Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

UVF OF HEAVY PHC – OFFICE VERSUS FIELD USE

John Banks

Remtech October 2011

OFFICE USE

Sample	F2	F3	F4	Total PHC	Water	Hexane
Office-1	ND	ND	ND	<60	-	-
Office-2	<10	<30	<20	<60	-	-
Office-3	<10	<30	<20	<60	-	-
Office-4	<10	<30	<20	<60	-	-
Office-5	12	<30	<20	<60	-	-
Office-6	<10	<30	<20	<60	-	-
Office-7	31	166	54	251	-	-
Office-8	28	185	84	297	-	-
Office-9	<10	342	220	562	-	+
Office-10	63	398	136	597	-	+ (faint)
Office-11	90	429	108	627	-	+ (faint)
Office-12	685	1100	190	1975	NA	+ (faint)
Office-13	2490	223	<20	2713	NA	+
Office-14	1270	1080	326	2676	+	+
Office-15	1080	3400	1140	5620	+	+
Office-16				16550	-	+
Office-17				54360	+	+

OFFICE USE

- 100% in hexane with this data set, best of all scenarios
- Most widely used at Matrix (for sample selection)
- Controlled setting, no outdoor light

CONTINUOUS SAMPLING

SAMPLE	FIELD VOC	TOTAL BTEX	TOTAL PHC (C11-C60)	WATER	HEXANE
CS-1	240	0.0	0	Negative	N/A
CS-2	400	0.0	0	Negative	N/A
CS-3	170	0.1	0	Positive	N/A
CS-4	30	0.0	0	Negative	Negative
CS-6	50	0.0	5	Negative	Negative
CS-7	300	0.0	6	Negative	N/A
CS-8	220	0.5	10	Slight?	Negative
CS-9	460	0.0	18	Positive	N/A
CS-10	95	0.0	65	Negative	N/A
CS-11	110	0.0	300	Negative	Negative
CS-12	130	1.3	360	Negative	Negative
CS-13	2000	0.4	370	Positive	N/A
CS-14	500	0.4	370	Positive	N/A
CS-15	1850	1.4	580	Positive	N/A
CS-16	320	0.3	770	Negative	Negative
CS-17	2200	6.2	1200	Positive	N/A
CS-18	740	4.8	1400	Positive	N/A
CS-19	1700	10.5	1700	Positive	N/A
CS-20	2300	6.1	1900	Positive	N/A
CS-21	380	10.9	3500	Positive	N/A
CS-22	1350	9.9	3900	Positive	N/A
CS-23	970	6.6	4500	Positive	N/A

