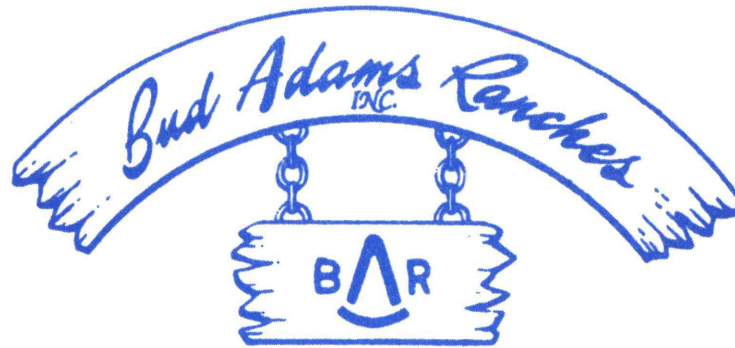


BAR I RANCH
Waller, Texas 77484



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Buchholts, Texas 76518

May 18, 2020

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300633

Ronald Batory, Administrator
Federal Railroad Administration
1200 New Jersey Ave, SE
Washington, D.C. 20590

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Office of Proceedings
May 18, 2020
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Public Record

Mr. Joseph McClelland
Director, Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Mr. Howard Elliott
Administrator, Pipeline and Hazardous Materials Safety Administration
Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Mr. Rickey James, Assistant Secretary of the Army for Civil Works
U.S. Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

Mr. Neil Chatterjee, Chairman
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Dear Gentlemen,

I believe both the public and the regulatory approach to Texas Central Railways' (TCR) proposed a high-speed railroad between Dallas and Houston stems from the premise that once a route for the train is mapped out the project can successfully be built. The current high-speed rail project in California should make it obvious this is a false assumption. TCR's project could result in disaster, waste billions of transportation dollars, and result in needless destruction of the environment. There is no excuse for the regulatory agencies charged with a responsibility to

protect both the environment and the safety of the citizens of Texas to proceed under this false assumption.

After participating in the May 6 public call for comments hosted by the Federal Railroad Administration (FRA), I believe the FRA and TCR have misled the public. The Draft Environmental Impact Statement (DEIS) for the Houston to Dallas High-Speed Rail (HSR) project assumes the energy companies will take responsibility for an independent environmental review of the challenges and hazards posed by the numerous pipelines TCR would impact. I learned on the May 6 call the FRA, without consulting with the FERC, The Texas Railroad Commission, or the Texas Public Utilities Commission to leave responsibility for the relocation of existing pipelines, abandonments, construction of new valve sites and additional cathodic protection units completely in control of TCR and numerous private energy companies. It is vital for the FRA to rely upon FERC to fulfill the regulatory obligation to review every aspect of the TCR project since the impact of the construction and operation of the HSR on pipelines was not assessed in the DEIS for the proposed HSR project. If the FRA issues rules governing the construction and operation as well as a final EIS on TCR's HSR the public will be denied its opportunity to be properly informed and to comment. The public has a right to know the magnitude of the changes required for the relocation or abandonment of existing pipelines which would require the acquisition of new right of way and relocation of homes and businesses. It is my understanding that some pipelines are operated under a blanket certificate which would allow them to relocate without additional environmental review. Given the number of pipelines crossed by the proposed HSR system, it is difficult to believe that all the pipelines are operated under blanket certificates.

The issues delineated above raise an important question. How can the United States Army Corps of Engineers (USACE) issue a Section 404 permit for a proposed HSR route without FERC having studied the impact on all the pipelines the route will cross?

By submitting this letter, I am petitioning FERC to review, evaluate, and list the impact of all pipeline crossings affected by the HSR route. I do not know if FERC has a formal process to do this. If FERC does not have an established procedure then this is a major regulatory deficiency since Texas Central High-Speed Rail is proposing to cross over 142 pipelines, as listed in the chart below.

During my lifetime there have been pipeline explosions that have caused significant property damage and loss of life. Attached to this letter is a February 21, 2020, news article from Fractracker Alliance which details the history of pipelines catching fire and exploding.

I have not found a consistent approach or a specific list of requirements that govern crossings over existing pipelines. Many pipeline companies have a very informal process to deal with crossings over their pipelines. It appears some pipelines only require a verbal or written notification that a crossing will take place. Others have an informal process where they require depth of cover separation, possibly an inspector on-site, and maybe a vague drawing that is not certified or reviewed by a registered surveyor and little else.

Does the FRA, FERC, or USACE know that in some pipeline crossings Texas Central is proposing to put a thirty 30 to 40-foot-tall by 100 to 200 foot wide berm of dirt on top of existing pipelines? On the top of the berm will be two sets of tracks, high voltage electrical lines, fiber, and access road traversing along the proposed tracks. In other areas, TCR is proposing an elevated structure ranging in height from 10 to 70 feet that will also contain two sets of tracks with high voltage electrical lines and fiber with an access road. None of these pipelines could possibly have been engineered with specifications to withstand the impact of all of this infrastructure! Yet on the public May 6 call, FRA representatives said problems caused by these pipeline crossing is not a concern of the FRA, nor is it an infrastructure issue the FRA should consider.

This proposed installation will have a dramatic effect on the safe operations of the impacted pipelines. The current pipelines were not constructed to withstand the added weight, vibration, and new consistent source of electricity and will require serious modifications, or, in some cases, complete replacement or relocations. Many of the older easements do not allow the pipeline companies to abandon the existing pipelines. Landowners are not being properly informed of their rights to have the abandoned pipelines removed from their property. The Pipeline and Hazardous Materials Safety Administration (PHMSA) issued new regulations that take effect in July 2020. Many of the identified pipelines have reached their end of life and will require replacement or abandonment. If a pipeline is abandoned this should require the involvement of FERC. Abandonment of a pipeline with a large diameter, under a major berm, could cause a depression in the soil which could result in a derailment of a train operating on the HSR system. Yet the FRA does not seem to recognize this as a safety concern?

