Tuning Agilent 5973/5975 Mass Spectrometers for DFTPP

DFTPP (Decafluorotriphenlyphosphine) is the compound required by the EPA to determine if the mass spectrometer voltages are set correctly. The process first requires the operator to tune the mass spectrometer using PFTBA as a reference compound and adjust the voltages of the source to gain the correct ion ratios. Subsequently when the DFTPP compound is introduced through the GC sampling system then acquired by the mass spectrometer, it needs to meet the EPA ion ratio criteria specified in the method. There are many ways to achieve these ratios. This document will discuss one possible technique using the Agilent Target Tuning program. This method of tuning will take advantage of the Dynamic Lens Ramping of the Entrance Lens Offset.

First we must access the Tune and Vacuum Control View; this can be accessed from the Instrument Control Window (Figure 1 below).

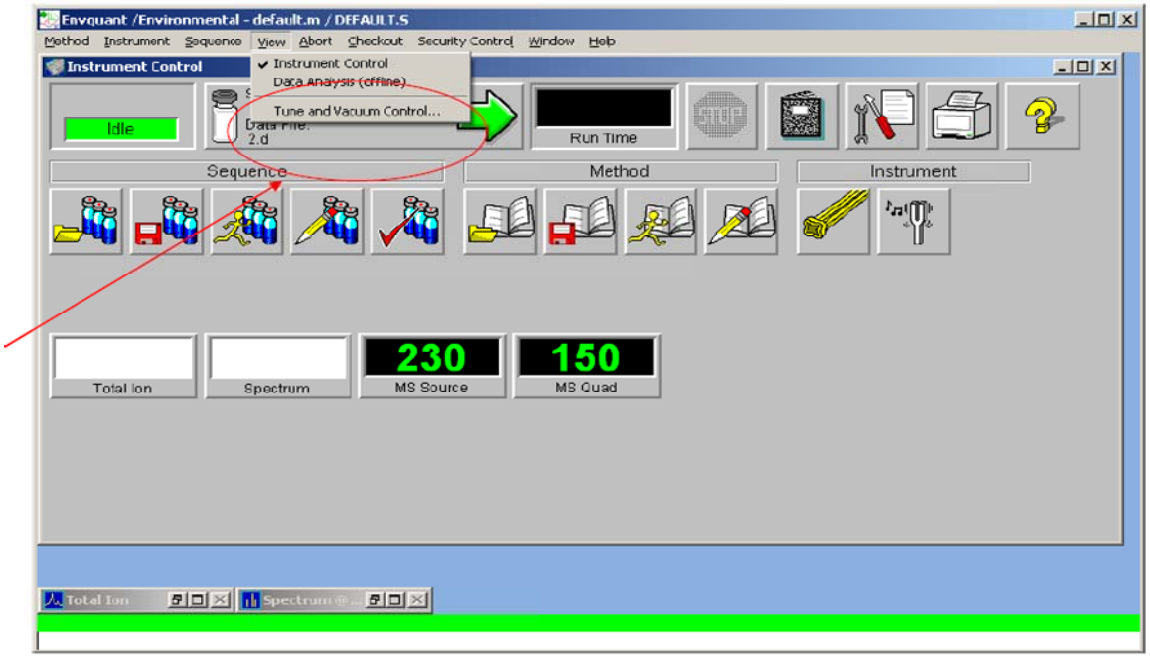

Figure 1

In the Tune & Vacuum Control View (Figure 2 below) you will load the dftpp.u tune file (Figure 3).

