Saving Helium on the 5890, 6890 and 7890 GC

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Why look at helium switching?

- Finite resource:
  - Save it for essential applications like Helium Ionization Detectors (HID's)
- Supply concerns
  - Sometimes difficult to acquire;
- COST, COST, COST!
  - Over $400/bottle

Conserve the expensive gas for necessities

Alternatives to carrier switching?

- Switch permanently; move to hydrogen
  - Excellent chromatography
  - Concerns about flammability
- Move to some other carrier;
  - Chromatography or run time may suffer
  - Detector sensitivity (e.g. TCD) may suffer

Where possible, H2 is an excellent alternative

Why stay with helium?

- Good carrier;
  - Excellent chromatography
  - Safe
- Some instruments (i.e. HID's) require it
- Some methods require it
  - e.g. Numerous ASTM methods
  - Detector sensitivity (e.g. TCD) may require it
 - Non-reducing carrier (HT SimDis)

When you have to stay with helium...

# Switching is way to stay with helium

- Move to helium to run method specified helium analysis;
    - GC control file switches to helium
    - Wait long enough to clear out idle gas (blank run)
- Move back to a different carrier for idle times
- Only consuming helium during analytical operations
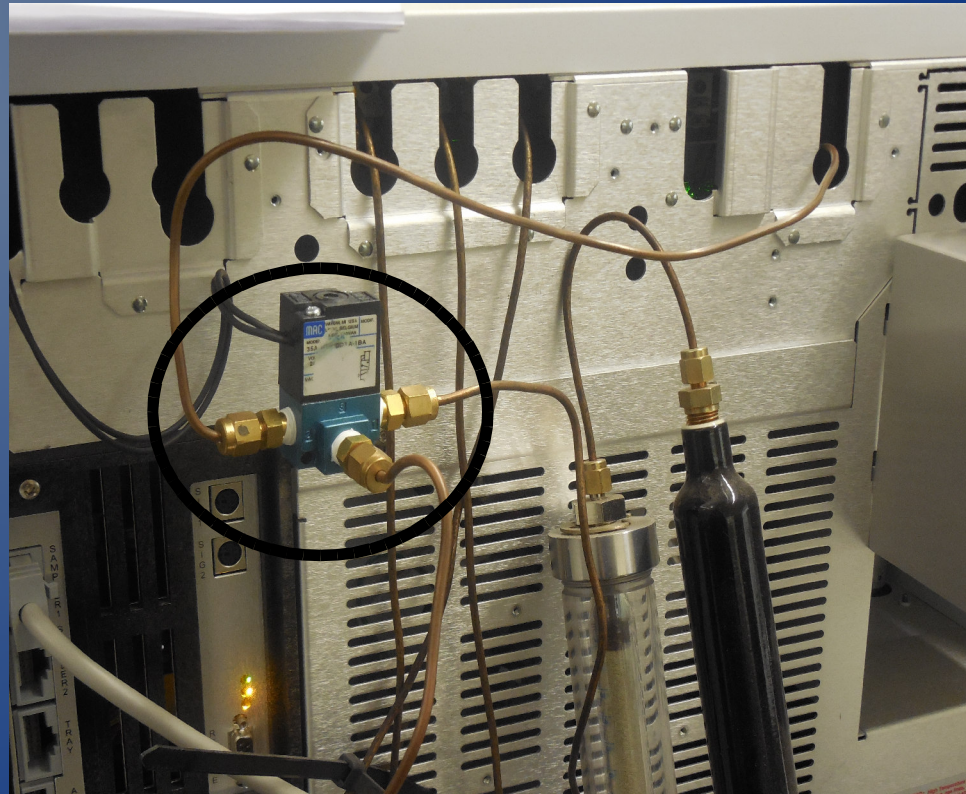
Simple way to have the best of both

