

# GC analyses results ecogas

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# Motivation and analysis steps

- GC analyses carried out at beginning of February with pure Ar showed some strange peaks
- We decided to analyze the whole ECO2 mixture and each gas separately (because with the GC alone one cannot identify the components of a mixture but only separate them)
- We will show the results in “steps” and try to explain them
- Some air leaks have also been found and fixed on site by Stefania (thanks!)
- **Caveat #1:** measurements not shown in “temporal order” for ease of explanation but dates of each measurements shown in each slide
- **Caveat #2:** for all the measurements we flushed the GC directly from the mixer (before the humidifier) and we don't flush the RPCs

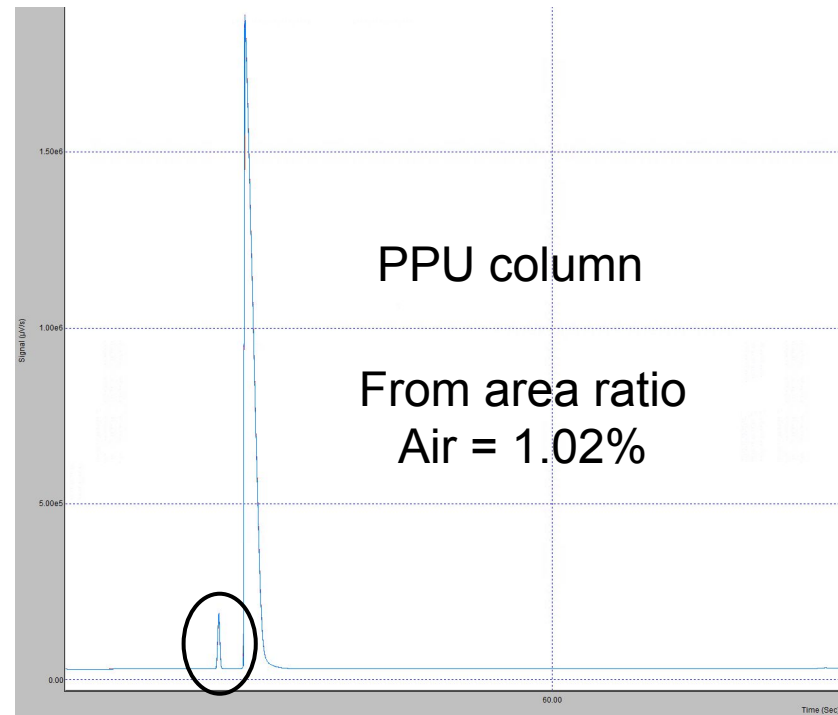
# Air leak



Air leak at GC input

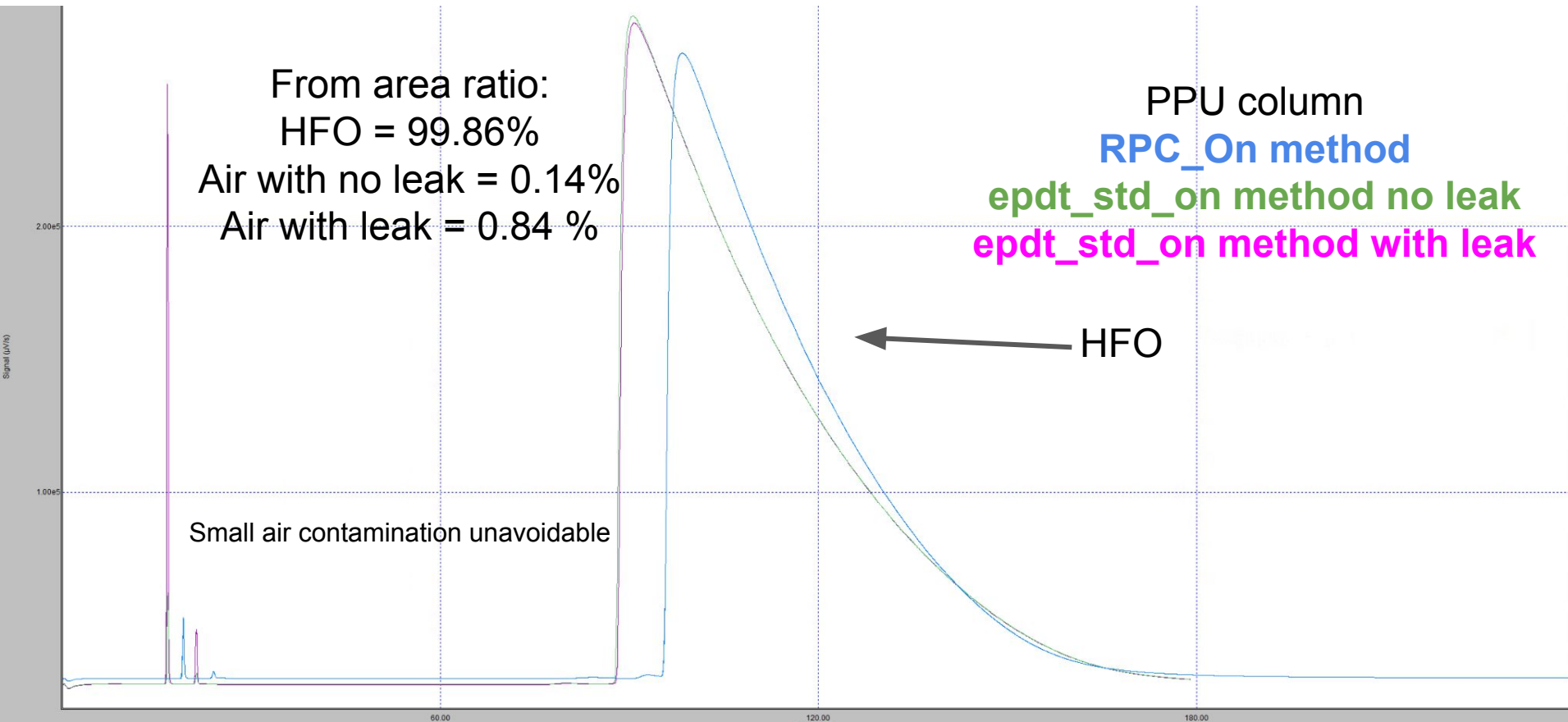


Air leak at mixer

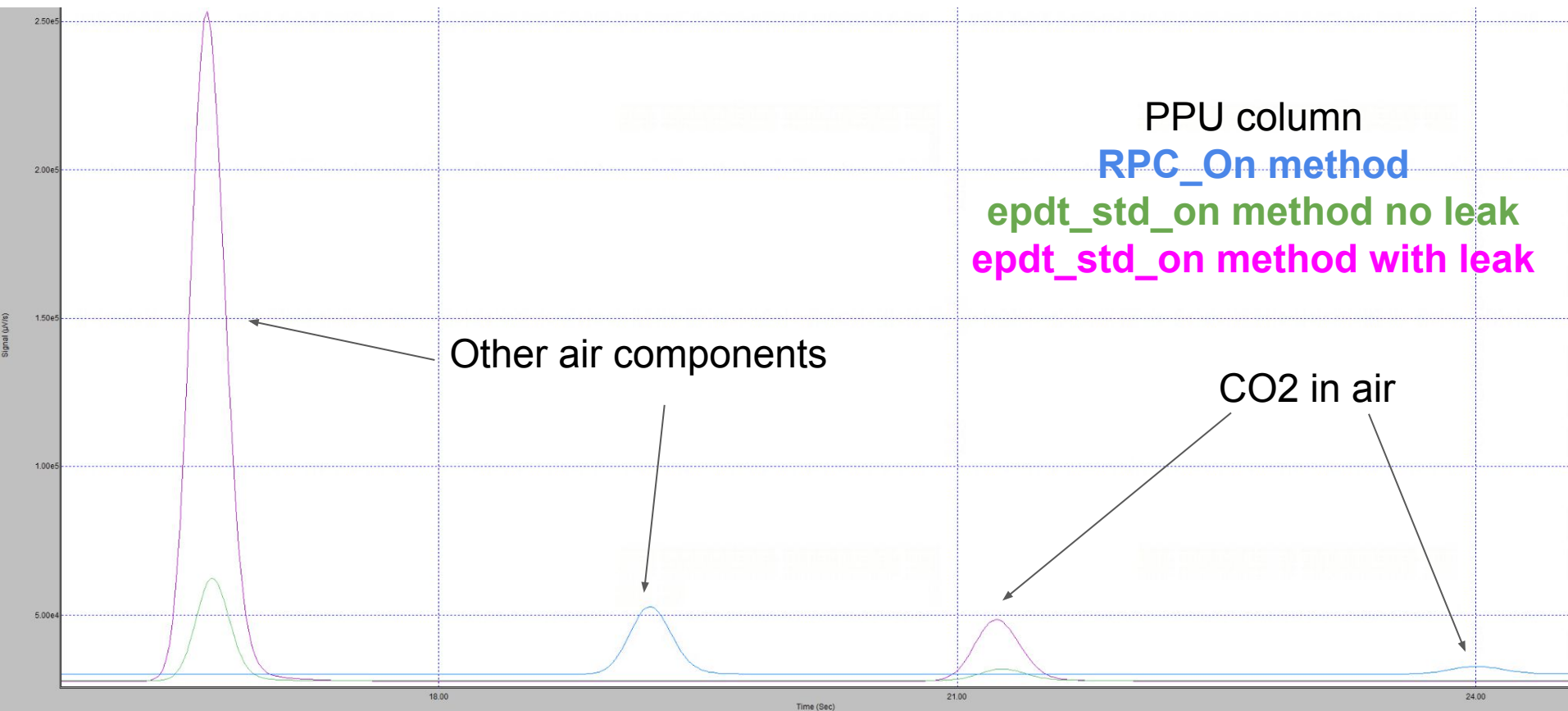


Air peak visible in GC

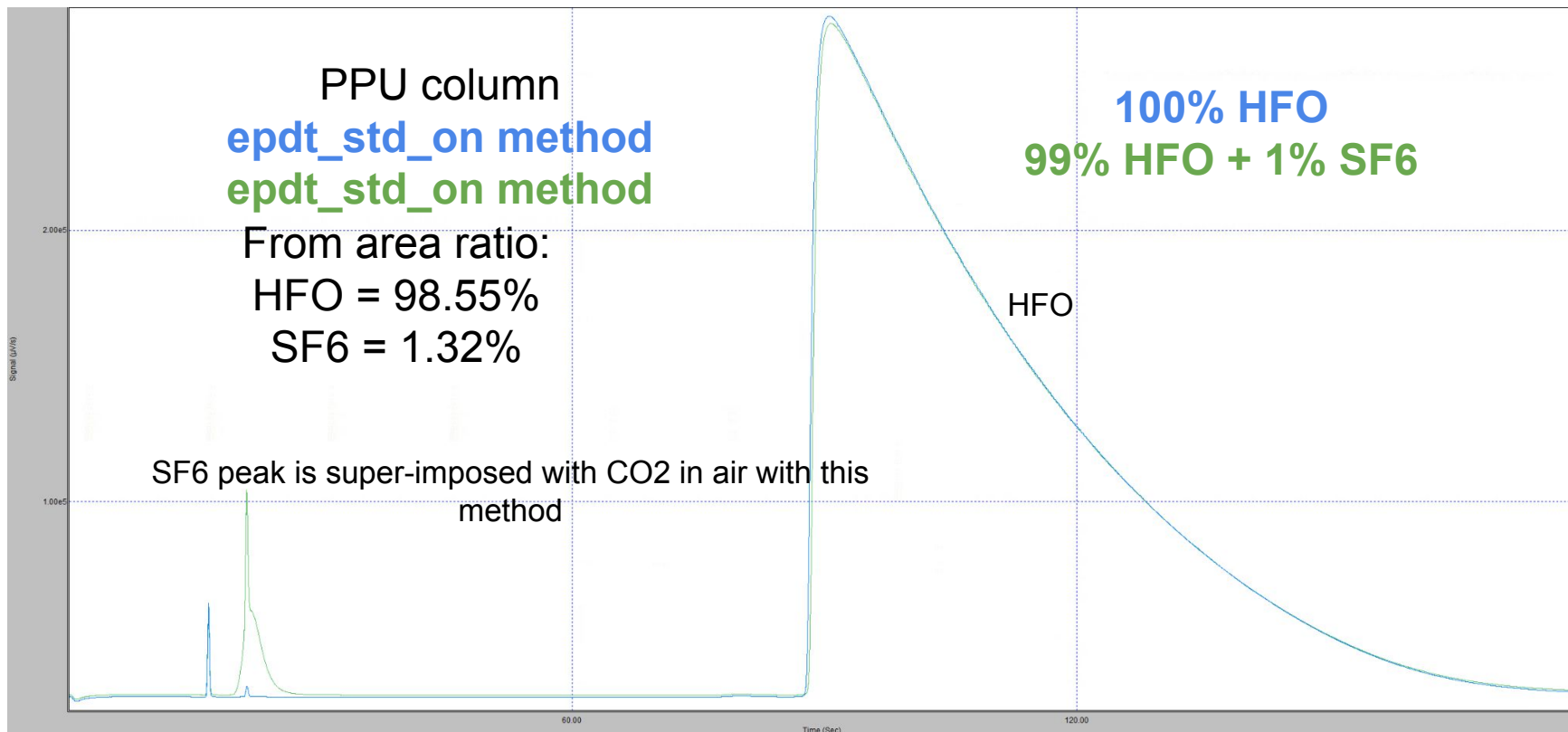
# Pure HFO



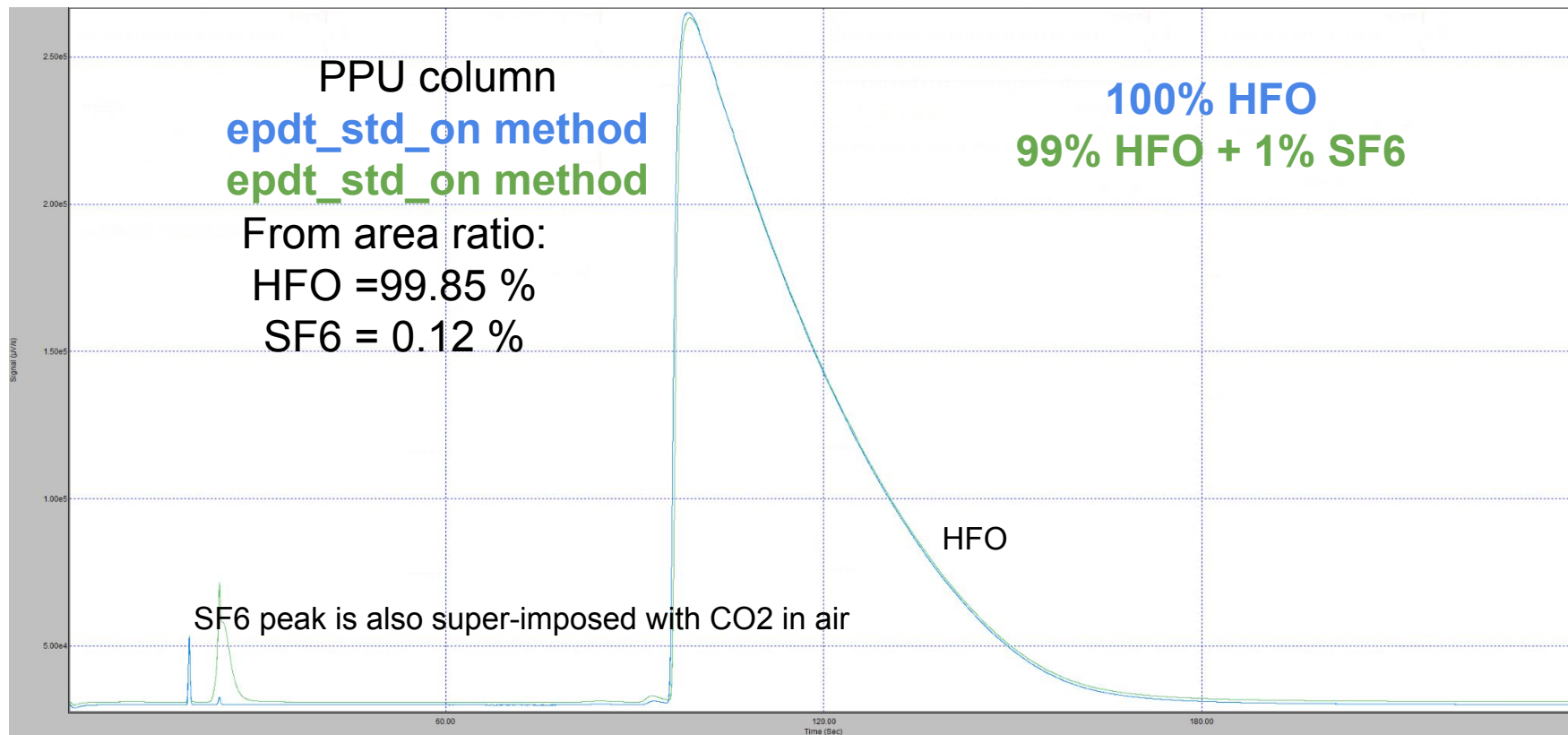
# Pure HFO - zoom on air leak



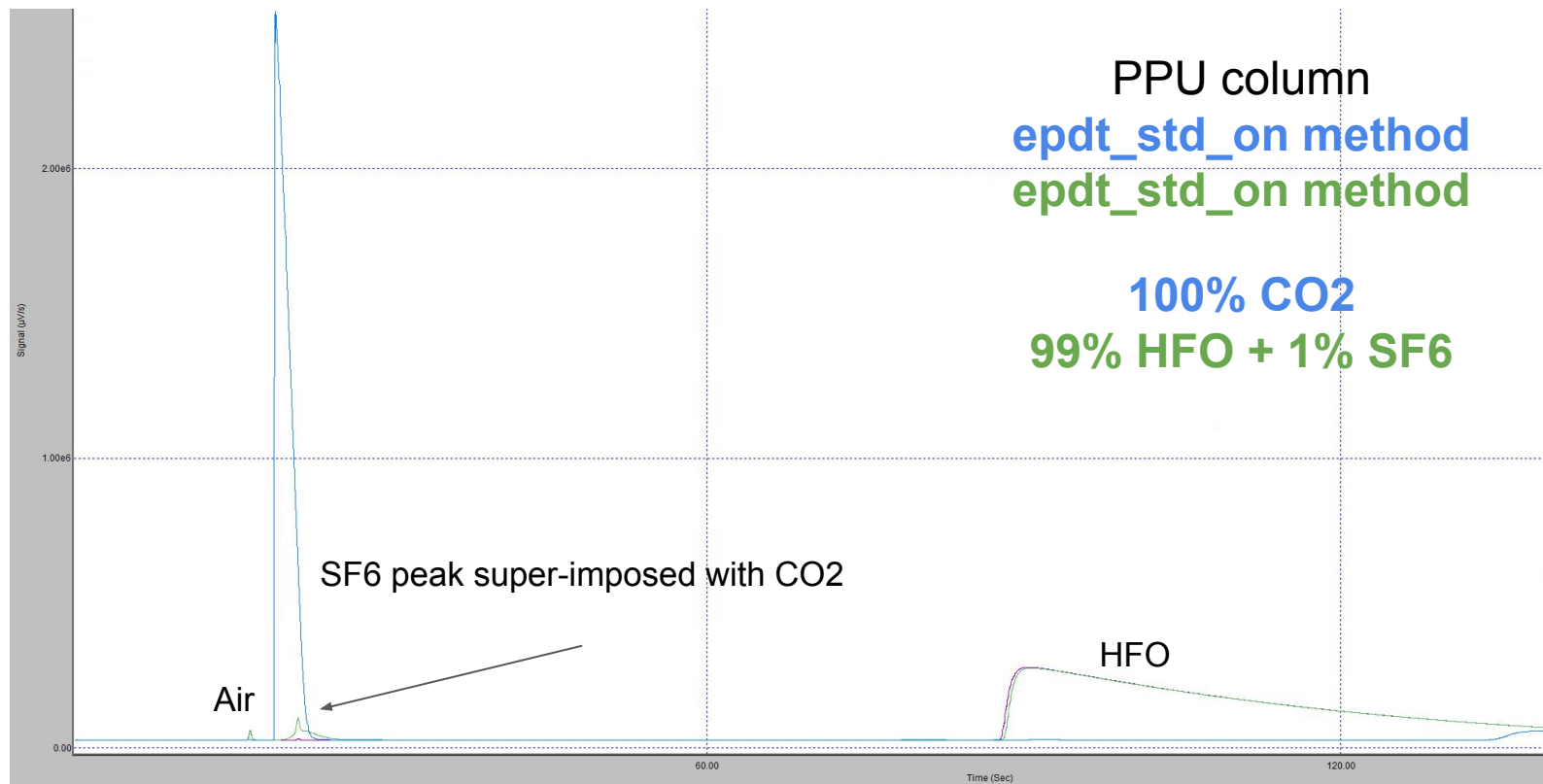
# HFO + 1% SF6 no air leak - EPDT method