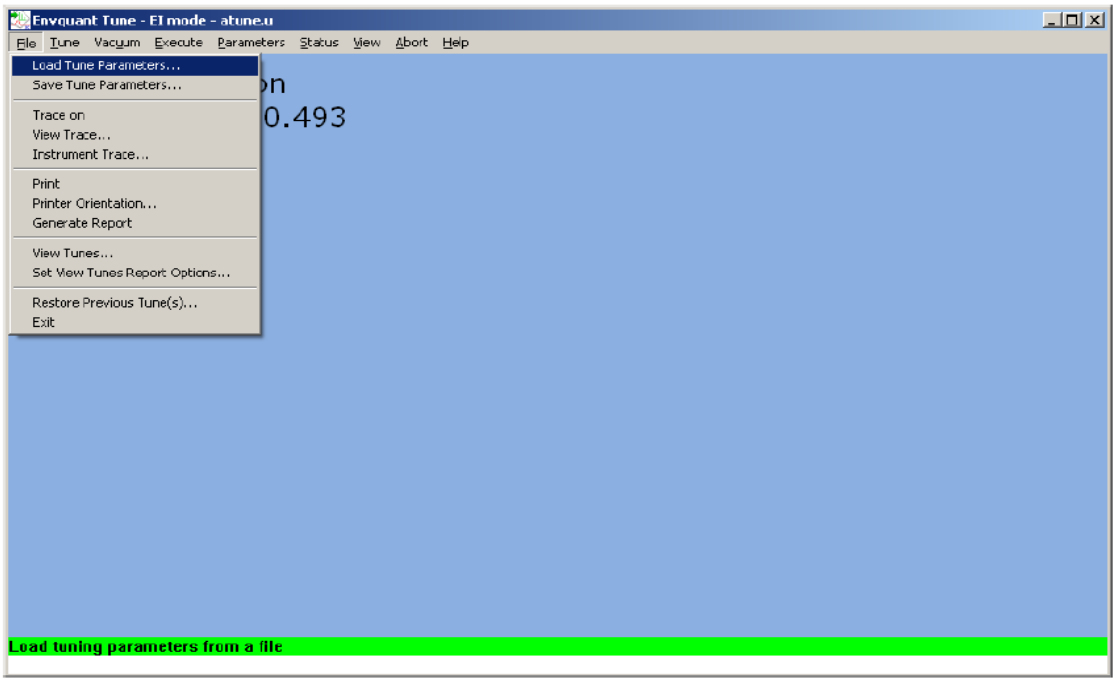

Figure 2

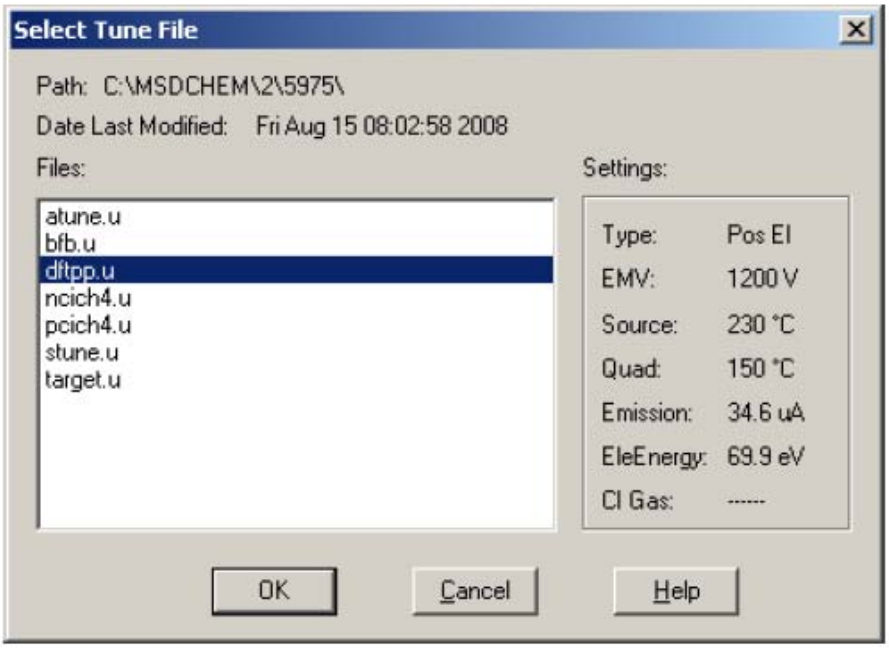

Figure 3

Once the dftpp.u file has been loaded choose “Edit Dynamically Ramped Parameters” (Figures 4 and 5 below).