TCR held several open house meetings where it stated that its proposed train project will have little to no impact on the pipeline systems it crosses. The DEIS may have contained data that grossly underestimated the vibration impact, the electro-magnetic impact, and electrical interference on existing infrastructure. To date, FERC and PHMSA have been omitted as contributing agencies to the safety of the HSR. It appears that TCR may be trying to eliminate any involvement or oversight by these agencies. TCR has stated at open house meetings they prefer the pipeline crossings to be handle in a separate process without independent environmental review processes. FERC's mission clearly requires it to step in and at least exercise oversight on each TCR impacted pipeline under its jurisdiction and subject to a FERC certificate.

Texas Central has zero experience in operating a train and absolutely zero experience in constructing a project of this magnitude. TCR has exhibited blatant ignorance and has refused to admit or address pipeline safety as a major concern.

FERC must also be involved because TCR is claiming its operations are interstate for several reasons. One reason for claiming to be an interstate railroad is that it will prevent any oversight of its project by the State of Texas or the Texas counties the HSR will impact. It is therefore critical that TCR submit for each pipeline company that will be impacted a full application with FERC which contains at a minimum the following information:

- Stakeholder list of impacted landowners, agencies, etc.;
- Third-party proof of Public Convenience and Necessity of proposed project impacting intrastate pipeline infrastructure that has a FERC Certificate. The pipeline/energy companies who are being required to relocate and interrupt services to suppliers and consumers had to prove Public Convenience and Necessity, TCR and its third-party contractors must notify impacting suppliers and consumers and provide proof their projects meet the same requirements and do not cause an undue financial burden on energy companies and consumers.;
- Detailed engineering drawings at each pipeline crossing to include above and below ground TCR installations.
- Valid vibration impact study extending two thousand (2,000) feet from the proposed centerline of the HSR system. DEIS did not assess vibration impact to pipelines, only residential and other buildings;
- Valid electro-magnetic interference impact extending two thousand (2,000) feet from the proposed centerline of the HSR system;
- Valid electrical interference impact study extending two thousand (2,000) feet from the proposed centerline of the HSR system since DEIS did not assess effects on pipelines;
- A statement summarizing the impact of installing 138kV electrical transmission line connections, TPSS substations, sectioning posts, sub-sectioning posts, autotransformer posts, and a 25kV 60 cycle overhead catenary system, crossing and parallel the pipelines
- Areas of disturbance which will require cathodic protection with defined rules as to replacement and maintenance of such;
- Areas of disturbance which will require new pipeline shut off valves;
- Defined rules for how often each pipeline must perform anomaly checks;
- An environmental review of the additional right of way required to relocate and strengthen impacted pipelines, (some of the impacted pipeline areas may have at one time been reviewed by FERC some as many as 30 plus years ago, therefore the areas of relocation impact may have significantly changed from the time most of these pipelines were initially constructed.);
- A full review of the current wall class and capacity of the impacted pipeline crossings since these will not be able to withstand the proposed HSR installation;

Other important items which need to be considered are as follows:

- The Houston to Dallas HSR DEIS did not assess the full area of impact required for relocation of pipelines so those areas that the pipeline companies would be impacting have no oversight. Some of these areas are impacting and abutting hazardous waste sites and impacting endangered and protected species.
- The use of pile drivers and other heavy construction equipment on, near and within 250 feet of impacted pipelines during construction will compromise the integrity of the pipelines both by the weight of heavy construction equipment and the constant pile driving for foundation supports for elevated portions of the tracks;
- Soil washout and run-off from the structures, which in some areas will range from 10 to 70 feet in the air, with no explanation of how rain run-off will be handled to prevent washout of soils above the pipelines;

- Some pipelines parallel the proposed HSR system and are within less than 5 feet to approximately 200 feet. Those impacted pipelines will surely sustain capacity issues that will require relocation outside of the approved and reviewed pipeline right of way. Some relocations are in heavily populated areas which require acquisition and removal of structures not accounted for in the DEIS;
- Required space for new cathodic protection in heavily populated areas will require acquisition and removal of structures not accounted for in the DEIS;
- Analysis of the impact on suppliers and consumers when the affected pipelines are shut down for modifications and relocations;
- The impact on prices to the consumers due to the shutting down of the pipeline system;
- Third-party foreign crossing entity to bear all cost associated with pipeline relocations and interruption of service and supply;
- Impacted hazardous waste sites in connection to the pipelines and the proposed HSR project. Some of which are Wortham State in Freestone County, TX at FM 27 E Mile East of Wortham, owner Chevron Pipeline, BP Pipelines North American Release Site
- The contingency plan to address remediation of accidental damage that might occur during oil/gas wells and pipeline relocation and requirements for remediation be conducted prior to the continuation of construction activities.

Below are statements in the DEIS for the Houston to Dallas High-Speed Rail project committing your agency to the environmental review and public involvement:

- “The utility provider will be responsible for managing and leading any environmental process requirements associated with the modifications to provide the connections to TCRR’s infrastructure.”
- “Utilities within the Study Area would be either realigned outside the restricted access areas of the HSR ROW or modified (e.g., encased in a pipe sturdy enough to withstand the weight of the HSR system and allow for maintenance access) to avoid conflict.”
- “FRA evaluated the Project’s impacts on underground water, wastewater, crude oil and natural gas pipelines, and communication service lines in Section 3.9, Utilities and Energy. Typically, impacts to utility resources that include the relocation or modification of existing above ground and below ground service lines or the introduction of new service line connections would be considered a direct impact; however, the actual location of these potential impacts cannot be reasonably determined by FRA at this time. These potential impacts would be evaluated, planned, and resolved by a utility provider(s) through separate environmental processes. Because this responsibility falls to the utility provider(s), and not TCRR or FRA, the utility providers would determine the exact location of the utility connection or relocation and its subsequent impacts. The potential direct impacts of the Project to transmission lines will not be evaluated, planned, and implemented through this EIS; therefore, only the potential indirect impacts are included in this assessment.”

