

OHSIG08

Workplace Exposure Standards

Interpretations of the current NZ WES for Carbon Monoxide

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CURRENT WORKPLACE EXPOSURE STANDARDS

to maintain COHb levels below 3.5%

Under most conditions this will be achieved if the average level over an 8-hour day does not exceed

25 ppm,

CURRENT WORKPLACE EXPOSURE STANDARDS

to maintain COHb levels below 3.5%

the sum of the exposure periods during the day should not (in total) exceed the following periods:

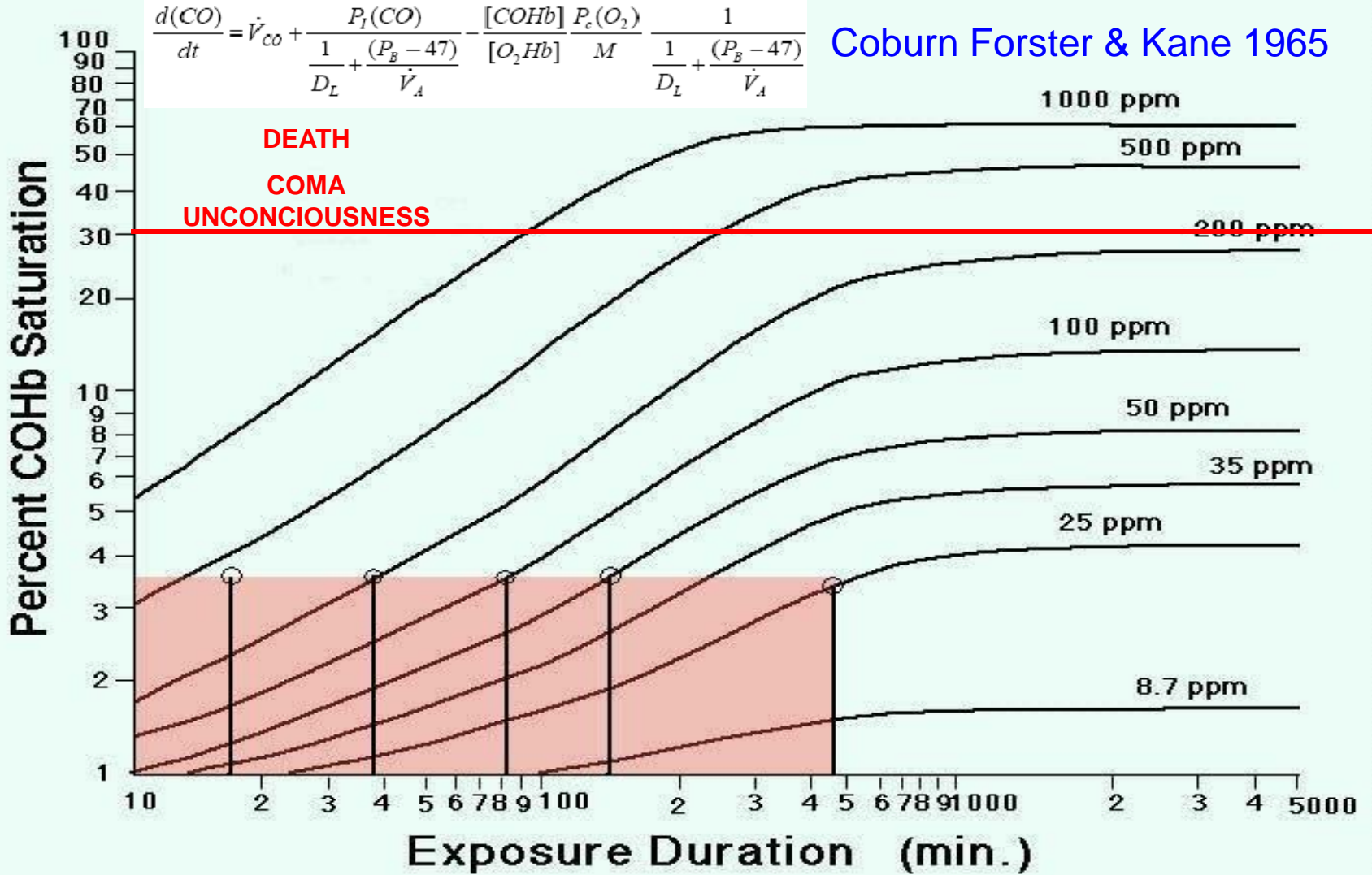
