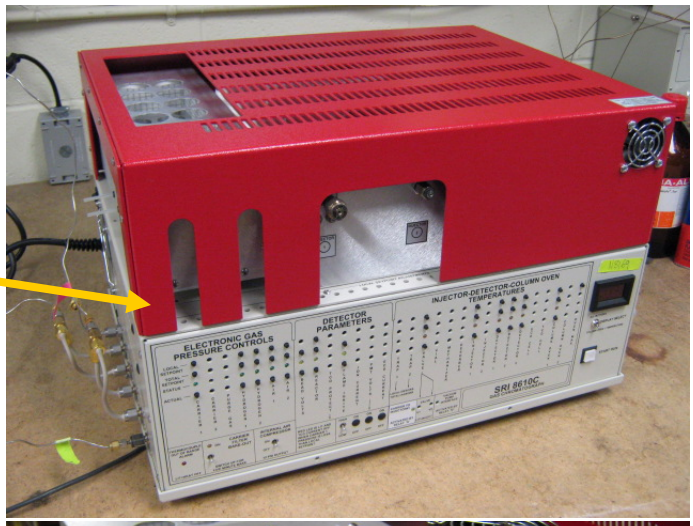
Medical Cannabis Pesticide Screening using the SRI 8610C GC

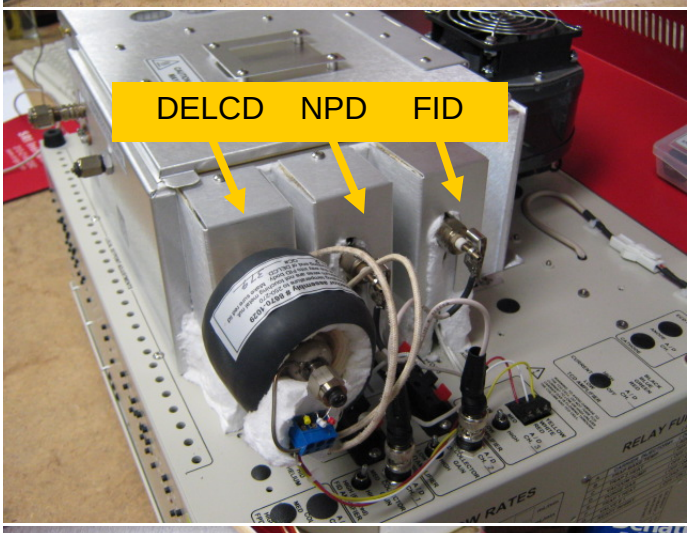
The SRI 8610C Gas Chromatograph (GC) configured for Medical Cannabis Potency and Pesticide testing is shown at right.



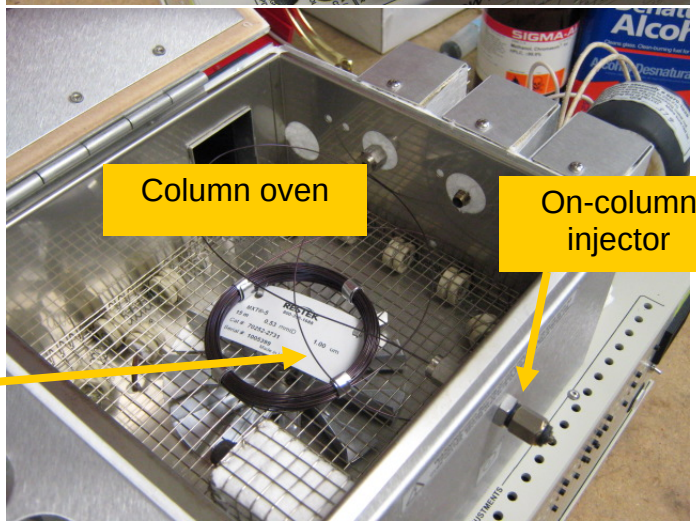
The GC is equipped with three detectors:

FID (flame ionization detector)
NPD (nitrogen/phosphorus)
DELCD (dry electrolytic conductivity)

Refer to the GC manual or pdf documents on the SRI website www.srigc.com for specific instructions on the detectors.



