

Special Operations with Scion 8400 Pro and 8410 Pro Automated Samplers

by **Randall Bramston-Cook**
Lotus Consulting
5781 Campo Walk
Long Beach, California 90803
310/569-0128
Email – randy@lotusinstruments.com

and **Victoria Klein**
Scion Instruments
11840 West Market Place, Suite K
Fulton, Maryland 20759

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Peak identification in gas chromatography is based parameters by retention times. To confirm analyte labeling, runs can be made with a mass spectrometer, or with a second column that has different selectivities than the primary column. Many standard methods, notably EPA Method 608.3: Organochlorine Pesticides and PCBs by GC/HSD (www.epa.gov), suggest setting up operations with a confirming column path.

Dual column operations can be performed by installation of an inlet splitter immediately following the injector with columns attached to a “Y” fitting for connections to two detectors.

To be effective, the following are restrictions with this mode.

1. Both columns must match physical dimensions to ensure an even split, Inclusion of a mass spectrometer on one channel introduces separate flow rates for each side to due the inherent vacuum at the terminus of the column to the mass spectrometer. More sample will be pulled on this channel making quantitation of analytes more difficult. A restrictor to balance the restriction can be installed on the mass spectrum side, but its setting is dependent on the column temperature and is established empirically.
2. Both columns must use the same injector parameters, including injector temperature, split ratio and injection volume.
3. Configuration of the gas chromatograph is typically with identical detectors for both channels.
4. A mass spectrometer cannot be used on one leg of the “Y” splitter. The inherent vacuum at the end of the associated column effectively pulls nearly all of the injected sample this direction. The other path sees virtually no sample.



Figure 1. Typical column inlet splitter.

Special Operations with Scion 8400 Pro and 8410 Pro Automated Samplers

A different approach is to inject the same sample into two separate injectors, with two separate columns and detectors, Individual injector conditions can be programmed separately for each channel. Use of an automated sampler that can make injections into one or both injectors by programming have these advantages:

Independent injector parameters to allow optimized conditions for each channel, including sample volume injected



Figure 2. Dual injectors on Scion Gas Chromatographs¹ with Scion 8400 Pro Automated Sampler.²

¹ Applicable Scion Gas Comptographs are Models 430, 436 450, 451, 456, 8300 and 8500.

² Latest version of Scion 8400 Automated Sampler is labeled as Scion 8400 PRO and differs by different outside panel design.

- Operation of a GC detector on one side and a mass spectrometer on the other. Inherent vacuum from the mass spectrometer does not affect the split flows.
- Minimization of leak locations by eliminating three connects in the tee device.
- Set up for two separate protocols and easy switch without instrument changes.
- Independent injector parameters to allow optimized conditions for each channel, including sample volume injected
- Operation of a GC detector on one side and a mass spectrometer on the other. Inherent vacuum from the mass spectrometer does not affect the split flows.
- Minimization of leak locations by eliminating three connects in the tee device.
- Set up for two separate protocols and easy switch without instrument changes.
- Increasing throughput by either switching to other pathway when the first side is complete, or, with one sampler, by injecting two samples from two vials to run simultaneously.
- Throughput can be increased by either switching to the other pathway when the first side is complete, or inject different vials within the same run, by injecting two samples from two vials to run concurrently.
- When a gas chromatograph is not fully utilized with one specific analysis, a second method can be setup with a separate injector, column, and detector.

The Scion 8400 Pro Automated Sampler has the ability to perform injections into one or two injectors in quick succession, yielding two chromatograms together concurrently, or each separately. The two Scion data systems have differing operations to accomplish this action.

Typical configuration of Scion 8500 for Dual Injections for EPA Method 608.3:

- 1. Scion 8500 Gas Chromatograph (Scion P/N 850000011, 120V)**
- 2. Scion 8400 Pro Automated Sampler (Scion P/N 84739371)**
- 3. 2 each, Split/Splitless Capillary Injector (Scion P.N 4561100101, 120 V)**
- 4. Capillary Column, Rxi-17, 30 m, 0.53 mm ID, 1.00 μ film (Restek P/N 13555)**
- 5. Capillary Column, Rxi-1701, 30 m, 0.53 mm ID, 1.00 μ film (Restek P/N 12505)**
- 6. 2 each, Electron Capture Detector, Exempt License (Scion P/N 4562302301), 120V)**
- 7. CompassCD^S Workstation (Scion P/N BR502002), [does not include computer]**

Other injectors, columns and detectors can be substituted for different applications.