Implementation: Switching valve is simple installation
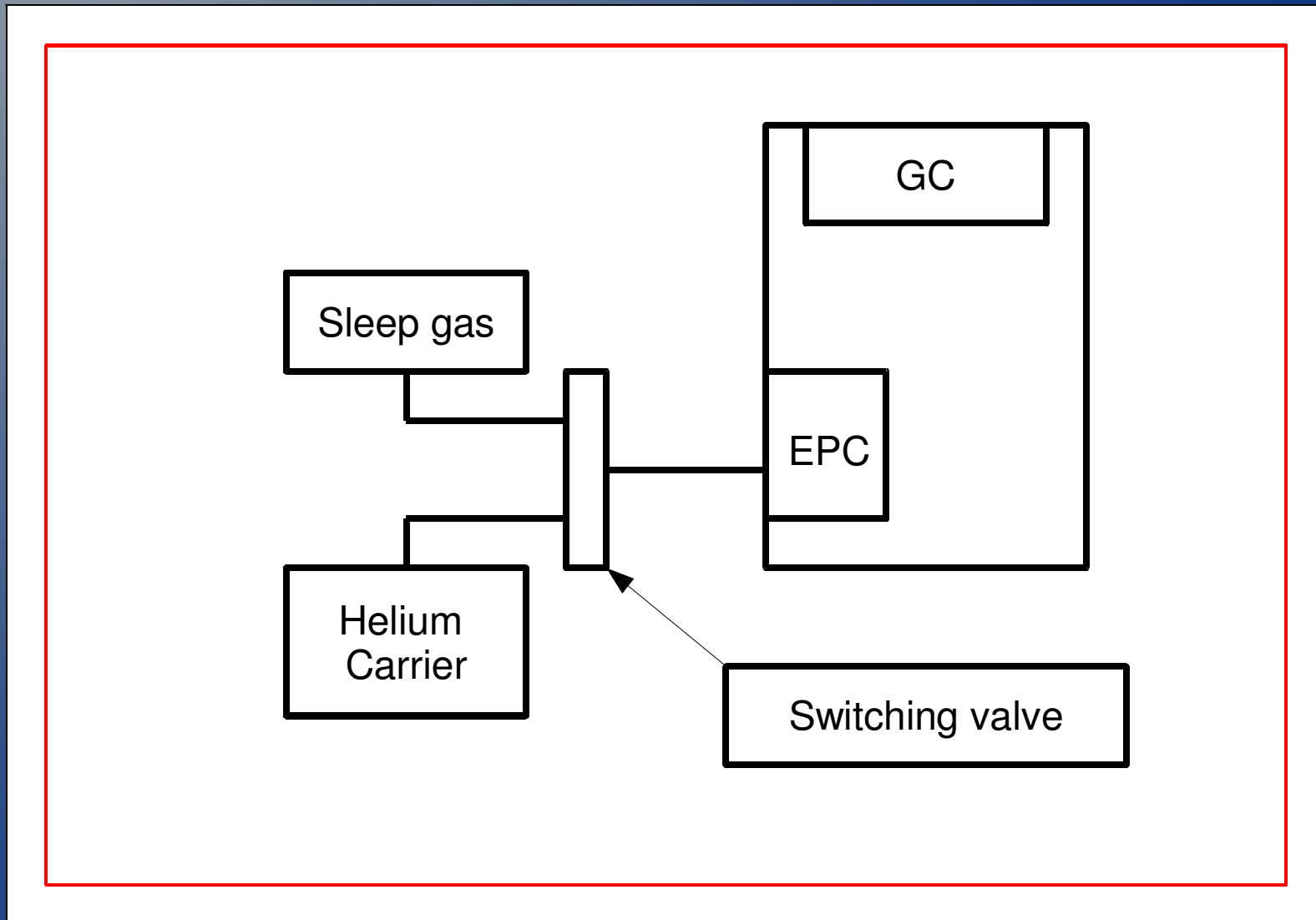
