Worldwide Pollution Control Association

WPCA/TVA

Coal & Gas Seminar

August 24, 2016

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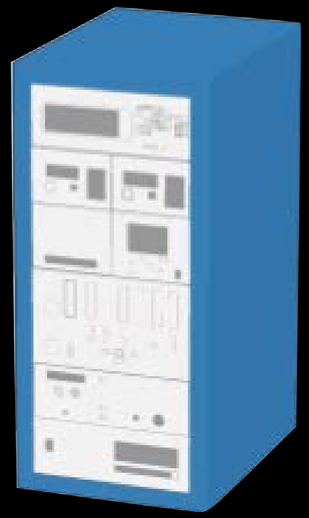
Flue Gas Sampling

Some Considerations and Recommendations



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Background

Current EPA regulations forcing tough decisions for plants

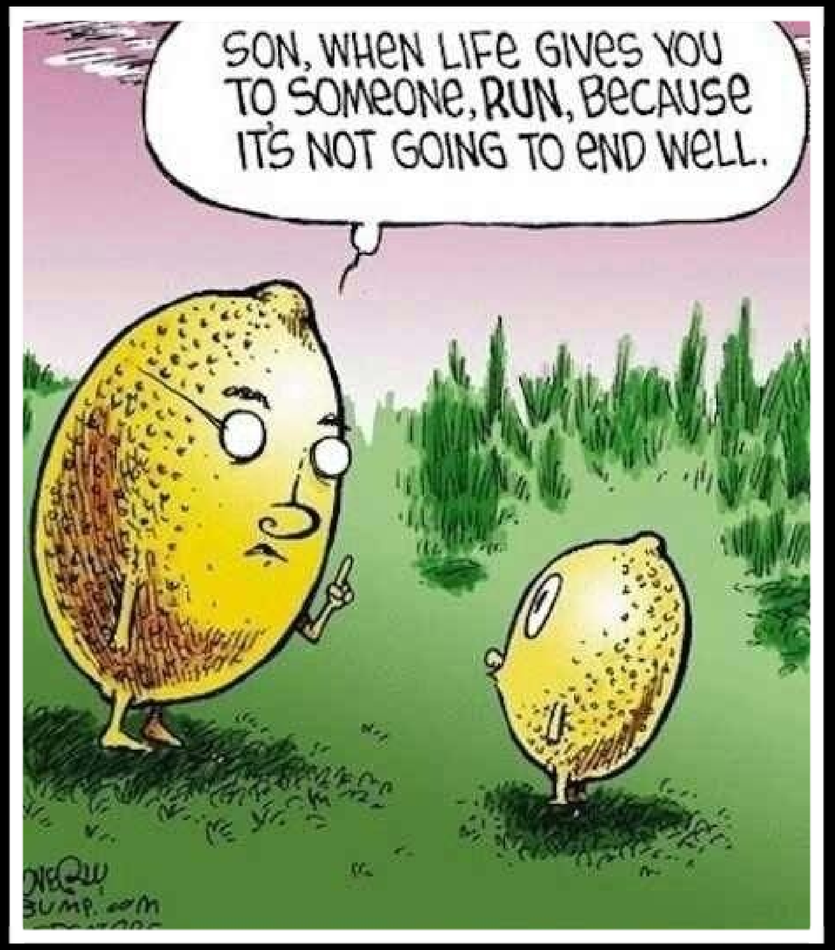
Current stack testing standard methods have inherent biases