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- The TPSS would provide the electric power to the trains and would be composed of the following components: 138kV electrical transmission line connections, TPSS substations, sectioning posts, sub- sectioning posts, autotransformer posts, and a 25kV 60 cycle overhead catenary system. Therefore, the energy (electricity) required for the propulsion of the HSR trains between Dallas and Houston is estimated at 248,200 MWh per year or 846,894 MMBTUs per year.
- The Houston to Dallas HSR will impact 53 vertical wells and 22 horizontal wells covering 4,490 feet. In Dallas County three thousand (3,000) feet of natural gas pipelines to be relocated. Other footages for relocations and abandonment has not been properly assessed nor notifications made to the impacted public.

The following companies and locations of crossings impacted by the Houston to Dallas HSR proposed project are as follows: ***Bold italic font represents pipelines that will parallel and crossing the proposed HSR project.***

Company	No. of Lines	Type	County
Amos Energy Corp	One	Natural Gas	Dallas
Gulf South Pipeline Company	One	Natural Gas	Dallas
Sunoco Pipeline LP	Two	Crude Oil	Ellis
Energy Transfer Company	Three	Natural Gas	Ellis
EMA USA Inc	One	Natural Gas	Ellis
Atmos Energy Corps	Three	Natural Gas	Ellis
Sunoco Pipeline LP	One	Crude Oil	Ellis
Energy Transfer Company	Three	Natural Gas	Ellis
EMS USA INC	One	Natural Gas	Ellis
Atoms Energy Corps	Three	Natural Gas	Ellis
Sunoco Pipeline LP	One	Crude Oil	Navarro
Magellan Pipeline Company	One	Unknown	Navarro
Magellan Pipeline Company	One	Gasoline/Jet Fuel	Navarro
Enbridge Pipelines	One	Natural Gas	Navarro
ONEOK Arbuckle Pipeline LLC	One	Natural Gas Liquids	Navarro
Energy Transfer Company	One	Natural Gas Liquids	Navarro
Sunoco Pipeline LP	One	Crude Oil	Navarro
Magellan Pipeline Company	One	Unknown	Navarro
Magellan Pipeline Company	One	Gas/Jet Fuel	Navarro
ONEOK Arbuckle Pipeline LLC	One	Natural Gas	Navarro
Energy Transfer Company	One	Natural Gas Liquids	Navarro
Sunoco Pipeline LLC	One	Crude Oil	Navarro
Magellan Pipeline Company	One	Unknown	Navarro

Magellan Pipeline Company	One	Gasoline/Jet Fuel	Navarro
Enbridge Pipeline	One	Natural Gas	Navarro
Energy Transfer Company	One	Natural Gas Liquids	Navarro
Enterprise Crude Pipeline	Four	Crude Oil	Navarro
Enterprise Crude Oil	Four	Crude Oil	Navarro
Trend Gathering & Treating LLC	Two	Natural Gas	Limestone
Enbridge Pipelines	One	Natural Gas	Limestone
Enterprise Crude Pipeline LLC	Six	Crude Oil	Freestone
Sunoco Pipeline LLC	Two	Crude Oil	Freestone
Magellan Pipeline Company	One	Gasoline/Jet Fuel	Freestone
ONEOK NGL Pipeline LLC	One	Liquefied Petro Gas	Freestone
Anadarko Gathering Company	Two	Natural Gas	Freestone
Atmos Pipeline	Two	Natural Gas	Freestone
Enbridge Pipeline	four	Natural Gas	Freestone
Energy Transfer Company	Two	Natural Gas	Freestone
Linn Operating inc	One	Natural Gas	Freestone
Pinnacle Gas Treating LLC	One	Natural Gas	Freestone
Trend Gathering & Treating LLC	One	Natural Gas	Freestone
ONEOK Arbuckle Pipeline LLC	One	Natural Gas Liquids	Freestone
Sunoco Pipeline LP	Three	Crude Oil	Freestone
ONEOK NGL Pipeline LLC	One	Liquefied Petro Gas	Freestone
Atmos Pipeline	One	Natural Gas	Freestone
Energy Transfer Company	One	Natural Gas	Freestone
DCP Midstream LP	One	Natural Gas	Freestone
Magellan Pipeline Company LP	One	Gasoline/Jet Fuel	Leon
Enbridge Pipelines LP	One	Natural Gas	Leon
Energy Transfer Company	One	Natural Gas	Leon
DCP Midstream LP	One	Natural Gas Liquids	Leon
Enbridge Pipelines LP	Three	Natural Gas	Leon
Trend Gathering & Treating LLC	Two	Natural Gas	Leon
Energy Transfer Company	One	Natural Gas	Leon
Atmos Pipeline	One	Natural Gas	Madison
Atmos Pipeline	One	Natural Gas	Madison
Whiteside Property	Two	Natural Gas*	Madison
Enterprise Pipelines LP	One	Crude Oil	Grimes
Magellan Pipeline Company	One	Crude Oil	Grimes
Energy Transfer Company	Two	Natural Gas	Grimes
Kinder Morgan Texas Pipeline LLC	Two	Natural Gas	Grimes
Copano Gulf Coast LLC	Two	Natural Gas	Grimes
Sunoco Pipeline	One	Refined	Grimes
Enterprise Products Operating LLC	Two	Y-Grade Products	Grimes

Blackhawk Pipeline LP	One	Crude Oil	Waller
Texas Eastern Transmission LP	One	Natural Gas	Waller
Enterprise Crude Pipeline LLC	One	Crude Oil	Harris
Magellan Pipeline Company LP	Two	Crude Oil	Harris
Genesis Pipeline Texas LP	One	Crude Oil	Harris
Netco Pipeline	One	Natural Gas	Harris
Kinder Morgan Texas Pipeline	Two	Natural Gas*	Harris
Atmos	Two	Natural Gas	Harris
Transcontinental Gas PL CO LLC	Two	Natural Gas	Harris
Houston Pipeline Company LP	Two	Natural Gas*	Harris
Natural GAs Pipeline Co	Two	Natural Gas	Harris
Gulf South Pipeline Company	One	Natural Gas	Harris
Tennessee Gas Pipeline Co	Two	Natural Gas	Harris
Trunkline Gas Company LLC	One	Natural Gas	Harris
Southcross Gulf Coast Trans Ltd	One	Natural Gas	Harris
Enterprise Products Operating LLC	One	Natural Gas Liquids	Harris

Please let me know if additional information is needed.