Hardware configuration
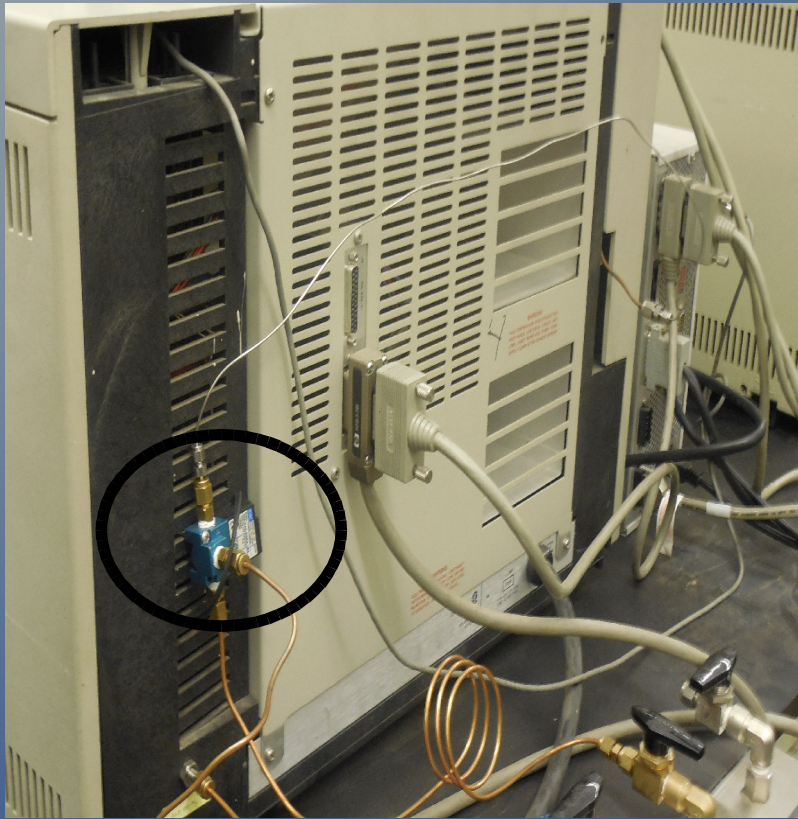
5890

