

**Written Testimony of Middletown Coalition for Community Safety**  
**Before the House and Senate Veterans Affairs and Emergency Preparedness Committees**  
**16 November 2016**

On Friday April 29th, 2016 at around 8:13 am, something horrible occurred in Salem, PA. Workers at the Delmont Compressor station heard a massive explosion, and determined that one of their nearby Spectra Energy Texas Eastern Natural Gas transmission pipelines had been breached and exploded. They began the shutdown process on the line, and reported the explosion to the National Response Center about an hour later.

The plume of gas and resulting smoke from the fire was so large it showed up as a false weather front 40 miles long during the weather segment of the news.



The explosion and resulting fire devastated the community. It left a hole 1,500 feet in diameter, and 40 acres of land were burned. Here is a chopper view of the blast site at Gilli's Lane and Route 819 in Salem Township, PA. The road was closed for days afterwards.



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Here's what the site used to look like, courtesy of Google Earth:



The approximate site of the breach is marked near the bottom-middle of the picture in red.

“House A”, 200’ from the breach, was completely destroyed and razed to the ground, along with all the trees surrounding it.



This is house “A” after the breach.  
KEITH SRAKOCIC / AP

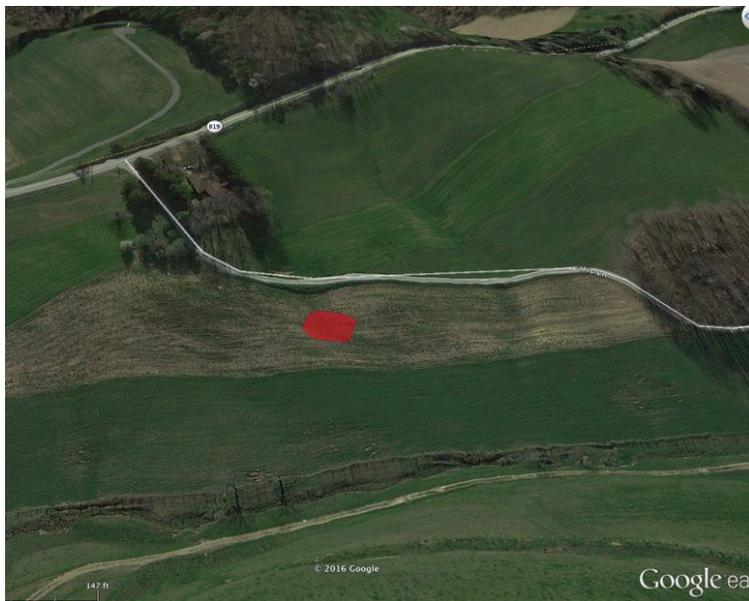


House “B” was 800’ away from the breach. It was so hot that the vinyl siding melted from the garage.  
KEITH SRAKOCIC / AP

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A 26 year old man was admitted to the hospital with 3rd degree burns over 75% of his body. Trees and telephone poles located thousands of feet from the explosion were charred and smoking for hours after the incident occurred. KEITH SRAKOCIC / AP



As with many blasts, the blast zone and heat focus was asymmetrical due to the terrain and the exact nature of the blast. In this case, the pipeline was in a bit of a valley. Geography and prevailing winds pushed the heat towards House A and House B.

The Pipeline Hazardous Materials Safety Administration (PHMSA), the federal agency charged with regulating gas pipelines, performed a preliminary inspection and determined that it had “identified evidence of corrosion along two of the circumferential welds: one at the point of failure and another excavated after PHMSA’s response to the Failure Site. The pattern of corrosion indicates a possible flaw in the coating material applied to girth weld joints following construction welding procedures in the field at that time”. In fact, the pipeline company, in this case Spectra, later admitted that a routine inspection in 2012 showed a 30% decrease in the thickness of the pipeline wall precisely in the location where the pipeline blew.

This story is a tragedy for the young man who was severely injured, his family, and his community. The silver lining, if there is one, is that the explosion took place in a sparsely populated rural setting, and only one person was harmed. Imagine the devastation of an explosion of this magnitude, or worse, occurred in a densely populated community, or next to a school.