# HFO + 1% SF6 no air leak - RPC\_on method

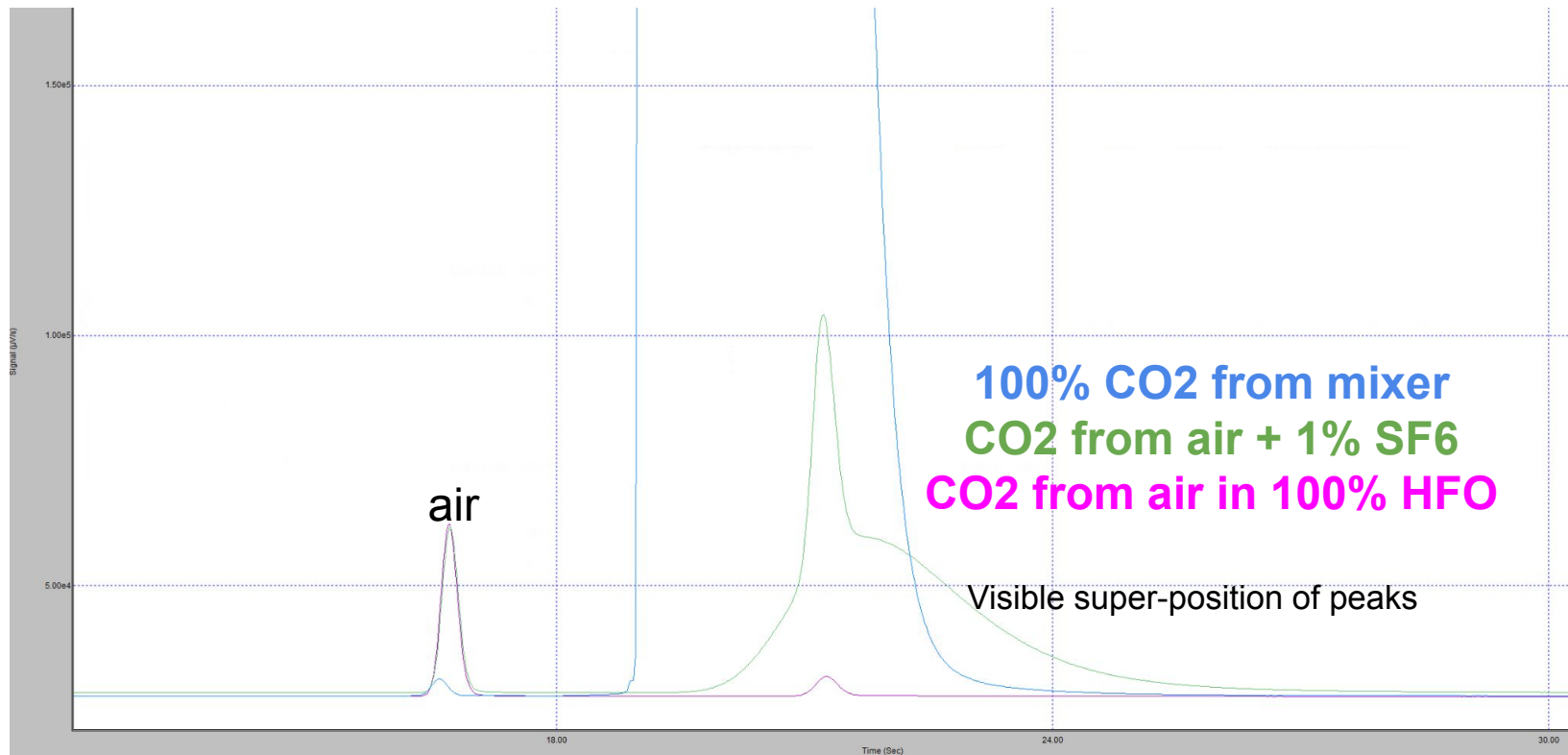


# Pure CO<sub>2</sub> compared to HFO + 1% SF<sub>6</sub>