7890

Controlled by GC software

Procedure:

- Set up sequence with awake method
  - Switches from idle gas (H2, N2, etc...) to helium carrier
- Runs a run long enough to effect carrier gas changeover
  - Time established empirically
- Runs samples (some number)
  - Regular analytical method
- Runs a run to switch back to alternative carrier (sleep method)

Sequence Example

Sequence Table: D3606

Currently Running

Line: [ ] Method: [ ] Location: [ ] Inj: [ ]

Sample Info

Line	Location	Sample Name	Method Name	Inj/Location	Sample Type	Ca
1			AWAKE	1	Sample	
2	Vial 1	QC	BENZENE	1	Sample	
3			SLEEP	1	Sample	

Method screen shot (5890) Analytical/Awake
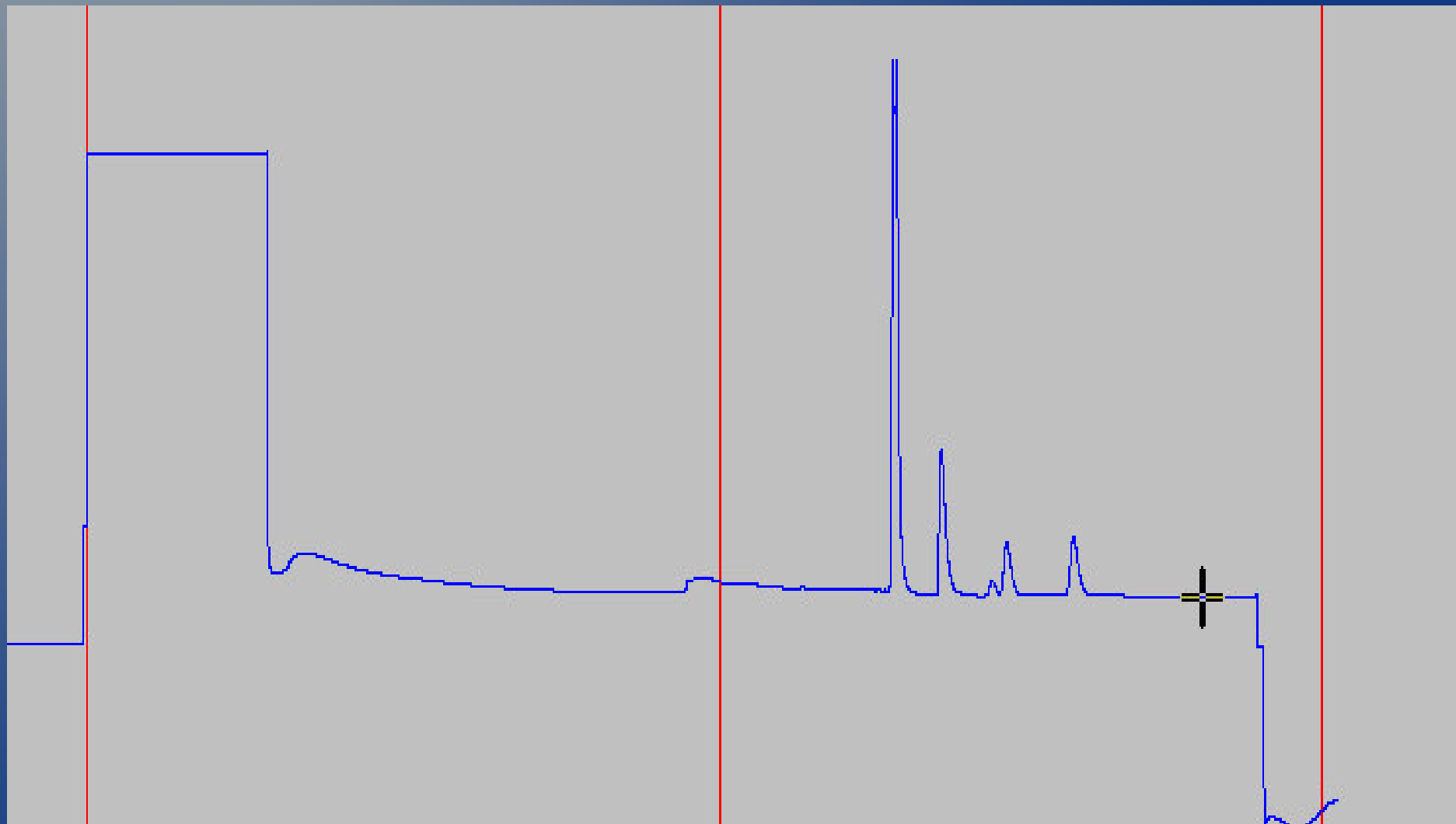

