

Annual Flowline-Related Spill Report

January 1st - December 31st, 2020

Integrity Engineering

March 23rd, 2021



COLORADO
Oil & Gas Conservation
Commission

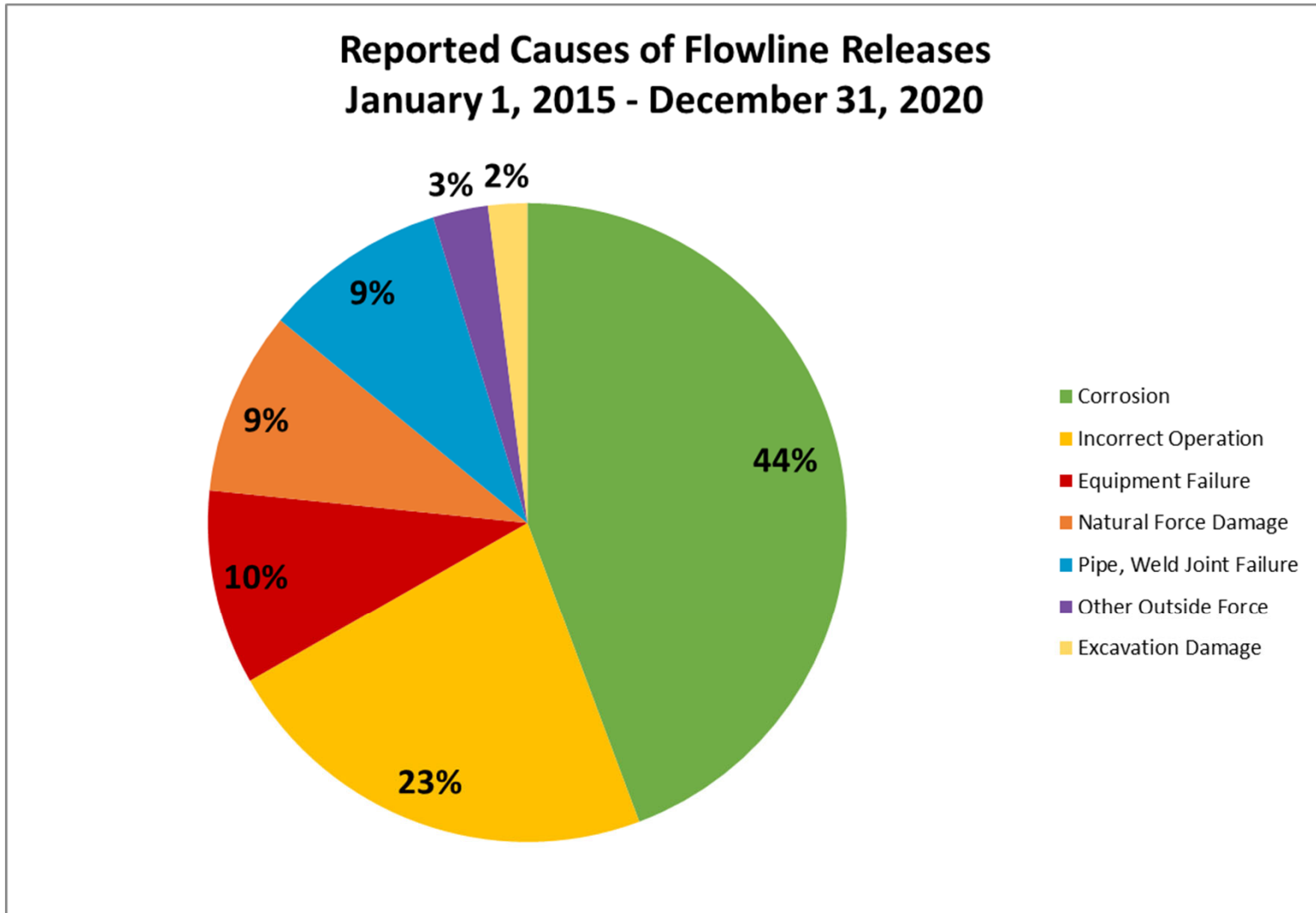
Department of Natural Resources

Semi-Annual Review

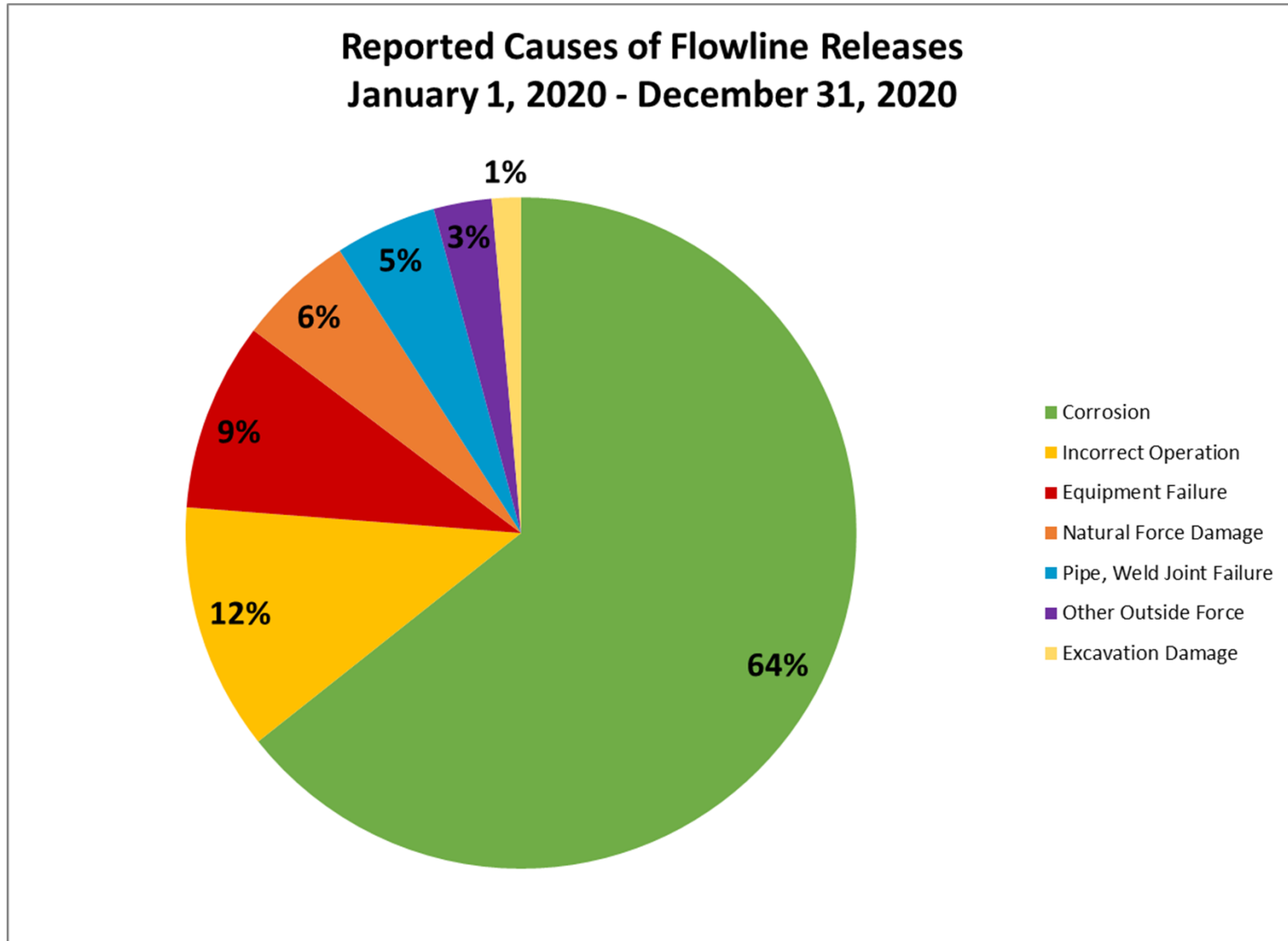
- *Global Root Causes (All to date vs. Current)*
- *Root Causes by Region (All to date vs. Current)*
- *Spill Trends*
- *Tanks Root Causes - 2020*