50ppm for 60 minutes

100ppm for 30 minutes

200ppm for 15 minutes

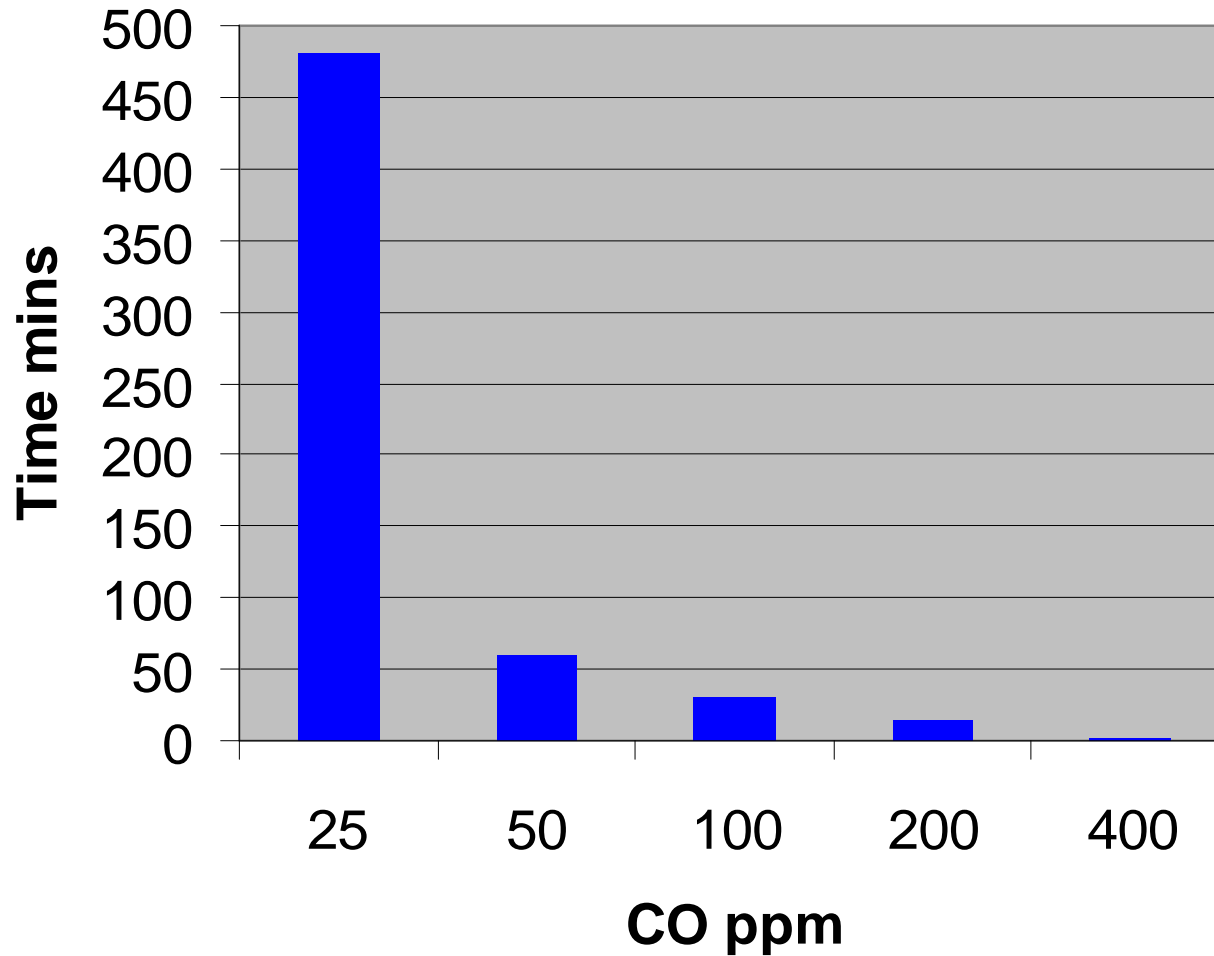
At no time should 400ppm be exceeded

THE SCIENCE

