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"Clear Knowledge in the Over Information Age"

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To: Mr. Patrick Landon
PHMSA
Via email to patrick.landon@dot.gov

Re: Accufacts Comments on Automatic/Remote Controlled Shutoff Valve Draft Study, Presentation, and Valve Workshop of October 5, 2012.[1]

Accufacts has reviewed the above referenced files and has the following brief observations and comments based on extensive experience, observations, and investigations, concerning both gas and liquid pipeline ruptures over a long career. We especially find the report's heat flux with time approach and many sensitivity cases related to heat flux impacts especially thorough, and reasonable. While Accufacts would have approached the heat flux vs. time and sensitivity cases differently, on further review and analysis Accufacts would have come to similar findings concerning valve impact and cost effectiveness, demonstrating that there is usually more than one engineering approach to any particular challenge or problem.

Pipeline ruptures are very high profile and often tragic events. Responses to either gas transmission or liquid pipeline ruptures require somewhat different operational and emergency response actions and valving decisions. Given the way the fluids act differently during pipeline rupture release, upon ignition, however, all transmission pipelines are capable of very high, seriously destructive, heat flux releases.

For Gas Transmission Pipelines

For gas transmission pipeline ruptures, Accufacts concurs with the draft report major observations:

> "For natural gas pipelines, installing ASVs and RCVs can be an effective strategy for mitigating potential fire consequences resulting from a release and subsequent ignition provided all of the following conditions are satisfied.
>
> - The leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 10 minutes or less after the break, and fire fighting activities within the area of potentially severe damage can begin soon after the fire fighters arrive on the scene.

[1] See https://primis.phmsa.dot.gov/meetings/Mtg80.mt

- Fire fighters arrive on the scene and are ready to begin fire fighting activities within 10 minutes or less after the break.
- Fire hydrants are accessible in the vicinity of the potentially severe damage radius.
- Block valves close in time to reduce the heat flux at the potentially severe damage radius (1.5 times the PIR) to 2.5 kW/m^2 (800 Btu/hr ft^2) or less within 10 to 20 minutes after the break."[2]

For gas transmission pipelines, the report properly captures the relevant major issue affecting valving decisions, which is the important role of first responders to attempt to triage in what can be extremely high and very dangerous heat flux events associated with gas pipeline rupture. This valve report is a serious technical step forward toward more effective valving regulatory efforts. Accufacts thus supports the report's main thrust concerning gas transmission pipeline valving with several caveats, or "tweaks," that we advise should be captured in the final report for gas transmission pipelines. These suggested changes should help avoid possible criticism or challenges that might be utilized in attempts to undermine this study's important efforts and findings.

1. The use of the word "leak" as seen in the above quote, and throughout the report, should be replaced with the word "rupture," where the high rate mass releases associated with pipeline failure are appropriate. It has been Accufacts' experience that the public quickly understands and grasps the consequences and differences between a gas transmission pipeline leak versus a rupture.

2. The vast majority of high stress steel gas transmission pipe ruptures are very high mass rate releases associated with pipe failures for various reasons that are usually full bore, or guillotine-type like breaks. Valving decisions are largely intended to effectively address rupture, or rupture-like pipe failures (such as girth weld breaks), not leaks.

3. "Detect" could be, and is most likely given the current state of technology, to be more than remote detection via SCADA or CPM.[3] It might be productive to expand on the meaning of "detect," such as report of rupture by a reliable source.

4. Emergency response plans should be very different for gas transmission pipeline leaks versus ruptures.

[2] Various authors, "Draft - Studies for the Requirement of Automatic and Remotely Controlled Shutoff Valves on Hazardous Liquids and Natural Gas Pipelines with Respect to Public and Environmental Safety," page xxviii, Released October 4, 2012.

[3] SCADA is Supervisory Control and Data Acquisition or a centrally based computer system used to remotely control and/or monitor a pipeline from a control room. CPM is Computation Pipeline Monitoring or a software based monitoring tool used to assist in pipeline release detection (49CFR§192.3 and 49CFR§195.2).

Accufacts finds and further supports the report's approach and the logic of first responder action within a reasonable period of time of 1.5 times the PIR (Potential Impact Radius), or potential severe damage radius, based on rupture heat flux with time impacts on various receptors. The time for first responders to be able to safely and effectively start to react and/or triage a gas transmission pipeline rupture actual impact zone during such very high heat flux events is key and leveraging to valve automation decisions (valve spacing and actuation) on gas transmission pipelines. Accufacts believes the report's approach addresses and overcomes many of the limitations associated with the simple and smaller PIR method initially developed as a first pass attempt at integrity management regulations, especially for larger diameter pipelines that can generate much higher heat fluxes and generate much larger severe impact zones that can be highly destructive.

