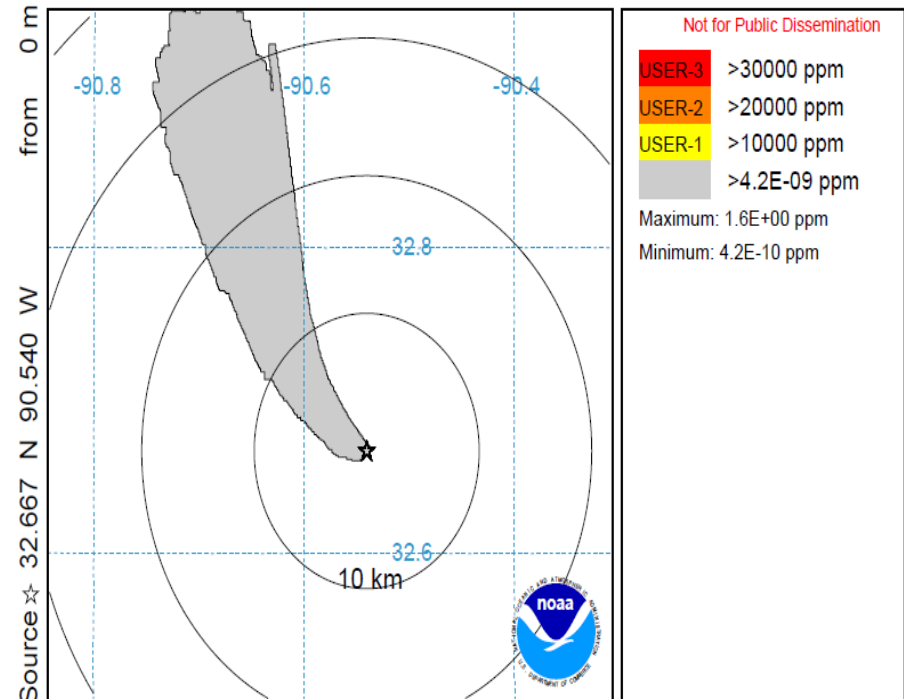
Denbury - Satartia, MS Incident

- 24-inch CO₂
- Installed in 2009
- 77 miles (Jackson Dome, MS to Delhi, LA)
- Primary use is for Enhanced Oil Recovery (EOR)



Incident Details

- February 2020
- Released occurred approximately one mile southeast of Satartia, Mississippi
- 45 individuals sought medical attention
- 200 Satartia, MS residents and those in the area evacuated
- Total of 31,405-barrels released



HRRR METEOROLOGICAL DATA

Job ID: 23884 Job Start: Sun Feb 23 04:29:26 UTC 2020
Release: lat.: 32.667157 lon.: -90.540381 Hgt: 0.0 m
Pollutant: (124-38-9) CARBON DIOXIDE
Release Quantity: 69.7 kg Start: 20 02 23 02 49
Output: Maximum 15-minute Average Air Concentration
Dry Deposition rate: 0 cm/s Wet Removal: None #Part: 40000
Initial LOC-3: 30000 ppm LOC-2: 20000 ppm LOC-1: 10000 ppm
Meteorology: 0200Z 23 Feb 2020 - HRRR
Event: Real_Event - Hazmat_Industrial
Produced by user: david.cox - WFO: MS: Jackson: 601-939-2786



Denbury - Satartia, MS Incident

- PHMSA investigated
- Failure attributed to land movement
- PHMSA issued \$3.8 million in proposed penalty



Advisory Bulletin

- Potential for damage to pipeline facilities caused by earth movement in variable, steep, and rugged terrain and terrain with varied or changing subsurface geological conditions.
- Changing weather patterns due to climate change, including increased rainfall and higher temperatures, that may impact soil stability in areas that have historically been stable.
- Owners and operators should consider monitoring geological and environmental conditions, including changing weather patterns, in proximity to their facilities.





NPIC Hotline (888) 719-9033

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(405) 590-3625