Operations with Scion CompassCDS Data System

CompassCDS METH Parameter for Simultaneous Injections

Positions in METH are defined by the system configuration. The first injector to be used is defined in the METH:

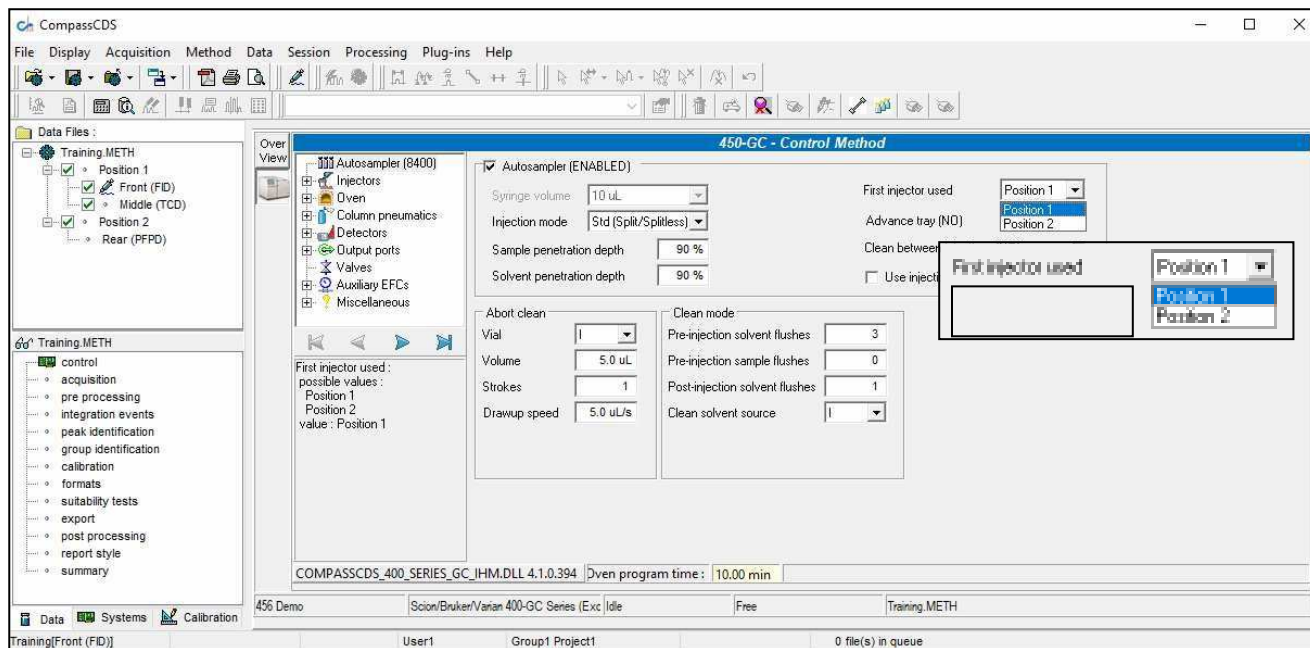


Figure 3. METH parameters for simultaneous injections.