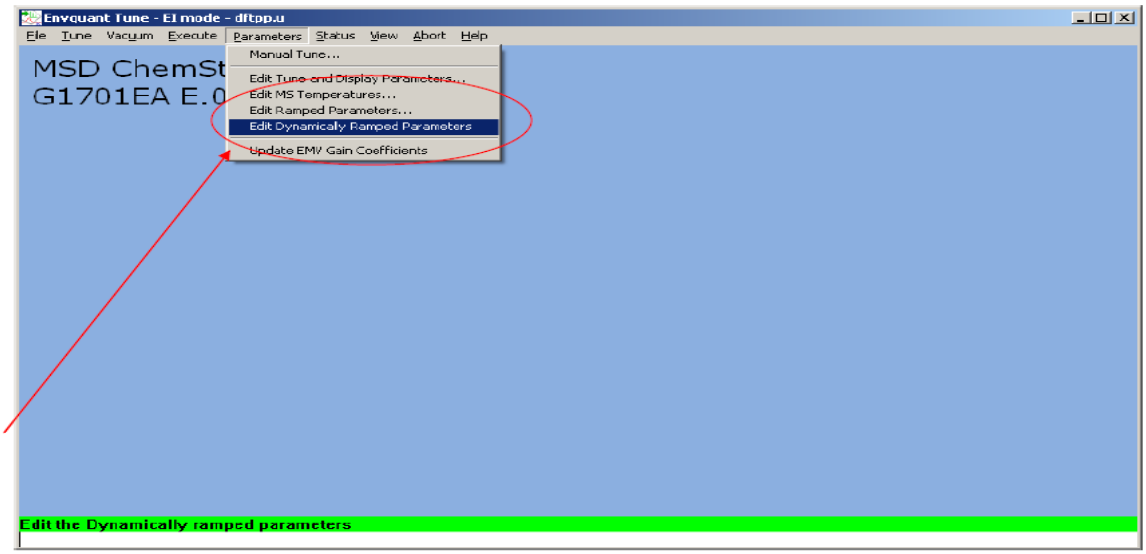

Figure 4

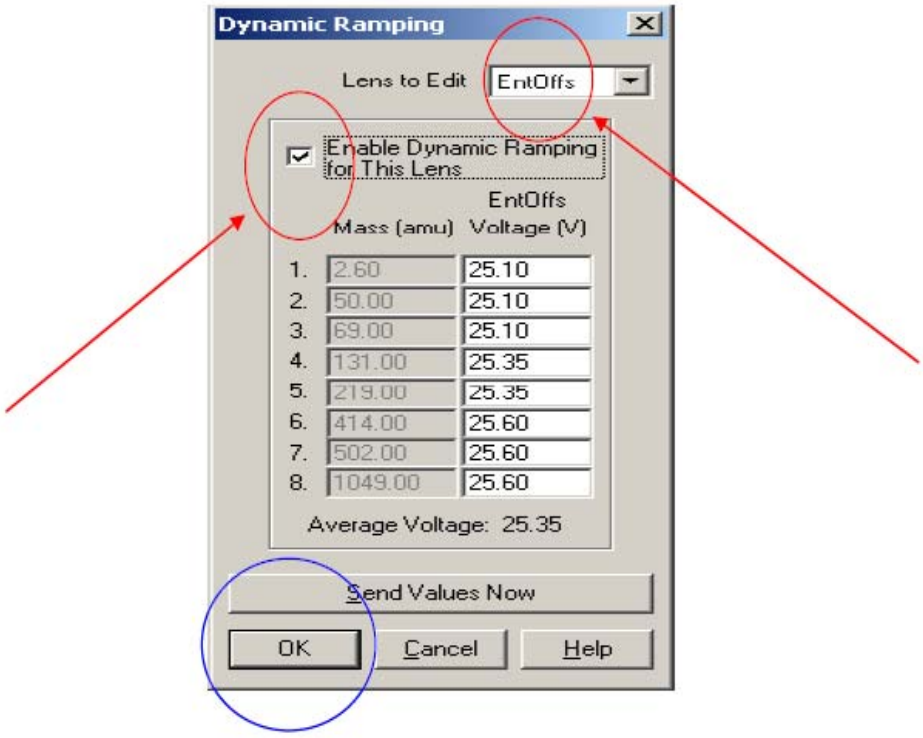

Figure 5

Once the above items are chosen, click okay to this screen (see Figure 5).
Next, the target ratios for the ions must be set so that the software can adjust the entrance lens offset voltages. Find the menu item “Tune” and choose” Tune Wizard” (Figure 6).

