THE GAMGRAM

No. 55 **METER PROBLEM** **MAR. 2005**

This GamGram issue is a bit different from others we have published, because we are telling you a “real life” story. A story about an unhappy situation that has cost someone a lot of money and down time. Please don't ask where.

Once upon a time, a decision was made to purchase a new kind of hydrant servicer. It had some innovative design features and the equipment chosen was well-proven and of the highest quality.

Shortly after it went into service, ever increasing amounts of metal shavings, appearing to be aluminum, were found in the nozzle strainer. The servicer had been built with no meter strainer, because it had been determined that the filter monitor located near the meter inlet was far better protection. It was assumed that the source of the debris had to be some piece of equipment downstream of the filter, so the meter was inspected for damage.

Inspection of the meter showed severe damage, and since there was good filtration at its inlet, the problem had to be something to do with the meter, right? Using that reasoning, blame was first placed on the meter manufacturer for poor quality. Then it was discovered the meter was being subjected to flow rates well above the maximum allowed by the manufacturer. Now the design of the servicer was drawn into question.

But evaluation of the debris also showed stainless steel to be present, and the meter manufacturer insisted his meter could not have been the source. So the search was centered on both where the stainless steel had come from and why the filter had not removed it.

It was found that the stainless steel debris was weld “splatter” from pipe welding, not uncommon in small quantities. The filtration was inspected and no problems were found. It seemed the welding splatter was only from the pipe after the filter, which was a small amount of pipe.

Now we come to the interesting part of the story. A study of the meter installation on the new hydrant servicer revealed that weld splatter and aluminum shavings were still in the meter, and had not been concentrated in, and removed when the nozzle strainer was inspected. But how could this happen? We are accustomed to assuming that when we check a strainer, we get all the debris that has been stopped by the strainer. How could debris still be in the meter?

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THE ANSWER

It seems that the debris was caught by the nozzle strainer as fuel flowed from the meter to the nozzle. But once flow stopped, some particles simply fell by gravity back through the hose and pipe and back into the meter. Then it was realized that these particles caused more damage in the meter every time the system started over and over again; this cycle could go on forever. This was why so much damage had been caused to the meter.

Cleaning the strainer does not solve the problem unless the flow has taken place when the hose and nozzle are in a horizontal position so that the particles stay in the strainer. In our opinion, this means that strainer inspections should be performed at a test stand that is designed appropriately. In addition, a very experienced mechanic named Bill W. once told us that if he finds anything in a strainer, he drains the entire hose into a white bucket and often finds more debris.

We must rely on the nozzle strainer to warn us of problems that may occur upstream. It is the final factor of safety. We hope no one thinks a strainer stops or holds all the dirt.

In conclusion, operators must keep in mind that they must never hold a pressure fueling nozzle with the outlet end upward prior to performing an inspection of the strainer. The ideal time to check the strainer is on the test stand after flow has taken place with the nozzle in a horizontal position.

The nozzle strainer warns of problems with the hose, meter, filter separator and all of the other equipment upstream. You must try to figure out where strainer particles come from.

What might you find in a nozzle strainer?

1. Teflon tape from recent pipe work.
2. Black particles - most likely indicate an internal failure of the hose.
3. Metal particles - most likely indicate a meter failure.
4. Fibers - filter failure.
5. Gel - filter monitor failure.

NOTE: Anything found in a 100 mesh (130 micron) nozzle strainer should not be there. No particle visible to the human eye can pass the API qualified filters (rated less than 1 micron) in your system.