Simultaneous Injections into Two Injectors for Dual Column Peak Confirmation

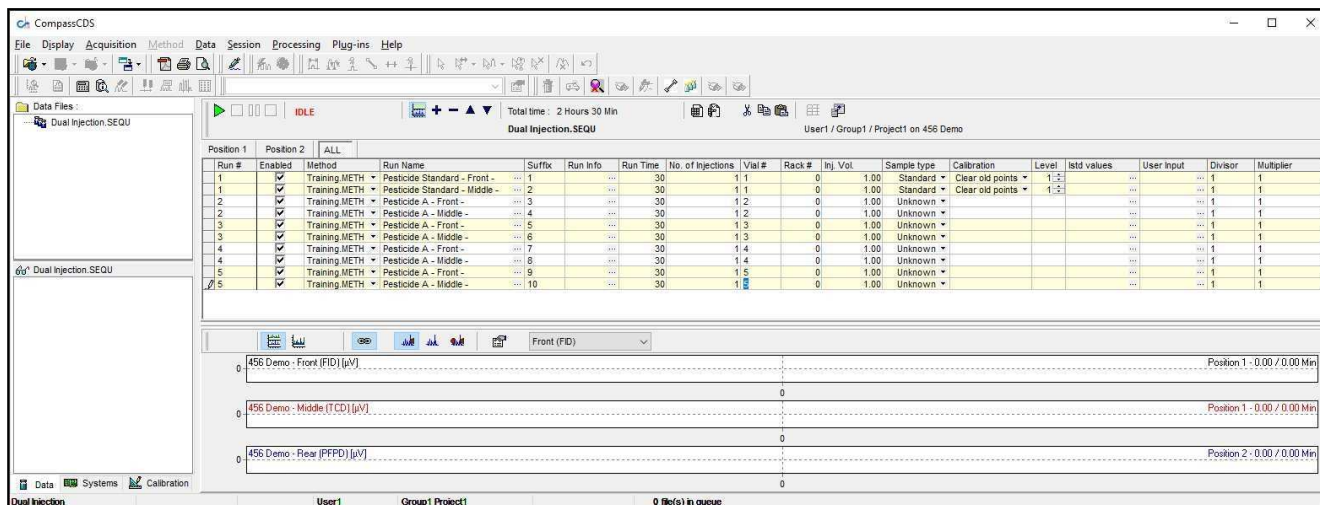
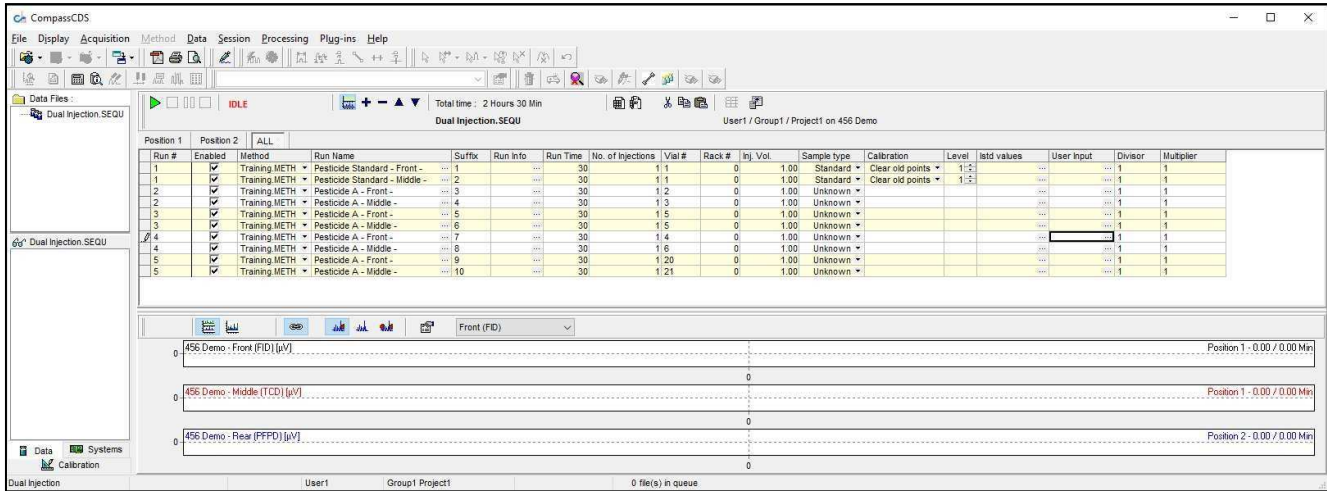


Figure 4. Suggested entries in Compass CDS Sequence for simultaneous injections from same vial.

