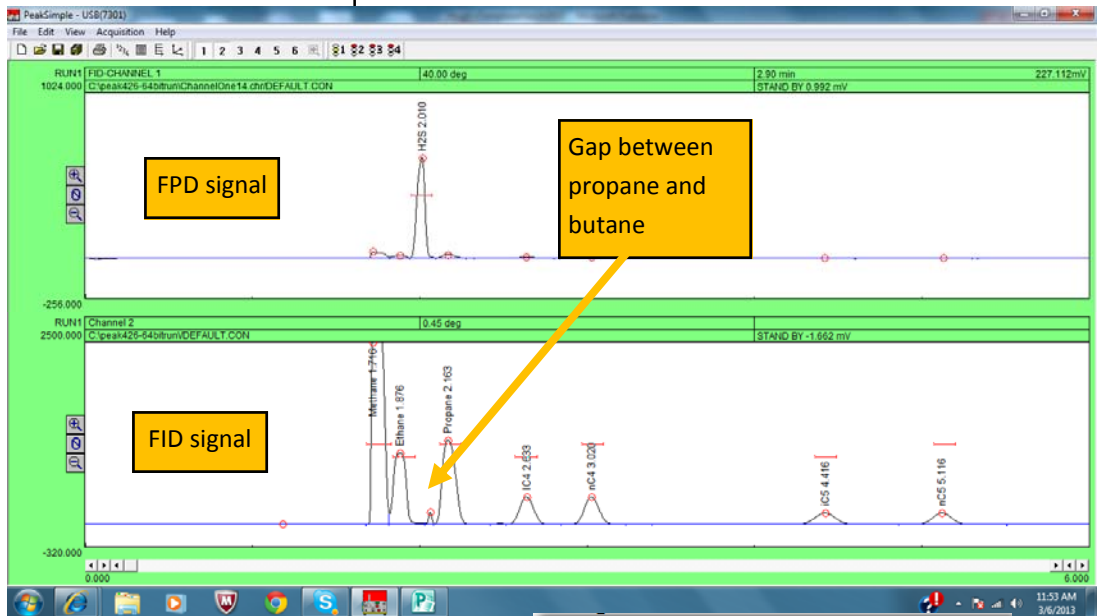


Sulfur in Natural Gas /LPG GC configuration

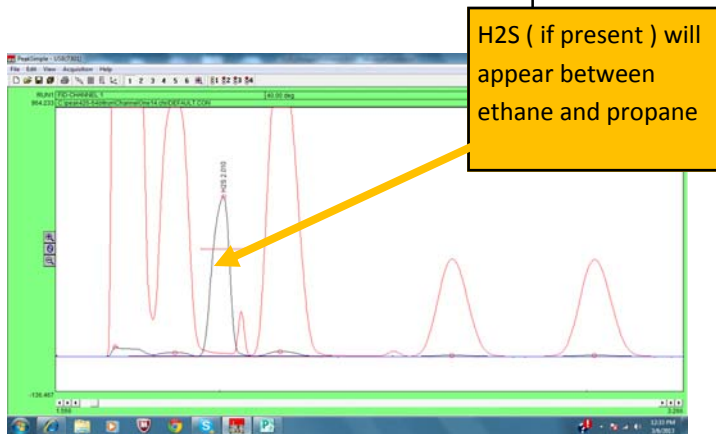
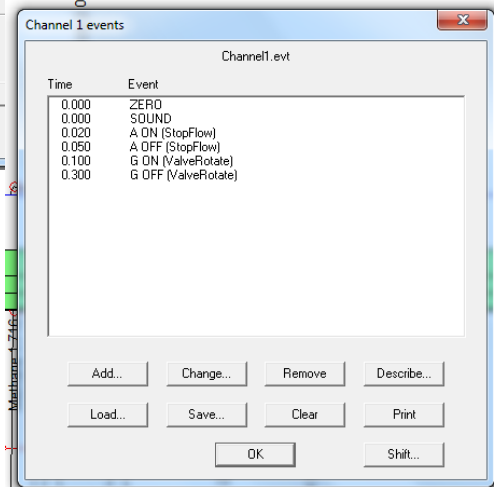
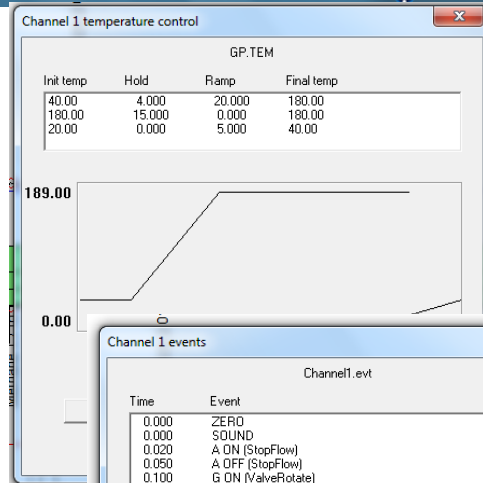
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This QuickStart document assumes that the user is familiar with the theory of operation of the Multiple-Gas#3 GC configuration. See SRI's website for this document.