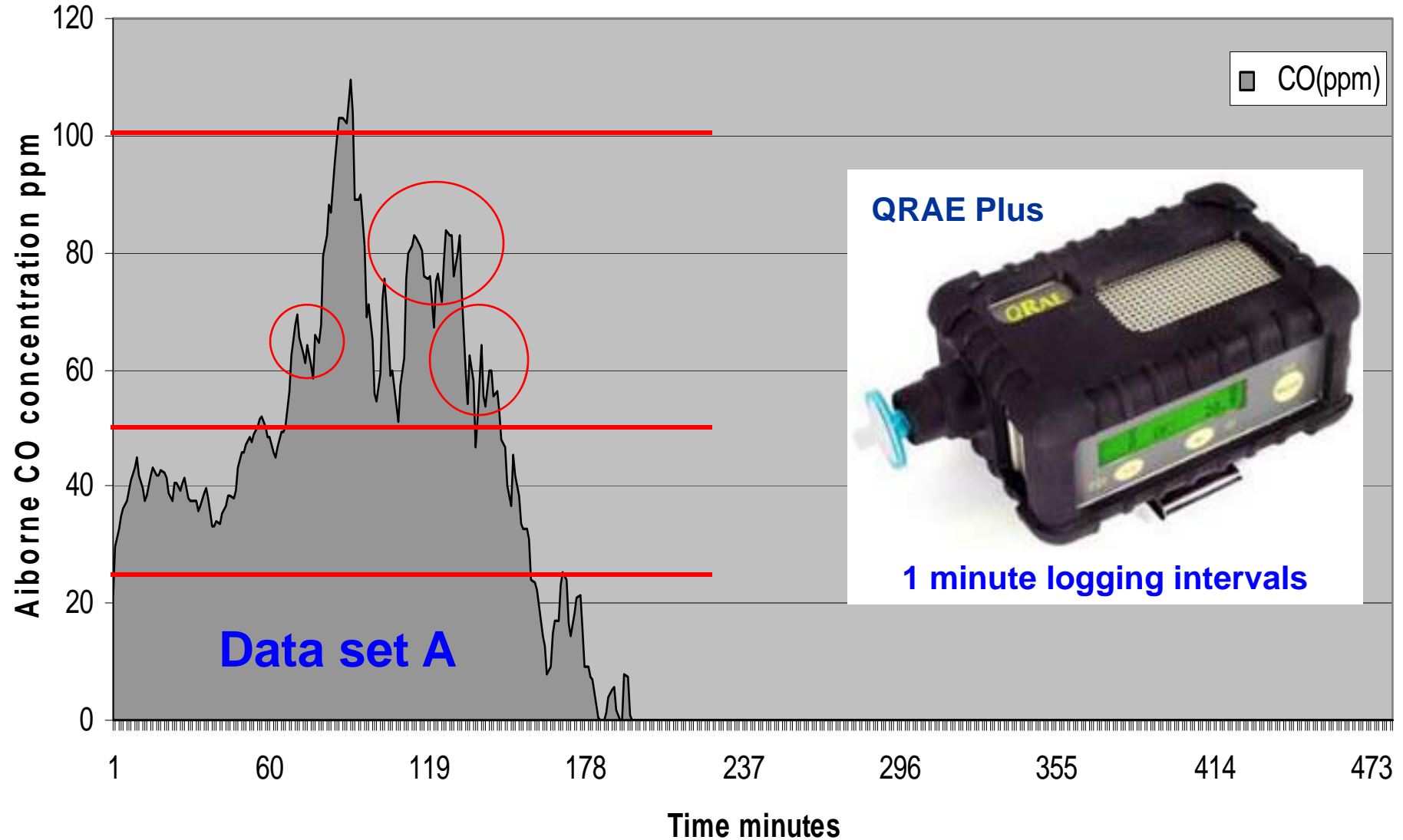


CURRENT WORKPLACE EXPOSURE STANDARDS

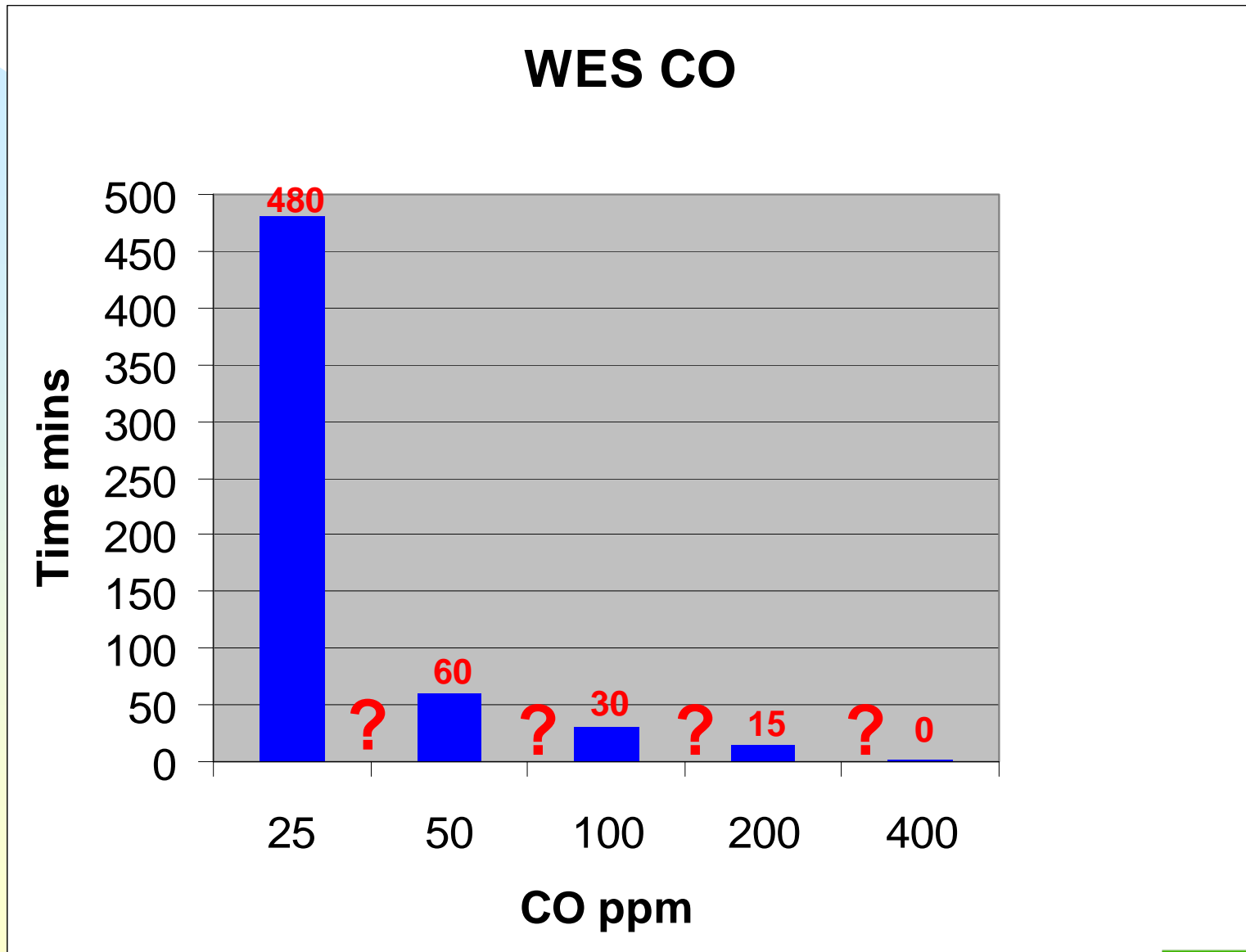
WES CO



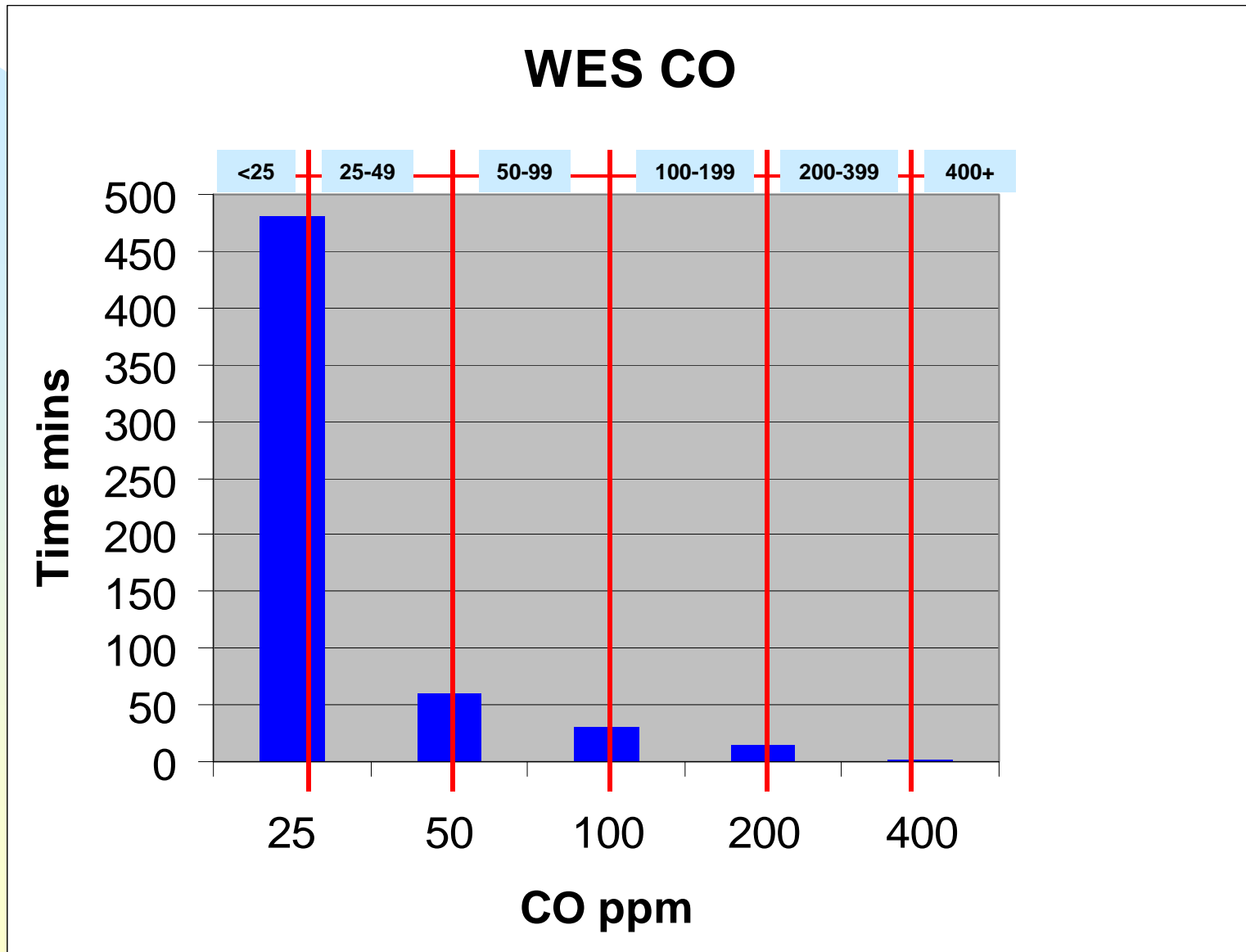
Real World Exposures