All Data Global Root Causes

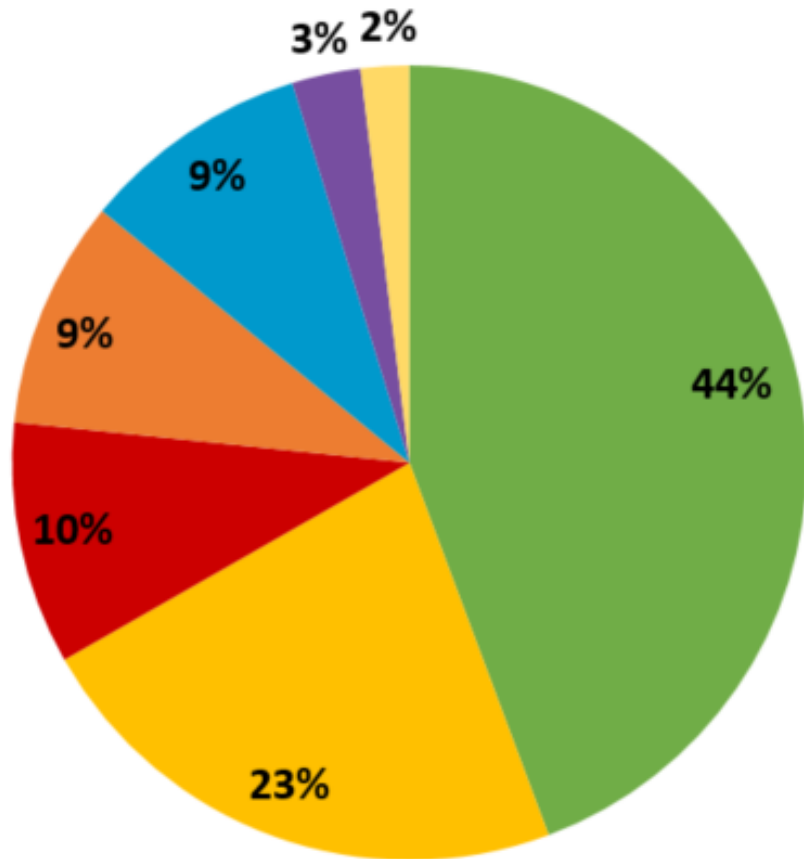


2020 Data Global Root Causes

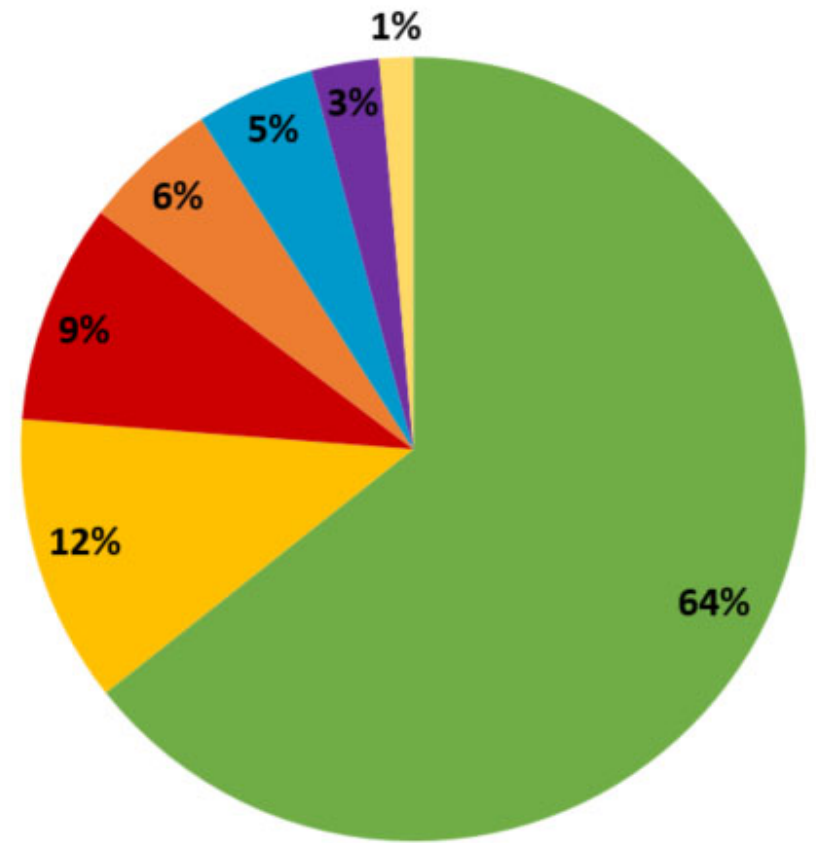


Comparison Root Causes

All Data 2015-2020



2020 Full Year