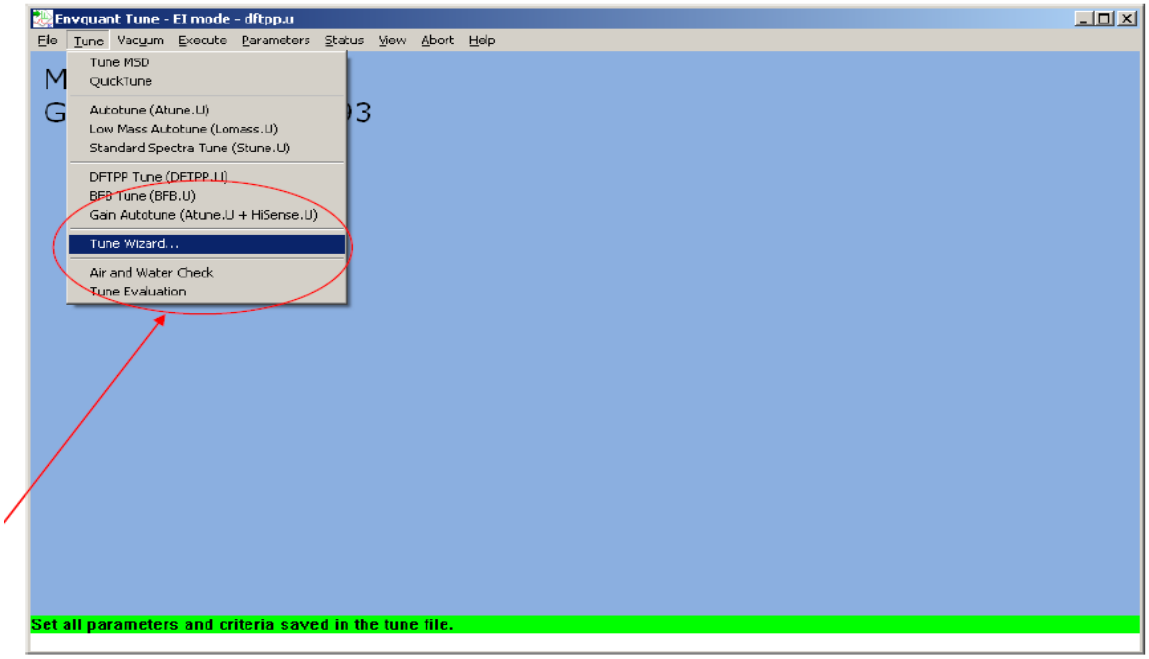

Figure 6

The Tune Wizard will present a series of new windows.

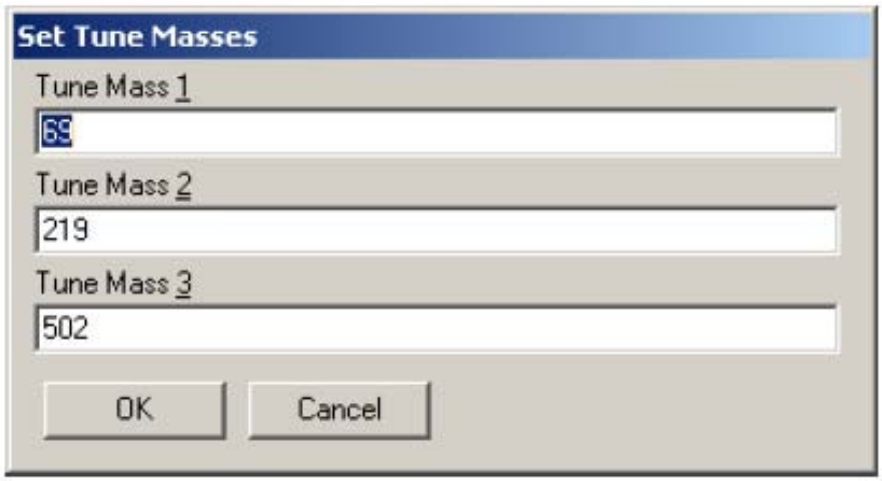

Figure 7

This window (Figure 7) will set the major masses to be used for tuning. Leave the default values in the window as you see above and press the OK button.