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**Expanding Pipeline Infrastructure in Pennsylvania**

The primary function of government is to reasonably provide for public safety. With regard to oil and gas infrastructure, our State and Federal governments use a complex regulatory framework to ensure public safety. These regulations are particularly important with regard to pipelines that transport materials over many thousands of miles, and in close proximity to residents, schools, hospitals, and other vulnerable sites. As the existing infrastructure expands, and new pipelines are planned for densely populated communities, it is imperative to determine if such pipelines are properly classified within the existing regulatory framework, or whether additional regulations are required to ensure public safety. An examination of existing emergency preparedness plans and capabilities is also necessary to determine whether additional resources are needed to address new and emerging technologies, or if a project must be re-engineered, rerouted, or re-planned in order to provide reasonable assurances to public health and safety.

In the Commonwealth of Pennsylvania, the number of proposed new pipelines stemming from Marcellus Shale is extensive. For the purposes of highlighting the potential risk to public safety, this testimony will focus on one such project, the Mariner East set of pipelines, comprised of currently operating Mariner East 1 (ME1) and the proposed Mariner East 2 (ME2). These high pressure Highly Volatile Liquids pipelines transport ethane, butane, and propane at up to 1,440 pounds of pressure per square inch (PSI) 350 miles, across 17 counties in the state, from the Marcellus Shale Formation in western Pennsylvania to Delaware County's Marcus Hook Industrial Complex for processing and transport overseas. The project includes 11.4 miles of pipeline running through densely populated Delaware County. Mariner East 2 will include an initial 20-inch diameter pipeline with ability to deliver approximately 275,000 barrels per day but could ramp up to 450,000 barrels, according to Sunoco. An optional secondary 16-inch pipeline could also deliver an additional 250,000 barrels per day. This is in addition to the existing Mariner East 1 pipeline that currently transports 70,000 barrels.

A simple framework for examining risk is likelihood and severity. If the likelihood of an incident is high, but the severity of impact low, risk to public health and safety is often determined to be acceptable. Similarly, even if the severity of the impact is deemed high or catastrophic, if likelihood of an incident is very low, we often determine it to also be an acceptable level of risk. It is when both likelihood and impact are high, that we must take pause as a community, or regulatory body, legislative body, and determine what measures are needed to mitigate the risk. In the case of Mariner East 2, and other high pressure Highly Volatile Liquids lines, the likelihood and severity for a catastrophic event are both high, yet the pipeline is not being regulated as such. This is in part due to a gap in regulatory framework that has allowed this particular type of pipeline to be treated as a liquids line, rather than Natural Gas, thereby bypassing some of the regulatory processes that would mitigate risk to public safety. This is further complicated by the fact that appropriate emergency preparedness plans are not in place.

In order to make reasonable assurances for the preservation of public safety, Mariner East 2, and other "Natural Gas Liquids" lines must be properly classified at the federal and state level, with appropriate siting, independent 3<sup>rd</sup> party risk assessment and impact studies, and credible plans for emergency notification and evacuation at the planning stages of the pipeline.

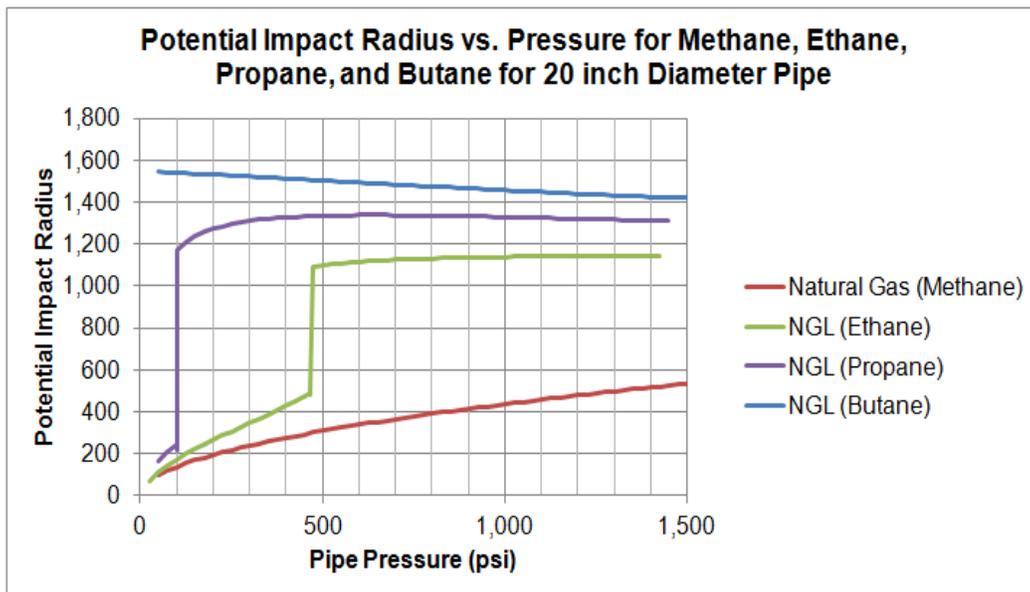
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**Assessing Risk**

