

Best's Insurance Law Podcast

[Trends in Pipeline Explosion Cases](#)

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Hosted by: John Czuba, Managing Editor

Guest Expert: Dr. Janine McCartney of [HHC Safety Engineering Services and HHC Safety Consulting Services, Corporation](#)

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John Czuba: Welcome to the Insurance Law Podcast, the broadcast about timely and important legal issues affecting the insurance industry. I'm John Czuba, manager of *Best's Insurance Professional Resources*.

We're very pleased to have with us today expert service provider Dr. Janine McCartney of [HHC Safety Engineering Services and HHC Safety Consulting Services, Corporation](#) of Wilmington, Delaware and with an office in Houston, Texas as well.

The companies provide safety consulting, safety engineering consulting, and expert witness services to law firms and the insurance industry. Dr. McCartney is a senior safety engineer and expert witness. She has a certified safety professional and a construction health and safety technician's designation with 31 years' experience in safety. Dr. McCartney also has CSHO credentials.

Her professional career has spanned over 45 years in private and government service with OSHA consultation. Dr. McCartney has worked in the oil and gas industry and the pipeline and construction industry as a regulatory expert. In safety, she worked her way up from safety representative to safety manager, to safety officer, to manager, and then to an expert.

She has extensive OSHA policies knowledge and has technical and historical knowledge in construction, telecommunication, utilities, manufacturing, food processing, distribution, oil and gas exploration and production, and property management.

Dr. McCartney is also an editor of ScienceDirect "Heliyon" and "Data in Brief," and an editor and reviewer of "Science of the Total Environment." She also works as an expert and consultant on a day-to-day basis. Dr. McCartney, we're very pleased to have you with us again today.

Dr. Janine McCartney: Thank you, John. It's great to be here.

John: Today's discussion is recent trends in pipeline explosion cases. For our first question today, Dr. McCartney, what trends in pipeline explosions have you seen in the last four years, and did this follow the normal trend of causation of pipeline explosions?

Dr. McCartney: Thanks, John. That is a great question. From a review of pipeline and gathering line incidents, there's basically five causes of pipeline explosions. They are excavation work being done on and around the piping, manufacturing defects, corrosion, improper installation, and poor maintenance.

In a pipeline explosion, there may be more than one cause of the explosion, and there may be a combination of any of these five factors. These five basic causes just mentioned follow the trend of pipeline explosions.

One of the most common causes of pipeline explosions is due having excavation work done near a piping system. The excavation process damages the piping and creates holes and cracks. These cracks can allow gas and other flammable gasses and liquids to escape and find an ignition source and cause an explosion.

Looking at explosion cases earlier than 2020, the US DOT Pipeline and Hazardous Material Safety Administration prepared a report in 2012. They found a majority of the pipeline fire and explosion cases were due to excavation damage to the pipelines.

For example, from 1993 to 2012, and according to the agency, there were 1,630 pipeline incidents caused by third-party excavation damage that resulted in 141 deaths, 440 injuries, and \$3.7 million in property damage. There's no information, though, about whether these incidents were the result of the exemption of the One Call laws, which is the call before you dig.

The second and a more common cause of pipeline explosion is due to manufacturing defects in pipe fittings, elbows, and other appurtenances. Some of the manufacturing defects may be from the pipe and the fittings themselves, or maybe from improperly selected pipes, fittings, and elbows.

Using pipe and fittings that are not manufactured for the needed use may result in incidents where the piping, valves, fittings are not able to withstand the pressure of the gas, liquid, vapor, the corrosivity of the material in the pipe, or the environment that the pipe is installed.

The selection of the proper pipe for the application is complex. The standard, which is the ANSI API 5L, specifies two-line pipe product. There's two levels, PSLI-1 and 2 of seamless and welded pipe in the transportation of petroleum and natural gas.

There are many different grades of pipe manufactured in that specification. The grades of pipe are based on process, carbon-equivalent control, and higher mechanical strength performance. You can see that this is a very complex process in trying to decide what particular pipe to order.