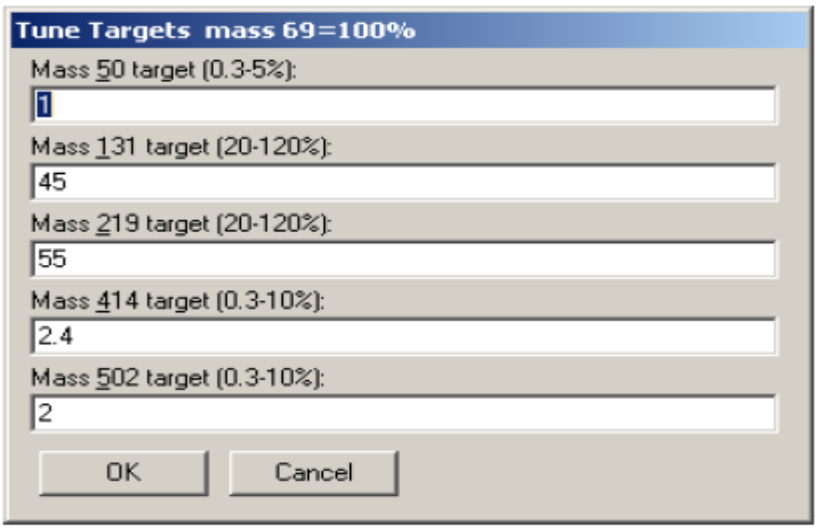

Figure 8

The next window (Figure 8) sets the target ratio values that the tuning algorithm will try to achieve. If this is the first time the system has been tuned for DFTPP accept the default values as shown in Figure 8 and press the OK button.

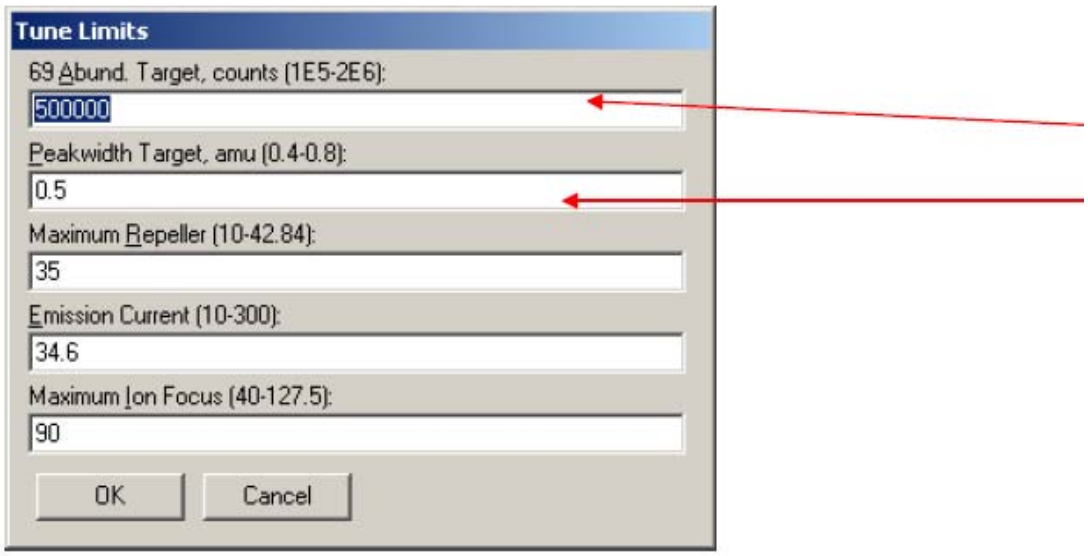

Figure 9

The Tune Limits window (Figure 9) has 2 variables that need to be adjusted. The first is the target abundance for mass 69. Depending on the EPA method you are running the target abundance for ion 69 may need to be increased or decreased. The next value to set is the Peakwidth Target. While the value needed depends on whether there are issues resolving the lower abundance masses in DFTPP (441 and/or 443). Begin with a setting of 0.5 amu for Peakwidth Target. Click the OK button.