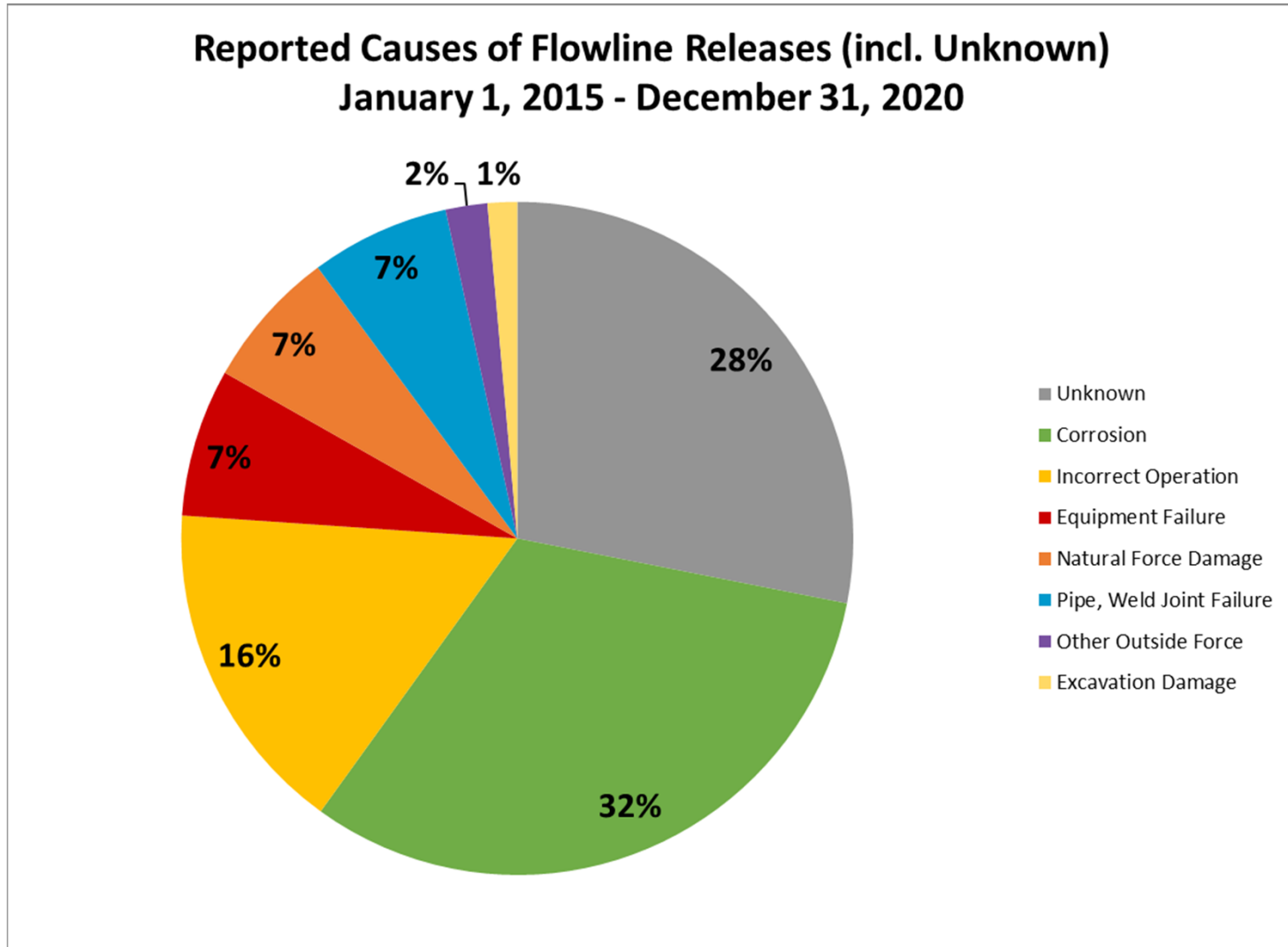
- Corrosion
- Equipment Failure
- Incorrect Operation
- Other Outside Force Damage
- Pipe, Weld, or Joint Failure
- Excavation Damage
- Natural Force Damage