This GC can be used for potency testing only by using the on-column injector and the FID detector. In this case only a single column is required in the column oven.



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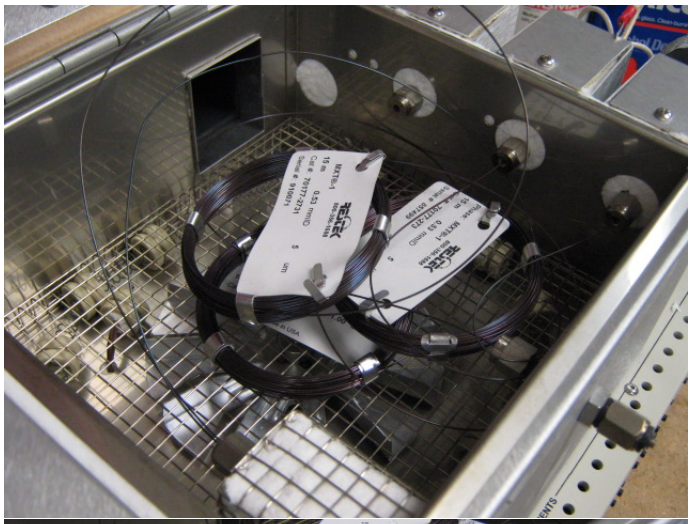
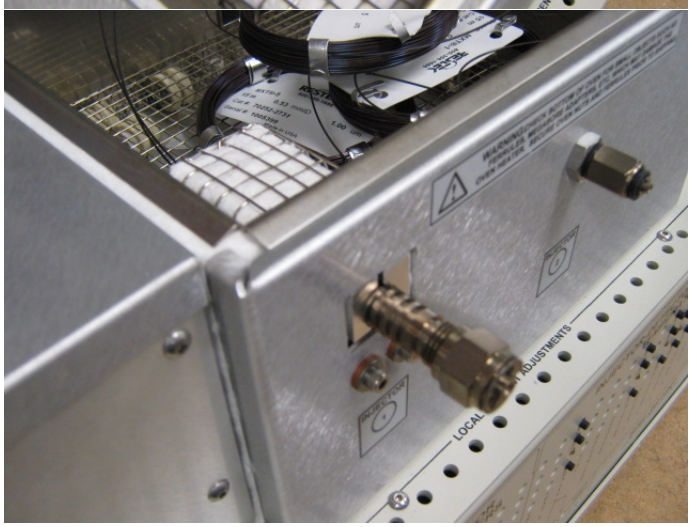
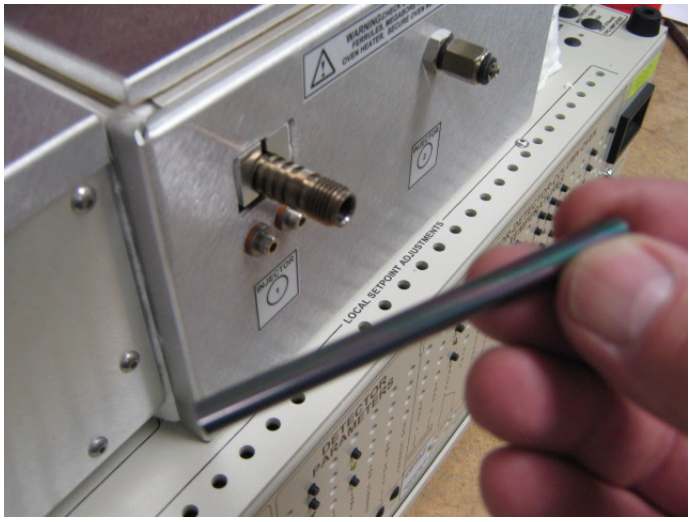
Two additional columns can be connected to the Heated Injector. One of these columns goes to the NPD detector and the other to the DELCD detector. The Heated Injector splits the sample onto the two columns using a two hole ferrule Restek part# 20246

The Heated Injector and on column injector are side by side on the front of the GC's column oven.