New and emerging methodologies are perceived as risk

But…

But…

When life gives you lemons make lemon water which has numerous health benefits



There is Hope

EPA is moving (slowly) towards allowing alternative methods

New research helps everyone understand testing issues

Some new methodologies are proving successful

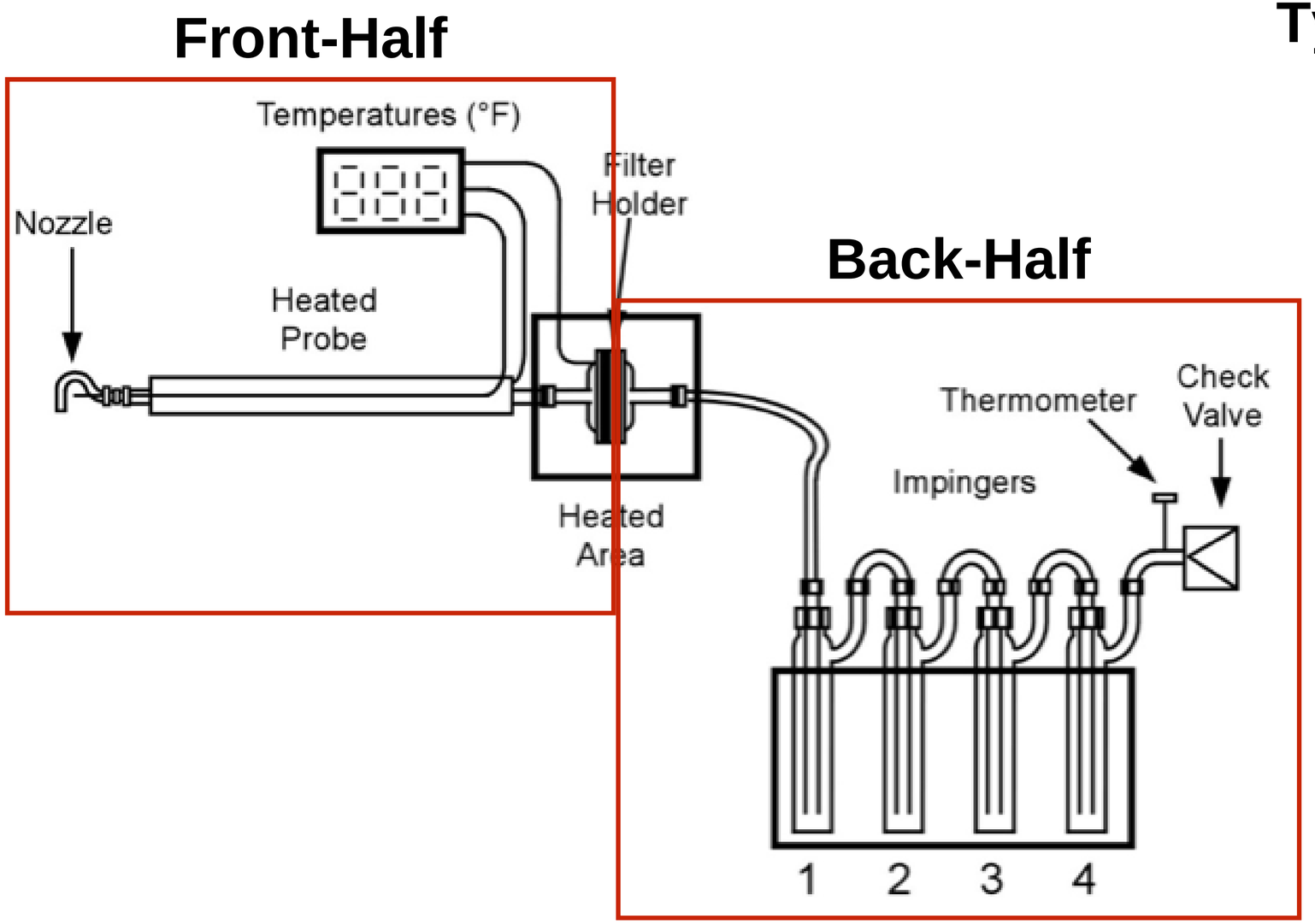
Speaking of Which…

Wet scrubbers can cause entrained droplets in the stack

Under current regulations, isokinetic wet method is necessary in this situation

Entrained droplets can cause HCl bias when passed through the wet method sampling system