If you were the person in charge of ordering the pipe, you would specify to the supplier the quantity, either in meters or tons, whether you wanted a PSLI-1 or PSLI-2 pipe, whether it was going to be applicable for sour services with hydrogen sulfide gas, whether it was going to be installed onshore or offshore. The orderer must specify the type of pipe you wanted, and whether you wanted seamless or welded pipe. In addition, the person ordering the pipe must specify the reference documents and the sections of API 5L that the pipe must comply with. The orderer would specify the steel grade, the outside diameter, the wall thickness, the length, and length type. The orderer would specify the individual annexes in that standard that they wished to comply.

The third and another common cause of pipeline explosion, is due to improper installation of the piping, fitting, and appurtenances. High-pressure piping must be installed per the manufacturer's specifications. If the piping is not installed correctly, the result can be leaks or other damage that can lead to explosion.

Improper installation can lead to pipes being loose and leaking over time, which sets up the condition for an explosion. One other thing, improper and compromised wells, and improper non-existent radiographic testing can also contribute to leaks and holes.

The fourth cause is due to corrosion of the pipe, piping system, elbows, and other appurtenances. Corrosion may occur when these same piping systems, pipe, elbow, and appurtenances, are exposed to water, liquids, and other liquid corrosive materials that cause that piping to deteriorate over time. This leads to deterioration, rusting, cracks, and holes in the pipe that allow gas and other flammable gasses/liquids to vent and leak and cause an explosion. Improper cathodic protection can also lead to premature corrosion.

The fifth cause of pipeline explosion is due to poor maintenance of the piping system, pipe elbows, and appurtenances. Some of the lack of maintenance may be because the company does not know that piping exists because there is an incomplete process safety management risk analysis, and an incomplete process and piping diagram. Some of the causations of the explosion may be due to gaps in regular inspections and repairs of the damaged piping. If the piping system has gaps in the inspection, the piping system may exceed its expiration date or use date of the piping component. That leads to weaknesses in the piping, the potential for leaking of flammable liquids and gasses, and explosion. The lack of maintenance and inspection of cathodic protection may also lead to corrosion and premature failure.

John: Dr. McCartney, what are the regulations that apply to the causation of pipeline explosions, and what agencies have jurisdiction over pipeline accidents?

Dr. McCartney: John, that's a great question, but it's a complicated question as well. The agencies that should respond are dependent upon whether the pipeline is an intrastate pipeline, the pipeline was within one state, or an interstate pipeline between states, or a gathering line.

For large interstate pipelines, it may be required to report the incident to the Pipeline Hazardous Material Safety Administration or PHMSA, NTSB, the FERC, US Coast Guard, if waterways are affected, US EPA, and possibly OSHA. The intrastate pipelines and gathering lines may only have state agency reporting.

The Pipeline and Hazardous Material Safety Administration is part of the Department of Transportation, and that agency investigates pipeline incidents and ensures compliance with federal pipeline safety regulations. They may investigate the incident for mandatory reporting requirements.

The National Transportation Safety Board, which is the NTSB, can also partner with the Pipeline and Hazardous Material Safety Administration, but the NTSB will only have the authority to investigate pipeline accidents that threaten public safety or involve the transportation of hazardous liquids or natural gas.

The operator of the pipeline may be required, in some cases, to report it to the National Response Center, such as during a spill. Other enforcement agencies associated with some jurisdiction over the pipelines can include, like we said before, the FERC, the Department of Energy, and US EPA.

If the pipeline is an intrastate gathering system within one state, or a gathering system, so either an intrastate pipeline or a gathering system, the State Public Utility Commission and other agencies such as the State Department of Environmental Protection and Department of Environmental Quality would have the enforcement jurisdiction over spills and releases.

John: Dr. McCartney, can you give us some examples of pipeline explosion incidents that you've seen in the last four years, and what were some common workplace safety deficiencies that were the causes of those accidents?

Dr. McCartney: It's a great question. I've seen pipeline explosion incidents in the last four years where the root causes of those incidents were excavation work, manufacturing defects, corrosion, improper installation, and poor maintenance. I've seen the five basic causes as the root causes in those incidents.