The Heated Injector includes a remove-able quartz lined stainless steel tube. Cannabis samples (100 milligrams) are inserted into the tube and then into the Heated Injector which at 200C thermally desorbs pesticides off the cannabis and onto the two columns.







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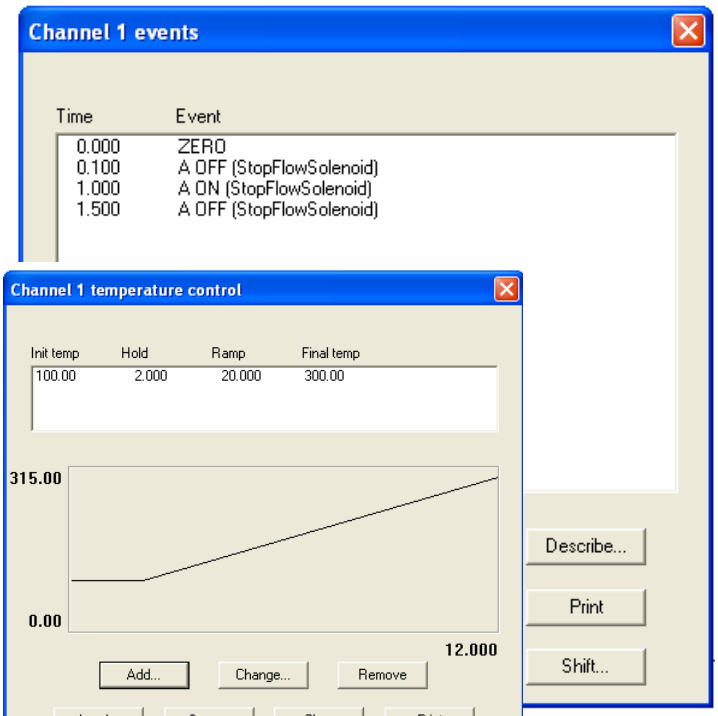
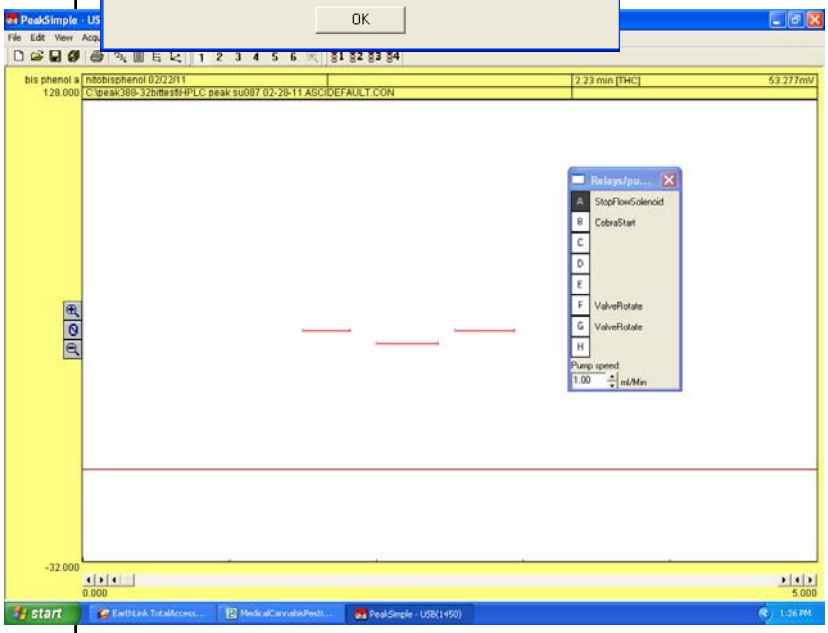
Edit the Event table in Channel 1 of the PeakSimple software to turn the carrier gas to the Heated Injector on and off at the times shown.

Enter the temperature program shown at right. The column oven starts at 100C for two minutes, then ramps at 20 degrees per minute to 300C.





Manually actuate Relay A prior to the start of the analysis. Display the Pump/Relay window and click the A button to actuate Relay A. When it is actuated, Relay A turns the carrier gas flow to the heated injector off.