Cateco Box Setup



Typical M26A sampling system

Glass nozzle/probe liner

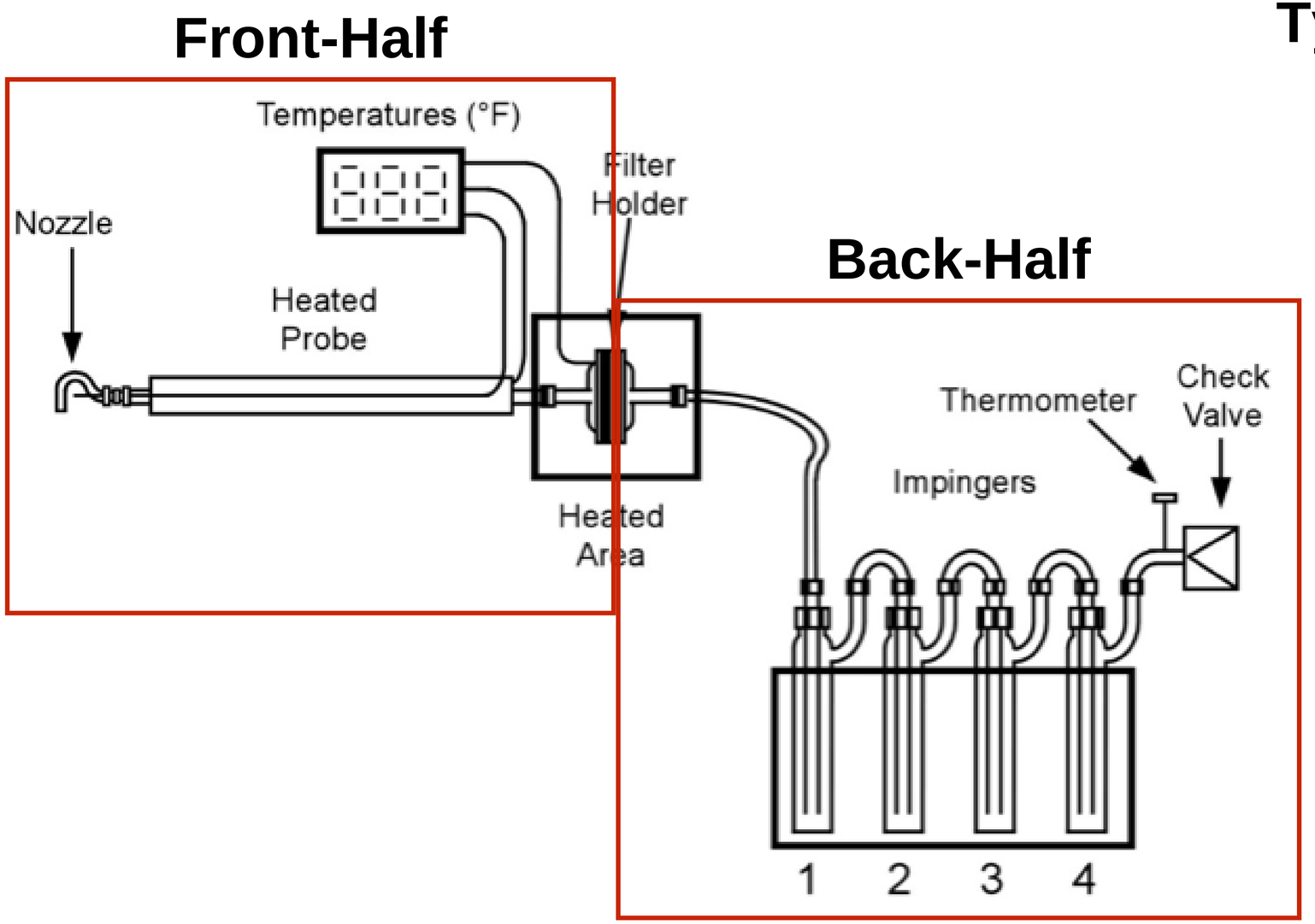
Heated front-half

Ice bath back-half

Filter allows HCl to pass to back-half

Filter stops other chlorinated compounds