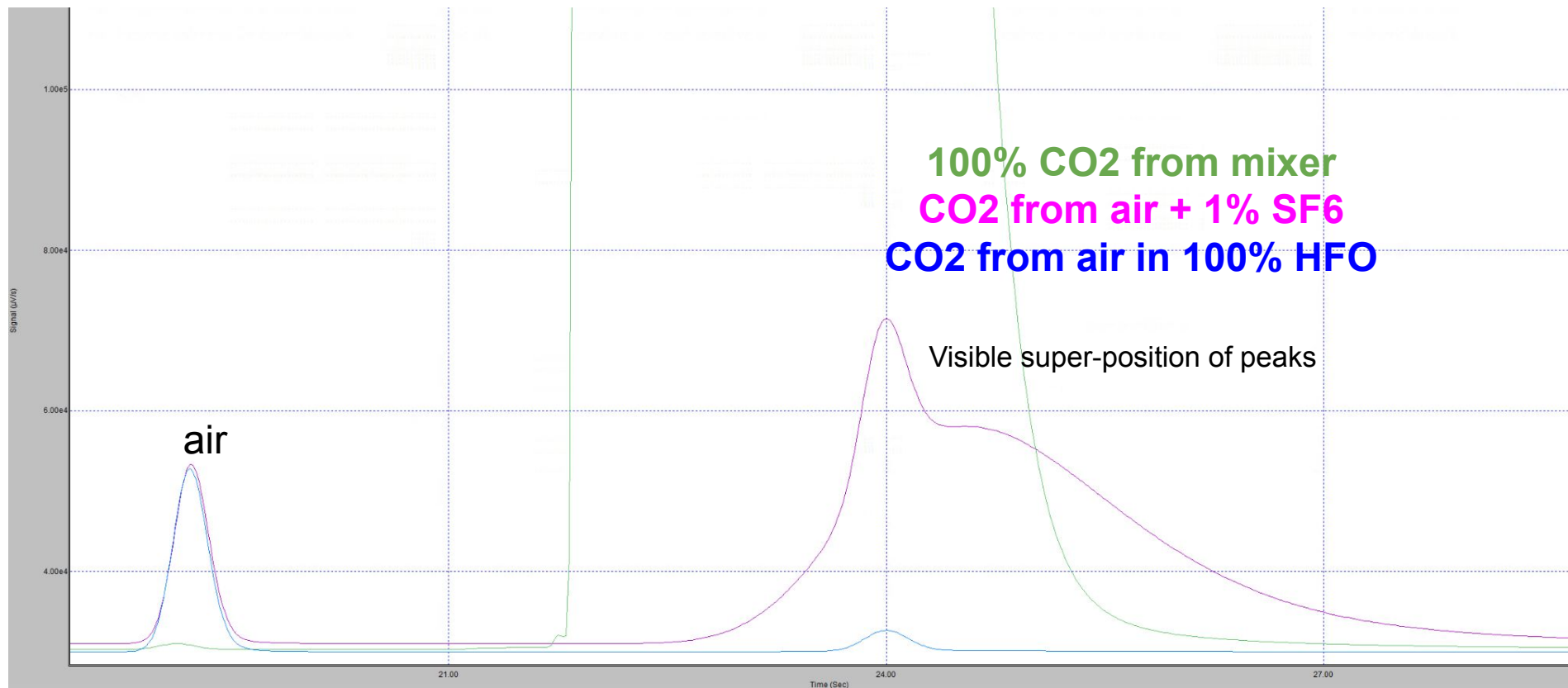




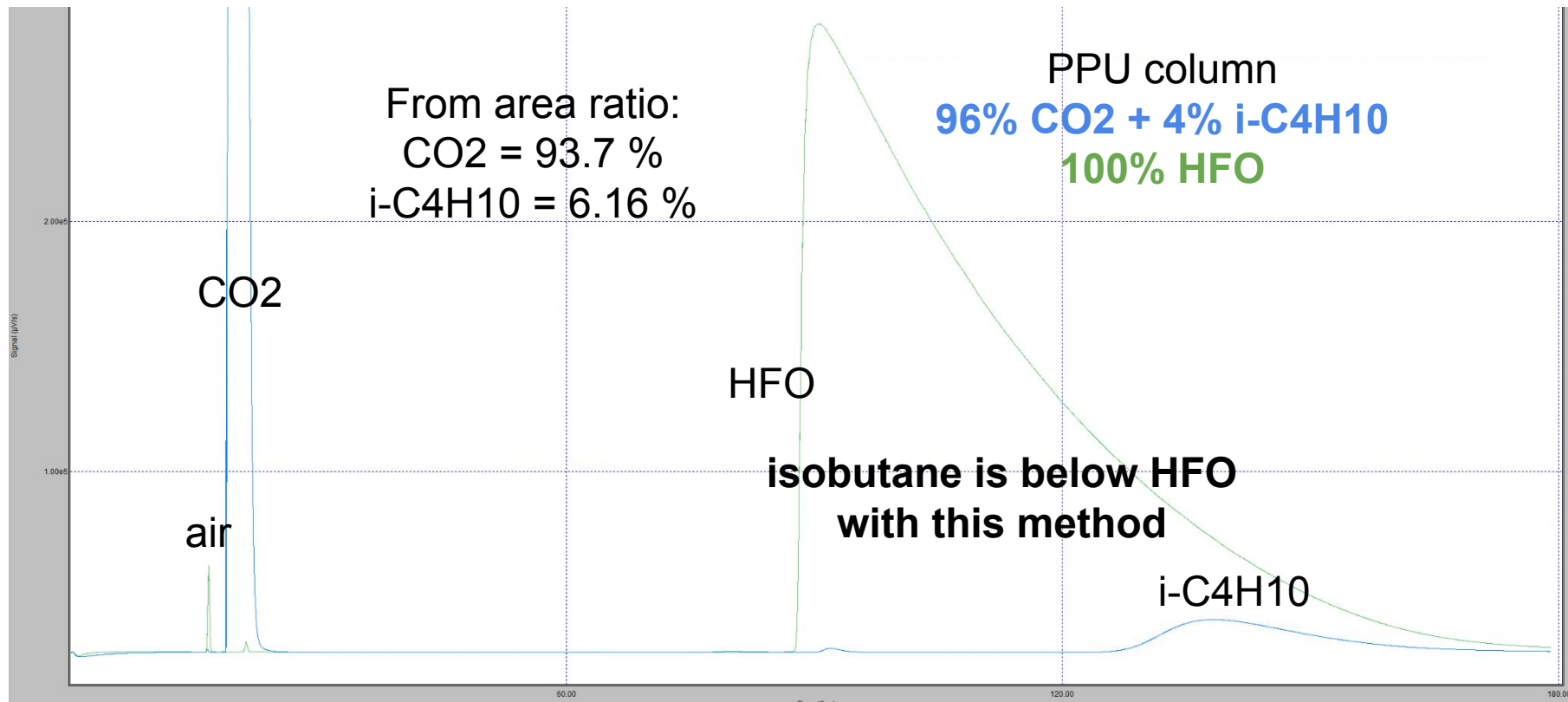
# Pure CO<sub>2</sub> compared to HFO + 1% SF<sub>6</sub> - zoom