Sincerely,



William R. Scofield
President

Attachment

CC: All Parties of Record

Pipelines Continue to Catch Fire and Explode

February 21, 2020 by Matt Kelso, BA

For the past decade, petroleum operators in the United States have been busy pumping record amounts of oil and gas from the ground. But has the pace been too frenzied? Since the vast majority of the oil and gas is not used *in situ*, the industry must transport these hydrocarbon products to other locations. The principal way of achieving this is through pipelines, a process which has resulted in thousands of incidents, causing hundreds of injuries and fatalities, thousands of evacuations, and billions of dollars' worth of damage.

The United States has an estimated 3 million miles of hazardous liquid, gas distribution, and gathering and transmission pipelines in operation, and more are being built every day. Not only have the pipelines themselves become so ubiquitous that most people never give them a second thought, the incidents themselves have become so familiar to us that even severe ones struggle to gain any attention outside of the local media area.

In 2019, there were 614 reported pipeline incidents in the United States, resulting in the death of 10 people, injuries to another 35, and about \$259 million in damages. As mentioned below, some of these totals are likely to creep upward as additional reports are filed. In terms of statistical fluctuations, 2019 was slightly better than normal, but of course statistics only tell a part of the story. Friends and family of the ten people that died last year would find no comfort knowing that there were fewer such casualties than 2017, for example. Similarly, it would be useless to comfort a family that lost their home by reminding them that someone lost an even bigger and more expensive home the year before.

Keeping in mind the human impact, let's take a look at the data.

Pipeline Incident Summary

These incidents are broken into three separate reports:

1. Hazardous Liquids (including crude oil, refined petroleum products, and natural gas liquids).
2. Gas Distribution (lines that take gas to residents and other consumers), and
3. Gas Transmission & Gathering (collectively bringing gas from well sites to processing facilities and distant markets)

Table 1: Summary of pipeline incidents from 1/1/2010 through 12/31/2019

Report	Incidents	Fatalities	Injuries	Evacuees	Damages (\$)	Fires	Explosions
Hazardous Liquids Lines	3,978	10	26	2,482	2,812,391,218	130	15
Gas Transmission & Gathering Lines	1,226	25	108	12,984	1,315,162,976	133	57
Gas Distribution	1,094	105	522	20,526	1,229,189,997	659	257
Totals	6,298	140	656	35,992	5,356,744,191	922	329

But is increasing the capacity of the pipes a good idea? As FracTracker has shown in the past, pipeline incidents occur at a rate of about 1.7 per day incidents per day. This holds true with updated data, showing 6,298 incidents from January 1, 2010 through December 17, 2019, which was the latest report filed when the data was downloaded in early February 2020.

Pipeline Usage in the United States

In 2018, roughly three million miles of natural gas pipelines transported almost 28 trillion cubic feet (Tcf) of gas, which is roughly 13 times the volume of Mount Everest. For liquids, pipeline data is available showing shipments of from one region of the country (known as a PAD District) to another, which shows that 1.27 billion barrels of crude oil were shipped through almost 81,000 miles of pipelines in 2018, and 3.39 billion barrels through nearly 214,000 miles of pipes when counting natural gas liquids and refined petroleum products.

Note that these figures are less than 2018 estimates based on 70% of liquid petroleum products being moved by pipeline. This discrepancy could be accounted for by the dramatic increase in production in recent years, or perhaps by intra-PAD shipments not listed in the data above. For example, petroleum produced in the Permian Basin in western Texas and eastern New Mexico may travel nearly 500 miles by pipeline en route to export terminals on the Gulf coast, while remaining in the same PAD District. If the 70% estimate holds true, then roughly 2.8 billion barrels (117 billion gallons) of crude would be shipped by pipeline, more than twice as much as the 1.27-billion-barrel figure shown above.

The drilling boom in the United States was quickly followed by a boom in pipeline construction. Total mileage for liquid pipelines – known as hazardous liquid lines – increased by 20% from 2010 to 2018. For those aware of thousands of miles of recent gas pipeline projects, it is confusing to hear that the data from the Pipeline and Hazardous Materials Safety Administration (PHMSA) are mixed for natural gas. It does show a 2.4% increase in total miles for gas distribution mainlines to 1.3 million miles, and a 2.0% increase over the same time in distribution service lines, which run from the mainlines to the consumer. However, the total mileage for transmission lines – which are large diameter pipes that move gas long distances – actually contracted 2.1% to just under 302,000 miles. Total mileage for gathering lines fell even more, by 8.4% to just under 18,000 miles. However, since PHMSA estimates only 5% of gathering lines report to the agency, this last figure is probably not a valid estimate.

If this data is accurate, it means that the thousands of miles of transmission and gathering lines built in recent years were more than offset by decommissioned routes. However, given the record production levels mentioned above, it is almost certain that total capacity of the system has gone up, which can be accomplished through a combination of increased pressure and diameter of the pipe.