Medical Cannabis Pesticide Screening using the SRI 8610C GC

Take a common cotton ball and make a small wad about the size shown.

Use a screwdriver or other tool to push the cotton wad about halfway down the tube.

Place the tube on the balance and then ‘tare” the balance to make it read 0.000 grams

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Manicure the cannabis sample and scoop 100milligrams (.1gram) into the tube.

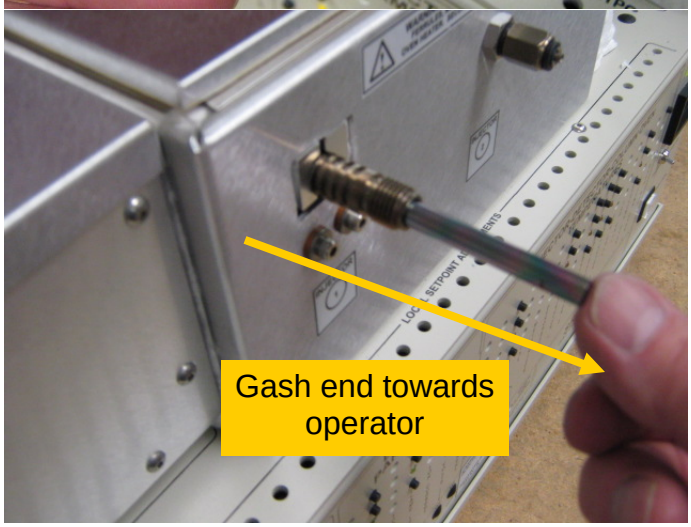
Weigh the tube until you get approximately 100 milligrams. You do not have to get exactly 100 so long as you are close (95-105 mg). The photo are right shows the weight at 99 milligrams. You can correct for the actual sample weight in the PeakSimple software after the analysis.

Stuff a little more cotton into the tube to hold the cannabis sample in place. Do not pack the cotton and cannabis tightly. The cotton should just be tight enough to prevent the cannabis from escaping the tube. The cannabis should be loose, NOT packed down.

Medical Cannabis Pesticide Screening using the SRI 8610C GC

Since the injector is HOT, use a tool like a 9/16” socket to remove the septum nut.

Insert the tube filled with cannabis into the injector. At this time the carrier gas is off so no gas will escape while you are inserting the tube.



The tube has a gash at one end.

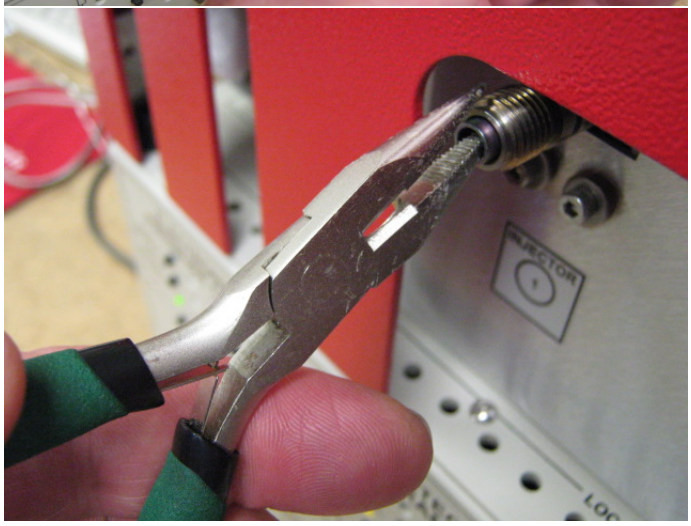
<u>The gash end MUST be towards the operator.</u>

Medical Cannabis Pesticide Screening using the SRI 8610C GC

Start the analysis by pushing the start button on the GC. You can also push the spacebar on the computer keyboard. The Event table in PeakSimple will de-actuate Relay A at .1 minutes into the analysis which will cause the carrier gas to strip the pesticides from the now HOT cannabis and deposit the pesticide molecules on the two columns.