Cateco Box Setup



Typical M26A sampling system

Glass nozzle/probe liner

Heated front-half

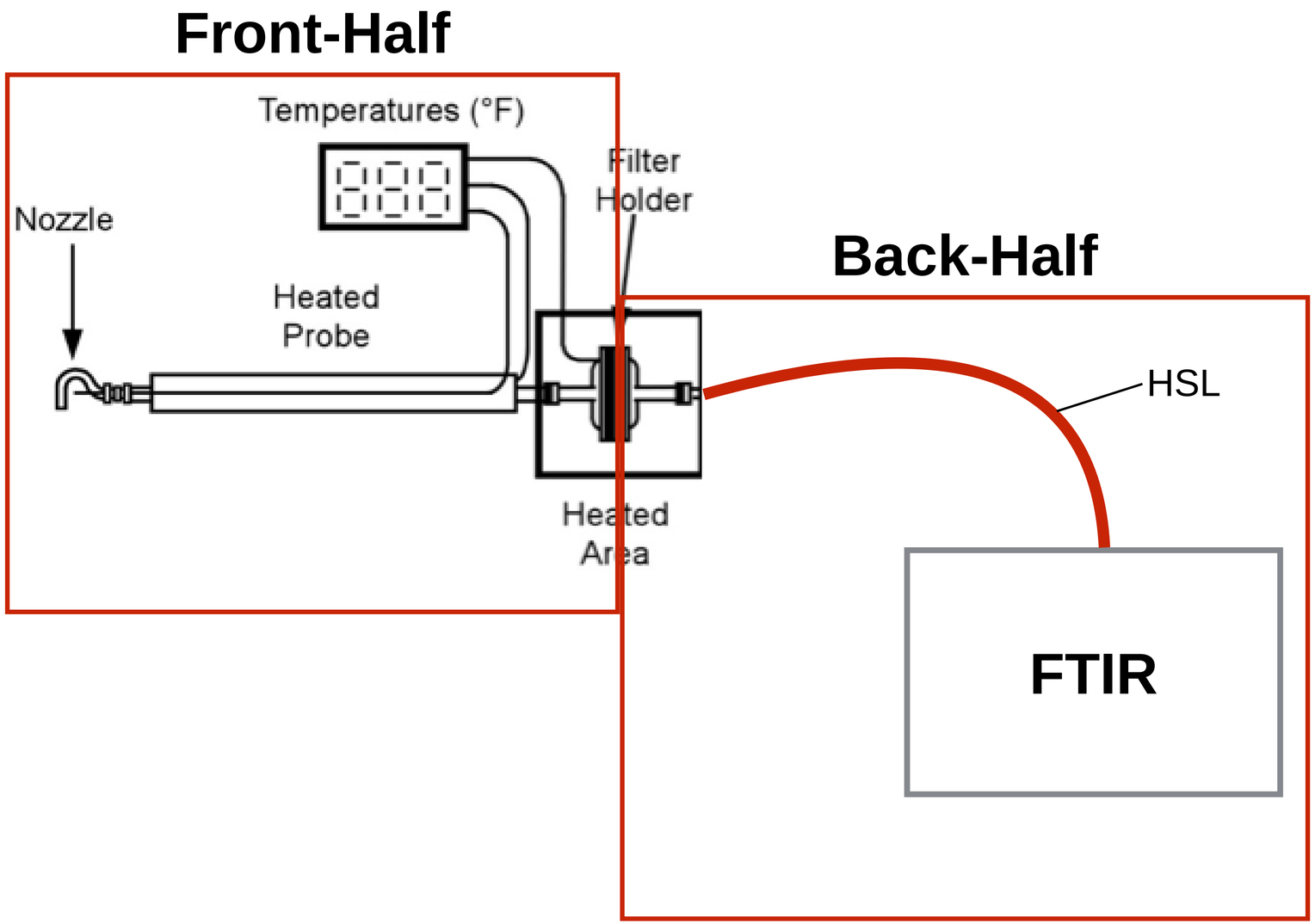
Ice bath back-half

Filter allows HCl to pass to back-half

Filter stops other chlorinated compounds

Or does it?