Step 1:

Inject natural gas (NG) or propane (LPG) using the temperature program and event table shown. The goal is to determine the time between the propane and butane peaks. This time will be when we Activate Relay A to turn on the StopFlow Solenoid. Stop the run early once all the peaks are out.



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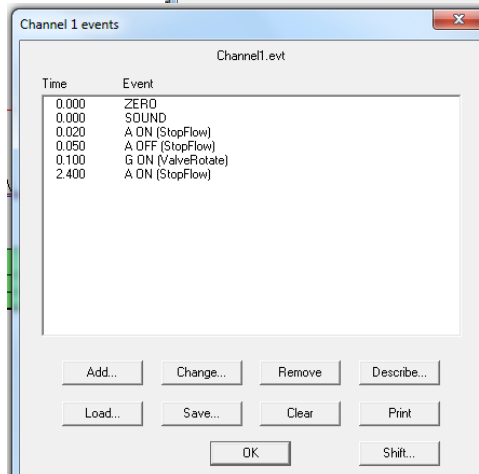
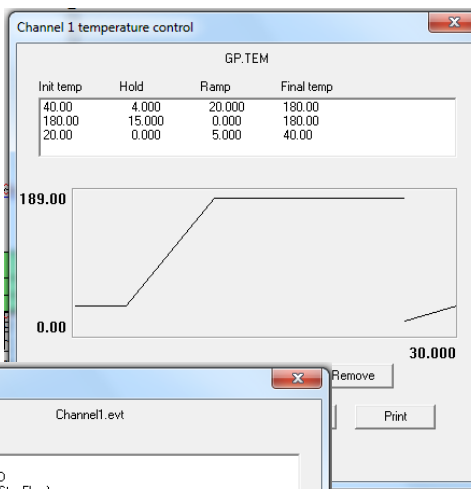
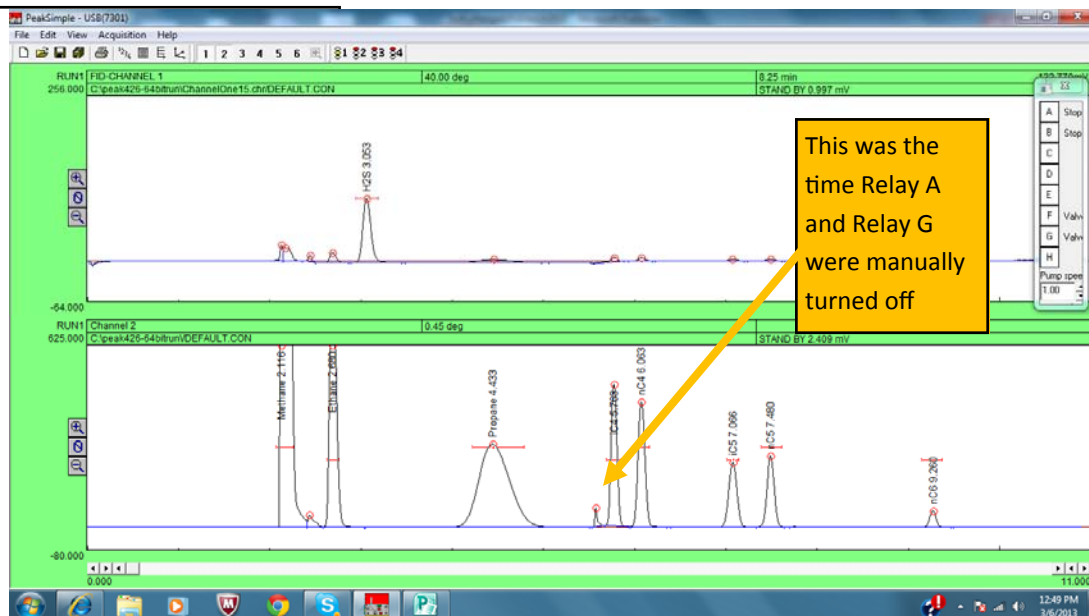
Sulfur in Natural Gas /LPG GC configuration

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Step 2:

Modify the Event table in channel 1 to include the Relay A ON command (stop flow solenoid). In this particular case, we chose 2.4 minutes since that was the time between the propane and iC4 peaks on the previous analysis.