The extent to which a pipeline leak represents a risk to public safety depends on a number of factors: materials contained within, pressure and diameter of the pipe, location in rural vs. densely populated areas, topography, wind direction, ignition sources, and many other factors. But the simplest way to assess risk is to analyze the combination of likelihood and severity.

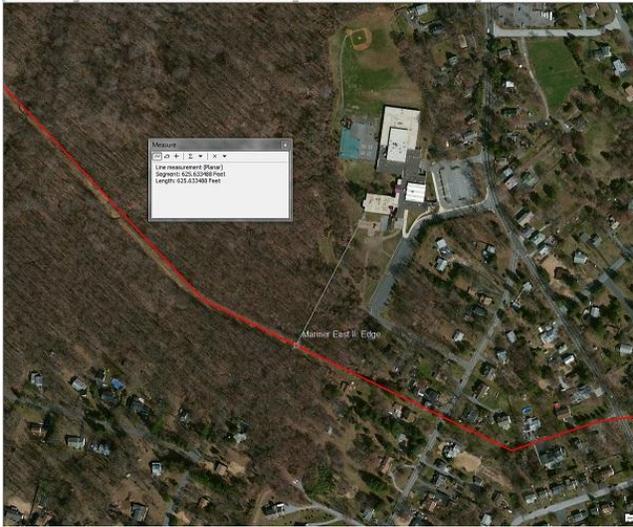
In the case of the proposed Mariner East 2, the severity of a leak has the potential for catastrophic consequences, particularly in densely populated Delaware County. The materials contained within the pipe are liquid only in the artificial environment of the pipe, due to extremely high pressure. If a leak occurs, the materials would escape the pipe in a gaseous state, odorless, invisible, asphyxiating, and highly combustible. Unlike methane, which is lighter than air and dissipates up into the atmosphere, “Natural Gas Liquids” such as ethane are heavier than air, hang low to the ground, and move according to topography and wind, pooling in low lying areas, thus making evacuation impossible for those closest. They are so explosive that something as mundane as a cell phone or garage door could create the spark igniting a fire wall.

A resulting explosion at the site of the pipe would have an approximately 1100 – 1500 foot blast zone, with thermal impacts (including damage to building and severe burns) up to a distance double in size. This, of course, is assuming immediate ignition at the source of a leak. A much larger impact area could result from the gas traveling before finding an ignition source, in which case the explosion would extend from the point of ignition back to the source of the leak. PHMSA provides a means of calculating Potential Impact Radius (PIR) based on pipe diameter and operating pressure, a useful tool for comparing severity for different types of pipelines. The equation is provided for methane, but can readily be adapted for ethane, propane, and butane by adjusting for each Natural Gas product’s density relative to methane under the same pressure. The chart shows PIR in feet as a function of pressure for a 20 inch diameter pipe, the same size as Mariner East 2.



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The severity of an impact is further compounded by the placement of such a pipeline in a “high consequence area,” such as Delaware County, Pennsylvania, where the population density is 3,000 residents per square mile. The Texas Eastern pipeline that exploded in Westmoreland County (referenced earlier in this document) is located mainly along rural, Class 1 and 2 areas. However, Mariner East 2 route is proposed to run through much higher risk Class 3 and 4 areas including neighborhoods, schools, hospitals, and other highly sensitive areas. Compare this to the Salem blast where only two residences were impacted, keeping in mind that a house 200 feet away was leveled by a considerably lower energy pipeline than ME2.