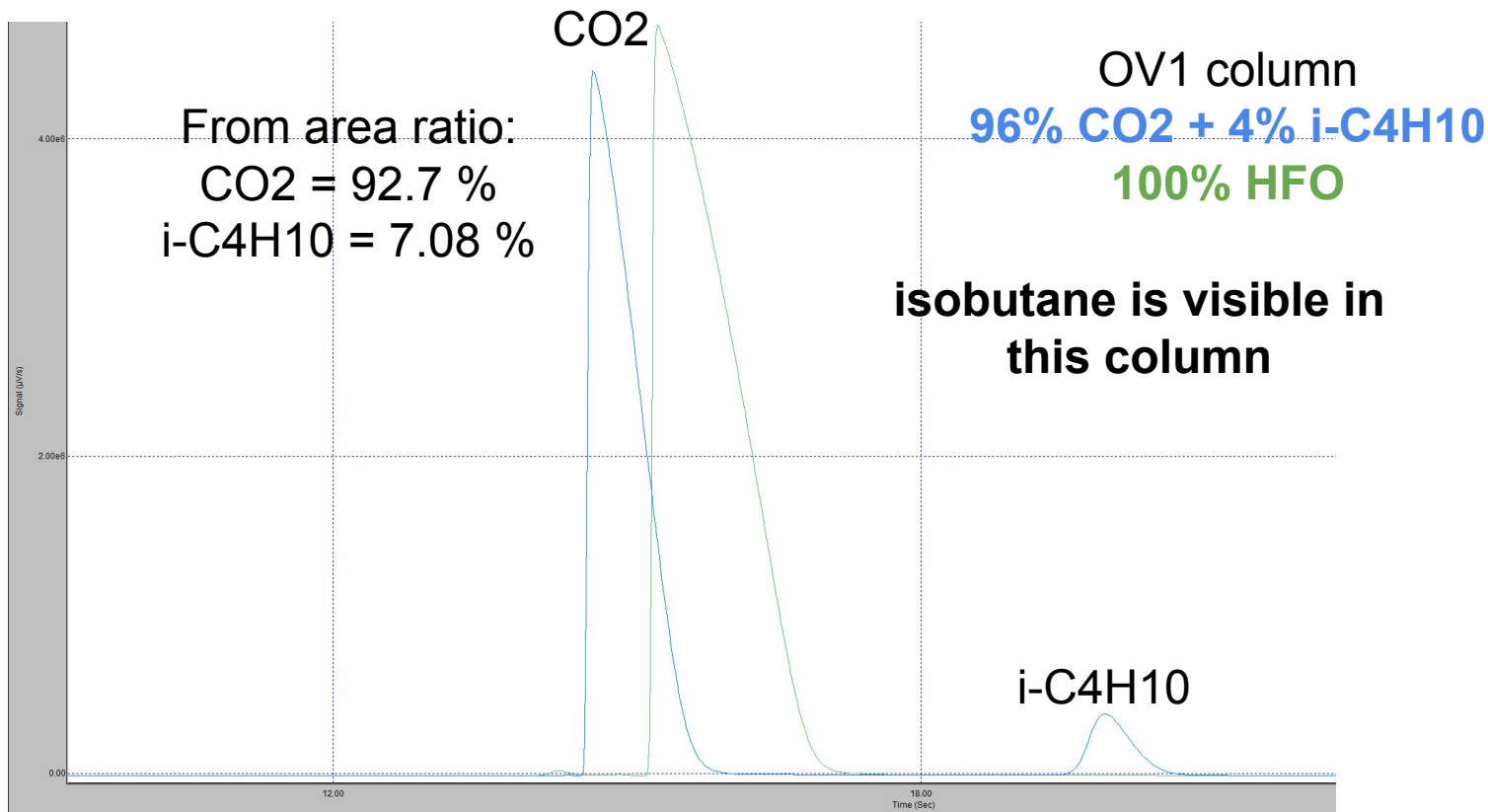
# Pure CO<sub>2</sub> compared to HFO + 1% SF<sub>6</sub> - zoom RPC method