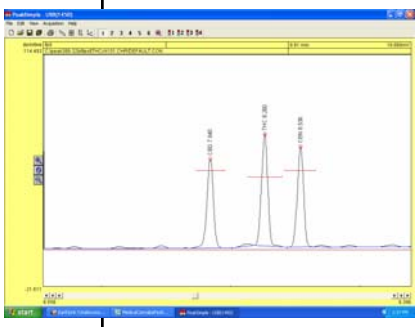
If your GC is equipped with a second injector and FID detector for potency measurement, you can inject the potency extract in the other injector anytime in the first 1 minute of the analysis.

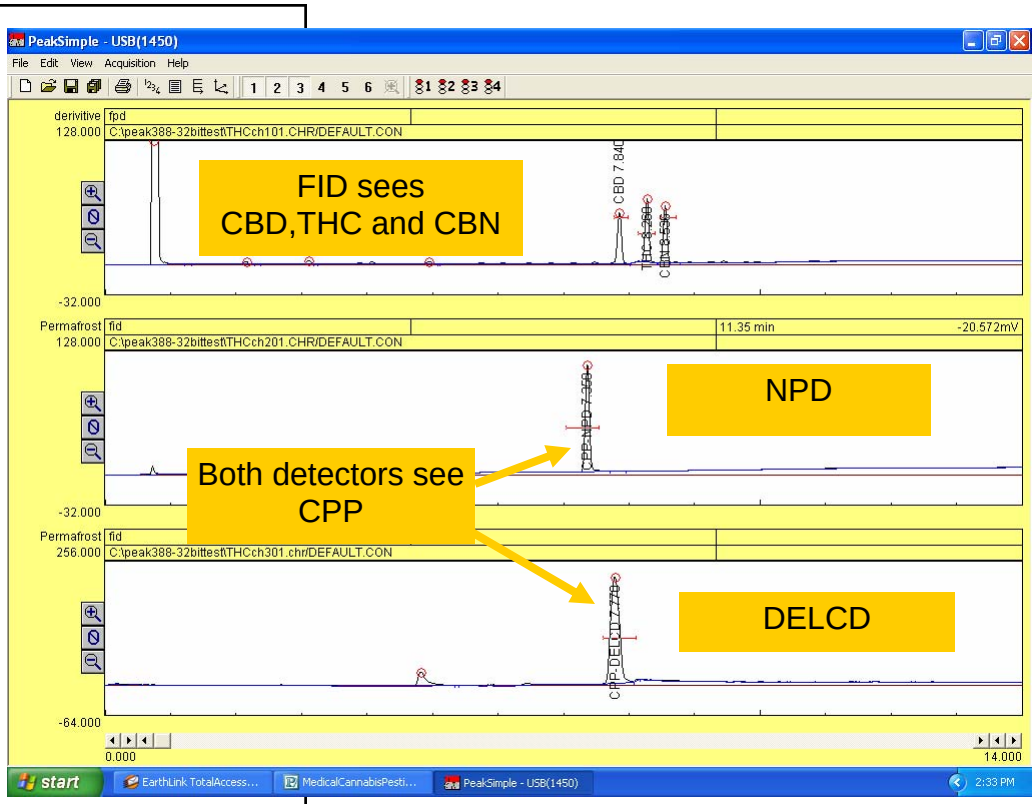
At 1 minute into the analysis, the carrier gas is turned off for 30 seconds. During that 30 second period remove the tube from the HOT injector using a tool to avoid burning your fingers. Place the HOT tube in a beaker to cool off. You must replace the septum nut within the 30 second window.



