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SOP on Troubleshooting Sorbent Traps in case of seeing Breakthrough and/or Spike Loss

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Dear Stack Sampling Team,

The following is a synopsis of knowledge in Troubleshooting Appendix K Stack Sampling in case of spike loss, breakthrough, and ‘wet’ or ‘hard’ carbon:

1. For “Wet” stack (After Scrubber) Sampling:

There is a problem if traps are coming back with “wet” carbon in the tube after sampling. This is a major cause of Breakthrough, Spike loss, Problems with flow, and hard “plugging” of the traps.

To troubleshoot these problems please do the following:

- A) Please use shroud which extends at least 5” inches over the end of the trap.
- B) Do not tilt probe with trap side down when removing it from the stack for trap changeovers. Condensate accumulated in the lines may leak back towards trap and upon contact with trap/heated lines turn into steam causing “steam stripping” of mercury from the back of the trap (spiked section) toward the front-into breakthrough section.
- C) Post run “leak check” vacuum should **NOT** be released through the trap cap, but rather from the after trap connection (umbilical to probe). This will prevent a surge of line condensate back into the trap.
- D) Test each trap well temperature with an independent handheld thermocouple thermometer by inserting it into each well for the length of the trap. Compare the handheld reading and units (F or C) with setting on the sampling console “Trap” (not “Probe” or “Stack”) temperature.
- E) Exposing the traps to high temperatures may lead to Spike Loss. In general, the trap temperature for a “wet” stack should be higher than the stack to

- prevent condensation. However, elevated temperature is bad for spike retention. The best range is 260-350°F and is unique for each stack due to its conditions. Test the temperature as described in D), confirm that the trap well temperatures are correct, and only after that start decreasing the temperature in 50°F intervals.
- F) We have incredibly strenuous QAQC procedures making spiking absolutely fool-proof. Therefore, it is very unlikely that the spike is wrong. In case of doubt, send a couple of unexposed traps back to Ohio Lumex for testing. You will be credited for the shipping and the traps. If we ever find a problem we will credit your account and replace all of the traps free of charge.
 - G) Consider switching to the High Moisture Resistant extended length Sorbent Traps. We custom make these sorbent traps for “wet” source clients.

2. Dry Stack with Urea or Anhydrous Ammonia Spray

- A) If traps are coming back with “hard” carbon or the loss of flow/vacuum is to “high,” increase the temperature gradually up to 350°F.
- B) Loss of Spike might still be an issue. At “dry” stacks the temperature could be just 25°F elevated above the stack temperature. Decrease the temperature in 25°F interval.
- C) After the trap condensation may still be a problem. Practice technique described in paragraph 1 section C) and D).

3. Stacks with High SO₂ and SO₃

- A) High SO₂ and SO₃ concentrations in the stack gas have a drastic effect on mercury. They basically fight for space against mercury on the activated carbon and force the mercury to pass through the trap or displace it. They have a tendency to lead to extreme breakthrough and spike loss.
- B) With these conditions please be wary of the temperatures the traps are exposed to. This means please follow the technique described in paragraph 1 section C) and D).
- C) Also, consider using sorbent traps with an Acid Gas Scrubber before the first section of sorbent. This will scrub the Acid Gases out of the flue gas and allow mercury to deposit on the first Activated Carbon bed.