# CO2 + 4% i-C4H10 EPDT method

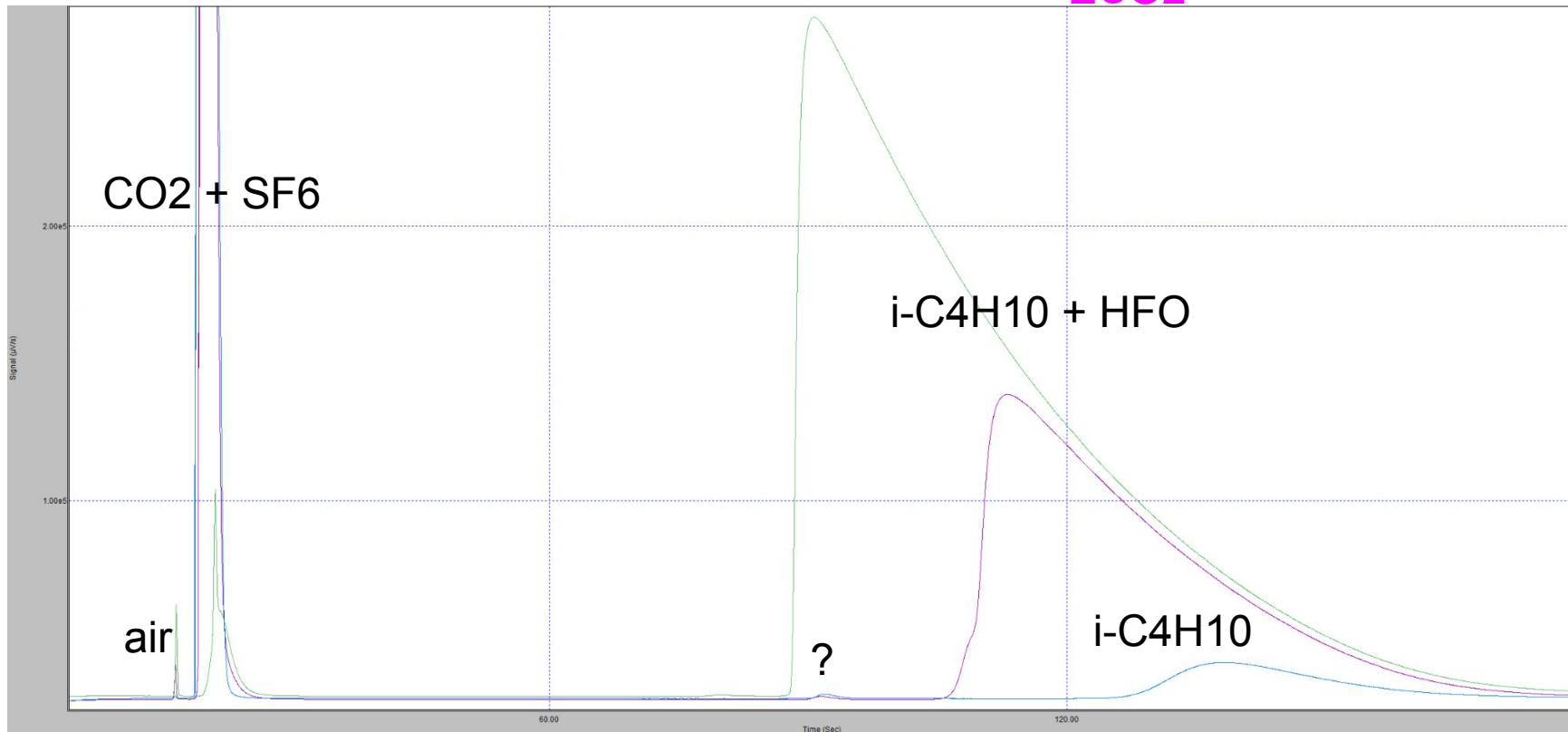


# CO<sub>2</sub> + 4% i-C<sub>4</sub>H<sub>10</sub> EPDT method



# ECO2 gas mixture

PPU column  
96% CO<sub>2</sub> + 4% i-C<sub>4</sub>H<sub>10</sub>  
99% HFO + 1% SF<sub>6</sub>  
ECO<sub>2</sub>



# Gas Retention Times

From the tests performed, we observed that:

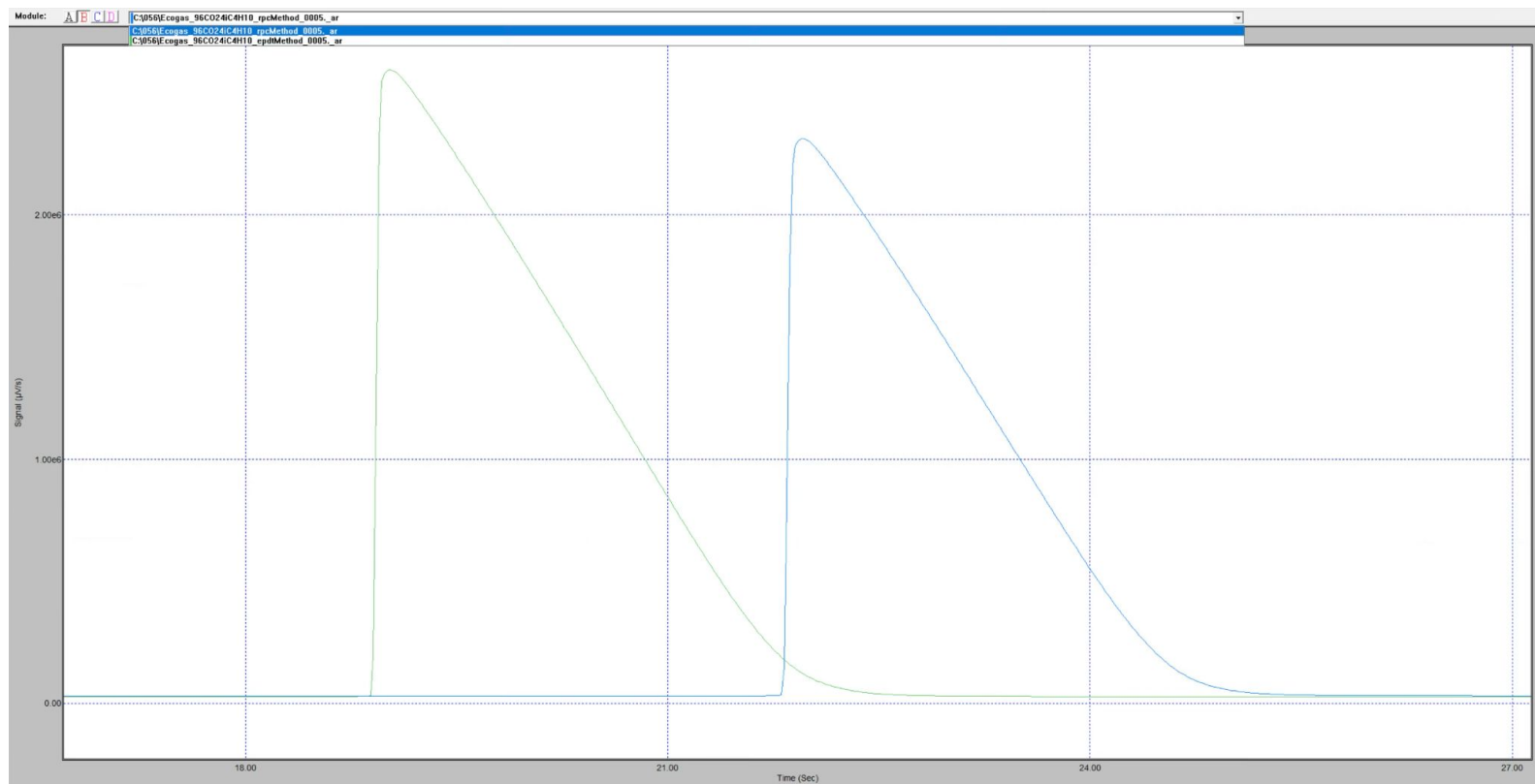
- HFO and i-C<sub>4</sub>H<sub>10</sub>
- CO<sub>2</sub> and SF<sub>6</sub>

show peaks around the same retention time with both methods tested.