Inject the sample again and watch the chromatogram closely as it develops. When the propane peak comes back down to the zero axis manually turn Relay A and Relay G off using the Relay/Pump Window (click View then Relay/Pump Window). This will allow the butane and higher peaks to elute from the capillary column. Note the time. In this case we chose 5.5 minutes.



Sulfur in Natural Gas /LPG GC configuration

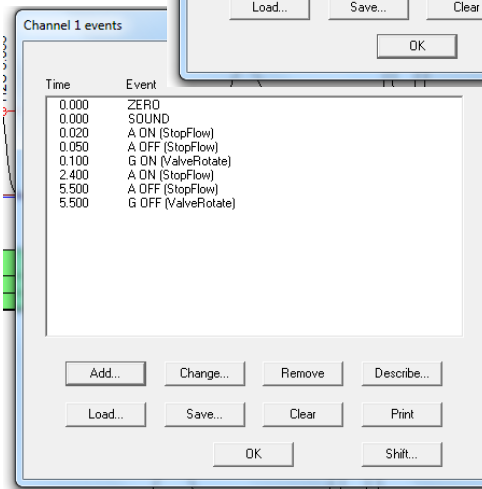
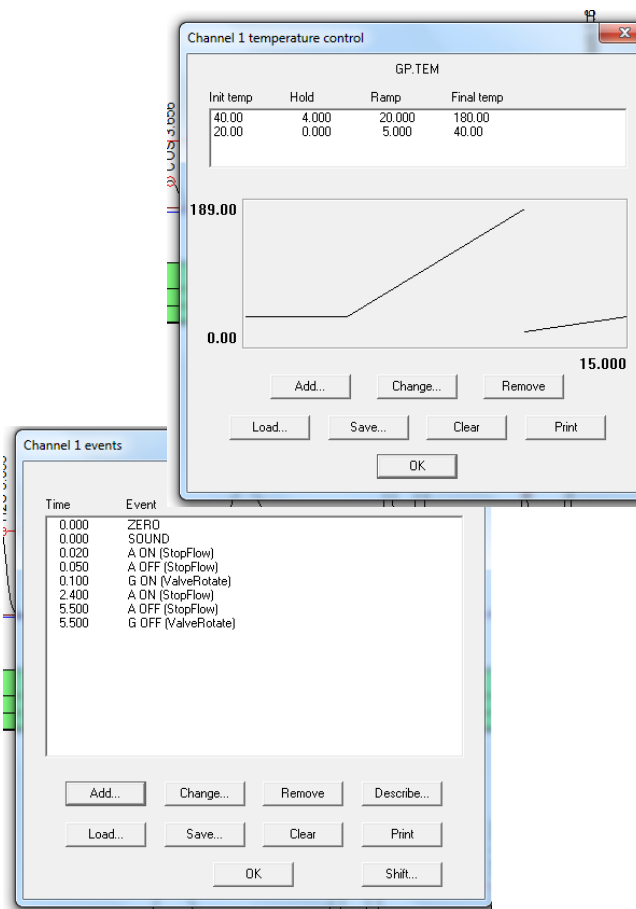
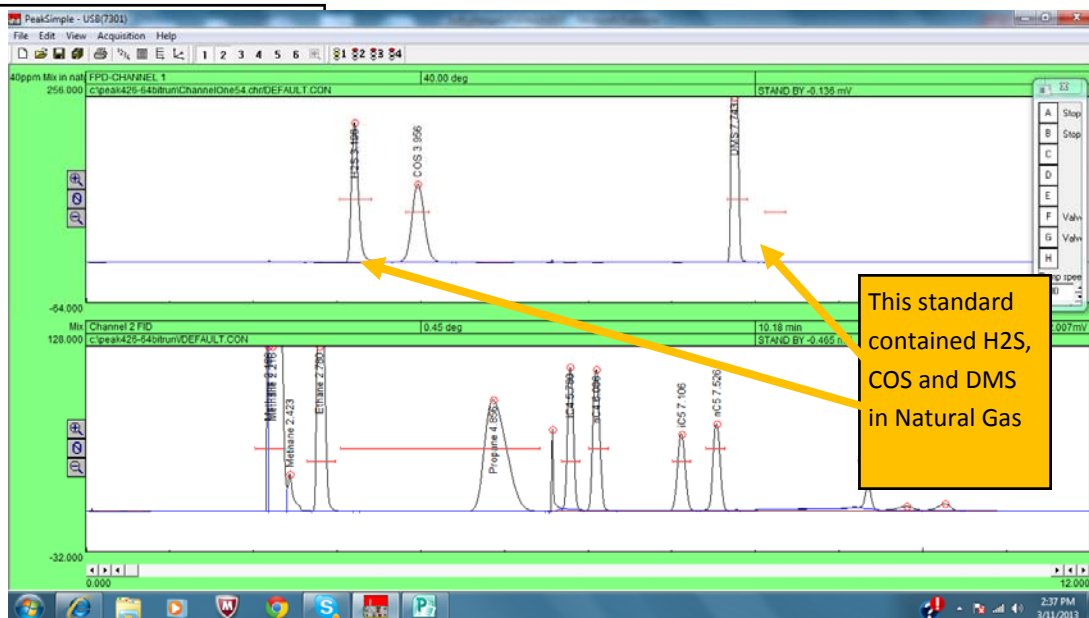
Quick Start March 2013