Switching valve on

Method screen shot (5890) Sleep
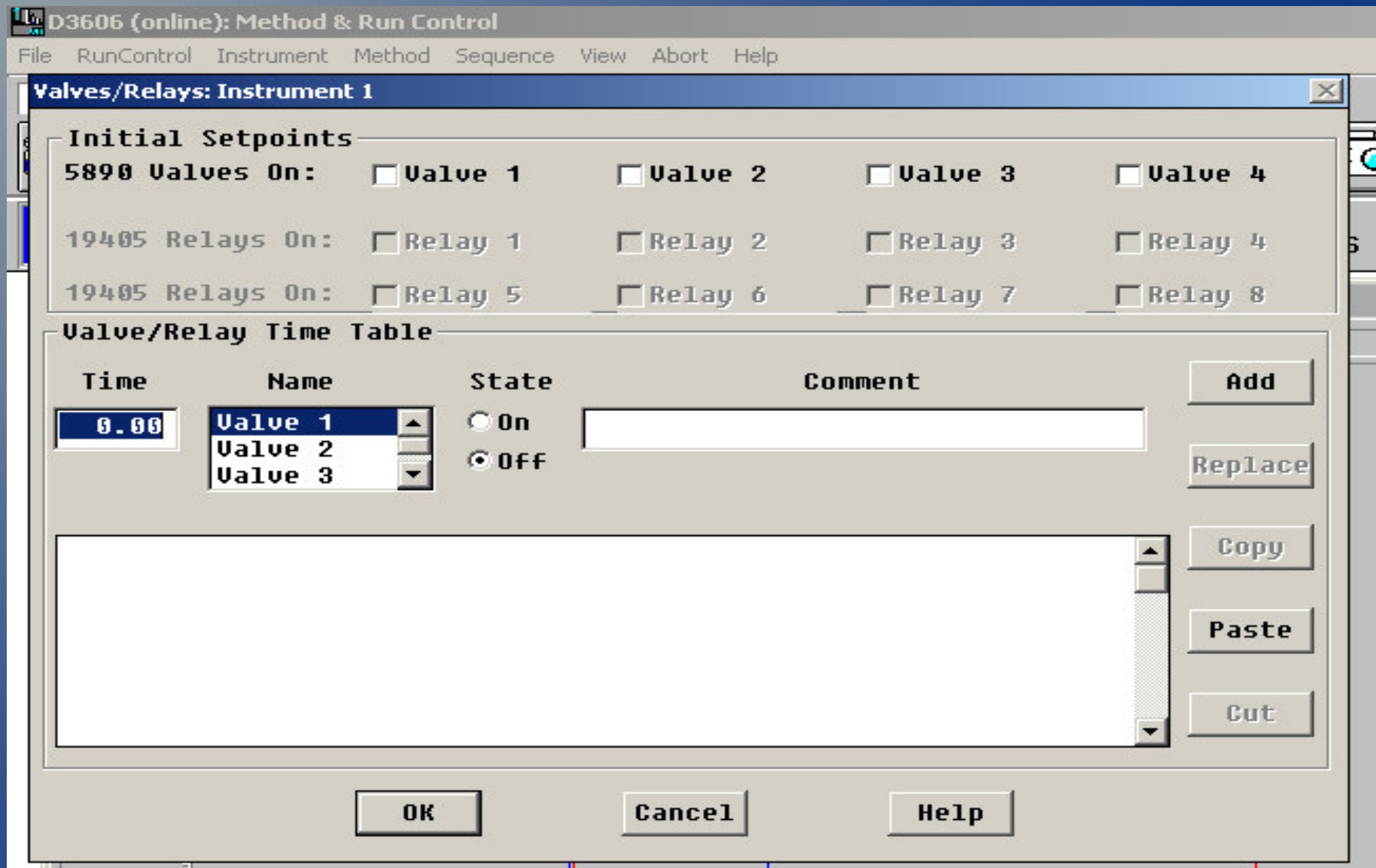
Switching valve off

3606 Chromatogram (includes switching)

Implemented on:

- 5890:

  - 2 instruments, manual pneumatics, helium/nitrogen, 1 TCD, 1 FID, 1 packed column, 1 capillary column

- 6890:

  - 1 Instrument, EPC pneumatics, helium/hydrogen, FID, capillary column

- 7890

  - 1 Instrument, EPC pneumatics, helium/hydrogen, FID, capillary column

Where it is not appropriate:

- Sensitive detectors
  - Cannot recover fast enough to trace amounts of idle gas (e.g. HID's)
  - Not "bubble tight"; might see air contamination
  - Mass Spectrometer: hydrogen switch over can be very dirty
- Applications that might measure sleep gas
  - Some TCD applications not appropriate

Where it is not appropriate (cont.):

- Method used all day, day in and day out
  - Not worth switching; hard on the switching valve
  - Not really cost effective
- May not be appropriate for certain instrument combinations
  - In my opinion: Switching to hydrogen idle with a TCD (safety issue) with a 7890

When you do use switching, be aware . . .

Identified issues:

- 7890 EPCs
    - Cannot re-configure; use hydrogen
    - Instruments converted are FID's so flammability not an issue
- 5890 manual pneumatics
    - No EPC - use nitrogen – cheap, safe
- Default to valve off (saves wear and tear)
    - Must return to sleep

Cost Savings:

- Working with customer to ascertain helium expenses for 2012 vs. 2013

- Also looking at H2 consumption for 2012 vs. 2013

- Complicated by move to H2, N2 generators

When you have to stay with helium carrier ...

Conclusion:

- Carrier switching offers a simple inexpensive means of reducing helium consumption in the laboratory
- Analytical methods stay with helium carrier
- Implementation is simple and inexpensive
- Not applicable to all instruments, all applications