Root Cause Discussion

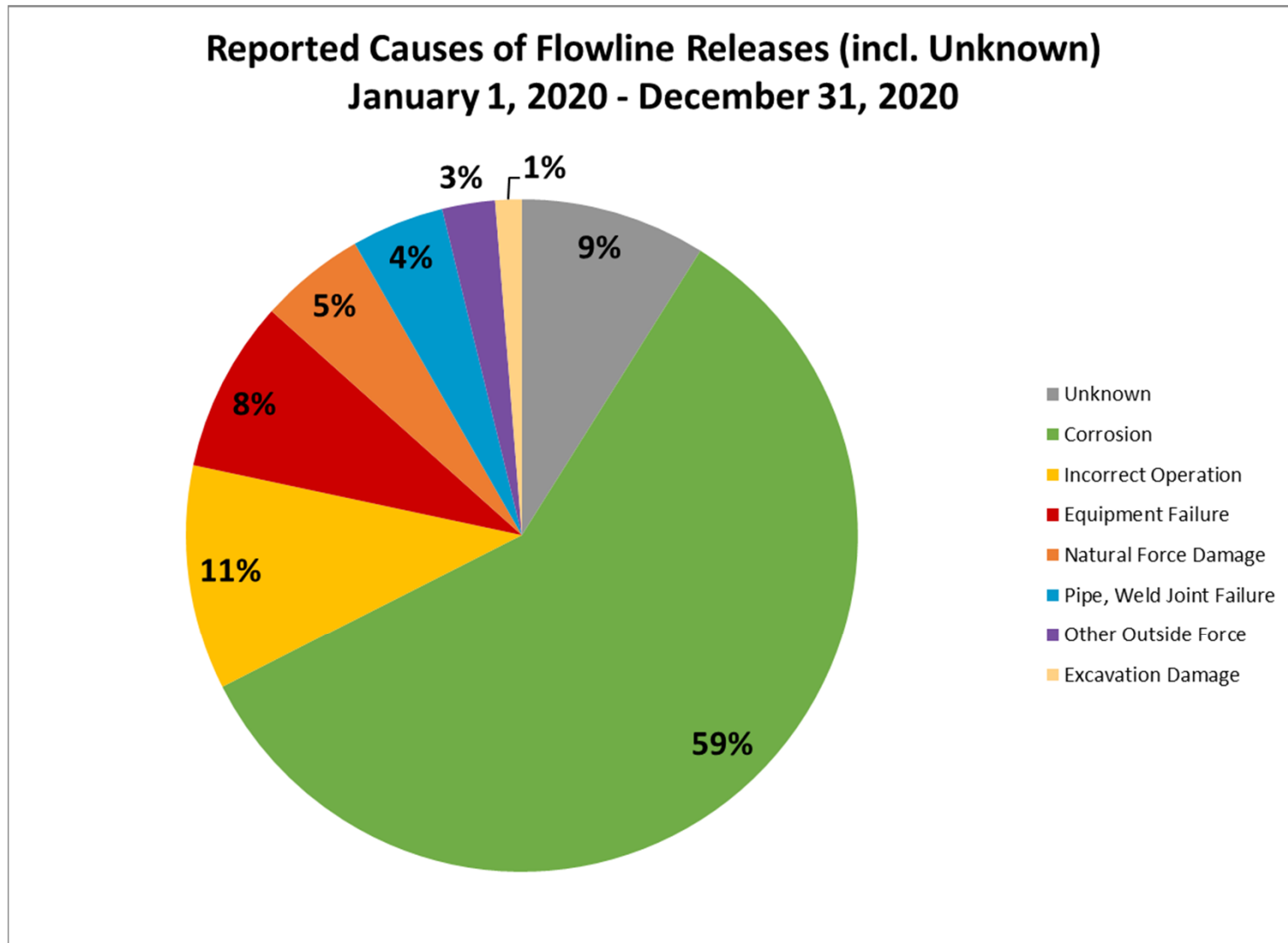
- *Corrosion*
 - *64% Internal, 11% External and 25% not given in root cause.*
- *Incorrect Operations*
 - *Poor Communication or Procedures*
 - *Incorrect Equipment Selection*
 - *Improper Installation of Equipment*