Hazardous Liquids

Incident Impact Summary - Table 2

Age of Pipelines - Histogram

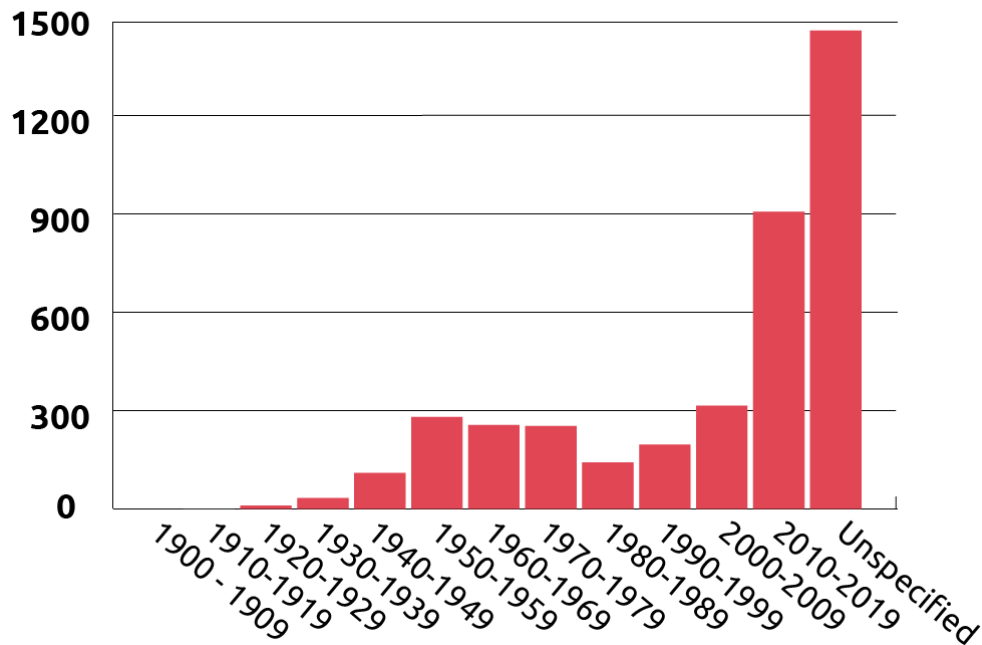
Cause of Incidents - Pie Chart

Table. 2. Hazardous Liquid Pipeline Incident Impact Summary. Data from PHMSA.

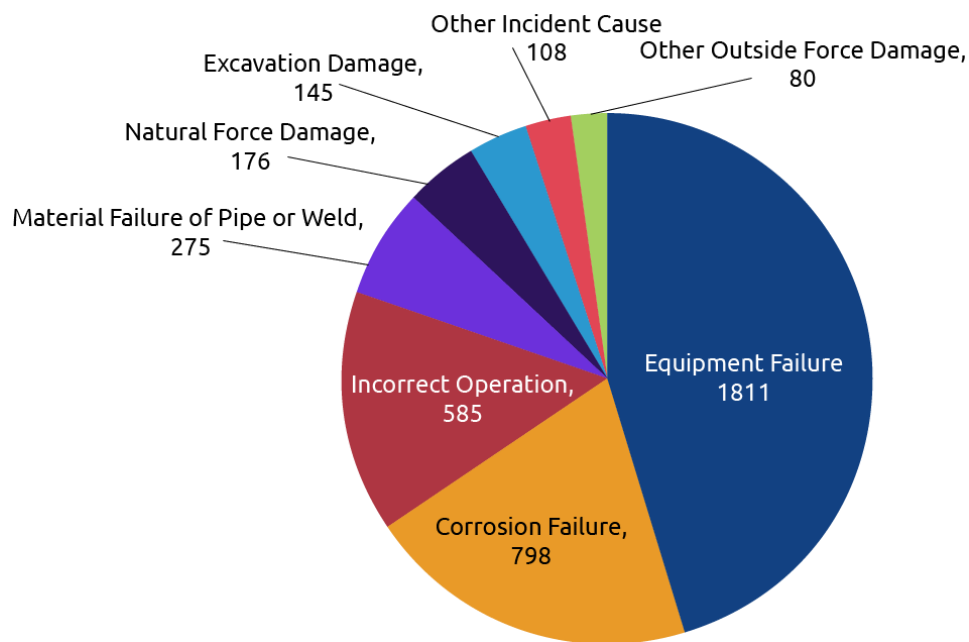
Year	Incidents	Fatalities	Injuries	Evacuees	Damages (\$)	Fires	Explosions
2010	350	1	3	686	1,075,193,990	8	1
2011	344	0	1	201	273,526,547	9	2
2012	366	3	4	235	145,477,426	10	2
2013	401	1	6	858	278,525,540	15	2
2014	455	0	0	34	140,211,610	20	4
2015	460	1	0	138	256,251,180	16	1
2016	420	3	9	104	212,944,094	17	2
2017	415	1	1	58	163,118,772	7	0
2018	405	0	2	165	152,573,682	15	1
2019	362	0	0	3	114,568,377	13	0
Grand Total	3978	10	26	2482	2,812,391,218	130	15

Hazardous Liquid Line Incidents from Jan. 2010 to Jan. 2020

Arranged by Year of Pipe Installation



Cause of Hazardous Line Liquid Incidents 2010 - 2019



The most important statistics when considering pipeline incidents are those representing bodily harm – injuries and fatalities. In those respects, at least, 2019 was a good year for hazardous liquid pipelines, with no reported injuries or fatalities. Most of the other metrics were below average as well, including 362

total incidents, three evacuees, \$115 million in damages, and zero explosions. The 13 reported fires represents a typical year. However, we should keep in mind that the results may not be complete for 2019. The data was downloaded on February 3, 2020, but represented the January 2020 update of the dataset. Additionally, there is [often a gap](#) between the incident date and the reporting date, which is sometimes measured in months.

One thing that really sticks out about hazardous liquid pipelines is that the pipelines that fail the most often are the newest. Of the hazardous liquid incidents since 2010, 906 occurred in pipelines that were installed within the decade. By means of comparison, the same amount of incidents occurred in the same period for pipes installed in the 40 years between 1970 and 2009. Of course, the largest category is “Unspecified,” where the install year of the pipeline was left blank in 1,459 of the 3,978 total incidents (37%).

The causes of the incidents are dominated by equipment failure, where the 1,811 incidents accounted for 46% of the total. The next highest total was corrosion failure with 798 incidents, or 20% of the total. Six of the incidents in the “Other Outside Force Damage” are attributed to intentional damage, representing 0.15% of the total.