Medical Cannabis Pesticide Screening using the SRI 8610C GC

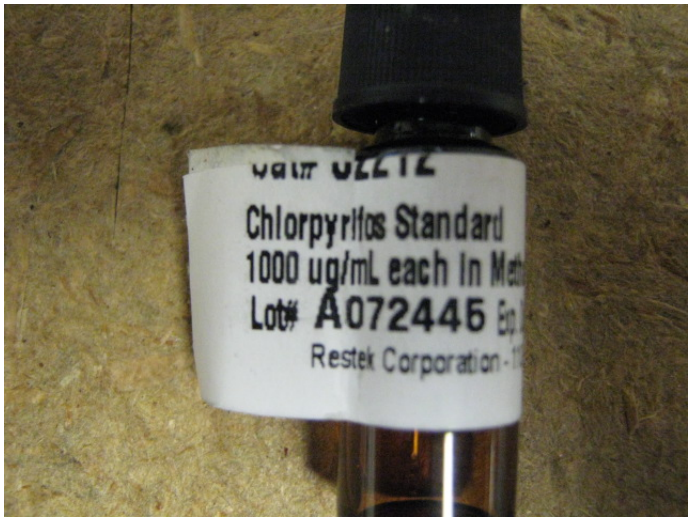
To calibrate the Potency channel (channel 1), inject 1ul of the 333ng/ul calibration mixture into the on-column injector. You should see three equal size peaks.





Preparation of the 333ng/ul working standard is described in another publication.

The two pesticide detectors (NPD and DELCD) are calibrated with a pesticide standard such as Chlorpyrifos. Restek part# 32212 is 1000ug/ml (1000ppm) of chlorpyrifos (CPP) in methanol. CPP was chosen as the calibration pesticide because it has both phosphorus (which the NPD detects) and chlorine (which the DELCD detects). So the one pesticide can be used to calibrate both detectors.



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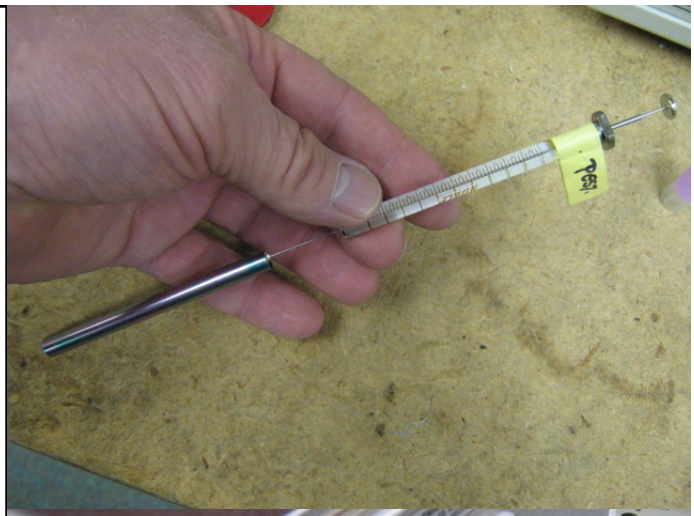
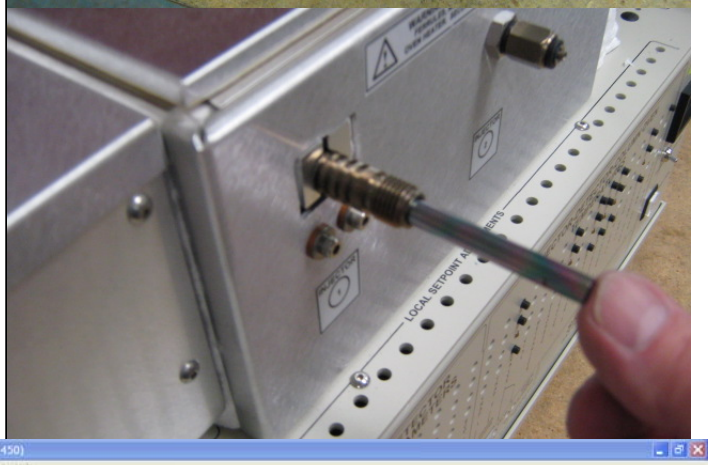
Deposit 1ul of the CPP standard on a clean cotton wad in the tube.

