

Pipeline Incidents Without Fire or Explosion

“Is This a Drill or Is This a Joke?”

Introduction This is a write-up of incidents without fire/explosion (f/e) since 1975 in pipelines conveying crude oil or refined products in the USA. (A companion piece is about incidents in those pipelines that did involve fire/explosion.) Like the companion piece, it is meant as a resource in commenting during the scoping process on the Pilgrim Pipeline and in later stages of SEQRA. The main use of the data here is to guide searchers to examples. Riverkeeper has an excellent [presentation](#) of some of the most important incidents.

This paper addresses thirty-two significant petro-pipeline incidents without fire/explosion. The most recent one is from Oct 21 2016. The title comes from a question asked of Dakota rancher when he called Transcanada on May 7 2011 to report a gusher of crude coming out of the [Ludden Pump Station](#) .

Since spills without fire are much more frequent than those with fire/explosion, this compilation is limited to recent years (1996-2016) and is not all-inclusive even for that epoch. Using the remarkable databases in Wikipedia for “significant” (per [PHMSA web site](#)) incidents in all types of pipelines USA [1975-1999](#) and [2000-2016](#) and [Canada](#) I selected incidents not involving explosions that illustrated a variety of problems in structural integrity and operational issues in pipelines transporting crude oil or refined products, viz. gasoline, distillates, kerosene, jet fuel, diesel fuel, aviation fuel. “Distillates” covers heating oil and “fuel oil.” I omitted HVLs (highly volatile liquids) such as propane, ethane, and butane. It is extremely unlikely that either of the Pilgrim pipelines would ever be dedicated to HVLs, which move only in dedicated lines. Incidents that started inside a refinery or terminal or on a rig were not counted.

In the data below, the source of locations and dates is Wikipedia, referred to above. In some cases the location name location is changed. Stephen Shafer is responsible for data in the columns for pipeline name, type of commodity, spill volume, water impact and cause.

A very important teaching-event spill from before 1996 that deserves mention for its nearness to the route of the proposed Pilgrim Pipelines was one of [567,000](#) gallons of # 2 heating oil into the Arthur Kill on Jan 1 1990. This issued from the underwater segment of a 6.7 mile pipeline between the Bayway Refinery in Linden NJ (then owned by Exxon) and Exxon's Bayonne terminal (now IMTT Bayonne). The leak was ascribed to a "fatigue crack" developing from a dent sustained earlier, date and cause unknown. Damage was made worse because an operator thought alarm signals were false for six hours.

When reviewing significant incidents bear in mind that leaks too small to be "significant" (i.e. less than 2200 gallons = 50 bbl) are very common but not reported. The AP discovered that [291](#) such leaks occurred in two years in Keystone. For a graphic story on how pipelines are roughed up in transport and construction click [here](#). Leak detection is lamentable. Click [here](#)

Using what reports could be found without days of research the thirty-two events (1996 into 2016) were categorized as below, assigning two causes in some cases. Note that someone else reading the same reports might assign causes differently.

- 1 External force applied very recently (< 1 week say) e.g. cultivator hits pipe, dredge hits pipe, electrical arcing holes pipe, derailed train, forceful water flow around pipe
- 2 External force applied more remotely in time, e.g. long-ago damage by heavy machinery
- 3 Damage in transport or construction (fatigue cracks, small dents)
- 4 Acute rupture not explained in reports I found
- 5 Chronic deterioration
- 6 Failure of weld e.g. seam, girth, sleeve
- 7 Sleeve failure
- 8 Corrosion external or internal see also 5
- 9 Operator error (e.g. discounting readouts of falling pressure)
- U I could not even make a guess using reports found readily

The Data

Location	state	Pipeline name	date	type	spill vol 1000gals	into water?	cause
Coalinga	CA	Chevron	1/9/1996	crude	200	no	1
Gramercy	LA	Marathon	5/23/1996	gasoline	475	Blind R	2, 9
Fork Shoals	SC	Colonial	6/26/1996	fuel oil	957	Reedy River	5
Bear Cr	GA	Colonial	8/30/1997	gasoline	19	Yes	9
Darling Creek	LA	Colonial	12/15/1997	gasoline	420	yes	5
S. Bernard Cty	CA	Plains All Americ	12/13/1997	crude	541	no	2,8
Knoxville	TN	Colonial	2/9/1999	fuel oil	53	Tennessee R	4,9
Victor	TX	TEPPCO	11/27/2001	jet fuel	16	Neches R	8
Cohasset	MN	Enbridge	7/4/2002	crude	252	marsh	3
Odessa	SK	Enbridge 2	9/29/2009	crude	46		3
Salt Lake City	UT	Chevron	6/12/2010	crude	33	Red Butte Cr	2
Marshall	MI	Enbridge 6B	7/25/2010	dilbit	843	Kalamaz R	10
Lockport	IL	Enbridge 6A	9/9/2010	crude	270	no	2
Peace River	AB	Plains Midstream	4/15/2011	crude	1176	not moving	U
Laurel	MT	Silvertip	7/1/2011	crude	63	YellowSt R	1
Sundre	AB	Plains Midstream	6/7/2012	crude	100	Red Deer R	1,6
Ogden	UT	Chevron	3/18/2013	diesel	25	no	4
Mayflower	AR	Pegasus	3/29/2013	dilbit	300	no	4
Tioga	ND	Tesoro	9/29/2013	crude	865	no	8
Belton	SC	K-M Plantation	12/8/2014	gasoline	480		7
Glendive	MT	Bridger (Poplar)	1/17/2015	crude	30	YellowSt R	1
Shively	KY	Marathon	2/17/2015	jet fuel	7		1
Seal oil site	AB	Murphy	3/1/2015	condensate	614		U
Refugio Beach	CA	Plains All Americ	5/19/2015	crude	120	ocean	4
Long Lake	AB	Nexen Energy	7/17/2015	emulsion	1323		
Freeman	SD	Keystone	4/2/2016	crude	17	no	6
Tracy	CA	Shell	5/23/2016	crude	21	no	4
Ventura	CA	Crimson	6/23/2016	crude	45	no	U
Bay Long	LA	Harvest	9/2/2016	crude	5	bay	1
Shelby Cty	AL	Colonial	9/9/2016	gasoline	252	pond	4
Sweetwater	TX	Permian Express II	9/10/2016	crude	33		6
Gamble Twp	PA	Sunoco	10/21/2016	line	55	Wallis Cr	1

Discussion There's more to be said than what is below. This is just a start.

Sixteen of the thirty two spills went into water or wetland, though not all were into drinking water sources. In some incidents part of the spill was recovered; gross volume is reported here, not net. The striking feature of the thirty-two cases is diversity of causes. Significant spills were attributed not just to the most widely-recognized causes, weld failure plus or minus operator error, but also to subtle damage done perhaps decades before such as tiny dents unremarked upon when data were collected by a sensor (smart pig) from the inside of the pipeline. Especially significant is the 2016 leak in the Permian Express II line, less than two years old. Welders were inadequately trained. It is notable that the owners of the pipelines involved in these thirty-two incidents were not neophytes or fly-by-night outfits, but big names in the energy business.

These thirty-two incidents highlight pitfalls in detection of both slow leaks and sudden ones. It is impossible to believe that any pipeline with a projected 50 year career will be immune to all the problems in construction, operation and maintenance that have been seen in North America to date. Assurances by spokespersons that the company need not indemnify municipalities and individuals against damaging releases because the Pilgrim Pipeline will not leak cannot be believed. Click [here](#) for video of such an assertion shortly after minute 17.

Stephen Q. Shafer MD MA MPH 917 453 7371 Oct 22 2016