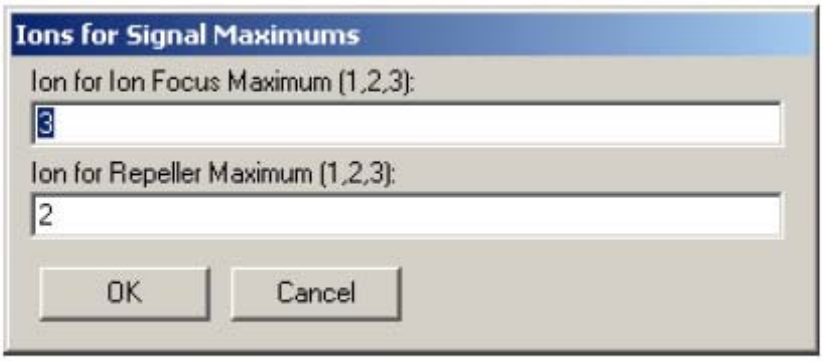

Figure 10

The next window (Figure 10) asks what mass you would like to use to adjust these lens parameters. Accept the default values you see above and press the OK button.

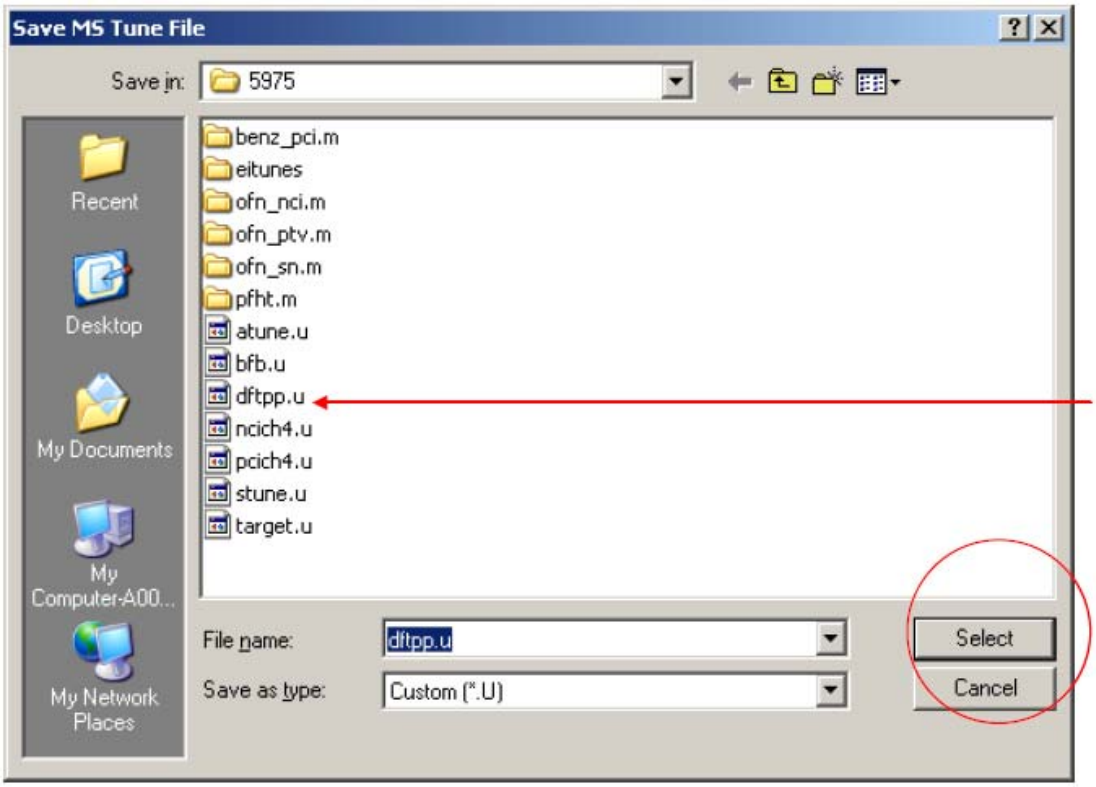

Figure 11

Last, we need to save the tune targets back to the “dftpp.u” file. Choose the “dftpp.u” file in the MS Tune File list (Figure 11) and press the Select button. Now that the target abundances have been saved we are ready to run our first tune using the values we configured in this document, With any luck we should achieve the ratios we need to pass DFTPP criteria. Start the tune by going to the menu item Tune and selecting DFTPP Tune (Figure 12).