Liquid Transmission Pipelines

For liquid pipelines Accufacts concurs with the draft report observations:

> "For hazardous liquid pipelines, installing ASVs and RCVs can be an effective strategy for mitigating potential fire damage resulting from a guillotine-type break and subsequent ignition provided the leak is detected and the appropriate ASVs and RCVs close completely so that the damaged pipeline segment is isolated within 15 minutes after the break. After continuous exposure to a heat flux of 31.5 kW/m^2 (10,000 $Btu/hr\ ft^2$) for 15 minutes, buildings located with the potentially moderate damage radius may begin burning. If the damaged pipeline segment is not isolated within 30 minutes after the break, buildings located with the potentially minor damage radius that are continuously exposed to a heat flux of 15.8 kW/m^2 (5,000 $Btu/hr\ ft^2$) may begin burning. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines decreases as delays in leak detection, pump shutdown, and block valve closure increase.
>
> Adding automatic closure capability to block valves in newly constructed or fully replaced hazardous liquid pipelines can also be an effective strategy for mitigating potential socioeconomic and environmental damage resulting from a release that does not ignite. Delays in closing block valves immediately following a break result in a release rate that approximates the normal pipeline flow rate. This flow rate continues until block valve closure isolates the damaged pipeline segment and the drain down phase begins. The cost effectiveness of installing ASVs or RCVs in newly constructed or fully replaced hazardous liquid pipelines increases as the time required to isolate a damage pipeline segment decreases because block valve closure swiftness affects the amount of product released following an unintended hazardous liquid pipeline rupture."[4]

Accufacts advises that additional clarifications are warranted in the Final Report to assure its credibility, and to minimize possible challenges that might undermine important leveraging findings related to liquid pipelines and valving:

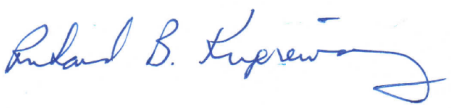
[4] Ibid., pages xxviii – xxix.

1. As in natural gas pipelines, the study should also be careful to identify the threat being addressed is more likely a liquid pipeline "rupture" not a leak, whether full guillotine-type break or not. For liquid pipelines, while the full bore guillotine-type break cannot be eliminated as a possible rupture like risk (more likely associated with girth weld failure from abnormal loading), liquid pipeline ruptures, though not full bore, will nevertheless be very high mass rate releases where the placement of prudent remote or automated valves will also prove very cost effective.

2. Accufacts believes a closer flow system analysis of flow rates immediately following a liquid pipeline rupture should indicate that release rates can easily exceed "the normal pipeline flow rate" as the pipeline system pressure curve is substantially changed by the rupture, and the pumps run out on their "pump curve." This substantial increase in flow rate is an important phenomenon often utilized by experienced control room operators to confirm a possible liquid pipeline rupture.

3. The report should distinguish the significant rupture differential risks and consequences of a specific class of hazardous liquid pipelines, Highly Volatile Liquid, or HVL, pipelines over more traditional hazardous liquids (such as crude oil or gasoline) ruptures. A prudent risk management regulatory approach will specifically address certain distinguishing and higher risk characteristics concerning valve placement and automation decisions on HVL pipelines. HVL pipelines are an area where federal minimum pipeline safety regulations have historically been seriously incomplete, especially as it relates to valves and their automation. Given the wide ranging activity of shale gas development across the country, Accufacts is seeing significant new HVL pipelines in locations where additional prudent valve decisions are especially cost effective and warranted.

The more difficult and challenging effort, which was not the objective of this study effort, will be the development of simple, clear, effective and efficient valve automation rulemaking that captures the important core concepts outlined in this study. Accufacts supports this study and its core findings, as it provides a more technically based foundation to start the regulatory effort related to important rulemaking and valving requirements. The challenge will be in developing such regulations without becoming overly complex, but are simple to understand and implement. Such regulatory effort is difficult and should involve collaborative efforts of all parties. Accufacts welcomes the opportunity to improve safety efforts in the important area of valves, especially for transmission pipelines.



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