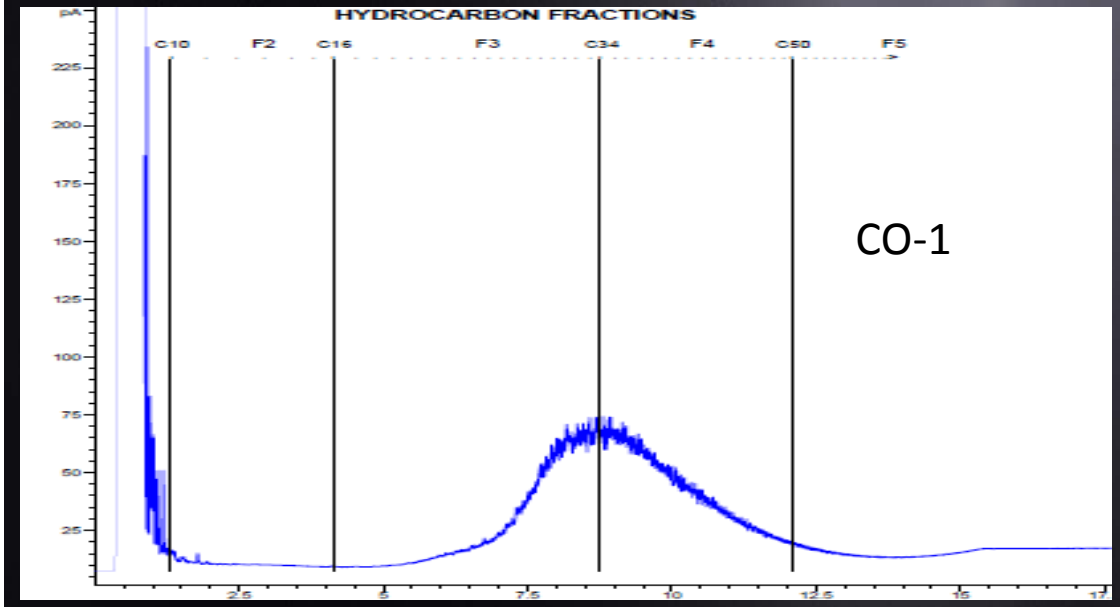
CONTINUOUS SAMPLING

- Plenty of time between testing events
- Fresher impact with saturated areas, very strong response
- 3 unexpected responses (but 90% correlation)
- Homogeneity or sampling error
- Sample size decreased to decrease sensitivity

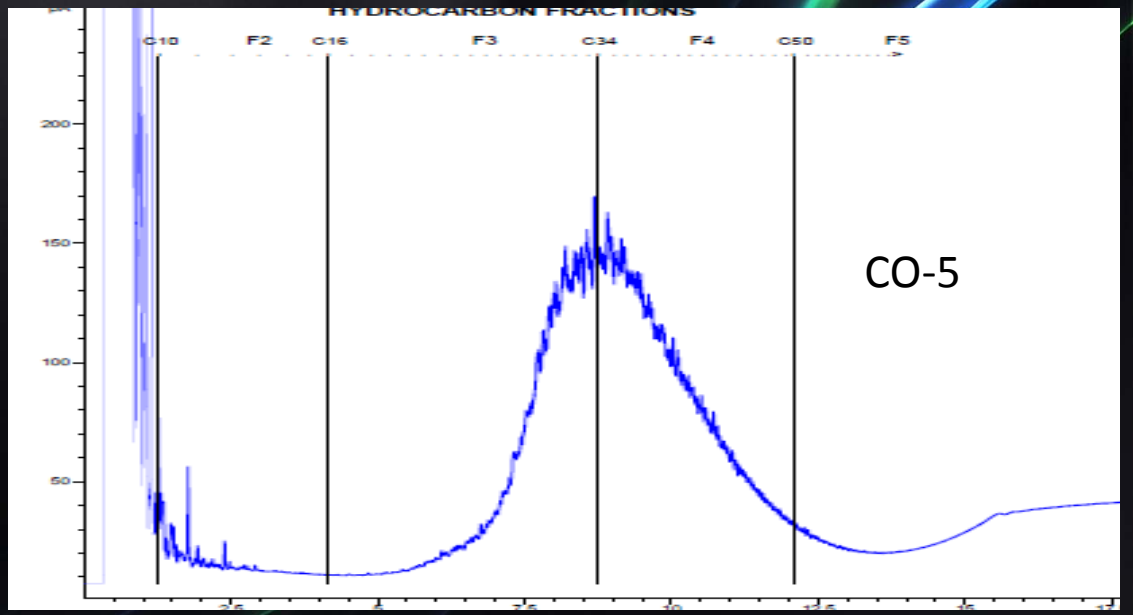
COMPRESSOR OIL SPILL

Sample	Soil Vapour	F1 (C6-C10)	F2 + F3 (C11-C34)	UVF Response
CO-1	-	504	540	slight
CO-2	60%	< 4	< 30	-
CO-3	170	< 4	< 30	-
CO-4	85	< 4	< 30	-
CO-5	100%	3830	990	-
CO-6	420	< 4	< 30	-
CO-7	620	6	< 30	-
CO-8	410	68	< 30	-
CO-9	70	< 4	< 30	-
CO-10	50	< 4	< 30	-
CO-11	10%	268	< 30	-
CO-12	40	< 4	< 30	-
CO-13	130	< 4	< 30	-