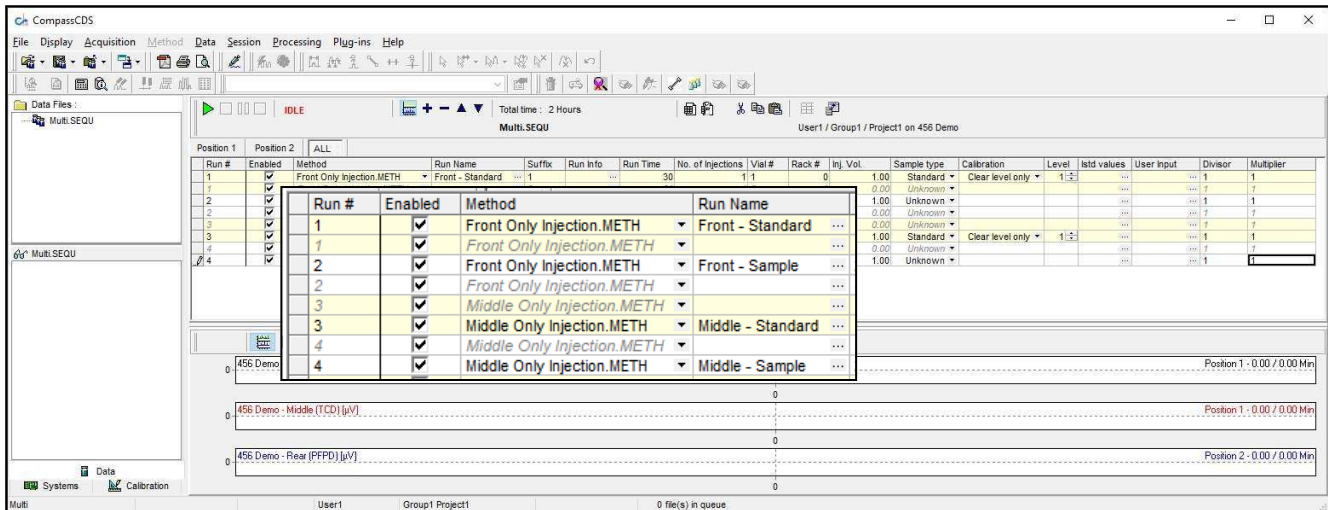
Enhanced Production with Simultaneous Injections of Samples from Two Different Vials



Run #	Enabled	Method	Run Name	Suffix	Run Info	Run Time	No. of Injections	Vial #	Rack #	Inj. Vol.	Sample type	Calibration	Level	Istd values	User Input	Divisor	Multiplier
1	✓	Training.METH	Pesticide Standard - Front	...	...	30	1	1	0	1.00	Standard	Clear old points	1:5	...	...	1	1
2	✓	Training.METH	Pesticide Standard - Middle	...	...	30	1	2	0	1.00	Standard	Clear old points	1:5	...	...	1	1
3	✓	Training.METH	Pesticide A - Front	...	...	30	1	3	0	1.00	Unknown	...	...	...	...	1	1
4	✓	Training.METH	Pesticide A - Middle	...	...	30	1	4	0	1.00	Unknown	...	...	...	...	1	1
5	✓	Training.METH	Pesticide A - Front	...	...	30	1	5	0	1.00	Unknown	...	...	...	...	1	1
6	✓	Training.METH	Pesticide A - Middle	...	...	30	1	6	0	1.00	Unknown	...	...	...	...	1	1
7	✓	Training.METH	Pesticide A - Front	...	...	30	1	7	0	1.00	Unknown	...	...	...	...	1	1
8	✓	Training.METH	Pesticide A - Middle	...	...	30	1	8	0	1.00	Unknown	...	...	...	...	1	1
9	✓	Training.METH	Pesticide A - Front	...	...	30	1	9	0	1.00	Unknown	...	...	...	...	1	1
10	✓	Training.METH	Pesticide A - Middle	...	...	30	1	10	0	1.00	Unknown	...	...	...	...	1	1

Figure 5. Suggested entries in Compass CDS Sequence for simultaneous injections for two different vials. This doubles throughput.

Running a group of samples with one method and switching to a different method for others, without reconfiguring the instrument hardware.



Run #	Enabled	Method	Run Name
1	✓	Front Only Injection.METH	Front - Standard
2	✓	Front Only Injection.METH	Front - Sample
3	✓	Middle Only Injection.METH	Middle - Standard
4	✓	Middle Only Injection.METH	Middle - Sample

Figure 6. Suggested entries in Compass CDS Sequence for injections with one method and switching to a different one.

Include “Manual” Injection in Sequence

The autosampler is disabled in order to make manual injections form the sequence.