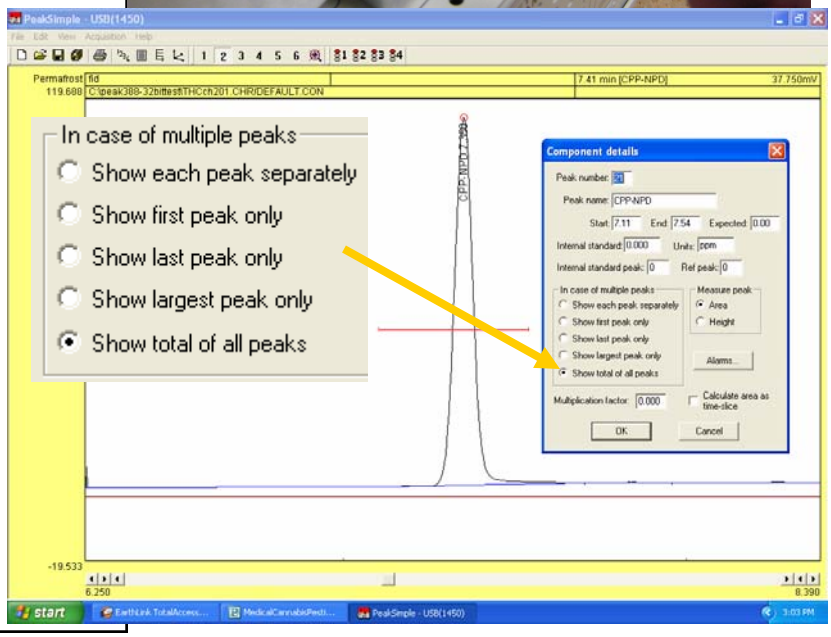


Then desorb using the standard program and events.



There should be a single peak on the NPD and DELCD channels.

Create a retention window for the CPP peak in the NPD channel and another similar retention window in the DELCD channel.



Notice that the retention window has
"Show total of all peaks" selected

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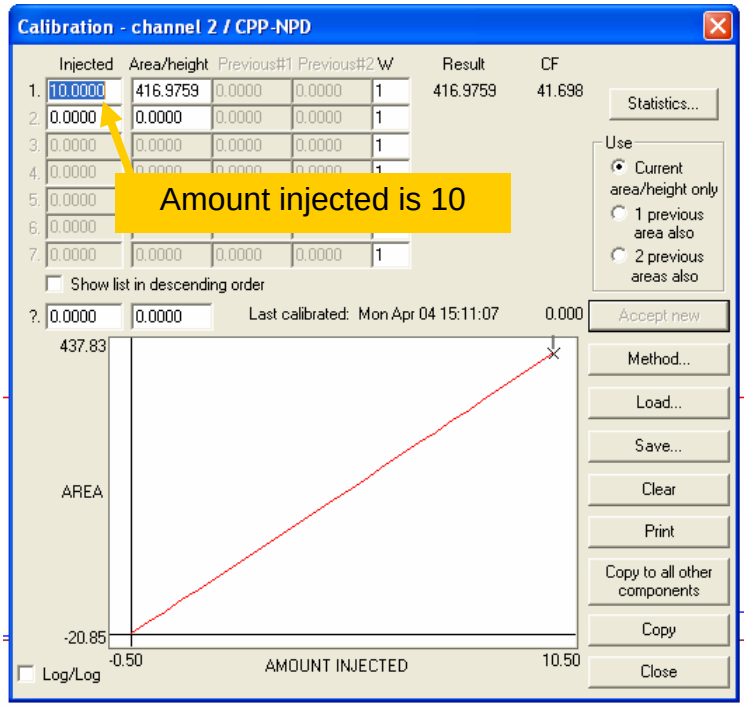
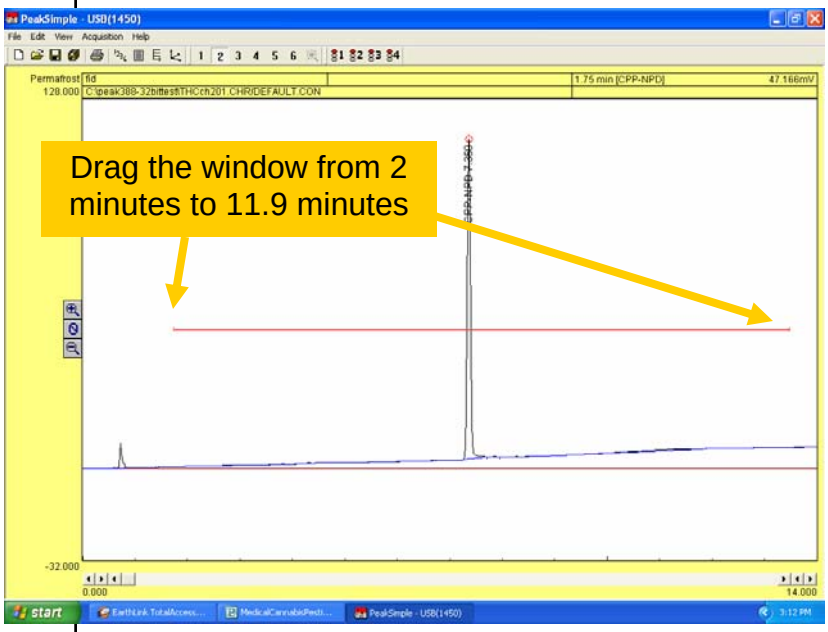
Create a calibration curve for the CPP in both NPD and DELCD channels. Note that the amount injected is set to 10.