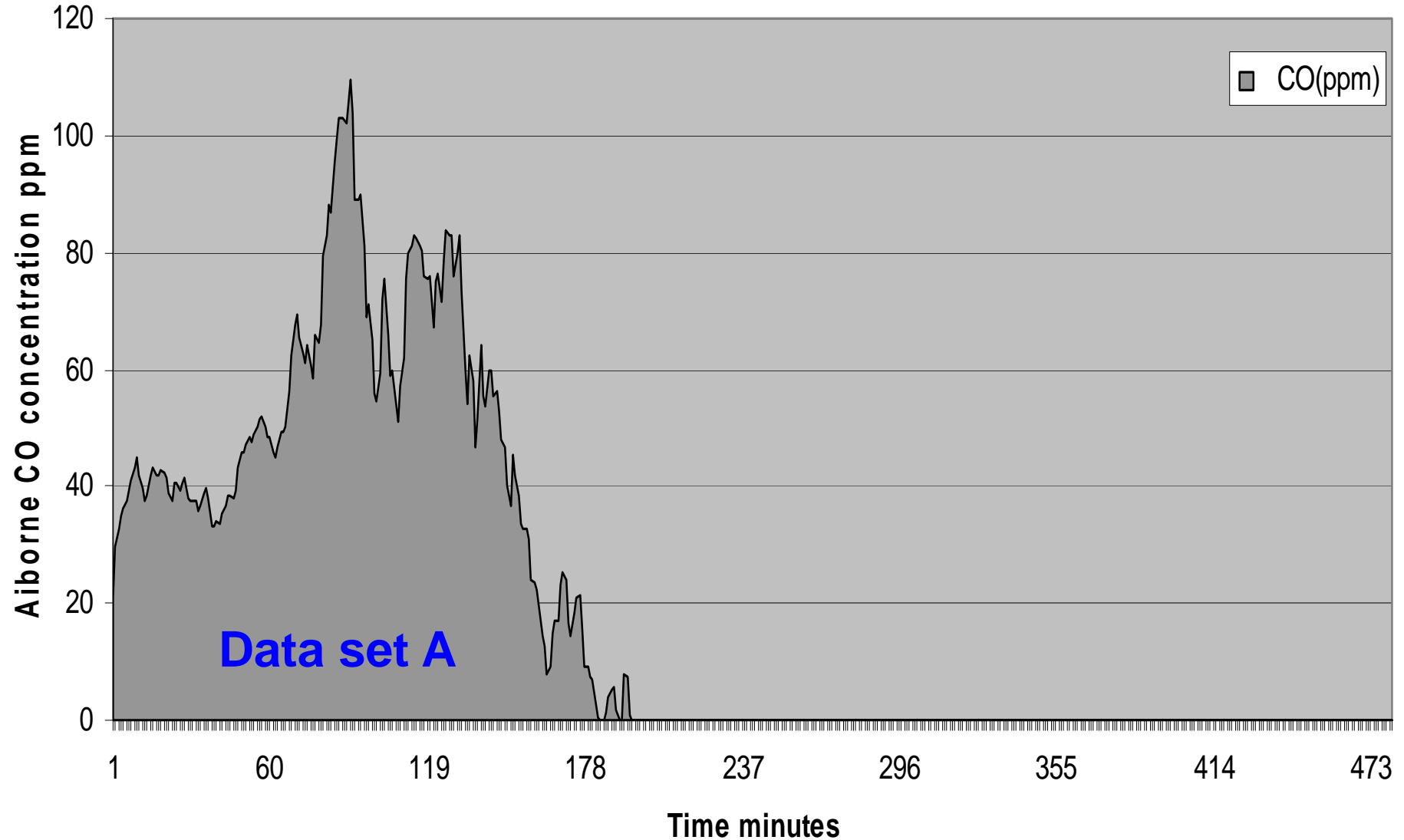
CURRENT WORKPLACE EXPOSURE STANDARDS



NOMINAL EXPOSURE BANDS

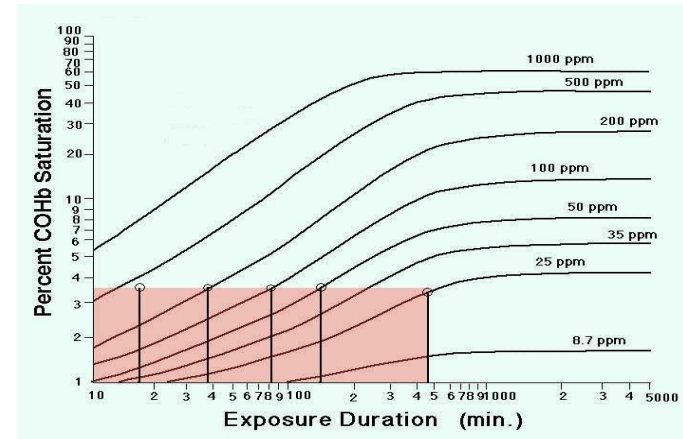
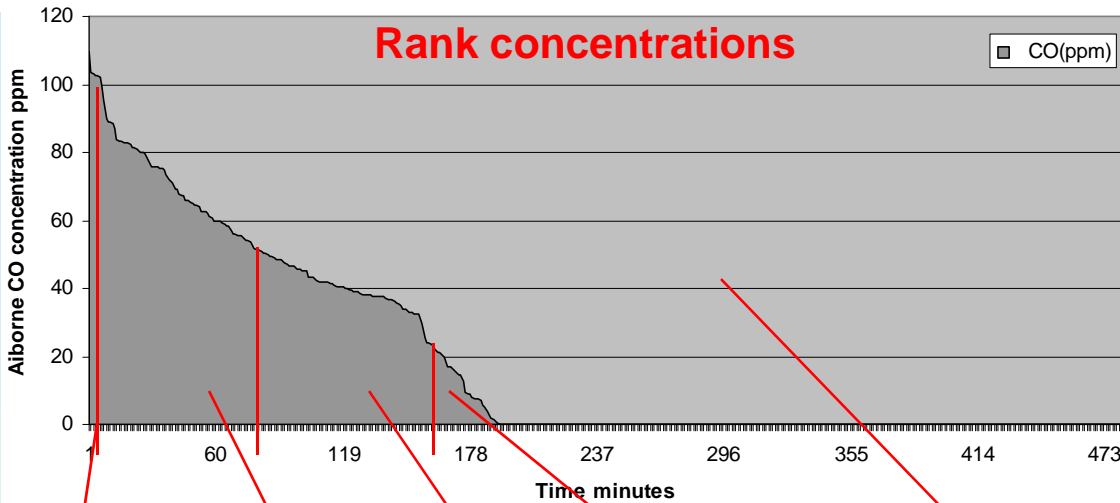