Isokinetic FTIR Setup



Iso-FTIR sampling system

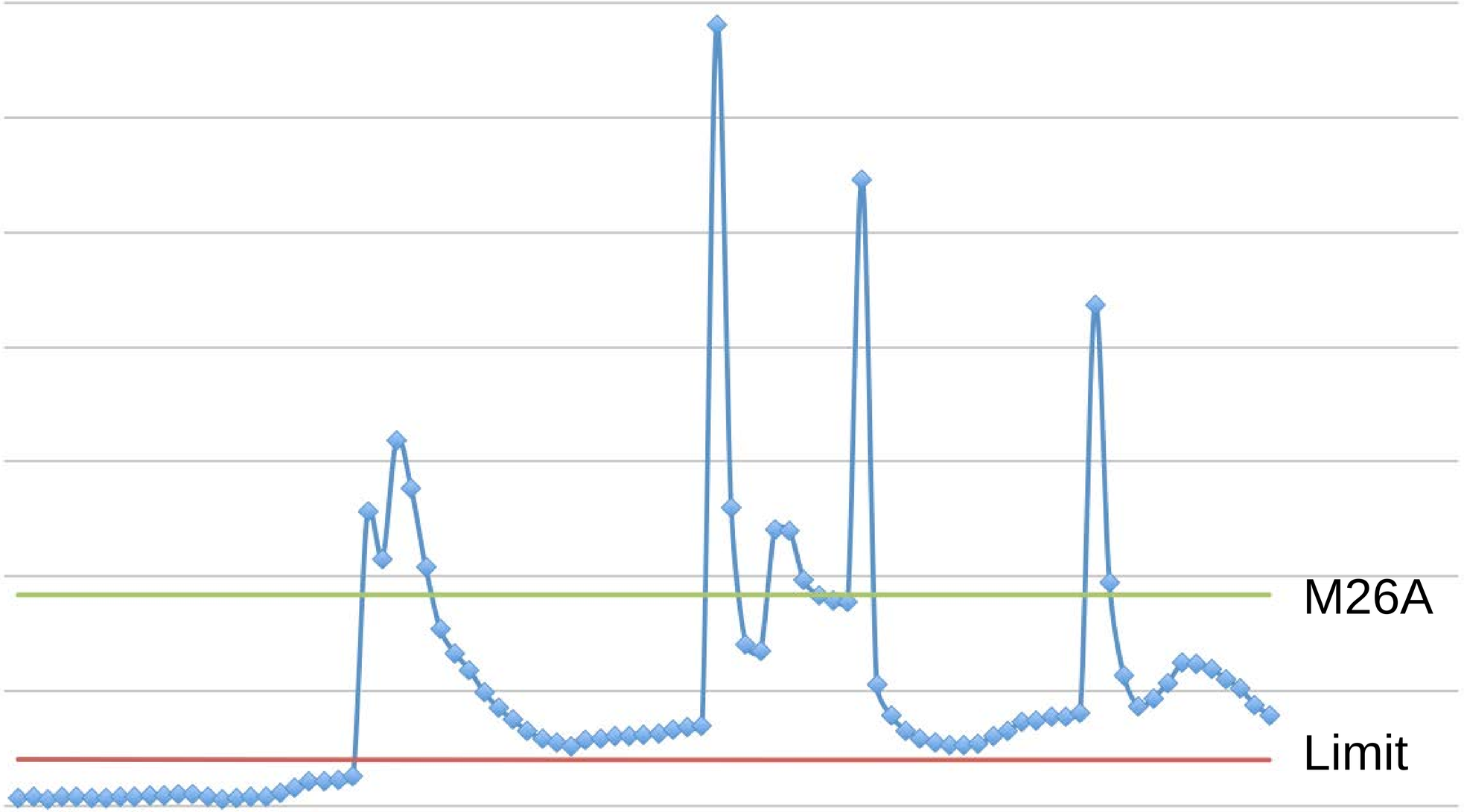
Same front-half

Same filter

HSL heats sample to FTIR analytical temperature

