

# Accufacts Inc.

“Clear Knowledge in the Over Information Age”

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**Date:** September 23, 2019

**To:** Mr. Casey LaLonde  
Township Manager  
West Goshen Township  
1025 Paoli Pike  
West Chester, PA 19380-4699

**Re:** Accufacts Supplemental Report on the episode on the evening of 8-5-19 at the Mariner East Boot Road Pump Station (“Event”), Boot Road, West Goshen Township, PA

This Supplemental Report is in response to the observations and questions raised by the Board of Supervisors at and subsequent to the public presentation on the findings of my report titled “Accufacts Report on the episode on the evening of 8-5-19 at the Mariner East Boot Road Pump Station (“Event”), Boot Road, West Goshen Township, PA,” dated September 16, 2019. I prepared the Report and this Supplemental Report subject to the constraints of the Nondisclosure Agreement which prevents me from disclosing certain confidential information. While I cannot disclose certain details, the Nondisclosure Agreement has not prevented me from reaching independent conclusions based on the documents and other information provided by Sunoco Pipeline, LP (“SPLP”). Bolded are the supervisor’s comments and questions, followed by my responses:

**Based on the Accufacts Report, the incident was a result of reignition of what had become a flammable residual mixture within the flare system after an excessive rate of line purging (nitrogen with propane) had overwhelmed the normal flare system combustion operation (flame out). Therefore, this event was an abnormal condition, as the design of the system does not intend for this to occur.**

This observation/conclusion is correct. I would describe the minor pipe addition to the pump station, and the following miss purge of nitrogen when putting this new pump station pipe segment into service, as an abnormal condition. The operator had the right sequence to put new pipe into hydrocarbon service but did not fully or accurately think the process through. They hit the flare with too high a rate of nitrogen. The additional flare safety equipment built into the flare protected the flare from impacting the pump station piping and pipeline operation.

**1) Therefore, after the 'small' explosion (or backfire) occurred causing some level of unintended over pressurization, should not the operator have shutdown flow in ME1 and had an engineering inspection performed to ensure that there had been no impact to the Mechanical Integrity (in Process Safety Management terms) of the flare system equipment**

**and controls? How does only a visual inspection that evening to confirm no obvious physical damage to the system satisfy the need to ensure that the pipe connections/control devices have not been damaged in some way and that the flare system operation has not been compromised? I would have thought a pipeline shutdown for a day or two of engineering mechanical/control checks would have been required before restarting flow.**

The overpressure was slightly above atmospheric. While I accurately describe the Event as an explosion, it is on the low end of the force spectrum. There were personnel in the pump station close to the flare at the time of the Event that heard the explosion. SPLP was able to quickly determine that the flare, a 4-foot diameter “pipe,” experienced minor overpressure. The flare is intended to protect and serve the Boot Road pump station for operational and maintenance needs within the station. It is the operator’s call whether to shut down the entire station and perform detailed reviews. Based on my background and experience, calling for a pump station shutdown and a detailed engineering mechanical/control checks, considering the way the station is designed and constructed, and is operated, was not necessary.

**2) Is it sufficient that "Modifications to the PS maintenance procedures should be implemented to prevent reoccurrence"? Procedure modifications still rely on mistake free operator performance and judgement of different maintenance situations. I would have thought that the system should be designed with engineering controls to prevent excessive purging flows (not relief flows) to the flare to prevent the possibility of flame outs. i.e. installation of flow restrictive devices in the purge lines routing to the flare. Why is that not part of the solution to prevent reoccurrence?**

This is a simple pump station flare operation intended to perform certain tasks associated with the pump station daily operation and periodic maintenance and the hydrocarbons such activities generate. It is accurate to state that the system was not designed to take slugs of nitrogen to the flare pilot. It is also accurate that mixing in nitrogen with propane would have helped prevent a flame out.

However, with the exception that the Boot Road PS flare can be automatically blocked off from fuel supply and the pump station, the Boot Road flare design/operation is not complex compared to, for example, a refinery flare. SPLP had the right concept to prevent an explosive atmosphere within the new PS pipe segment being placed into service, but missed the impacts associated with hitting the flare pilot too hard with high pressure nitrogen. The flare itself can handle a minor overpressure Event, but such situations should be avoided for other reasons.

This Event resulted from what I would call a “one-off” situation created by a unique pump station change/addition causing the flare Event that could have easily been avoided if they had thought it through and communicated thoroughly to field personnel. I have discussed with SPLP several different approaches to prevent nitrogen getting to the flare. None involved installing flow restriction to the flare. Normally I would not rely on procedural changes alone, but given the rarity of this event and the complexities that may be added to the flare that might defeat the intent of the flare, I do not see a problem with procedure

changes in this unique instance. Equipment changes/additions sometimes appear to add an additional factor of safety, but instead result in unexpected consequences or complexity that defeat the very safety intent of the equipment within the system.

One simple solution to this issue is to not nitrogen purge the flare (i.e. vent nitrogen to atmosphere), but SPLP has rejected this option. I can only advise SPLP. This is not the first time I have had very frank discussions with them and recommended operating and/or equipment changes, but as the operator, the final decision is theirs.

I would like to thank the Board of Supervisors for its careful review of my Report and invite any further questions that might be raised that I can take back to SPLP, respecting that certain details I cannot make public.



Richard B. Kuprewicz,  
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