Step 3:

Enter the time Relay A and Relay G are to turn off in the Event table for channel 1. In this case we chose 5.50 minutes because this was the time in the last analysis that the propane peak had completely eluted.

Inject another sample or standard that has multiple sulfur peaks.

To save analysis time, modify the temperature program to end at an earlier time (once all the peaks have eluted). Some of the higher boiling sulfur peaks may take a while to elute from the column. It is not advisable to take the temperature hotter than 180C because the Teflon column (4 foot Porapak QS in 1/8" teflon tubing) may get soft at temperatures above that. Set your temperature program to remain at 180 for as long as it takes to see all the peaks.



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Sulfur in Natural Gas /LPG GC configuration

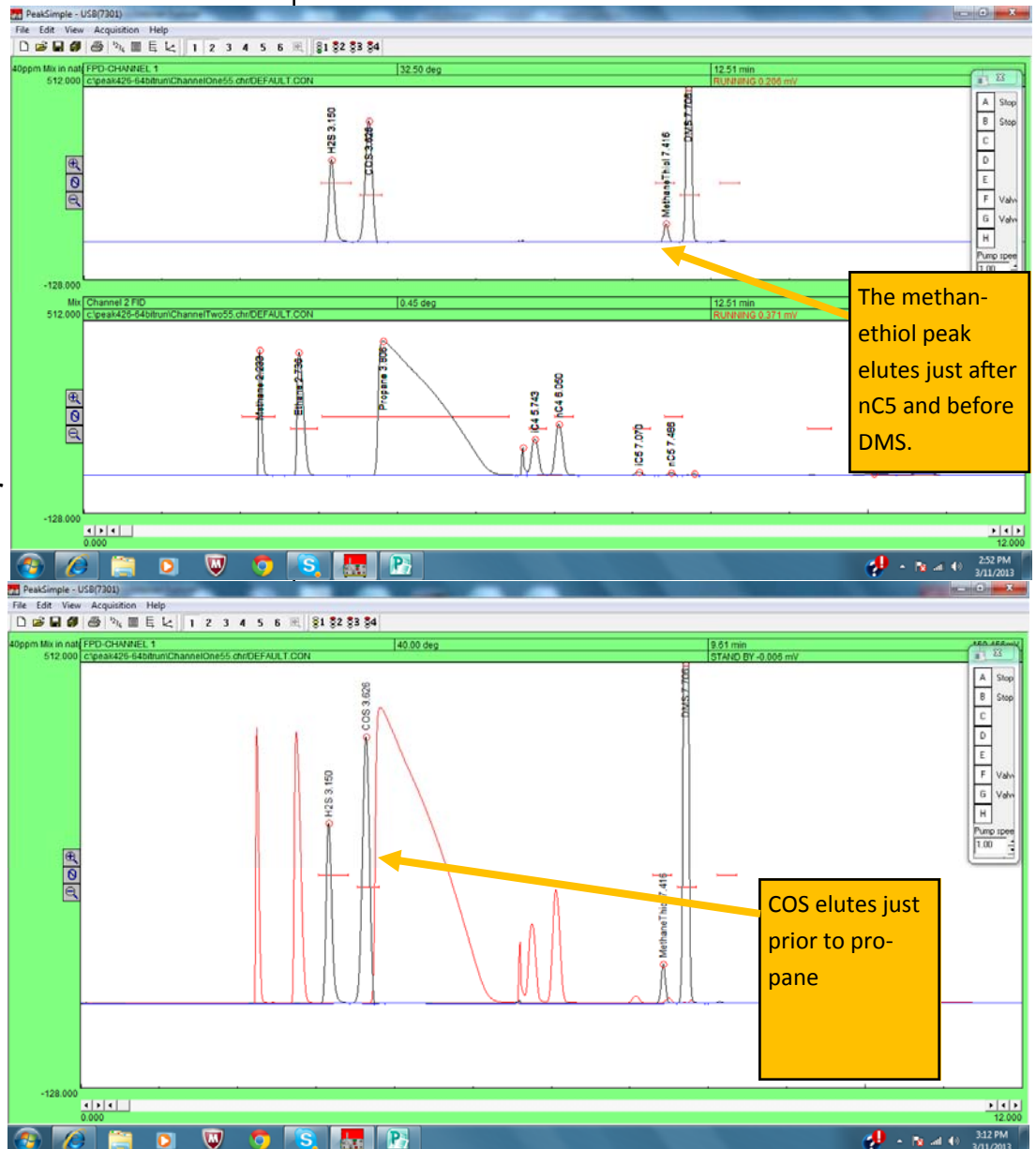
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Step 4:

Enter

Inject a real world sample such as propane. Most propane will have an odorant molecule such as methanethiol added. This peak should appear after 5.50 minutes.

To make it clearer, we have overlaid the FID signal (in red) on top of the FPD signal (black). You can see the COS is just separated from the propane. This is important because if the propane elutes at the same time as the COS, it will affect the sulfur response of the FPD detector.

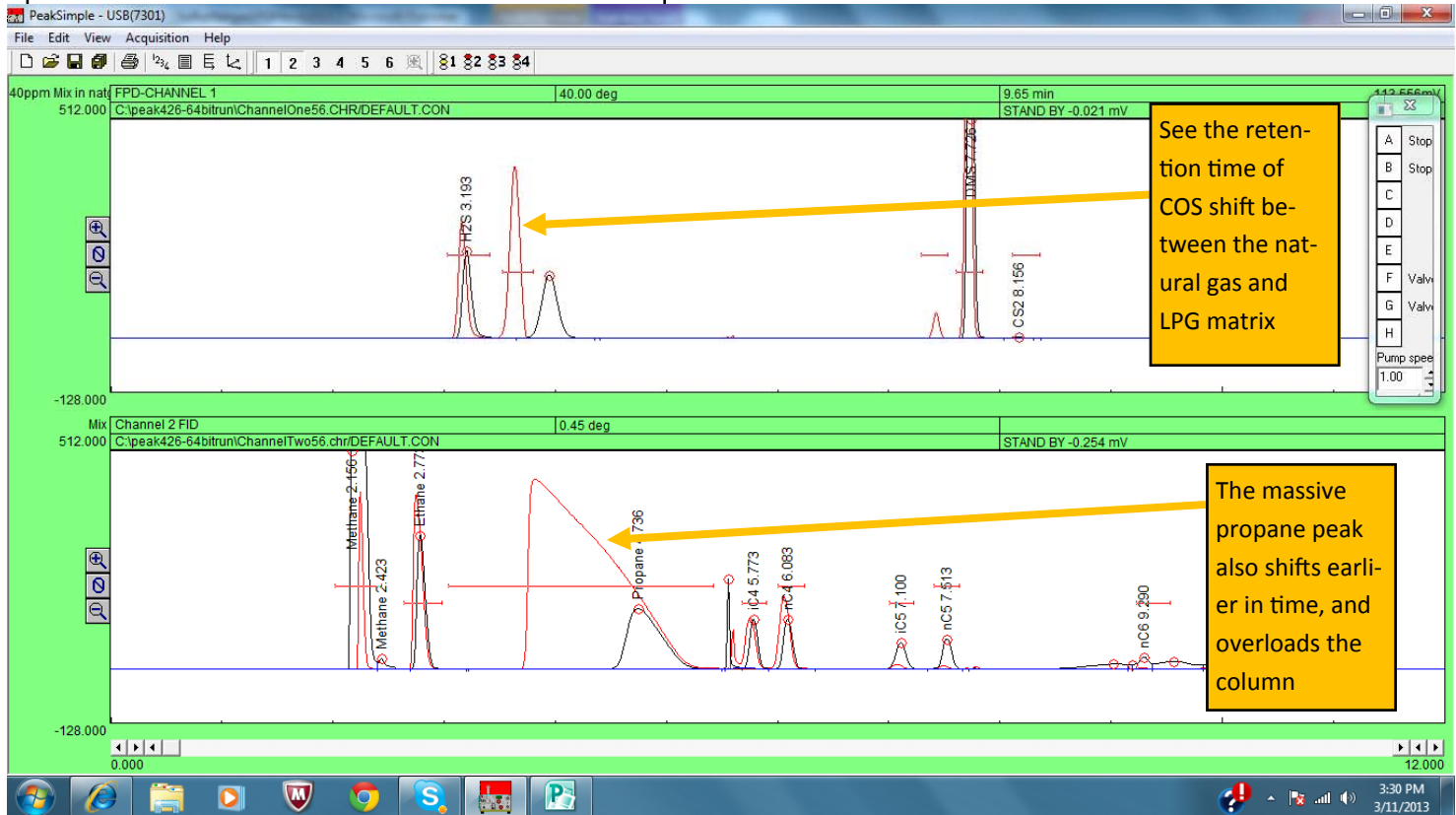


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Sulfur in Natural Gas /LPG GC configuration