All Data Global Root Causes

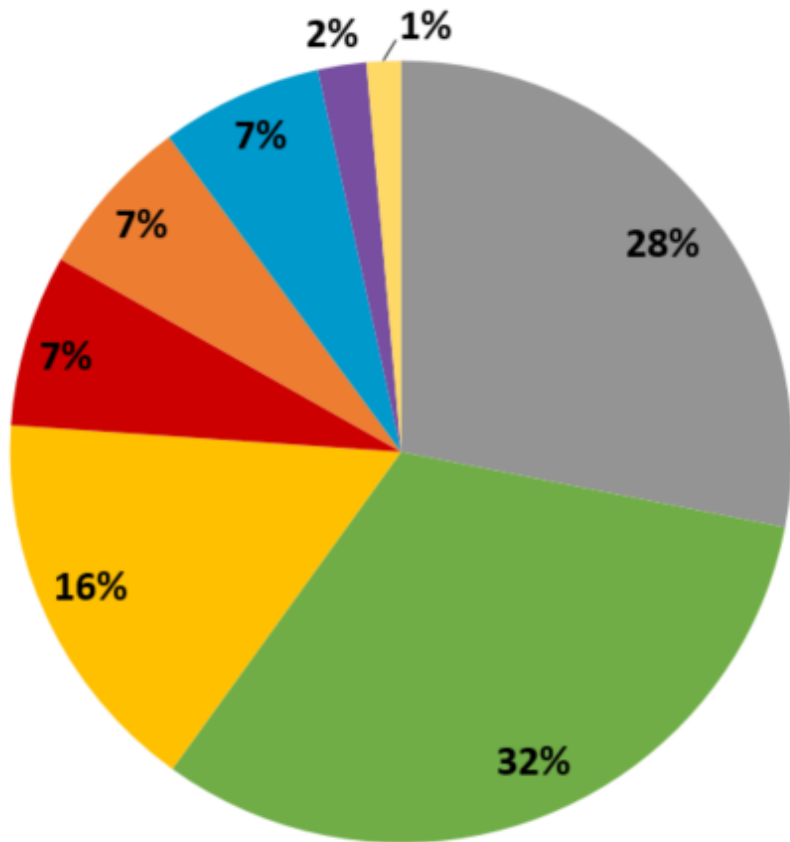


2020 Data Global Root Causes

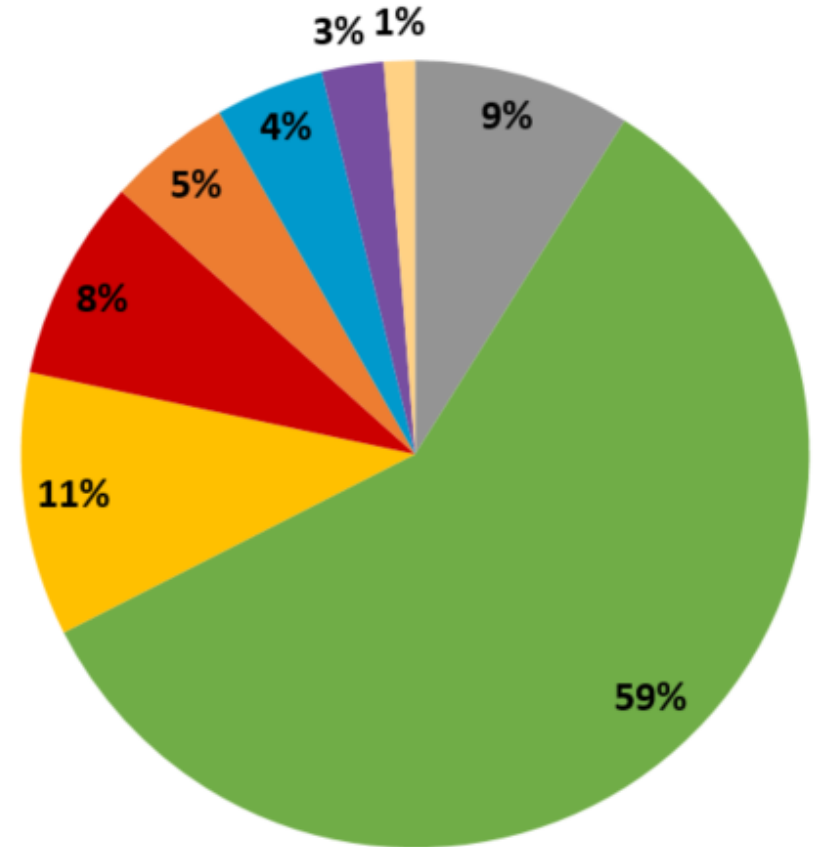


Comparison Root Causes

All Data 2015-2020



2020 Full Year



- Corrosion
- Incorrect Operation
- Pipe, Weld, or Joint Failure
- Natural Force Damage
- Equipment Failure
- Other Outside Force Damage
- Excavation Damage



Root Causes of Flowline-Related Spills in Each County (2015-2020)

County	Corrosion	Equipment Failure	Excavation Damage	Incorrect Operation	Natural Force Damage	Other Outside Force	Pipe, Weld Joint Failure	Unknown	Grand Total
ADAMS	9	1		2		1	2	18	33
ARAPAHOE	3		1	1				2	7
ARCHULETA				1				1	2
BACA			1						1
BOULDER	3				1		2	5	11
BROOMFIELD				1					1
CHEYENNE	1				1		4	1	7
ELBERT	1				2			1	4
GARFIELD	70	13		24	2	2	5	29	145
GUNNISON	2	1			3			2	8
JACKSON	5	1		4	4			7	21
LA PLATA	16	4	2	9	3	1	2	16	53
LARIMER	3	1				2	1	1	8
LAS ANIMAS	10	6		51	22	2	18	5	114
LINCOLN	3			1	1			3	8
LOGAN	2			1				1	4
MESA	14	5		5		1		10	35
MOFFAT	2	2		1	3	1		1	10
MONTEZUMA	3	2					1		6
MORGAN	1						1	1	3
PITKIN								1	1
RIO BLANCO	62	12	1	10	14		6	55	160
WASHINGTON	5			5	2			6	18
WELD	165	36	12	71	17	13	20	157	491
YUMA	1	1		6	5	1	18	13	45
Grand Total	381	85	17	193	80	24	80	336	1196



Root Causes of Flowline-Related Spills in Each County (only 2020)

County	Corrosion	Equipment Failure	Excavation Damage	Incorrect Operation	Natural Force Damage	Other Outside Force	Pipe, Weld Joint Failure	Unknown	Grand Total
ADAMS	1								1
ARAPAHOE			1						1
CHEYENNE					1				1
GARFIELD	31	1		3	1		1	3	40
GUNNISON	1								1
JACKSON	1								1
LA PLATA	4	1	1	4				5	15
LAS ANIMAS		1		2	3		2		8
LINCOLN	2			1					3
LOGAN	1								1
MESA	1								1
MOFFAT	1								1
RIO BLANCO	11	3			2		1		17
WASHINGTON	1								1
WELD	36	7		6	1	4	3	6	63
YUMA				1				1	2
Grand Total	91	13	2	17	8	4	7	15	157



Root Causes of Flowline-Related Spills in Each County (only 2020)

County	Corrosion	Equipment Failure	Excavation Damage	Incorrect Operation	Natural Force Damage	Other Outside Force	Pipe, Weld Joint Failure	Unknown	Grand Total
ADAMS	1								1
ARAPAHOE			1						1
CHEYENNE					1				1
GARFIELD	31	1		3	1		1	3	40
GUNNISON	1								1
JACKSON	1								1
LA PLATA	4	1	1	4				5	15
LAS ANIMAS		1		2	3		2		8
LINCOLN	2			1					3
LOGAN	1								1
MESA	1								1
MOFFAT	1								1
RIO BLANCO	11	3			2		1		17
WASHINGTON	1								1
WELD	36	7		6	1	4	3	6	63
YUMA				1				1	2
Grand Total	91	13	2	17	8	4	7	15	157



Root Causes of Flowline-Related Spills in Each Basin (2020)

Basin	Corrosion	Equipment Failure	Excavation Damage	Incorrect Operation	Natural Force Damage	Other Outside Force	Pipe, Weld Joint Failure	Unknown	Grand Total
Denver (DJ) Basin	41	7	1	8	1	4	3	7	72
Interbasin Area					1				1
North Park Basin	1								1
Piceance Basin	44	4		3	3		2	3	59
Raton Basin		1		2	3		2		8
San Juan Basin	4	1	1	4				5	15
Sand Wash Basin	1								1
Grand Total	91	13	2	17	8	4	7	15	157