We injected 1ul of CPP standard which contains 1000 nanograms of CPP. Since we will be desorbing 100milligrams of cannabis, 1000 nanograms is 10ppm, hence the number 10 in the amount injected column.

Drag the retention window across the entire screen except for the first 2 minutes. This will have the effect of adding up all the peaks detected during the analysis and applying the CPP calibration to the total of the peaks, regardless of whether a particular peak is CPP or another pesticide.



Unlike the potency analysis where the results are reported in Percent, the pesticide results are reported in ppm (parts per million) because the concentration should be very low.

1,000,000 ppm =100%
100,000ppm=10%
10,000ppm=1%
1000ppm=.1%
100ppm=.01%
10ppm=.001%
1ppm=.0001%

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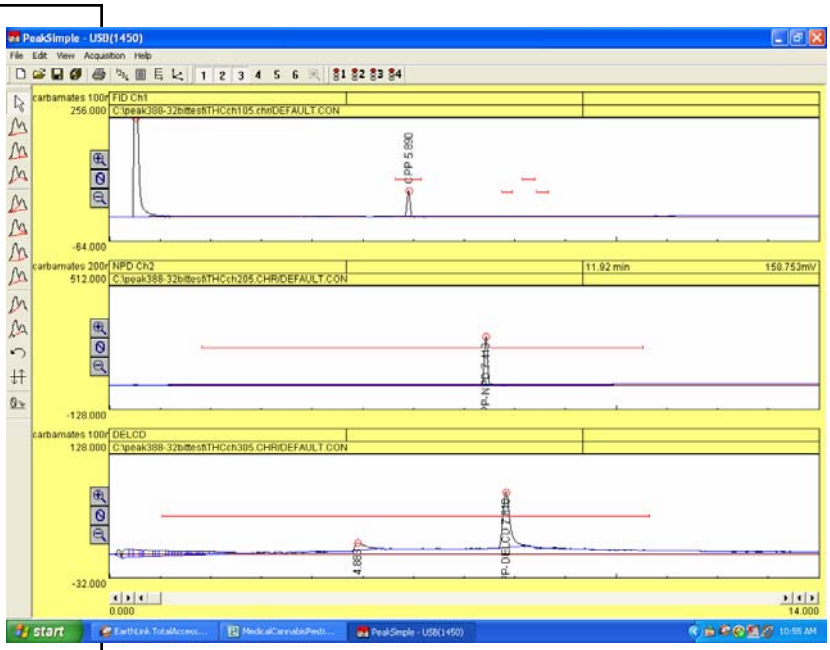
The chromatograms at right show the CPP peak on all three channels. The top channel (FID) was injected with the CPP standard just for comparison. Normally the FID channel is used for potency (CBD, THC, CBN).

The NPD (channel 2) and the DELCD (channel 3) show the CPP standard desorbed from the desorber tube.



The chromatograms to the right show carbamate pesticides.

You can see the NPD responds but the DELCD does not. Since the carbamates do not have chlorine this makes sense.