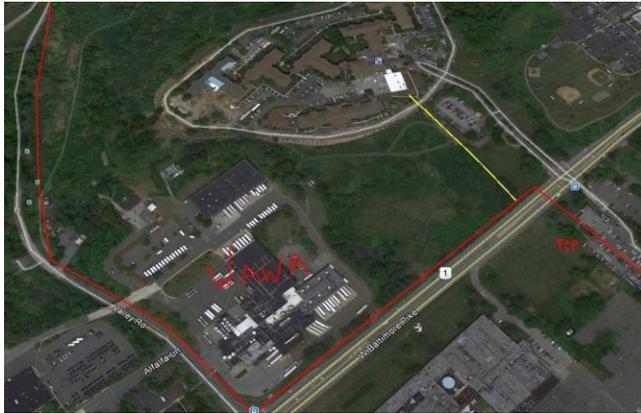


Here's the Glenwood Elementary School on Route 452 in Middletown Township. The Mariner East 2 will run just 625 feet from the playground, and just 800 feet from the closest part of the building, which houses the kindergarten and first grade classrooms.



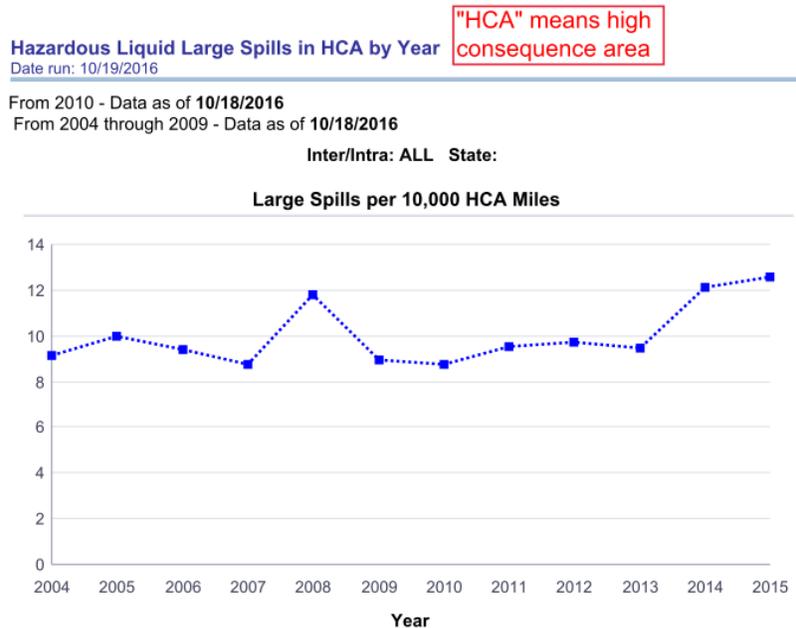
Here is the pipeline construction as it runs through Glen Riddle Apartments. As you can see the pipeline runs right through the complex, less than 25 feet from some of the buildings.

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In this picture, the pipeline is seen as it runs 631 feet from Lima Senior Living Estates, and adjacent to the Wawa on Baltimore Pike. It also runs *just 9 feet* from the Pennsylvania State Police barracks. Imagine a situation where first responders are unable to answer an emergency call because they are located within the blast zone. It is a ludicrous, and yet entirely plausible scenario.

It is clear that a leak or explosion along Mariner East 2, or other NGL pipeline situated in a high consequence area could have catastrophic severity. The question then becomes what is the likelihood? The answer is too high. Large hazardous liquids leaks are actually steadily increasing, reaching their highest level in 2015 (the last year for which we have records).



Sunoco Logistics, the operator of the proposed Mariner East 2 pipeline has a particularly poor record, with over 270 leaks over the past ten years.

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**Data for 2006-2016 (source: PHMSA web site):**

<b>SUNOCO PIPELINE L.P.</b>			
<b>All Incidents, All Pipeline Systems: 2006-2016</b>			
<b>Year</b>	<b>Number</b>	<b>Property Damage</b>	<b>Gross Barrels Spilled (Hazardous Liquids)</b>
2006	28	\$957,179	1,423
2007	25	\$4,462,834	2,696
2008	23	\$2,274,784	577
2009	23	\$2,282,837	5,041
2010	26	\$1,571,302	324
2011	21	\$1,789,272	1,537
2012	25	\$19,734,998	2,142
2013	36	\$8,165,845	1,863
2014	19	\$1,270,649	505
2015	31	\$4,452,222	1,346
2016 (YTD)	14	\$610,514	287
<b>Totals</b>	<b>271</b>	<b>\$47,572,436</b>	<b>17,747 (745,374 gallons)</b>

Leaks have occurred in Aston Township, Pennsylvania twice in the past 6 months alone.