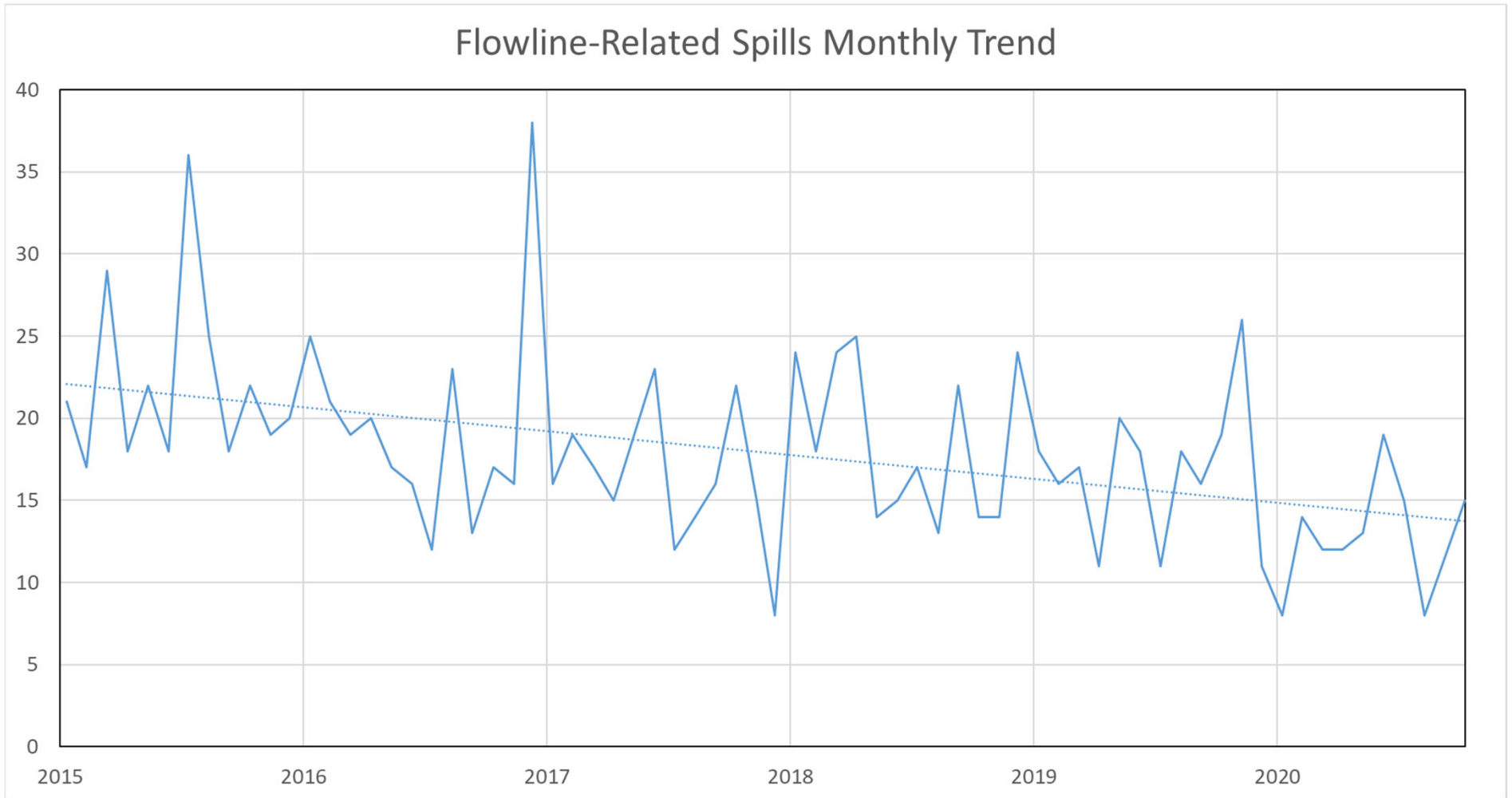


Root Causes of Flowline-Related Spills in Each Basin (2015-2020)

Basin	Corrosion	Equipment Failure	Excavation Damage	Incorrect Operation	Natural Force Damage	Other Outside Force	Pipe, Weld Joint Failure	Unknown	Grand Total
Denver (DJ) Basin	193	39	13	88	27	16	44	207	627
Douglas Creek Arch	24	3		4	3		4	22	60
Hugoton Embayment			1						1
Interbasin Area	3				2	1	2	2	10
Las Animas Arch	1						2		3
North Park Basin	5	1		4	4			7	21
Paradox Basin	3	2					1		6
Piceance Basin	125	28	1	36	16	4	7	75	292
Raton Basin	10	6		51	22	2	18	5	114
San Juan Basin	15	4	2	10	3	1	2	17	54
Sand Wash Basin	2	2			3			1	8
Grand Total	381	85	17	193	80	24	80	336	1196



Trend of the Number of Flowline-Related (2015-2020)



Outside Reporting



Colorado

TOP STORY

Oil, gas-related spills declined in Colorado, New Mexico, Wyoming last year, analysis says