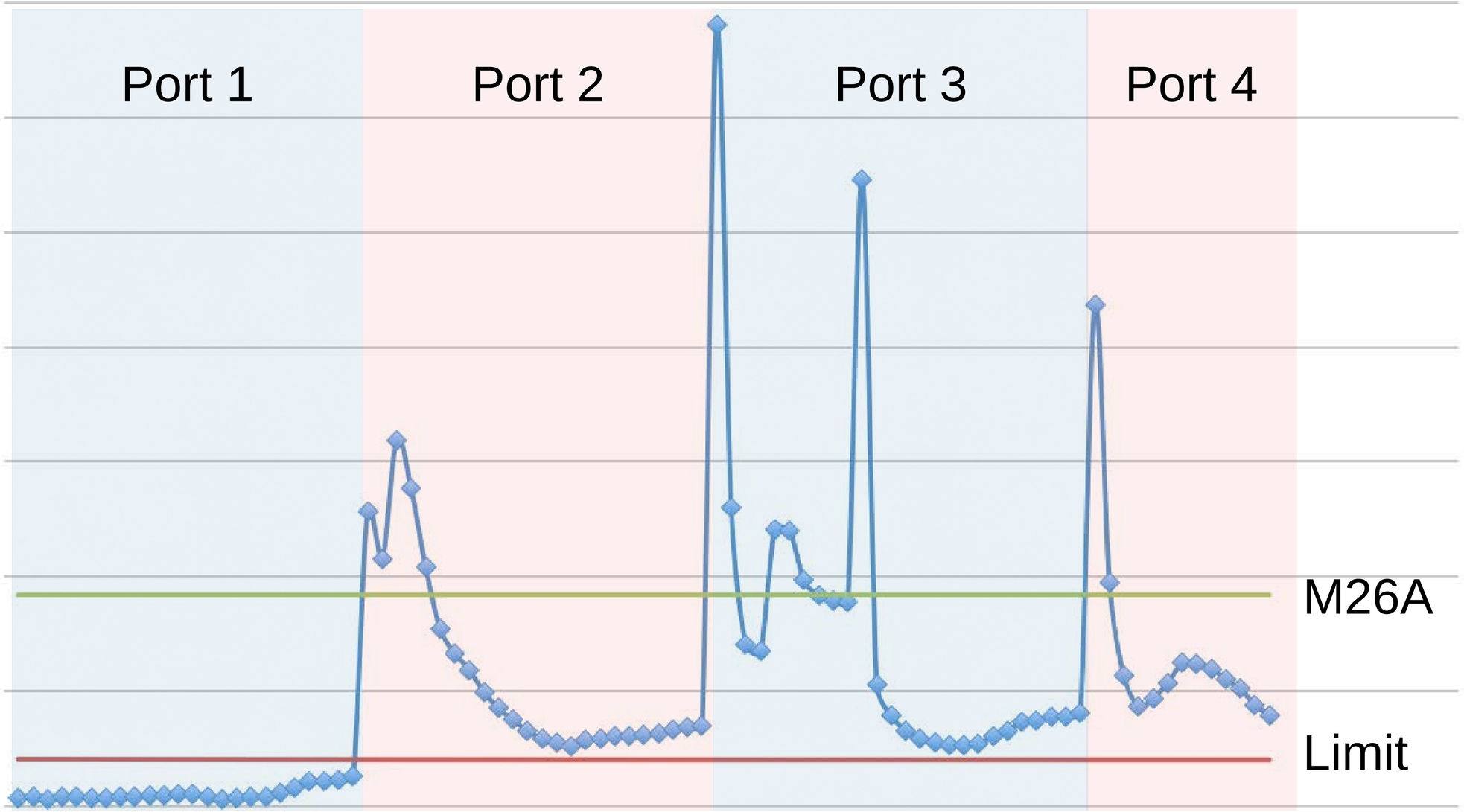
FTIR analyzes HCl, and other compounds

FTIR HCl Concentrations



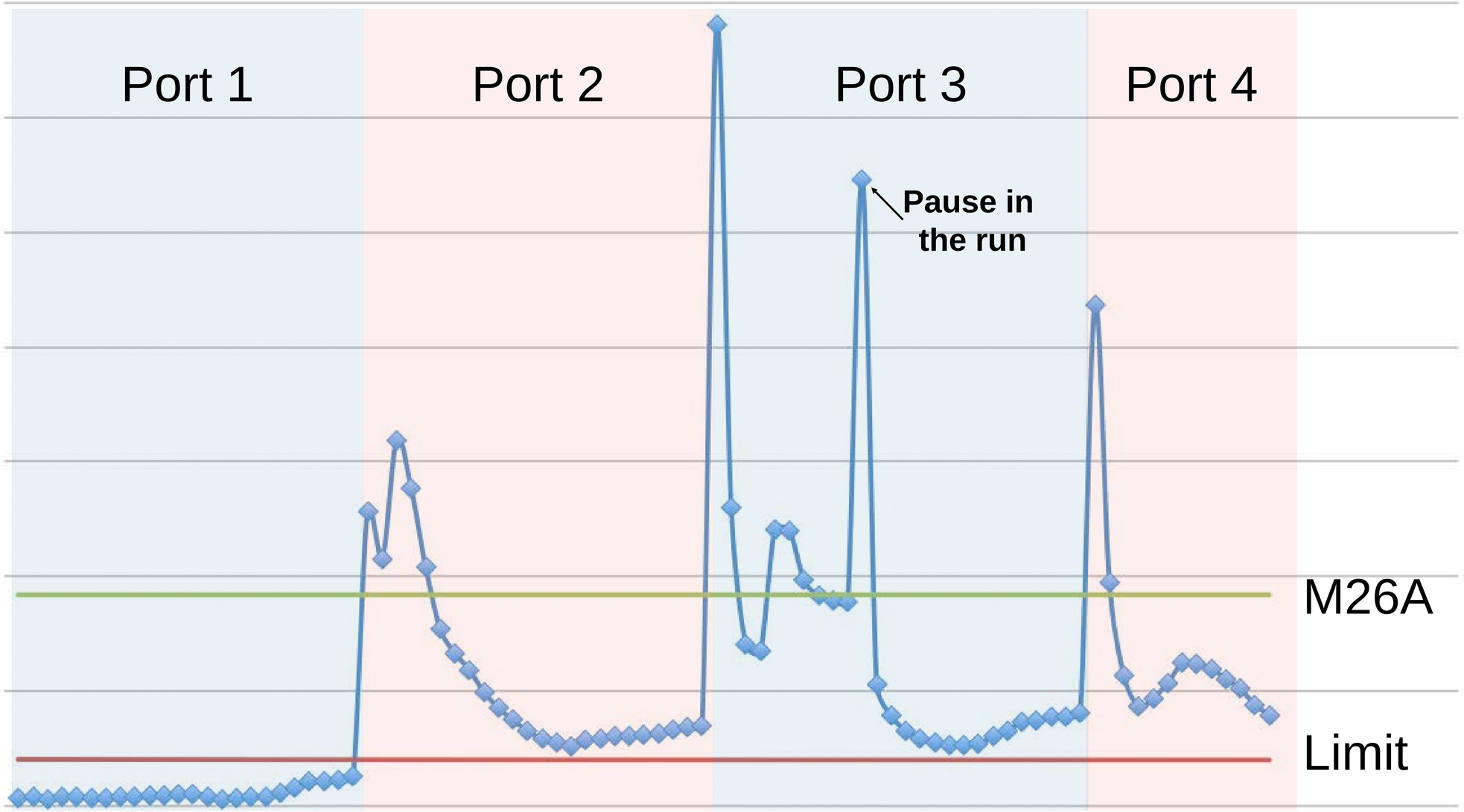
FTIR concentration generally less than wet method.