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Step 4 continued:



Note how the massive propane peak from the LPG (in red) injection shifts the retention time of both the COS and propane earlier. This is because the propane peak is so large that it overloads the column. Other peaks are not affected.



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Sulfur in Natural Gas /LPG GC configuration

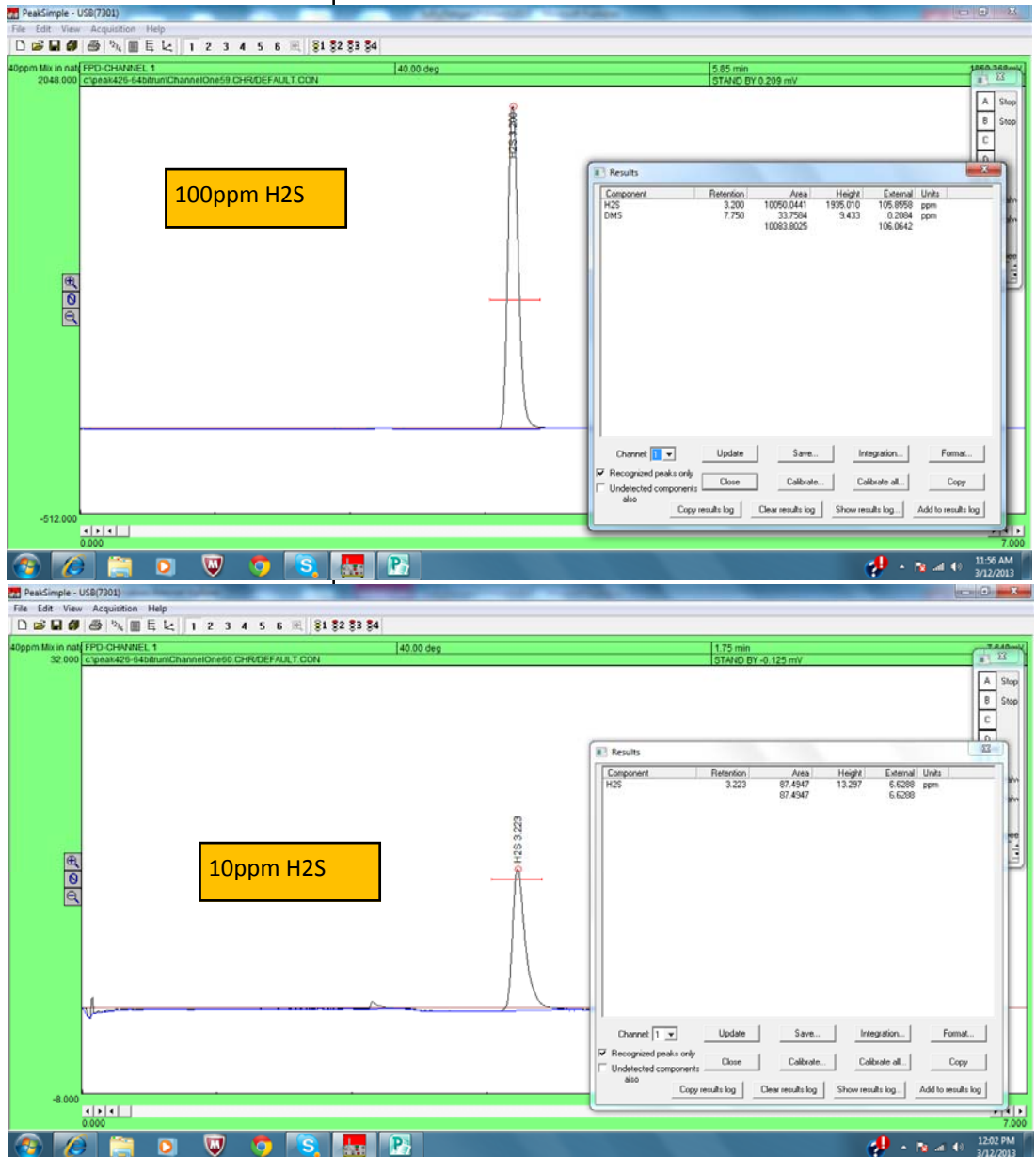
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Step 5:

Optimize the detector response and verify the detection limit.