By Derek Draplin | The Center Square | Mar 9, 2021

THE DAILY SENTINEL

Oil, gas spills down in state last year

By DENNIS WEBB Dennis.Webb@gjsentinel.com | Mar 13, 2021



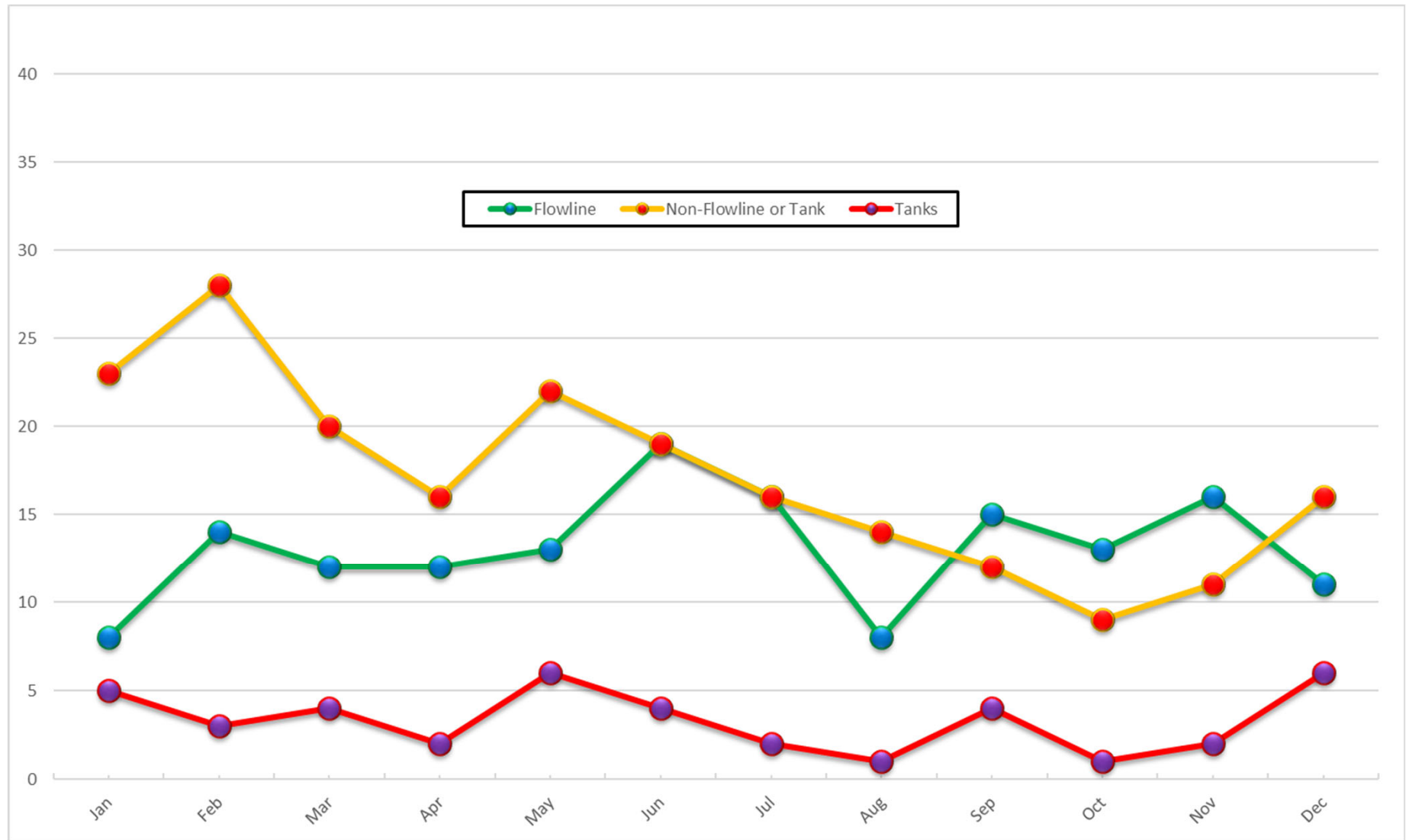
Reported oil and gas spills declined considerably last year in Colorado, state data shows.

Colorado Oil and Gas Conservation Commission data indicates companies reported 476 spills last year, down from 639 in 2019.