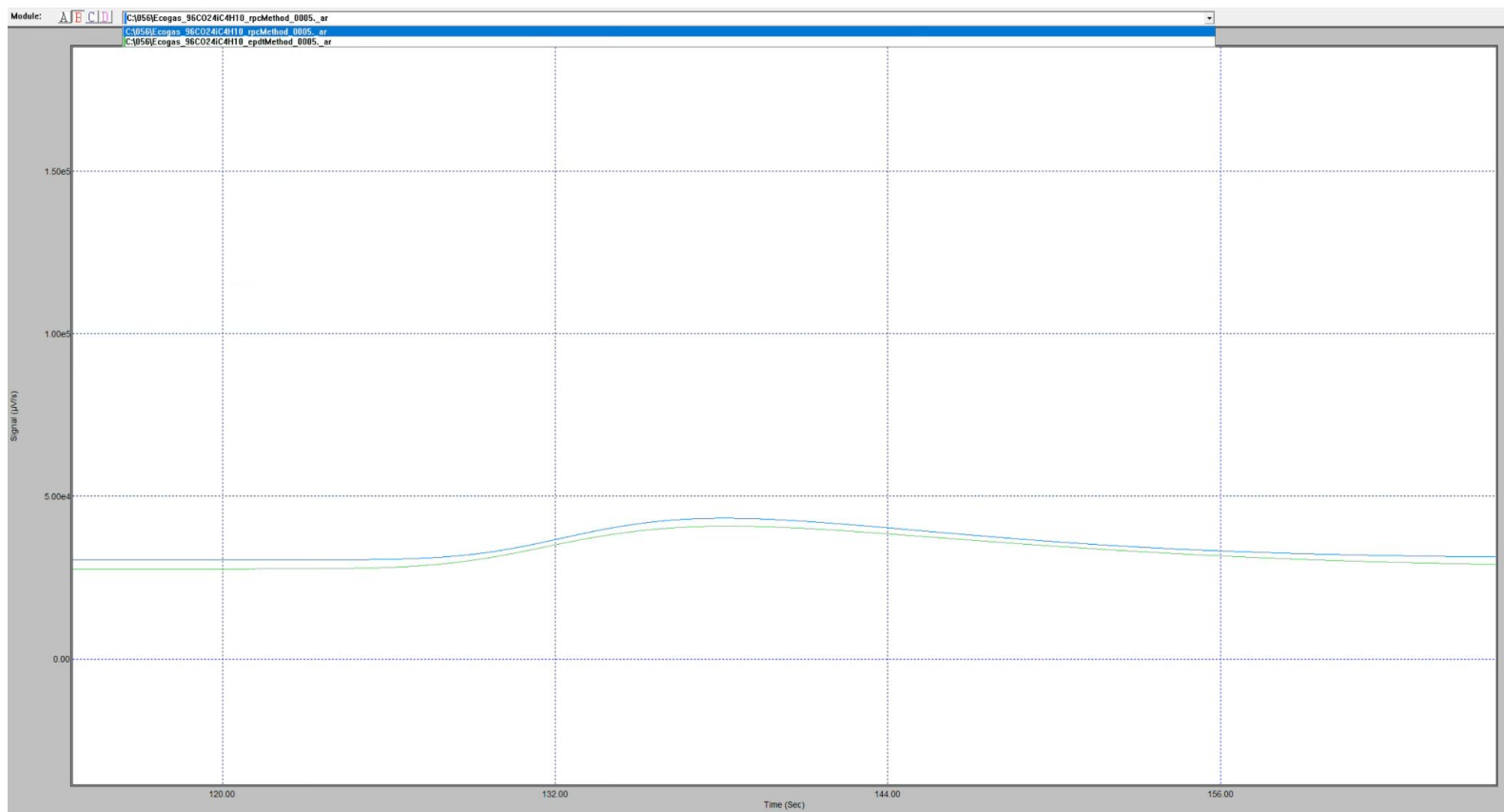
This makes it difficult to understand their ratios in the ECO<sub>2</sub> mixture.

Component	Retention Time [s] - PPU	
	EP-DT	RPC On
HFO	90	100
CO <sub>2</sub>	19	22
iC <sub>4</sub> H <sub>10</sub>	132	132
SF <sub>6</sub>	19	23

# CO<sub>2</sub>

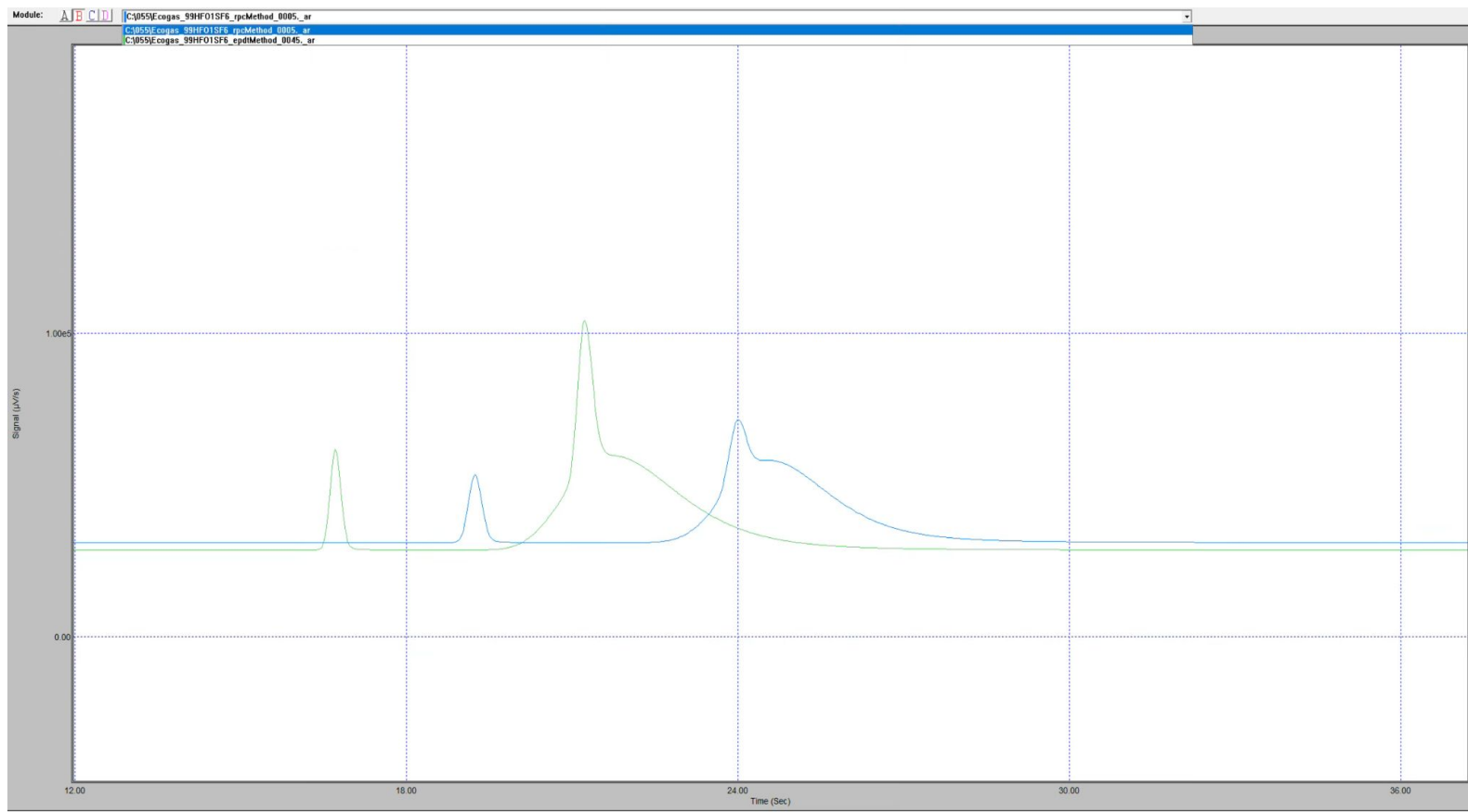


# i-C<sub>4</sub>H<sub>10</sub>





# SF6



# HFO