REAL WORLD EXPOSURES



INTERPRETATION

CO(ppm) 48 minute shift



Assign to WES Range

100-199ppm

6 mins

**Avge
104ppm**

50-99ppm

78 mins

**Avge
69ppm**

25-49ppm

73 mins

**Avge
40ppm**

<25

323 mins

**Avge
1ppm**

480 mins

**Avge
19ppm**

PLOT

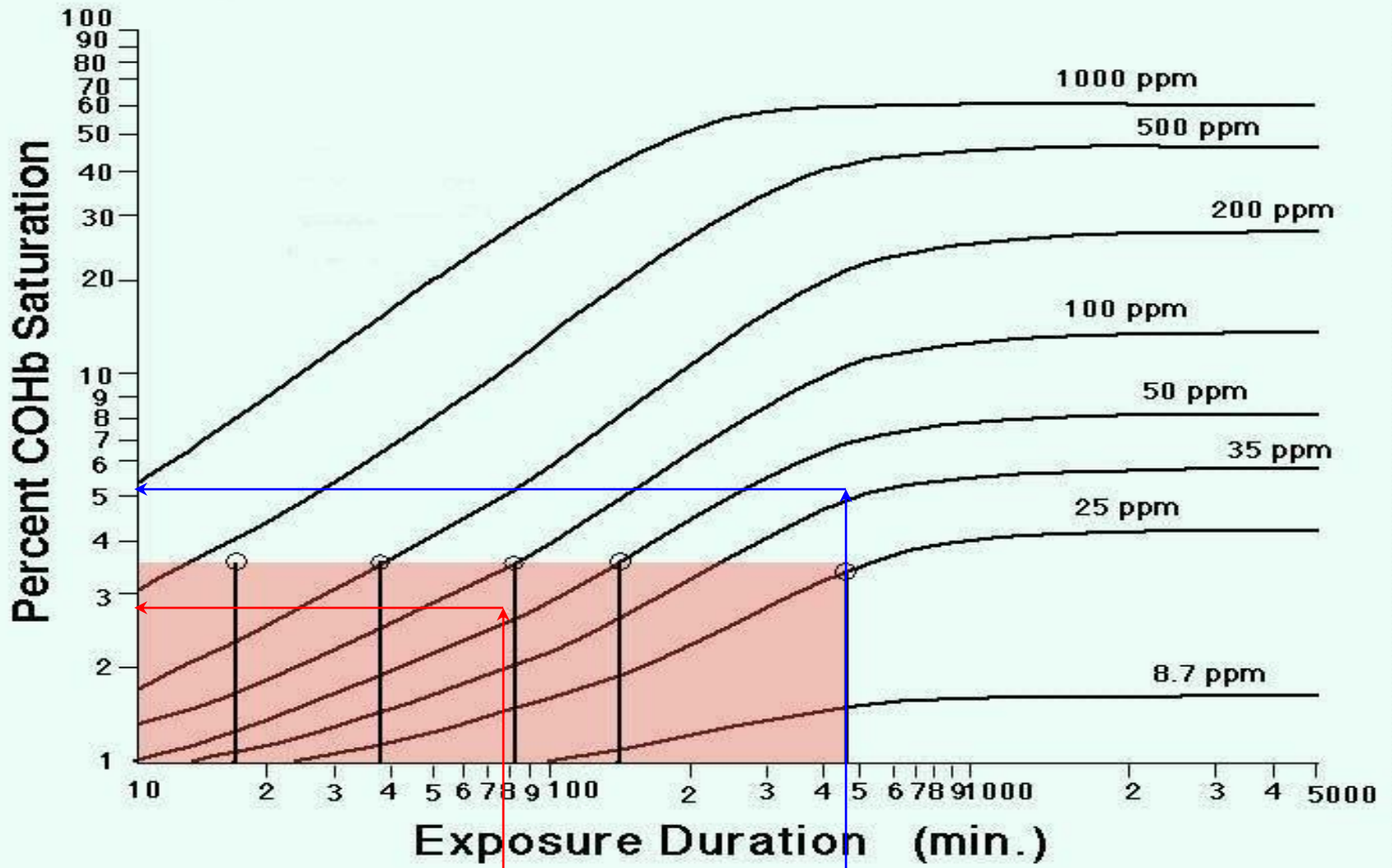
INTERPRETATION

Nominal CO Concentration Band	>400 ppm		200-399 ppm		100-199 ppm		50-99 ppm		25-49 ppm		<25 ppm	
	A	B	A	B	A	B	A	B	A	B	A	B
Data Set												
Number of minutes in Band	0	0	0	2	6	61	78	73	73	52	323	291
Average CO concentration	-	-	-	215	104	123	69	72	40	34	1	13
Calculated COHb %	-	-	-	<1	1	3.3	2.9	2.8	3	1.6	<1	1.8
8 hour average CO concentration	Set A= 19 ppm						Set B= 39 ppm					
Calculated COHb % (8hr)	Set A= 2.9%						Set B= 5.0%					