Gas Transmission & Gathering

Incident Impact Summary - Table 3

Age of Pipelines - Histogram

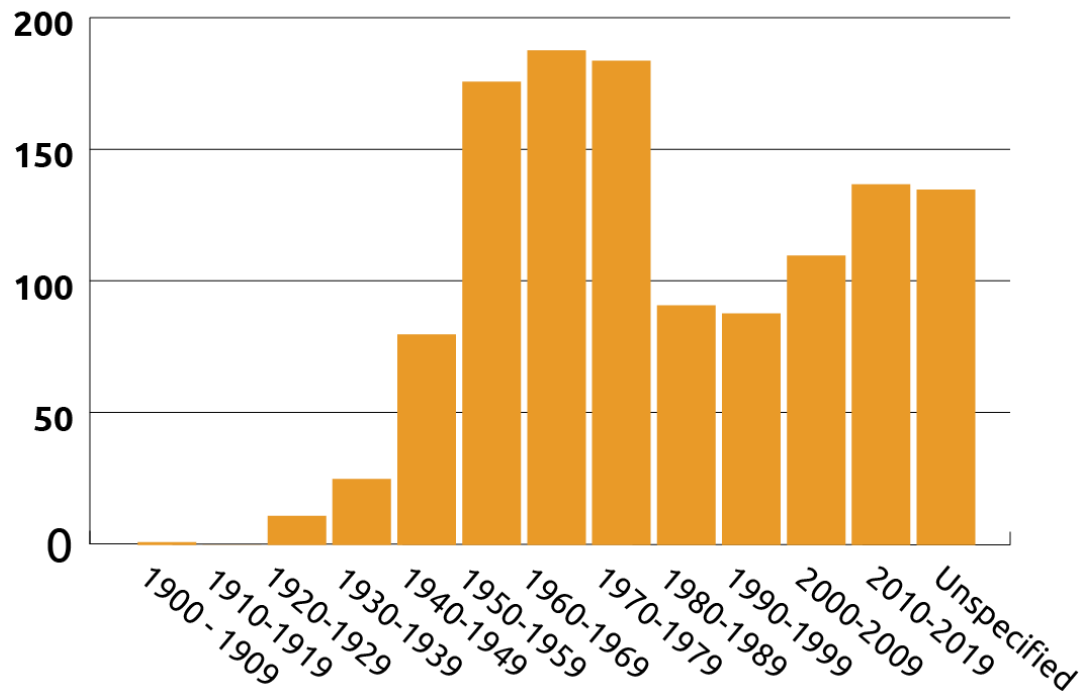
Cause of Incidents - Pie Chart

Table. 3. Gas Transmission and Gathering Pipeline Incident Impact Summary. Data from PHMSA.

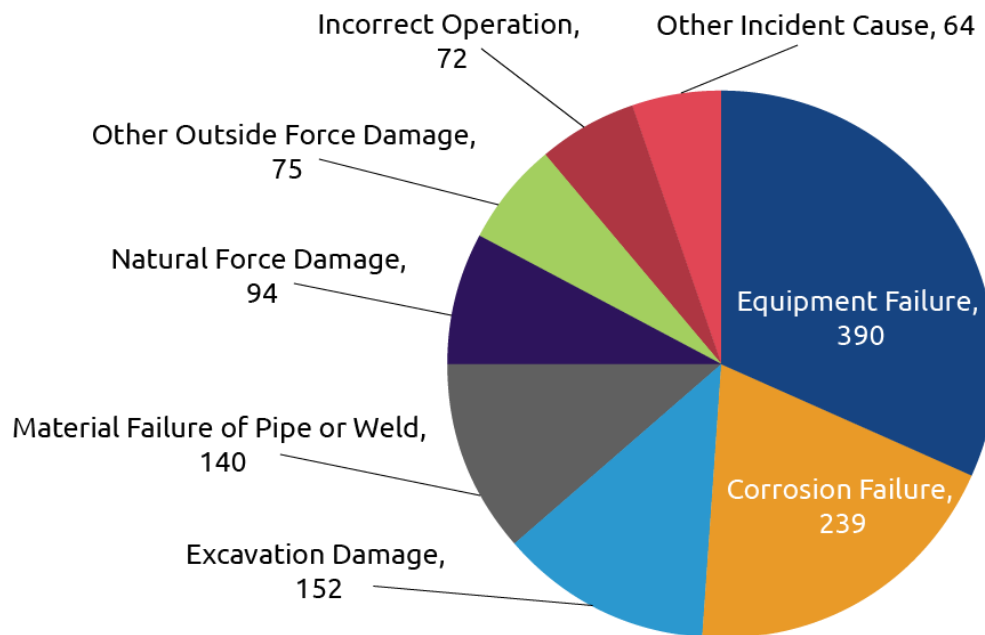
Year	Incidents	Fatalities	Injuries	Evacuees	Damages (\$)	Fires	Explosions
2010	116	10	61	373	596,151,925	19	7
2011	128	0	1	874	125,497,792	14	6
2012	116	0	7	904	58,798,676	15	7
2013	112	0	2	3,103	53,022,396	11	4
2014	142	1	1	1,482	61,533,154	15	6
2015	149	6	16	565	61,498,753	10	6
2016	97	3	3	944	107,524,564	8	4
2017	126	3	3	202	85,665,233	17	7
2018	118	1	7	4,088	77,753,611	17	6
2019	122	1	7	449	87,716,872	7	4
Grand Total	1,226	25	108	12,984	1,315,162,976	133	57

Gas Transmission and Gathering Line Incidents from Jan. 2010 - Jan. 2020

Arranged by Year of Pipe Installation



Cause of Gas Transmission and Gathering Line Incidents: 2010 - 2019



One person died and seven were injured from gas transmission and gathering line accidents that were reported to PHMSA in 2019, which were both below average for this dataset. The total number of incidents was typical, while the 499 evacuees, \$88 million in property damage, seven fires, and four explosions were all below normal. Note that only a small fraction of the nation's gathering lines are required to report incident data to PHMSA, so this data should not be seen as comprehensive. And as with the hazardous liquid incidents, it is likely that not all incidents occurring during the year have had reports filed in time for this analysis.

The distribution of the age of pipes that failed within the past decade is different from the hazardous liquid pipelines. Pipes installed in the 1950s, 1960s, and 1970s were the most likely to fail, although failures in routes built this century represent a secondary peak. The number of incidents where the age of pipe data field was not completed remains high at 135 incidents, but the data gap is not as outrageous as it is for hazardous liquid lines.

Once again, equipment failure is the most common cause of transmission and gathering line accidents, with 390 incidents accounting for 32% of the total. Corrosion failure was the second most common reason, with 239 incidents accounting for an additional 19%. One incident was attributed to intentional damage, accounting for 0.08% of the total.