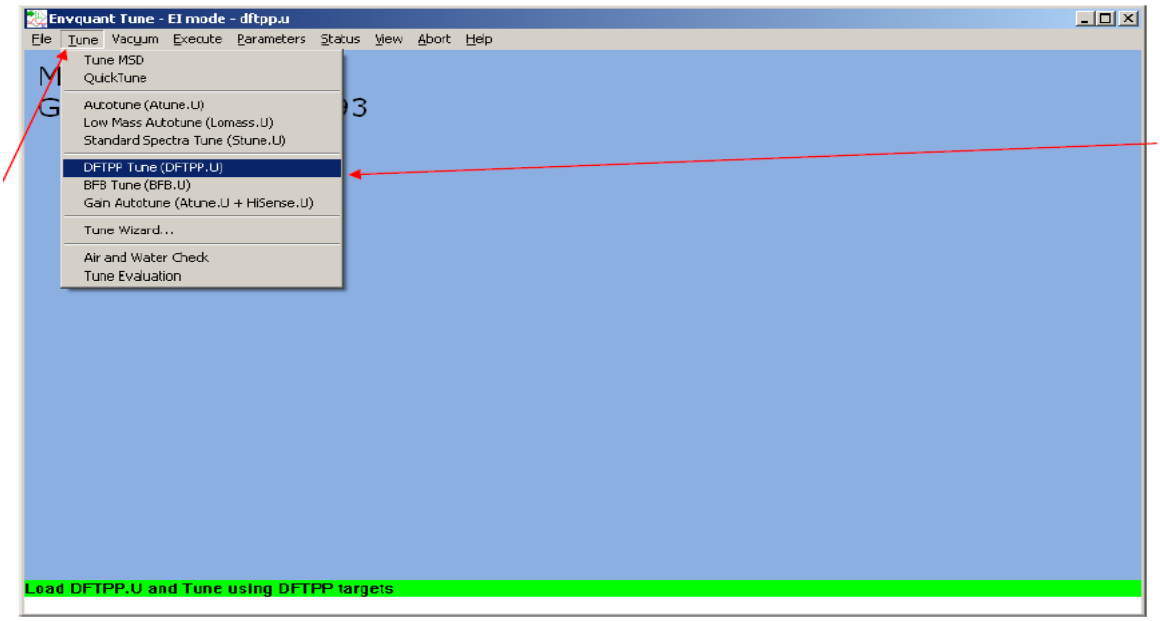

Figure 12

When the tune completes and prints, go to the menu item File and press Save Tune Parameters. You will be prompted again for the tune file (Figure 11) and choose dftpp.u. Return to Instrument Control View by choosing the menu item View and choosing Instrument Control. You will be prompted again to make sure your tune file is saved. If you have not saved it press No and save the tune file via the steps above. If you did, press Yes.

The Last step is to configure your GC/MS acquisition method to acquire all new datafiles, using the dftpp.u tune file we just saved. (See figure 13 & 14 below)