COMPRESSOR OIL SPILL



CO-1



CO-5

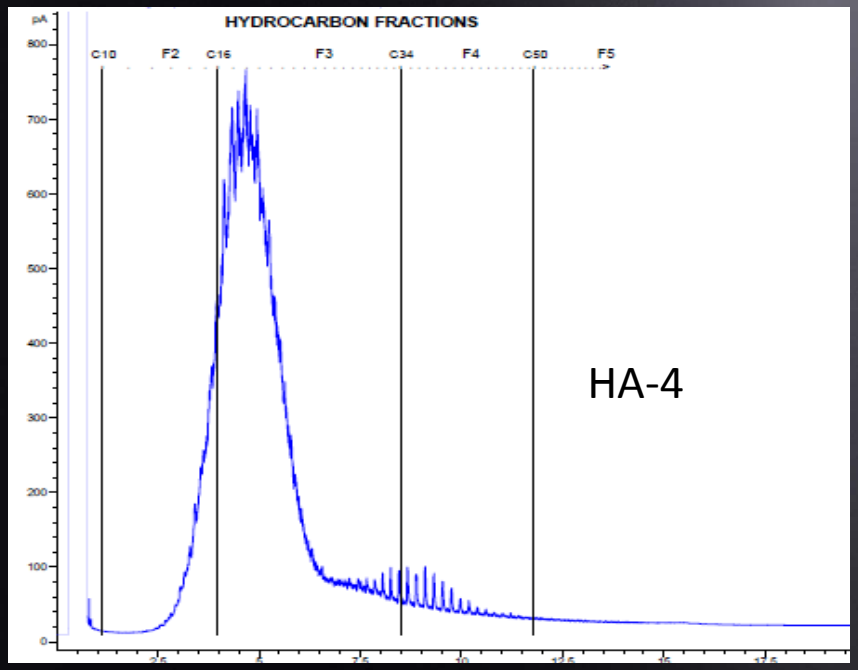
COMPRESSOR OIL SPILL

- Spill had been scraped prior to sampling
- Slight and no response where F3 reported
- Very little PAHs in compressor oil on lab analysis
- Unexpected light end hits (likely condensate - F1) with no response from UVF as expected
- Bio-remediation for remaining impacted soils

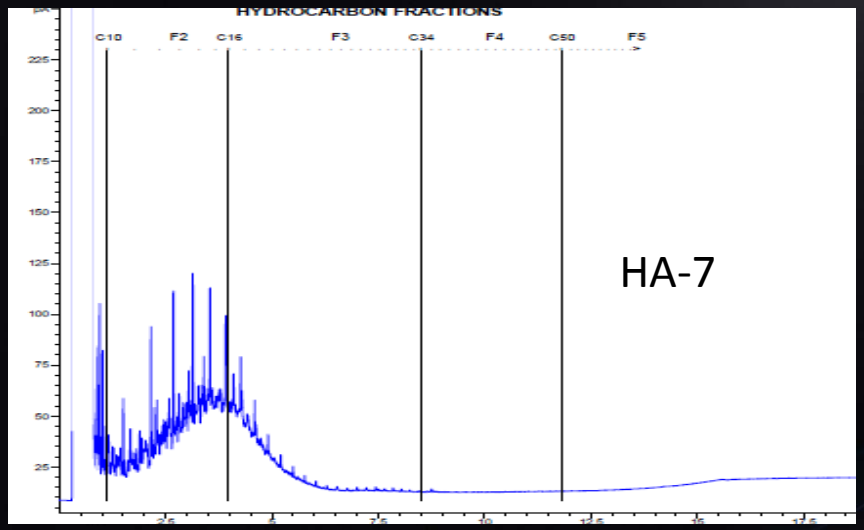
HAND AUGER SAMPLING

Sample	F1 (C6-C10)	F2 + F3 (C11-C34)	UVF Screening	Chromatogram Comments
HA-1	<4	60	slight odour, no response	very weathered diesel pattern at C17, little single peak shaping
HA-2	<4	<30	drier soil, no response	some minor peak shaping around C25
HA-3	<4	90	no odour, possible very slight purple response	weathered diesel at C17 extending to C46
HA-4	<4	6300	light odour, slight response	completely weathered material at C17, does not appear to be similar to the diesel pattern
HA-5	<4	<30	slight response	fairly clean chromatogram
HA-6	<4	1800	organic material, no response	completely weathered material at C17, does not appear to be similar to the diesel pattern, secondary peak at C28
HA-7	37	740	slight odour, no response	diesel pattern response
HA-8	<4	<30	no odour, no response	clean chromatogram

