The higher probability of ignition of a broken natural gas pipeline

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The NTSB maintains a public library of their Final Reports of pipeline incidents they have investigated.

Listed below are the most recent 29 Final Reports for Pipeline Incidents for the 13 years from 1995 to 2008 which are available at www.ntsb.gov/Publictn/P_Acc.htm and can be viewed by you. Obviously they represent the worst of the worst incidents since they triggered an NTSB investigation.

Here is their analysis of the explosions and fires from each of these NTSB reports. I have struck through Final Report incidents that occurred due to 1. a natural gas leak migrating into a building and igniting or 2. if the hazardous liquid was NOT natural gas or a petroleum liquid leaving only pipeline accidents. Also a storage tank fire and an underwater natural gas pipeline incident were also struck through.

Blue indicates a **FLAMMABLE LIQUID pipeline incident**.
Red indicates a **NATURAL GAS pipeline incident**.

NTSB R/N	Location	Liquid	Gals leaked	Exp/Fire?	Natural Gas	Exp/Fire?	
~~PAB-10-1~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
PAR-09-1	**Pipeline**	**Liq propane**	**Unknown**	**Yes**			**Ign cause unkwn**
~~PAB-08-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAB-07-02~~	~~Pipeline~~	~~Ammonia~~					
~~PAB-07-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAB-06-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAB-04-02~~	~~Storage tank~~	~~Diesel~~	~~Unknown~~	~~Yes~~			
PAR-04-01	**Pipeline**	**Crude oil**	**252,000**	**No**			
~~PAB-04-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
PAR-03-01	**Pipeline**				**Yes**	**Yes**	**Ignited 4 minutes**
PAR-02-02	**Pipeline**	**Gasoline**	**237,000**	**Yes**			**1 ½ hours after leak**
PAR-02-01	**Pipeline**	**Fuel oil**	**149,000**	**No**			
~~PAR-01-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
PAB-01-03	**Pipeline**	**Gasoline**	**564,000**	**No**			
PAB-01-02	**Pipeline**	**Crude oil**	**489,000**	**No**			
PAB-01-01	**Pipeline**	**Diesel fuel**	**53,500**	**No**			
~~PAB-00-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAR-00-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
PAB-99-03	**Pipeline**	**Diesel**	**84,700**	**No**			
PAB-99-02	**Pipeline**				**Yes**	**Yes**	**No time noted**
PAB-99-01	**Pipeline**	**Gasoline**	**30,000**	**No**			
PAB-98-02	**Pipeline**	**Liq butane**	**Unknown**	**Yes**			**Ignited by car**
PAR-98-01	**Pipeline**	**Fuel oil**	**956,000**	**No**			
~~PAR-98-01*~~	~~Pipeline~~				~~Yes~~	~~Yes~~	~~Submerged pipeline~~
PAB-98-01	**Pipeline**	**Gasoline**	**475,000**	**No**			
~~PAB-98-02~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAR-97-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
~~PAR-96-01~~	~~Inside bldg~~				~~Yes~~	~~Yes~~	
PAR-95-01	**Pipeline**				**Yes**	**Yes**	**Ignited "within minutes"**

Keep in mind a crucial difference between flammable liquid and natural gas NTSB pipeline accident reports. The large quantity of liquid fuel that leaks (and if there is damage/fire/fatality) triggers an investigation by the NTSB. On the

other hand, there are natural gas pipelines that leak but do not ignite since there was no damage or not enough gas escaped, so a NTSB investigation wasn't triggered. Therefore, generally the natural gas accidents investigated by the NTSB always have fires. But the fact that there are fewer natural gas accidents than liquid fuel accidents investigated by NTSB isn't the significant fact here.

There is, however, a profound statistically significant pattern present. Here it is: Despite the fact that liquid pipelines discharged enormous quantities of flammable fuel above ground, in all the liquid fuel pipeline leaks there were only 3 fires and 2 were definitely attributed to man made causes. One fire was ignited by a car driving through the gas cloud of the vaporized liquid fuel, one fire was ignited 1 ½ hours after discharging a quarter of a million gallons of gasoline into flowing stream and last fire ignited later from an unknown cause.

Here is the key question: ***If ignition sources randomly occur in pipeline right of ways, and if pipelines are maintained to regulation within adequate and safe right of ways, what can explain the observation that ruptured natural gas pipelines appear to have a higher probability of igniting while ruptured flammable liquid pipelines with almost 100% certainty will not ignite?***

Logic says if any ignition sources are randomly present in pipeline right of ways, the flammable liquids should ignite sooner and have a higher incidence of fires since they have lower auto-ignite points. Diesel/fuel oil ignites at 494F. Gasoline vapors ignite at about 536F. Crude oil vapors ignite at about 800-1000F (depending upon composition). Natural gas ignites at 1076F. Yet the chances that liquid fuels spilled will ignite appear to be virtually zero based upon these NTSB investigations despite the fact liquid fuels have ignition points significantly LOWER than natural gas. Therefore, randomly present ignition sources in or near pipeline right of ways can't explain why the natural gas leaks did ignite and why the flammable liquids didn't. There must be another ignition source.

What ignited the natural gas pipeline leak is just as important as why the pipeline ruptured. Just as failure analysis of ruptured pipe is conducted to prevent future integrity failure, so ignition analysis should be conducted to prevent future ignitions. As gas industry research has consistently shown, natural gas escaping under pressure creates friction at the point of exit. This friction creates static electricity at the point of leak. Natural gas leaks can be self-igniting since they create their own ignition source during leaking – static electricity. This analysis of NTSB Final Incident Reports provides strong empirical evidence of that phenomenon.

For natural gas distributors, there is no difference between a 30" pipeline leaking in San Bruno California and your 1" plastic pipe broken by 3rd party damage. The risk of internal generated static igniting that leaking gas pipe is profoundly genuine based upon these NTSB reports.

The minimum first step in preventing and reducing static ignitions in your system involves a 5 second spraying of IGT's Aerosol Static Suppressor for external static dissipation on any gas pipe surface your workers might have an intentional or unintentional release of natural gas . Our state of the art topical anti stat is specifically formulated for the natural gas distribution industry to quickly and easily immediately eliminate on contact any static our spray encounters – without grounding, wrapping and other clumsy procedures. Our easy to use aerosol can be used in virtually any field situation where gas might accidentally be released (which soapy burlap cannot) dramatically reducing the possibility of an ignition. Using soapy rags for static dissipation in the natural gas distribution business is being penny wise but pound foolish.

However, while our IGT Aerosol will effectively eliminate any exterior static present in field conditions, until the interior gas pipe static issue is addressed this ignition problem will continue. Our Ionix Gas Static Suppression Cartridges have been proven in lab tests as well as by actual gas distributor use in their systems to eliminate interior pipe static. Simply install our cartridge at your city gate and your system is static free to burner tip.

Please see our web site www.IonixGasTechnologies.com for information about our exterior and interior static suppression products.

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