The majority of the pipeline cases that I've seen in those last four years, though, have been on gathering lines on production facilities where the third-party excavation work is being done.

I've seen instances where the third party installed improper grade piping and appurtenances for the pipeline application. I've seen cases where equipment on a gas line being removed and replaced by a third party, was not properly locked out, tagged out, the line was not purged, and then you had a fire erupt.

I've seen cases where production gathering lines were not properly locked out by a third party. The gas was still under pressure, and where workers were in the process of removing a bull plug and valve, and they stood right in the line of fire to the bull plug and valve, and that not only hit the worker, but a fire erupted.

Some of the violations for these cases I have seen included violation of the OSHA excavation standard, which is 29 CFR 1926 Subpart P. I've also seen a violation of best management practices of industry standards and company standards for body positioning and standing in the line of fire.

I've seen violations of best management practices of the American Petroleum Institute, such as API RP 74 and 76, and violations of OSHA's process safety management standard, which is 29 CFR 1910.119, and then lastly, violations of what's called industry practices for Recognized and Generally Accepted Engineering Practices, or RAGAGEP. That would be with respect to causation of mechanical integrity of that pipeline. It could also include processes, risk assessments of process and pipeline, poor choices, and equipment selection that was not meant for the application.

John: Dr. McCartney, one final question today. What can claims managers look for in the facts of the pipeline explosion accidents, and what will help them assess them?

Dr. McCartney: One of the most important things that claims examiners do ordinarily is try to assess the cause and contributions of the parties to the suit. I'd like to add three points for claims examiners to consider. The first is that the claims examiners should be provided with specific regulatory standards that are applicable to the causation of the accident.

Claims Examiners may consider the qualification of the third parties working on the pipeline and should be aware of the increasing use of illegal drugs by workers and contractors, and the contribution that impairment of that worker may be a causation of the accident.

First, it's important for claims examiners to be provided with specific regulatory standards that are best management practices for the industry and that apply to the causation factors of the accident.

What does happen in pipeline cases, because the regulatory environment is very complex, that without a clear understanding of the best applicable management practices, reptile-type, unrealistic safety standards are imparted for the jury to assess instead of realistic and attainable, best management practices and standards that the industry uses every day.

That includes Recognized and Generally Accepted Engineering Practices that I spoke about before, which is called RAGAGEP. Because of the exclusion motions prior to trial, the jury may not be provided with all the actual industry best management practices but provided with unrealistic reptilian standards that are unattainable and that appeal to the emotions of the jury.

With that said, and while performing work, I've been an expert for plaintiffs as well as defendants, so I've seen both sides of those cases.

Secondly, claims examiners may consider the qualifications of the third parties performing work around the pipelines. The safety and job training of the employees performing the work is important in order to determine if they are competent to do the work and know the industry safety procedures to follow.

Body positioning of the employees are important to ensure that the employees are not in the line of fire, standing directly in front of pressurized valves or fittings. It's also important to discover whether the pipelines are still under pressure while the work is being performed.

Thirdly, for the claims examiner, there's one other issue not completely captured in the statistics of causation of intrastate pipeline and gathering line explosions, and that is the workers' use of drugs while working on those lines. This industry is not a work environment where someone suffering from the effects of illegal drugs can safely perform work or can safely work around others. They then become a danger to themselves or others. In some cases, post-accident drug testing may not be admissible depending upon the judge's rulings. The end result may be that the behavior of the employee was influenced by that illegal drug, and this causation factor may be admissible. As an expert, this impacts my report and my testimony.

Thank you, John, for the opportunity to provide this information to AM Best and your listeners.

John: Dr. McCartney, thanks again for joining us today.

Dr. McCartney: Thanks, John.

John: You're listening to Dr. Janine McCartney of [HHC Safety Engineering Services and HHC Safety Consulting Services, Corporation](#) in Wilmington, Delaware. Special thanks to today's producer, Frank Vowinkle.

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