**Emergency Preparedness**

Given the combination of both high likelihood and high severity, it is essential to examine existing emergency preparedness plans and determine if additional plans and resources are required. Current first responder training, as provided by pipeline operators, consists of avoiding the impacted area and establishing a perimeter, thereby accepting casualties within. The industry's plan for the public in the event of a known or suspected leak includes: do not operate a cell phone, a doorbell, or a vehicle; to evacuate, on foot and upwind, to a distance of at least one-half mile. This generic plan is severely incomplete and implausible for many residential, institutional and commercial properties within the potential impact zone in heavily populated areas. It fails to identify the conditions that warrant an evacuation, the extent of the area to be evacuated, or which if any procedures for carrying out the evacuation would actually contribute to the severity of any accident. The public is left without credible area specific disaster response plans.

This is particular problematic and disturbing when we consider the proximity of the proposed pipeline to schools, and how many schools up and down the pipeline route lie within a potential blast zone or evacuation zone. In Rose Tree Media School District, Delaware County the entire Glenwood Elementary school building is within a blast zone, and three additional schools are within an evacuation. In neighboring Penn-Delco School District, Northley Middle School lies within an impact zone, and all 5 other schools are within an evacuation zone. In Chester County, 12 schools are located within close enough proximity to Mariner East 1 and 2, that a toxic and asphyxiating gas cloud would reach the school within 10 minutes. Saint Peter and Paul School is just 100 feet from the pipeline.

Our communities and our schools are in dire need of credible notification and evacuation plans in order to preserve the life and health of our students and our residents. This is why the Rose Tree Media School Board and so many municipalities (Thornbury, Middletown, Media,

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Westtown, Swarthmore and others) have passed Resolutions declaring their grave concern regarding the existing ME1 and proposed ME2 lines. As it stands thousands of school children, residents, and other highly sensitive groups are sitting ducks

**Regulatory Issues**

The lack of attention to public safety with regard to pipeline siting, and the absence of credible emergency response plans prior to construction, is in large part due to regulatory issues and the misclassification of certain pipelines. There are several different types of pipelines. Natural Gas pipeline typically refers to methane gas, which we use for home heating and cooking. Liquids pipelines refer to liquid gasoline or petroleum products, which liquid within the pipe and spill as a liquid in the event of a leak. "Natural Gas Liquids" or NGL is an industry term that describes gas products such as ethane, propane, and butane that are artificially condensed to a liquid within the pipeline, despite the fact that they are naturally gaseous, and revert to a gaseous state if leaked. In the condensed state within the pipeline, these NGL or "Highly Volatile Liquids" materials contain about 500 times the energy density per unit volume as the methane Natural Gas, and are therefore much more combustible than stable petroleum liquids such as crude oil or gasoline. By making NGLs and stable liquids pipelines interchangeable within the regulatory framework, the public's safety is put at unacceptable risk.

Due to this misclassification, NGL pipelines are not regulated at the federal level the way gas pipelines are; rather they are regulated at the state level similar to a true liquids line. This is exceedingly problematic and creates gaps in the existing regulatory framework. For example, no regulatory body in Pennsylvania is currently exercising siting authority around NGL pipelines. An operator can place a pipeline wherever it is possible to gain easements or rights of way. There is no regard for the distance from the pipeline to residential homes, schools, hospitals, or any other sensitive site. The only state regulatory body that has any siting authority over an NGL pipeline is the Pennsylvania Department of Environmental Protection (PA-DEP), which can enforce siting around water crossings and wetlands, but not with regard to public safety. Rather than identify alternative routes that would minimize impact to public safety, pipeline operators will simply reuse an existing rights-of-way, which may have an appropriate setback for an oil pipeline, but not an NGL.