Gas Distribution

Incident Impact Summary - Table 4

Age of Pipelines - Histogram

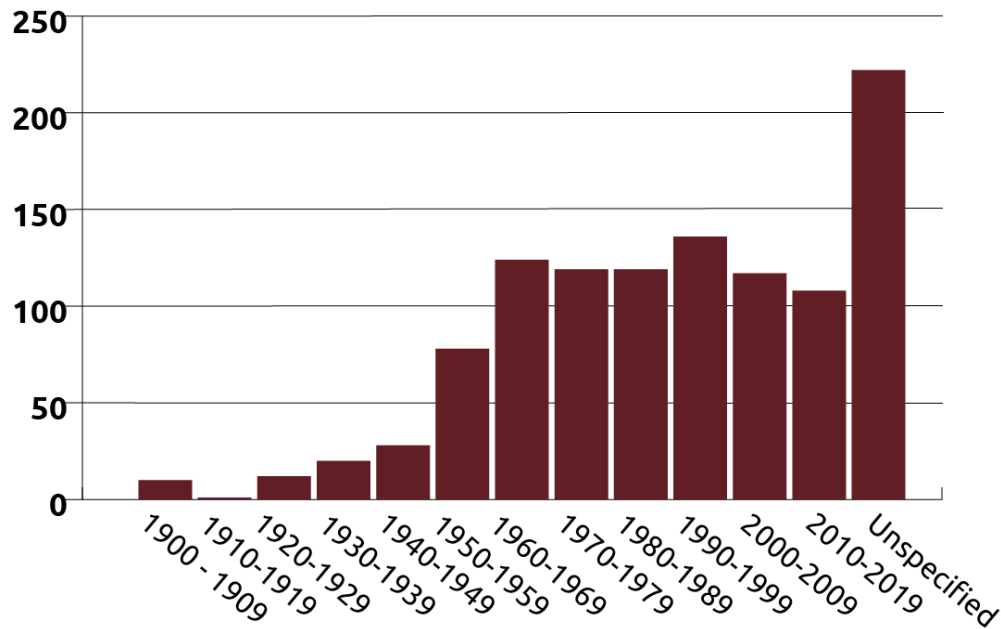
Cause of Incidents - Pie Chart

Year	Incidents	Fatalities	Injuries	Evacuees	Damages (\$)	Fires	Explosions
2010	120	11	44	2,080	21,155,972	82	29
2011	116	13	53	4,417	27,105,022	73	32
2012	88	9	46	746	25,556,562	61	22
2013	104	8	36	1,606	37,363,960	59	20
2014	106	18	93	2,037	72,885,067	61	30
2015	101	4	32	948	32,176,608	65	24
2016	115	10	75	2,510	56,900,068	71	28
2017	104	16	34	1,960	72,226,380	57	17
2018	110	7	81	2,561	827,647,610	64	31
2019	130	9	28	1,661	56,172,748	66	24
Grand Total	1,094	105	522	20,526	1,229,189,997	659	257

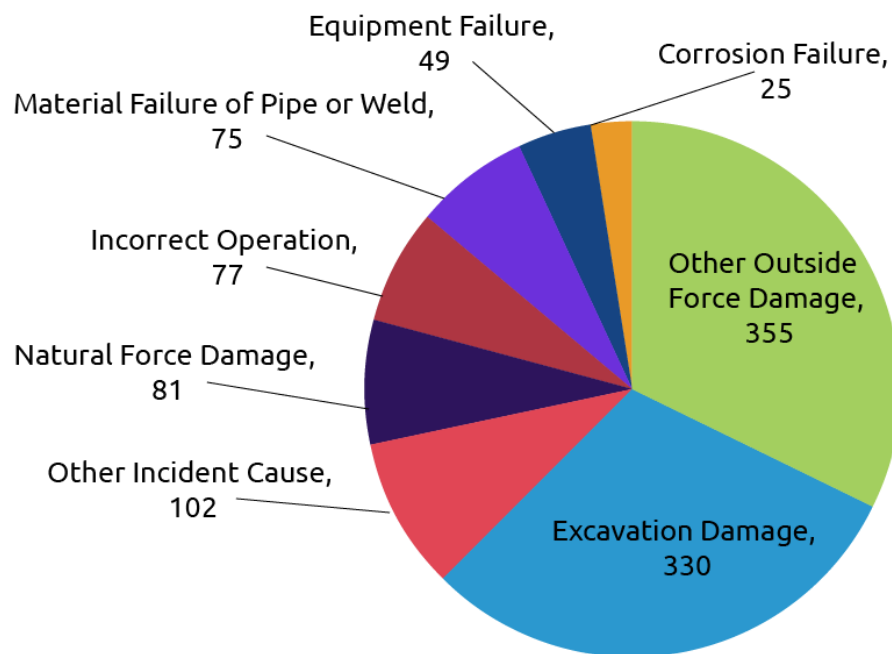
Table 4. Gas Distribution Pipeline Incident Impact Summary. Data from PHMSA.

Gas Distribution Line Incidents from Jan. 2010 - Jan. 2020

Arranged by Year of Pipe Installation



Cause of Gas Distribution Line Incidents: 2010 - 2019



The nine fatalities and 28 injuries reported for gas distribution lines in 2019 were obviously tragic, but these totals are both below what would be expected in a typical year. The 130 incidents and 66 fires were both above average totals, while the 1,661 evacuees, \$56 million in property damage, and 24 explosions

were all below average. As with the other reports, these totals are subject to change as additional reports are filed.

The distribution for the age of pipes that failed during the past decade is more like a normal (or bell curve) distribution than the other two datasets, with the most incidents occurring in pipeline routes laid in the 1990s. Much like the hazardous liquids dataset, however, the largest category is “Unspecified”, where the age of the pipe was not entered into the data for one reason or another. These 222 incidents account for 20% of the total, and if we had this data, the distribution could be significantly different.

The causes of distribution line incidents are attributed very differently than either the hazardous liquids or transmission and gathering line datasets. The leading cause is “Other Outside Force Damage,” with 355 incidents accounting for 32% of the total, followed by 330 “Excavation Damage” incidents accounting for an additional 30%. This difference could well be explained because this type of line tends to occur in highly populated areas. The largest subtype for the outside force damage category is damage by motor vehicles not involved in excavation, with 160 incidents, followed by fires or explosions which the operator claims did not originate with the pipeline, with 78 incidents. Intentional damage remains rare – although still way too high – with 15 incidents, or 1.4% of the overall total.