FTIR HCl Concentrations



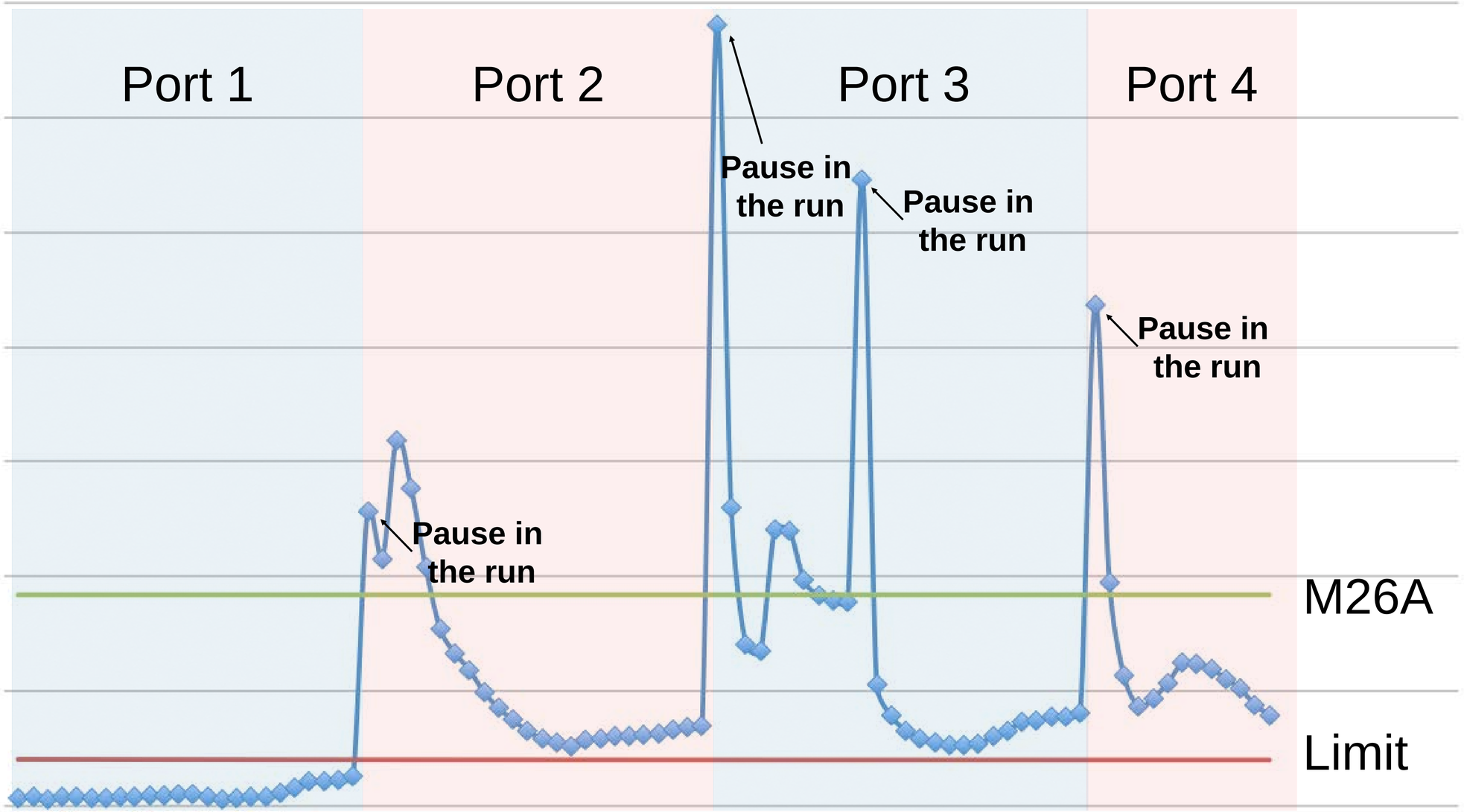
FTIR concentrations increase after first port change.