Further, Natural Gas pipeline regulations require increased pipe wall thickness in high consequence areas. This makes the pipe less susceptible to corrosion-induced rupture. No location-specific wall thickness requirements are in place for Natural Gas Liquids. In fact, Sunoco has disclosed that they propose to use a wall thickness of .380 inches on Mariner East 2. As a result, the Mariner East 2 pipeline will be traversing through densely populated Class 3 and 4 areas with 16% and 50%, respectively, less wall thickness than it would have were it carrying the less energy-dense methane Natural Gas product. The table below shows how the Mariner East 1 and 2 NGL pipe wall thickness would be required to change if they were treated as a Natural Gas under Part 192 depending on its proximity to populated locations:

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	<b>Mariner East 2</b>	<b>Mariner East 1</b>
Fluid within Pipeline	Ethane	Ethane
Diameter (in)	20	8
Pressure (MAOP) (psi)	1,440	1,500
Pipe Material	API5L X65	80+ year old Carbon Steel
Material Yield Strength (psi)	65,000	40,000
<b>Required Wall Thickness (in) per 192.111 for Class Locations per 192.5</b>		
Note: No Class-Specific Design Requirements are Enforced for NGLs in Title 49, part 195		
Class 1 (10 or fewer buildings)	0.308	0.208
Class 2 (>10 but <46 buildings)	0.369	0.250
Class 3 (>46 buildings OR <100 yards from small, well-defined outside area with >20 people 5 days/week)	0.443	0.300
<b>Class 4 (&lt;220 yards from 4-story buildings)</b>	<b>0.554</b>	<b>0.375</b>

Finally, Natural Gas pipelines are required to contain odorant, and NGLs are not. In the event of a gas leak, odorant allows for detection by the endangered public. NGL pipelines also leak in a dangerous gaseous state, yet provide no sensory means of public detection. It is interesting to note that the Natural Gas Act was established in 1938 as the result of a horrific pipeline failure in 1937. Odorless methane Natural Gas leaked into the basement of a Texas school and ignited, resulting in the deaths of 298 students, grades 5-11. It took the federal government another 33 years after this unimaginable tragedy to adopt further safety regulations requiring the addition of an odorant to Natural Gas, preventing many further tragedies from occurring. And yet now, in the absence of proper regulation, we are faced with a pipeline operator siting an NGL pipeline, more dangerous than Natural Gas, capable of leaking odorless, asphyxiating, and explosive gas within close proximity to upwards of 30 schools across the state. And the question remains: will we maintain a culture of responding to the last accident rather than preventing the next one? How long will we allow a gap in the regulatory scheme to needlessly expose the public to risk?

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**What Is Needed at the State Level**

The discovery of Natural Gas deposits in Pennsylvania has led to a rapid expansion of infrastructure, particularly for gas and NGL pipelines. We can all agree that our country's energy infrastructure is critical. However, energy infrastructure is a strategic entity that requires planning. It must be organized and laid out in such a way as to maximize public benefit and maintain public safety.

As such, it is essential to consider additional steps our state should take to ensure the safety of Pennsylvanians. There is an opportunity within the legislation in the General Assembly to recognize the significant risk posed to public safety with regard to high pressure gas and Natural Gas Liquids lines, and to mitigate those risks through a proper regulatory framework.

Specifically, legislation is needed that would allow state agencies to properly classify Natural Gas Liquids pipelines as gas lines, and to exercise siting authority with respect to public safety. Independent third party risk assessment and impact studies must be required to determine probable blast zones, thermal impact zones, and evacuation zones before high pressure gas and Natural Gas Liquids pipelines are routed through densely populated high consequence areas. No one expects elected officials to be experts in pipeline safety. However, we do expect you to assemble an unbiased team to provide you with good information to allow for educated decision making.

Finally, credible area specific emergency preparedness and response plans are needed for all communities, and in particular for schools, hospitals, and other highly sensitive populations. Again, the worst-case scenario emergency must be developed by an independent third party with a comprehensive plan set in place that would properly inform residents of the possibility of such an event. Methods for alerting and evacuating the general public must be well established and understood by everyone living in the predetermined evacuation area.

Our State has already seen significant pipeline leaks and explosions in Unityville, Lycoming County, in Salem Township, Westmoreland County, in Jackson Township, Cambria County, and others. To date, we have avoided a mass casualty event, primarily due to siting in rural areas. If we continue to push forward high pressure gas and NGL pipelines in to densely populated high consequence areas, it is only a matter of time before a tragedy occurs. Our mission is to prevent that tragedy. We call upon our legislators to take meaningful and decisive action to ensure the safety of our children, our families, and our communities.