Data Notes

PHMSA incident data is ultimately self-reported by the various operators. Because the vast majority of gathering lines do not report to the agency, this dataset should not be seen as comprehensive for incidents in that category.

There were eleven issues with faulty location data that we were able to correct for this map. There are likely to be more, as only the ones with coordinates rendering outside of the United States were identified. Some of these had mixed up latitude and longitude values, or omitted the negative value for longitude, placing the points in Kyrgyzstan, the Himalayas, and Mongolia. One record had no coordinates at all, but included a detailed description of the location, which was then found on Google Maps. Two wells that rendered in Canada were on the correct longitude for the county that they belonged in, but had faulty latitude values. One of these was reduced by exactly 20° of latitude, while the other was reduced by exactly 7° of latitude, and were then located in the proper county. Other than the adjustments for these eleven incidents, all location data reflects the data available on the PHMSA .

Additional Leaks

The data above reflects 6,298 incidents over the course of a decade, with a few more incidents likely to trickle in during the next few updates of the reports by PHMSA. And while these discrete incidents account for the majority of human impacts in terms of life and well-being, it is worth noting that these 1.7 incidents per day are not the only problems that occur along millions of miles of pipelines in this country.

William Limpert has analyzed information about pipeline leakage in gas transmission lines, which found that 0.35% of the volume of gas was lost in transmission, one tenth of which was vented or flared intentionally, for example in compressor station blowdown events. This means that 0.315% of the gas is released unintentionally.

These numbers sound tiny, but due to the enormous volume of gas transported in pipes, they really add up quickly. For example, the Atlantic Coast Pipeline, Mr. Limpert's primary focus, is scheduled to transmit 1.5 billion cubic feet (Bcf) of natural gas per day. At a typical rate of failure, we could expect leakage of 4.725 million cubic feet (MMcf) per day, or 1.725 billion cubic feet over the course of a year. That's enough gas to provide to all Pennsylvania residential consumers for about 13 days in August, and this is just from one pipeline.

As mentioned above, the entire pipeline network moved about 28 Tcf in 2018. The estimated amount leaked at 0.315% is 88.2 Bcf. What would residential consumers pay for that volume of gas? Even with the current low prices due to the gas glut, the average residual price was \$9.43 per Mcf in November 2019, the most recent data available. That means that residential consumers would pay roughly \$832 million for an equivalent amount of gas.

Still More Leaks

There are also countless leaks that occur during the construction of the pipelines themselves. When pipelines are built, they have numerous obstacles to navigate during their construction. Among the most challenging are linear obstacles, such as roads and streams. A method that the industry regularly uses to avoid having to trench through these features is horizontal directional drilling (HDD).

While HDDs are meant to minimize impacts, they very frequently result in an incident known as an "inadvertent return," when volumes of drilling mud return to the surface through a series of underground voids, frequently karst geology or abandoned mines. The leaking borehole under the road or stream then leaks drilling mud – sometimes thousands of gallons of it – which can then affect aquatic stream life. Additionally, these areas represent voids in the matrix that is intended to keep the pipeline stable and may represent future opportunities for catastrophic failure.

These features are so prevalent in some parts of the country that pipeline operators seem to be unable to avoid them, and regulators seem unwilling to press the issue in a proactive fashion. For example, Energy Transfers' Mariner East II pipeline is currently being built to move natural gas liquids from Appalachia to its industrial complex and export terminal at Marcus Hook, Pennsylvania. During construction, there have been hundreds of inadvertent returns, both to the soil and waters of the Commonwealth. The presence of karst and abandoned mines along the route were well known ahead of time to the operator designing and implementing the HDDs, as well as the regulators who approved their use.

The many issues along the Mariner East II route, when combined with a massive pipeline explosion in Beaver County led to Pennsylvania's decision to temporarily block all permit actions by the operator statewide. That hold is now lifted, leading residents along the route worried about a new batch of inadvertent returns, related sinkholes, and other follies as the project is completed. Construction activities for the parallel Mariner East 2X pipeline are already underway.

While residents along the Mariner East pipeline system have seen more than their fair share of impacts from the construction, these impacts are not at all rare or unusual. What is unusual, however, is for regulators to provide data highlighting these types of errors. In Pennsylvania, enough people requesting data on a variety of problematic pipelines has prompted the Department of Environmental Protection to create a Pennsylvania Pipeline Portal page. This only includes information on recent major pipeline projects and is not comprehensive in terms of content, but it is a major step in the right direction in terms of data transparency.

Can We Do Better?

Statistics can never capture the full force of tragedies. Most of us are aware of this point intellectually, and yet when we are confronted with such numbers, it seems that we are obliged to process them in one form or another. Perhaps the most common way is to compartmentalize it, where we might acknowledge the data and misfortune that they represent, but then file it away in the messy cabinet of our mind, clearing the slate of active thought for the next bit of information. Many of us never stop to question whether we can do better.

So, can we do better with pipelines? Perhaps so. If there are structural hazards such as abandoned mines or karst, perhaps regulators could demand that the operator route around them. If there are residents nearby, communities should demand that the pipeline get rerouted as well. Of course, these reroutes will just push the impacts elsewhere, but hopefully to an area where people won't be affected by them, if such a place exists. Certainly, there could be better standards for construction and identification, so that there are fewer accidents involving pipelines. Or better yet, we could transition to renewable fuels for an ever-increasing share of our energy needs, making dirty and dangerous pipelines a relic of the past.

The one thing that we can no longer afford to do is continue to stick our fingers in our ears and dismiss the entire issue of pipeline safety as manageable or the cost of doing business.

By Matt Kelso, Manager of Data and Technology, FracTracker Alliance

Feature image at top of page shows San Bruno, California, following the 2010 pipeline explosion

<https://www.fracktracker.org/2020/02/pipelines-continue-to-catch-fire-and-explode/>