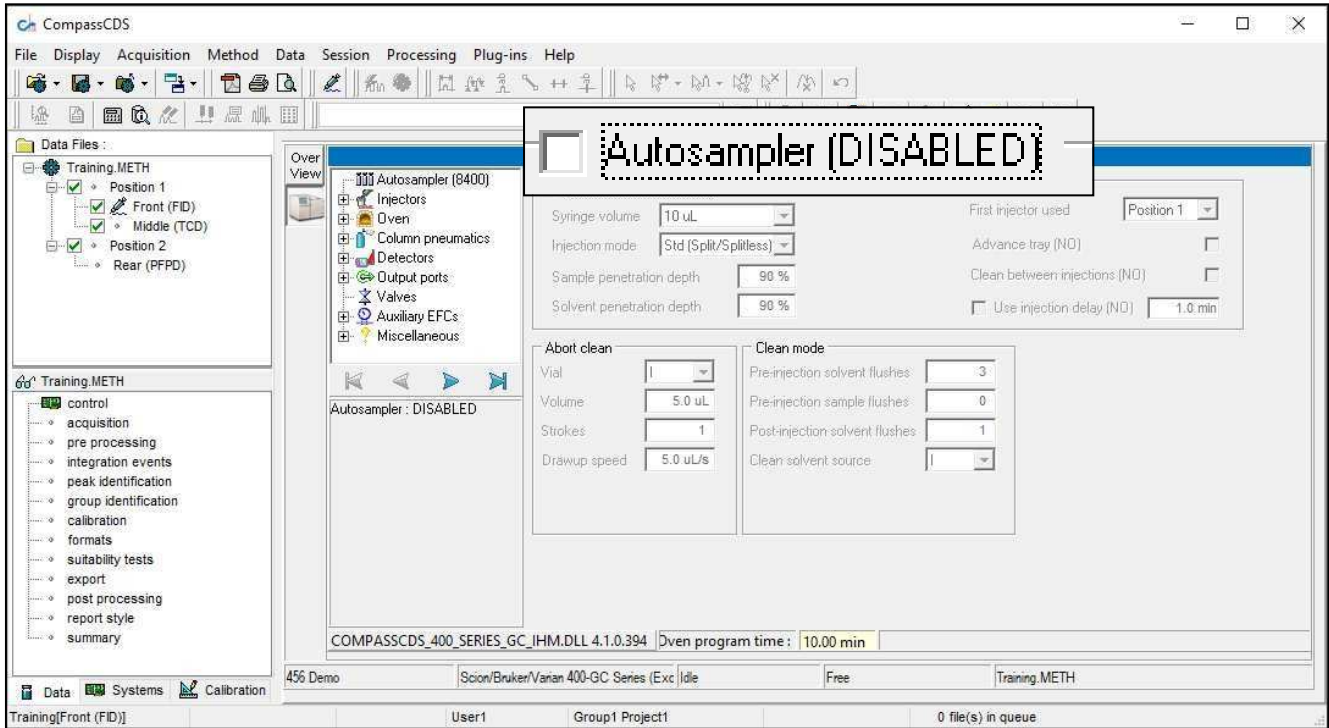


Figure 7. To make manual injections, the Automated Sampler must be disabled in the related method.

A method is constructed to perform a manual injection from Sequence.