Inject 100ppm of your sample. Here we show 100ppm H₂S on medium gain with the PMT set to -400 volts.

Next 10ppm H₂S. Note that the area is about 100 times less since the FPD has an exponential (not linear) response.



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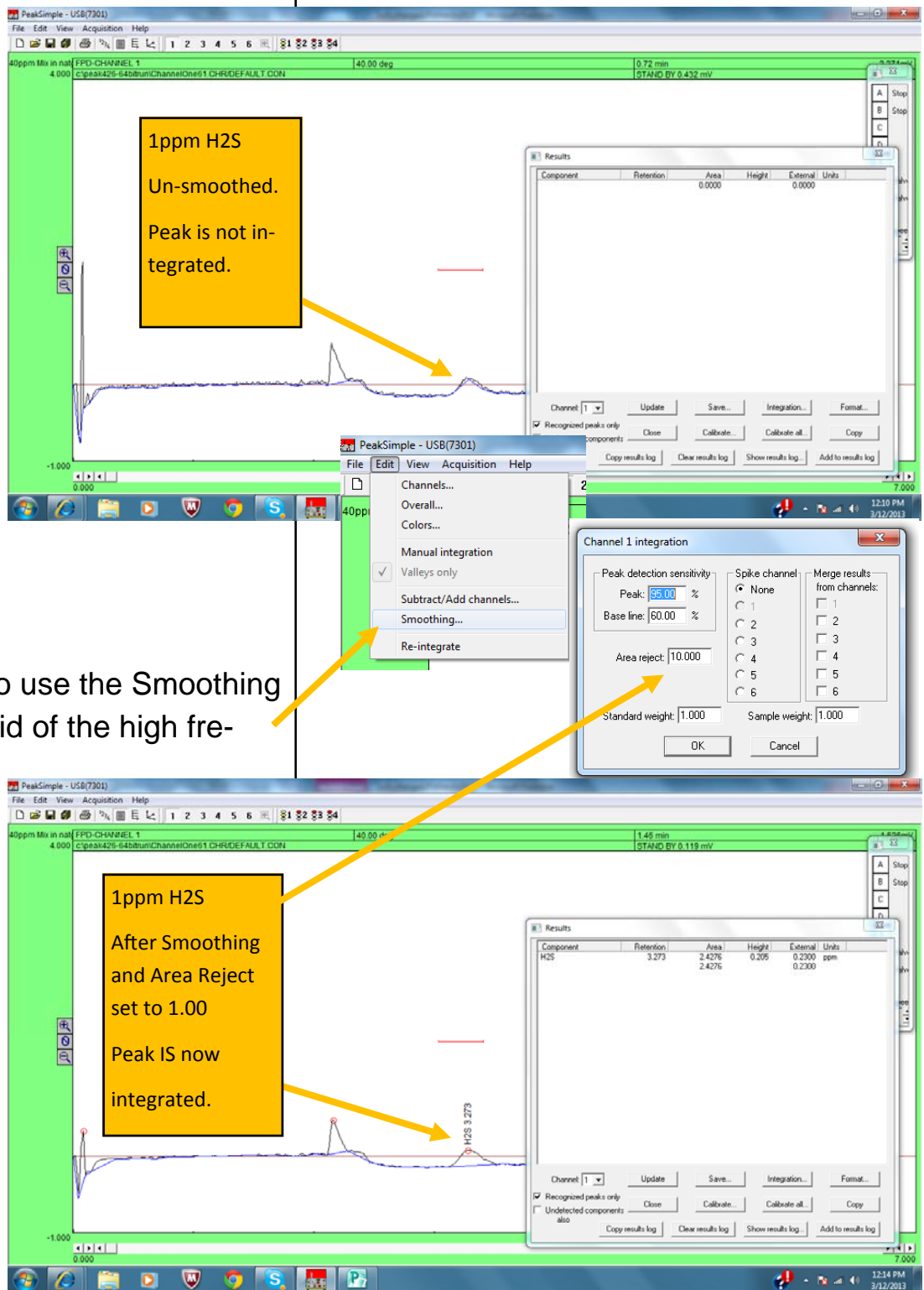
Sulfur in Natural Gas /LPG GC configuration

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Step 5 con- tinued:

Inject 1ppm H2S.
This peak may be small enough that it will not integrate unless the Area Reject and Integration parameters are adjusted.