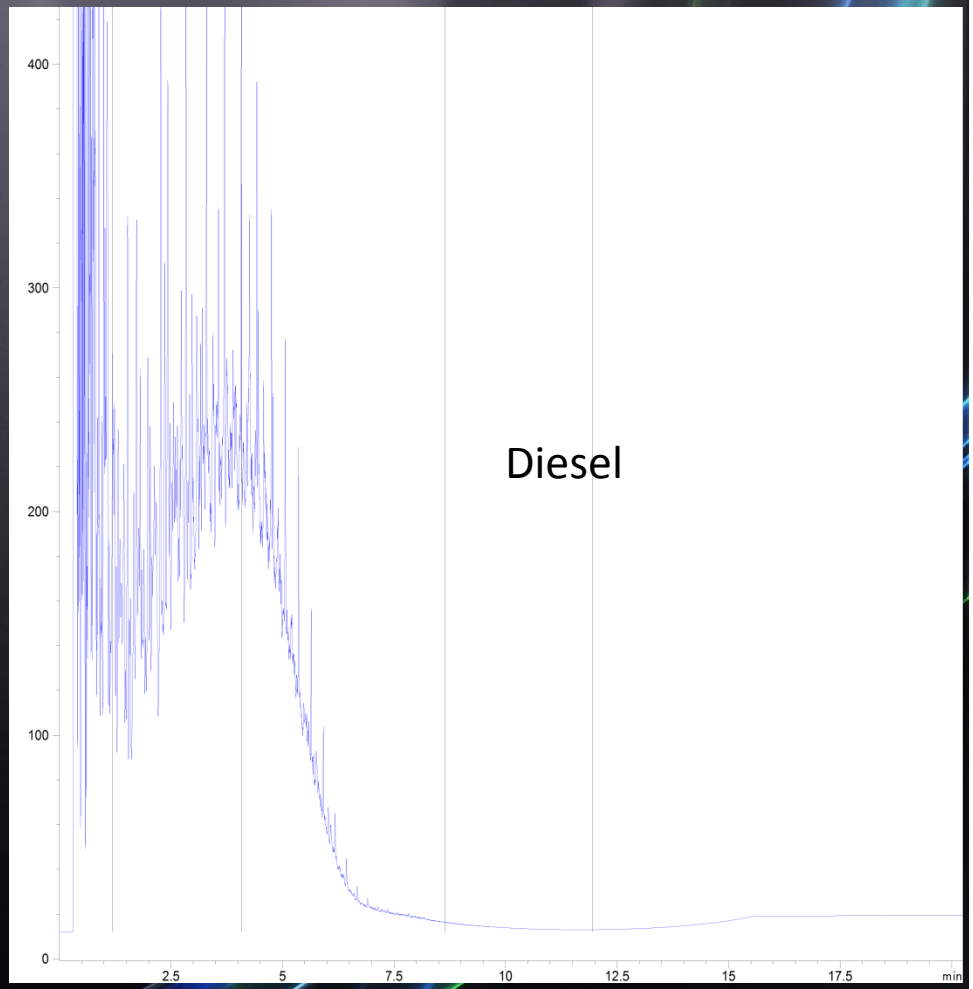
HAND AUGER SAMPLING



HA-4



HA-7



Diesel

HAND AUGER SAMPLING

- Diesel used as cleaner, clay soil at surface, sun baked
- Very weathered, only 1 ppm PAHs per 6,300 mg/kg PHC with slight response
- Hexane only and 5 minute wait gave good UVF response for HA-4

FIELD USE – KEY POINTS

1. Understanding hydrocarbon characterization of site is beneficial
2. Gain experience on known samples
3. Complete trial run on equipment prior to job
4. Be consistent throughout work

CONCLUSIONS

- Impact homogeneity and/or field sampling to laboratory error issues can be reflected by UVF field testing (increased data set)
- Effectiveness will be dependent on PHC characteristics – what holds the PAHs
- Shown to be effective in separating soil with only F1 impacts from that of F1 plus heavy end PHCs
- Leads to more intelligent sample selection
- Addresses odour testing safety issues