QRAE Plus



INTERPRETATION

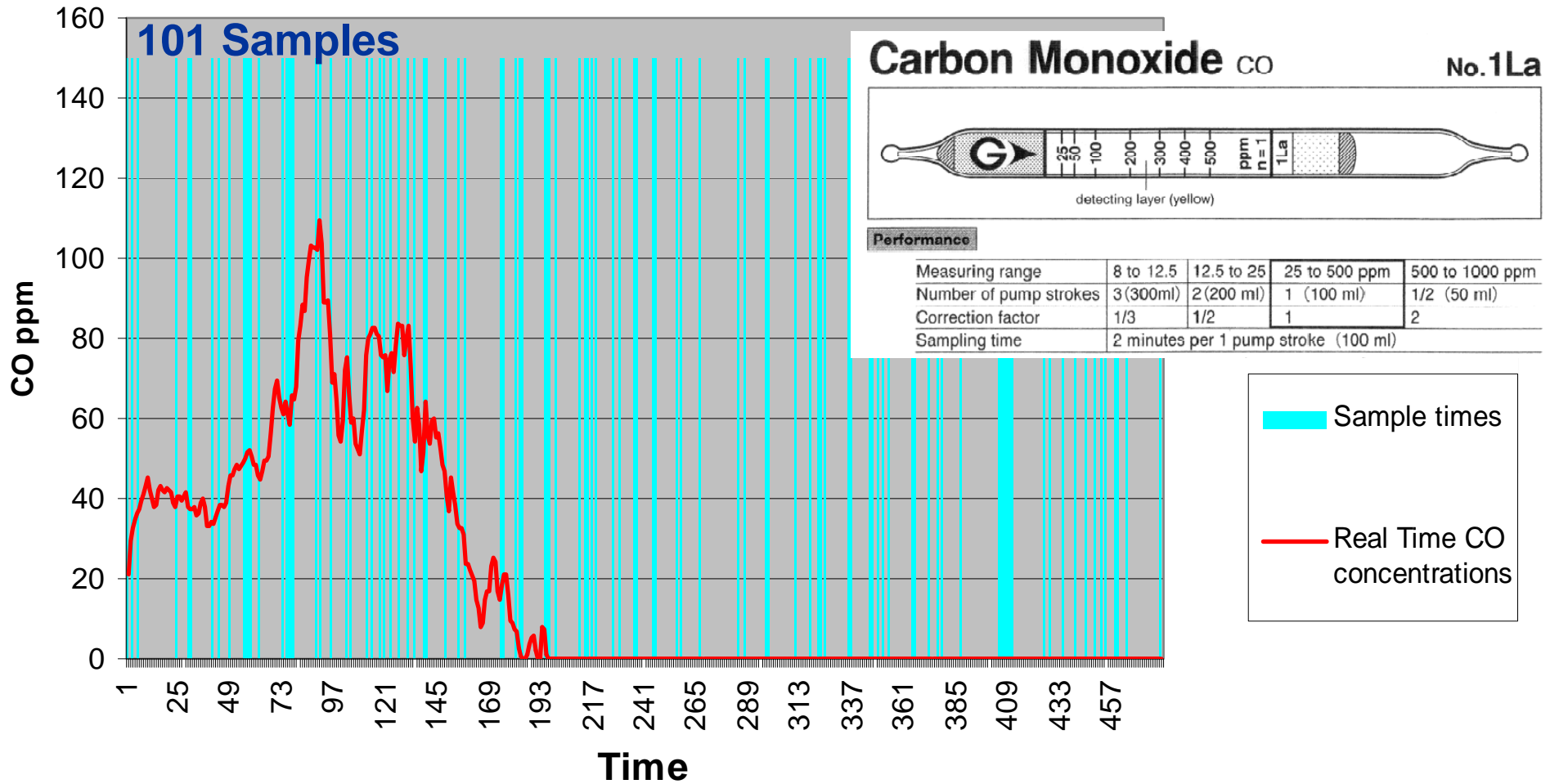


78 mins @ 69ppm = 2.9% COHb

480 mins @ 39ppm = 5.1% COHb

ALTERNATIVE SAMPLING METHOD

CO real time + Random sampling



VIABILITY OF ALTERNATIVE SAMPLING METHOD

Nominal CO Concentration Band	>400 ppm		200-399 ppm		100-199 ppm		50-99 ppm		25-49 ppm		<25 ppm	
	A	R	A	R	A	R	A	R	A	R	A	R
Data Set												
Number of minutes in Band	0	0	0	0	6	30 (2)	78	60 (22)	73	12	323	65
Average CO concentration	-	-	-	-	104	106	69	63	40	38	1	1
Calculated COHb %	-	-	-	-	1	2.3	3.6	2.7	3		<1	<1
8 hour average CO concentration	Set A= 19 ppm						Set R= 22 ppm					
Calculated COHb % (8hr)	Set A= 2.9%						Set R= 3.2%					

PROPOSED WORKPLACE EXPOSURE STANDARDS

Nominal CO Concentration Band	>400 ppm	200-399 ppm	100-199 ppm	50-99 ppm	25-49 ppm	<25 ppm
Band mid point ppm		300	150	75	37	--
Minutes to reach 3.5%COHb	15	28	53	110	200	480
Guideline WES time	Ceiling Limit	15	30	60	100	480

FOR EXPOSURE TIMES IN EXCESS OF 480 MINS THE TWA CONCENTRATION SHOULD BE LOWERED ACCORDINGLY

PROPOSED WORKPLACE EXPOSURE STANDARDS

Concentration Band (ppm)	>400	200-399	100-199	50-99	25-49	<25
Cumulative Time (mins)	Ceiling Limit	15	30	60	100	480

FOR EXPOSURE TIMES IN EXCESS OF 480 MINS THE TWA CONCENTRATION SHOULD BE LOWERED ACCORDINGLY

PROPOSED WORKPLACE EXPOSURE STANDARDS

PROPOSAL

A Concentration Banding system be used for the Carbon Monoxide WES

The Coburn, Forster & Kane nomogram be used to assess compliance with the WES in the same way as the WBGT nomogram is used for Heat Stress assessments

DoL review the WES for carbon monoxide as a priority using real time data to test the model