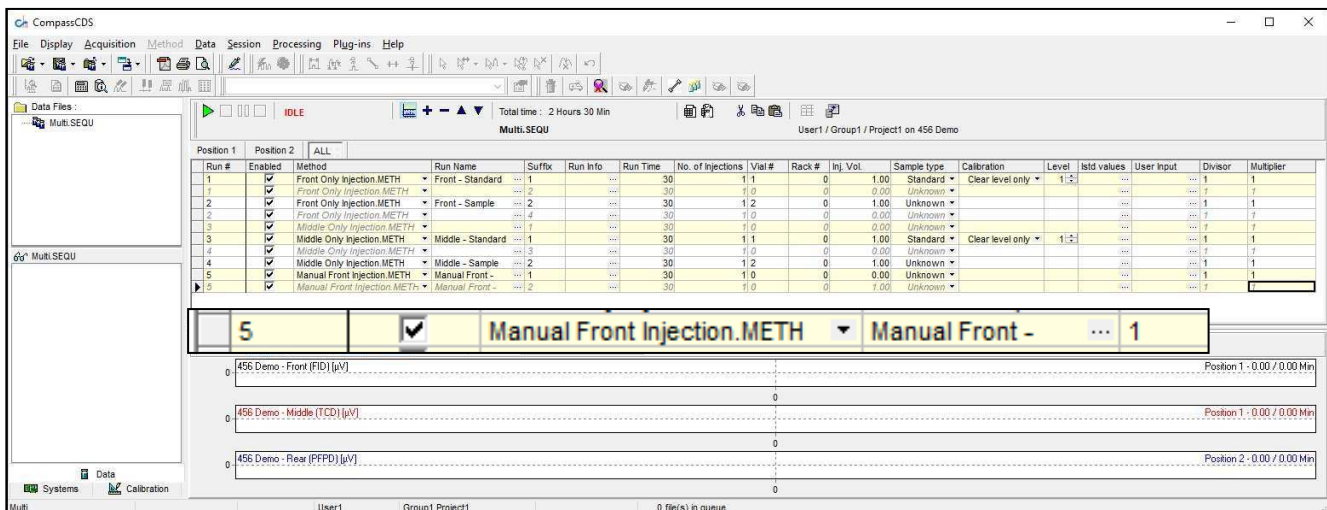


Figure 8. A separate method is selected in active sequence for performing a manual injection.

Operations with Scion MS Workstation

Simultaneous Injections into Two Injectors for Dual Column Peak Confirmation

Double injections can be performed using parameters in the 8400 SampleList. This operation utilizes two injectors, two column and two columns. Then, by running this SampleList in System Control, the same sample will be injected as specified.

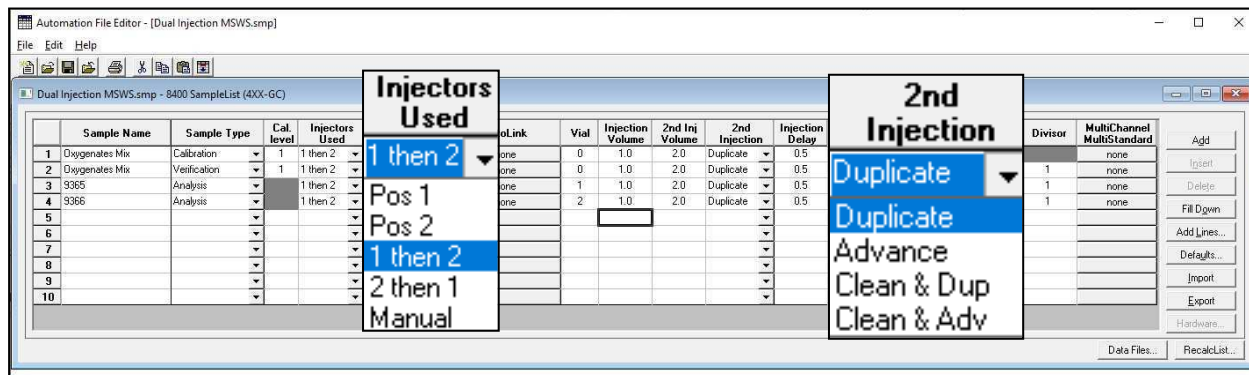


Figure 9. Example SampleList for Scion MS Workstation indicates injection mode for dual injectors for each sample position.

Enhanced Production with Simultaneous Injections of Samples from Two Different Vials