FTIR HCl Concentrations



Unexpected spike occurs due to a pause in the run.

FTIR HCl Concentrations



In fact, spikes at port changes occur due to pauses in the run.

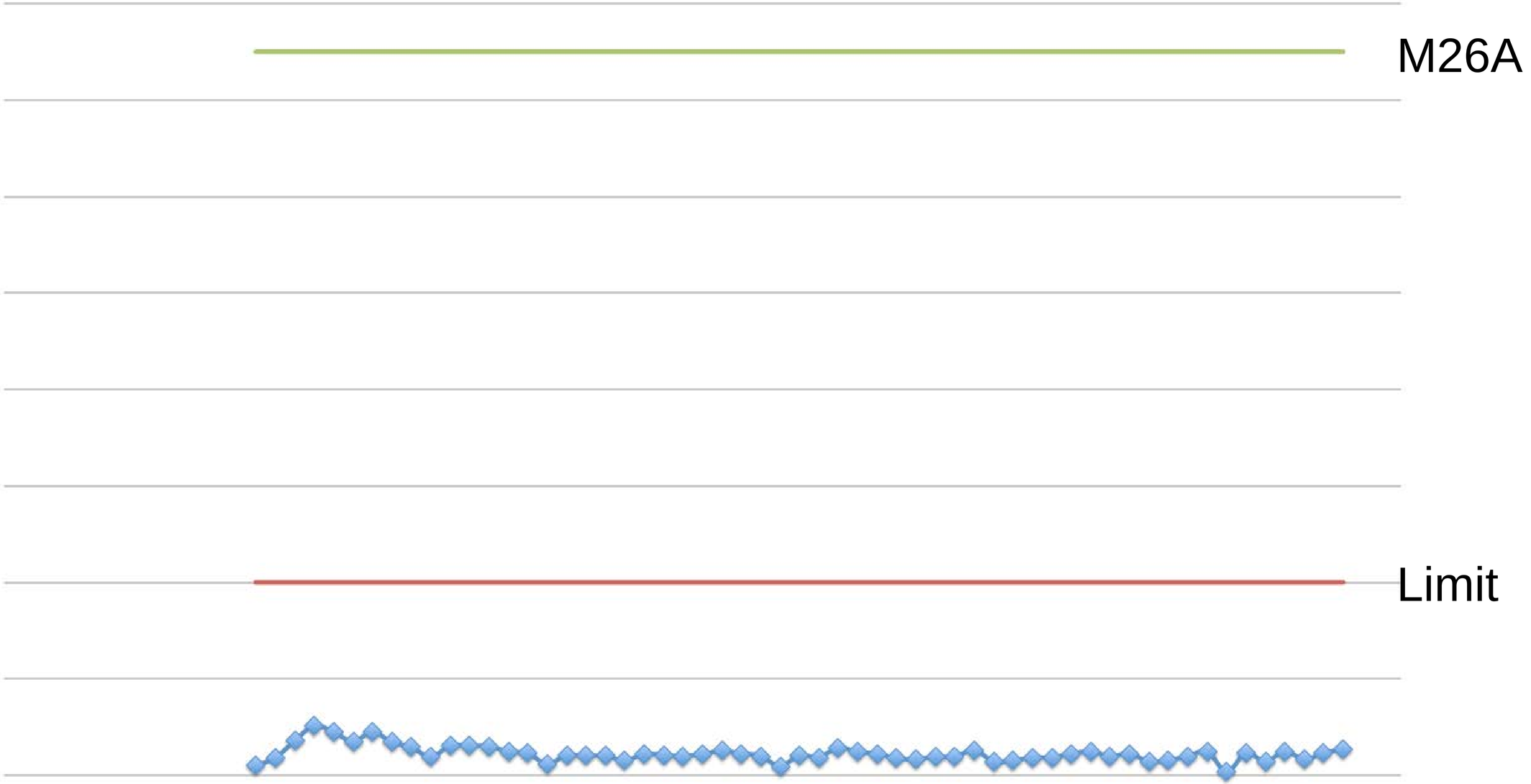
Mechanism For Spikes

A chlorinated compound (most likely calcium chloride) is in the liquid water droplets

Stagnation in the probe and filter during port changes causes free-chloride gas

Persistent HCl increase due to droplet pooling

FTIR HCl Concentrations



Solution: FTIR does not require total volume; therefore no pauses.

Conclusions

Current stack testing methods are under scrutiny

Research is good and necessary for progress

Drinking lemonade is better than sucking on lemons (to me at least)

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