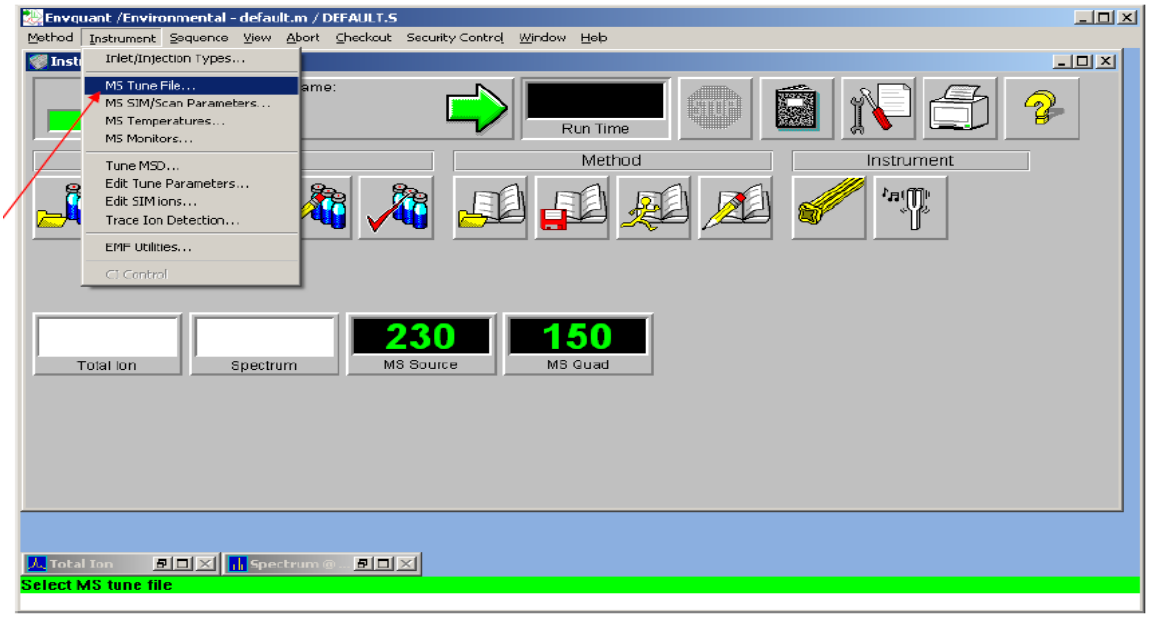

Figure 13

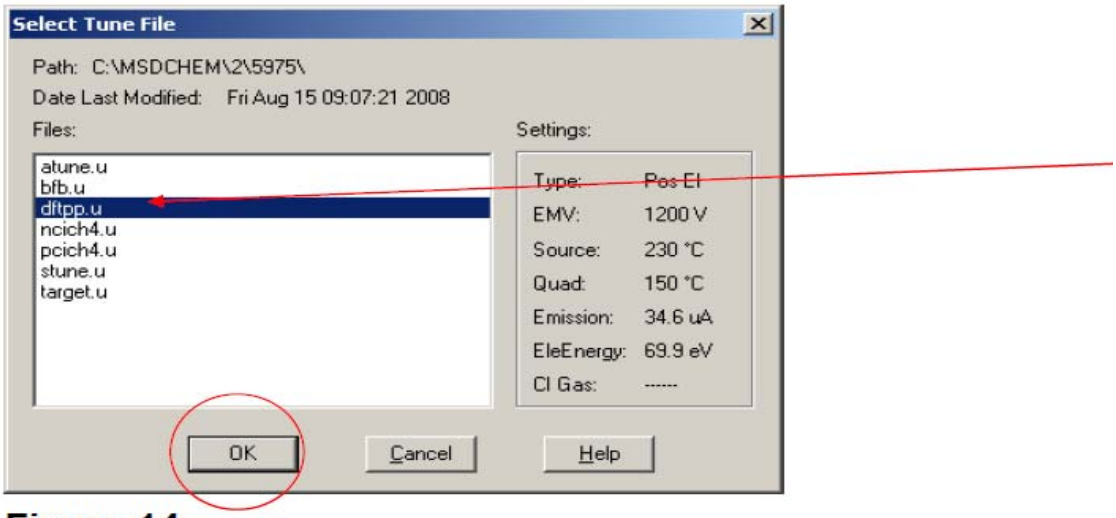

Figure 14

Save your method with these changes, acquire DFTPP, and evaluate it for EPA method passing criteria.
Additional Tuning Assistance The section below describes how to fully utilize the Dynamic Lens Ramping of the Entrance Lens Offset. This technique can be used to fine tune the MS when most of the masses of DFTPP are passing and only a couple of the other masses are falling outside the specified EPA criteria. Adjust the following comparison masses from PFTBA, to influence the ratios of the similar masses in DFTPP.

PFTBA	DFTPP
50	51
69	69
131	127
219	198
414	442

If after acquiring DFTPP, you observe relative ratio of mass 442/69 is low or high, we can open the Edit Dynamic Lens Ramping dialog (Figure 5) and adjust the voltage for mass 414. Lowering the voltage if we need the 442/69 ratio to decrease, or increasing it if we need the 442/69 ratio to increase. After adjusting the voltage re-save the tune parameters (do not retune the mass spec at this point). Reacquire DFTPP and note that the "new" abundance of mass 442 will change but all the other masses will not be affected. This same procedure can be used for all the masses listed in the above table. If you perform these steps and are still having a problem please call 1-800-227-9770 option #3 for technical support assistance.