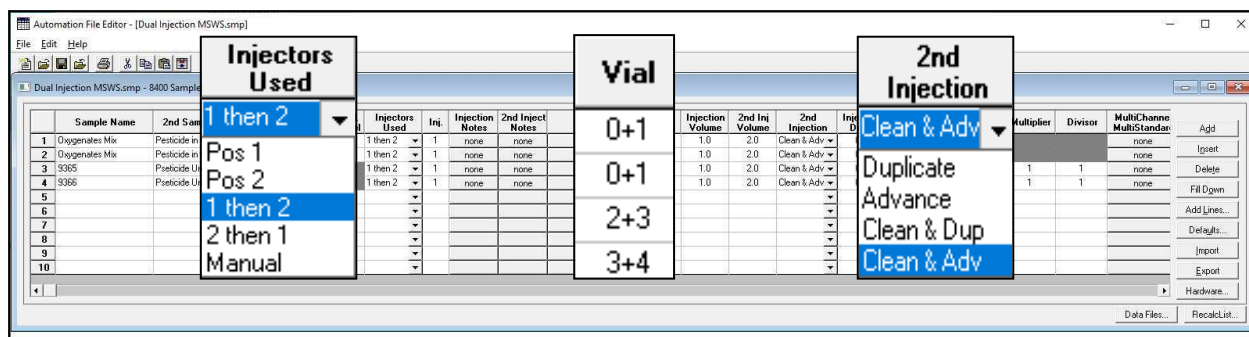


Figure 10. Example SampleList for Scion MS Workstation indicates injection mode for dual injectors for doubling up productivity of the gas chromatograph. “Clean & Adv” performs a rinsing of the syringe just before injection for the second injection and defines the active vials.

Running a group of samples with one method and switching to a different method for others, without reconfiguring the instrument hardware.

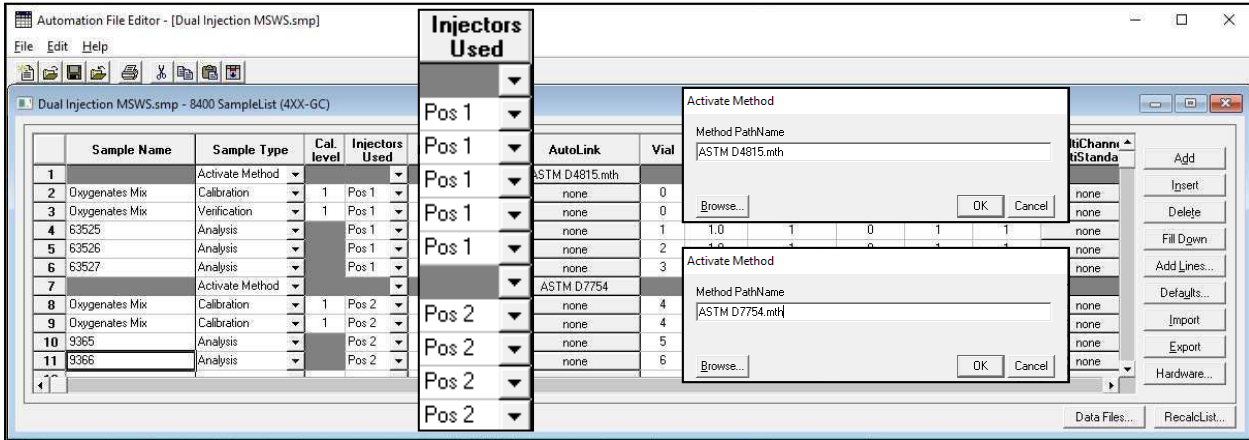


Figure 11. Example of SampleList for Scion MS Workstation extending utilization of gaschromatograph by inserting vials for a different analysis in empty locations, and then switching methods to set up different instrument operating conditions.

Include “Manual” Injection in SampleList

Scion 8400 Pro Automated Sampler is mounted on the top right side of the instrument and provides an unobstructed access to the injectors. This entry in the SampleList waits for a manual injection and does not use the sampler for that sample line. This permits manual injections without removing the sampler.

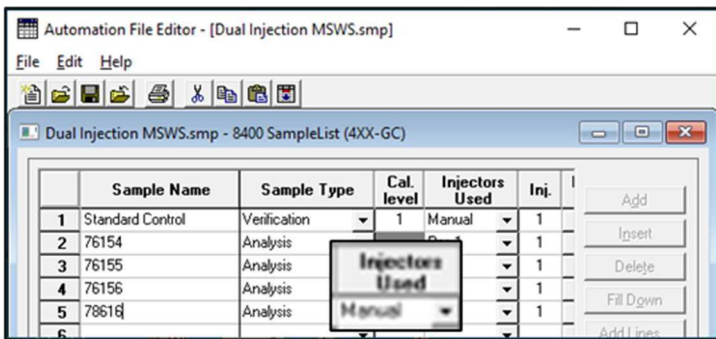


Figure 12. Manual injections are selected in SampleList column “Injectors Used.”

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