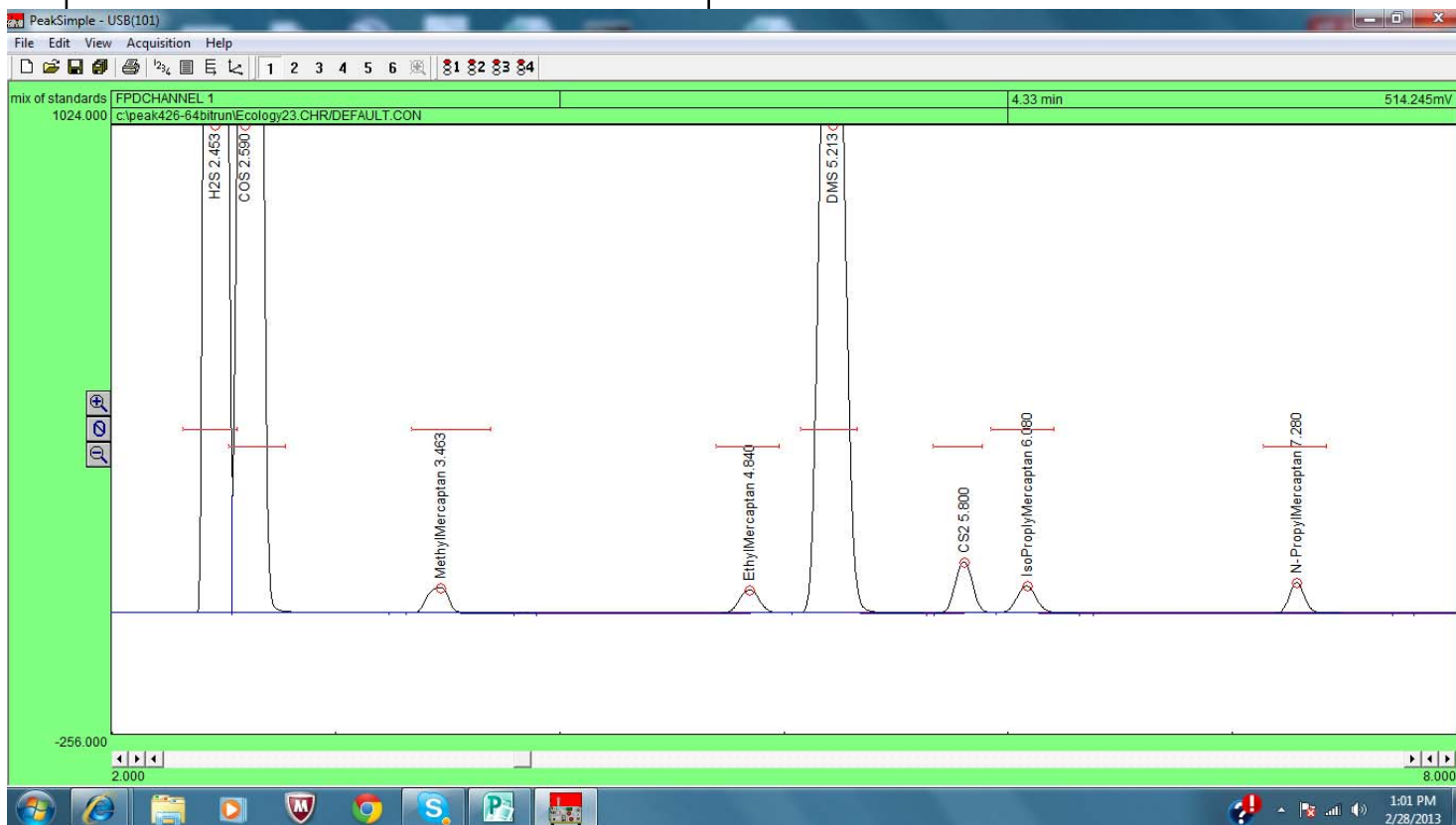
It is also helpful to use the Smoothing Algorithm to get rid of the high frequency baseline noise. The Smoothing Algorithm can also be invoked automatically at the end of the run by clicking the "Smooth First" box in the Postrun screen.



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Sulfur in Natural Gas /LPG GC configuration

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For reference, a chromatogram run on the 60MXT1 only is shown above. This shows the relative elution times for a number of sulfur compounds heavier than H2S and COS.



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