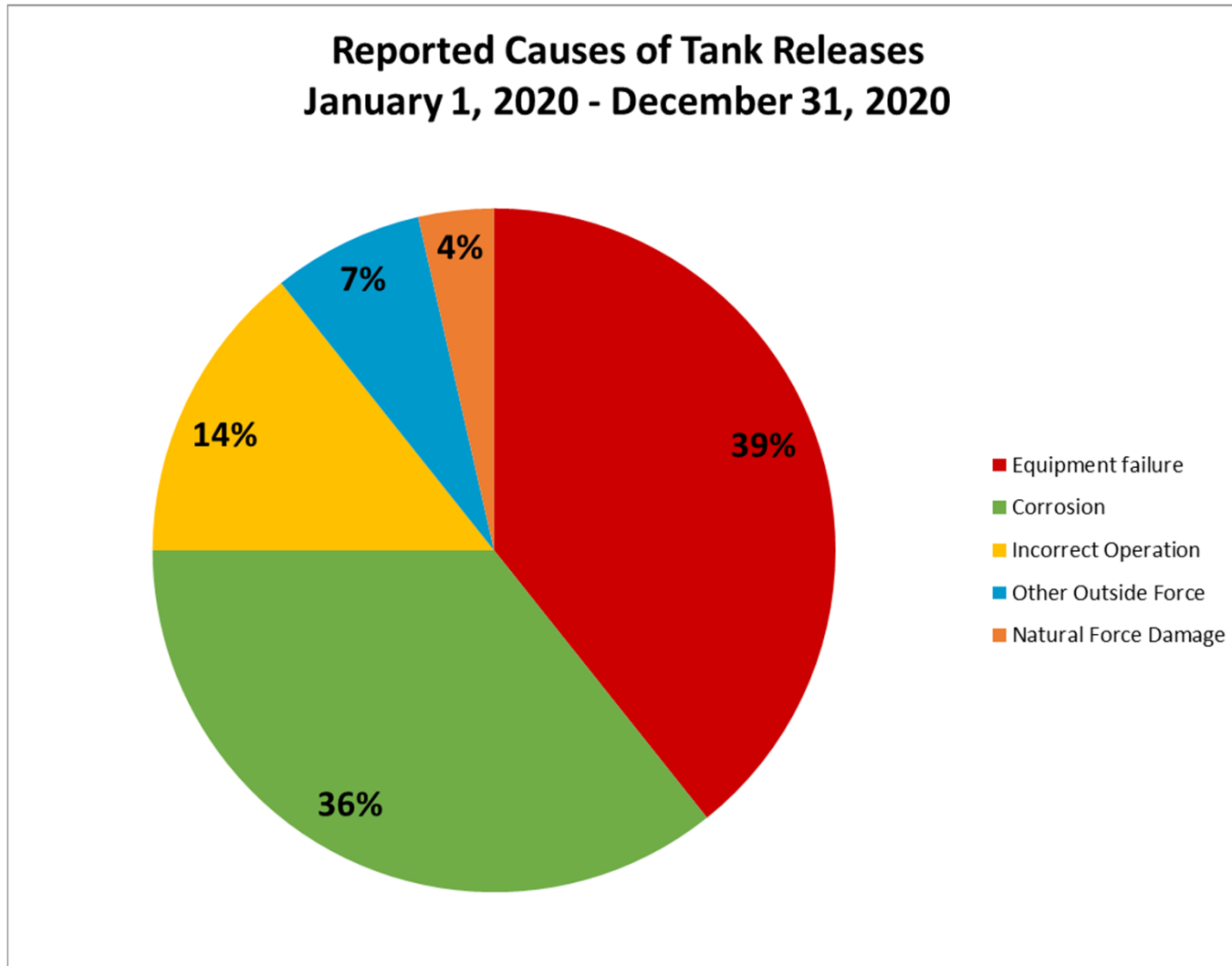


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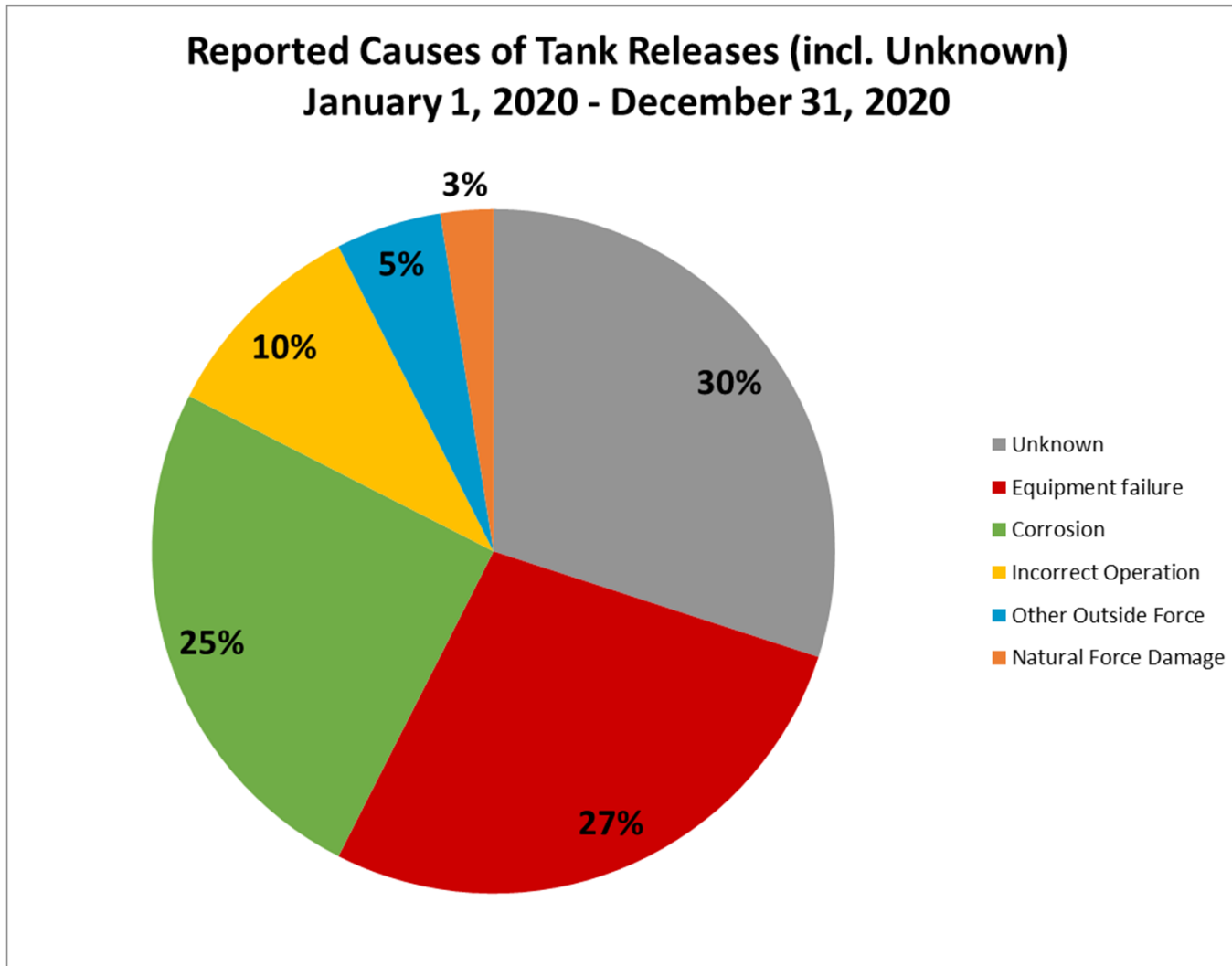
Trend of the Number of Flowline-related Spills vs. Tank-related vs Non-flowline/Non-tank Spills (2020)



2020 Tank Spill Root Causes



2020 Tank Spill Root Causes



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Fluid Type and Volumes (Flowlines)

- 2020 Reporting
 - 95/157 reported volumes correctly in the form 19
- Fluid Types

	Condensate	Oil	Other E&P Waste	Produced Water
Percent of reported	2%	16%	9%	73%
Avg (bbl)	12.5	132.2	193.0	121.1
Median (bbl)	12.5	14	200	7

- 48% (all fluids) less than 10 bbls
 - 62% are on-location for 2020





Questions?



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