SUPPORTING INFORMATION

ROLE OF WEATHERED COAL TAR PITCH IN THE PARTITIONING OF POLYCYCLIC AROMATIC HYDROCARBONS IN MANUFACTURED GAS PLANT SITE SEDIMENTS

Muhammad F. Khalil, Upal Ghosh*, Department of Civil and Environmental Engineering, University of Maryland Baltimore County, Baltimore, MD 21250, USA. ughosh@umbc.edu; phone: 410-455-8665

Joseph P. Kreitinger, The RETEC Group,1001 W. Seneca Street, Ste 204; Ithaca, NY 14850, USA.

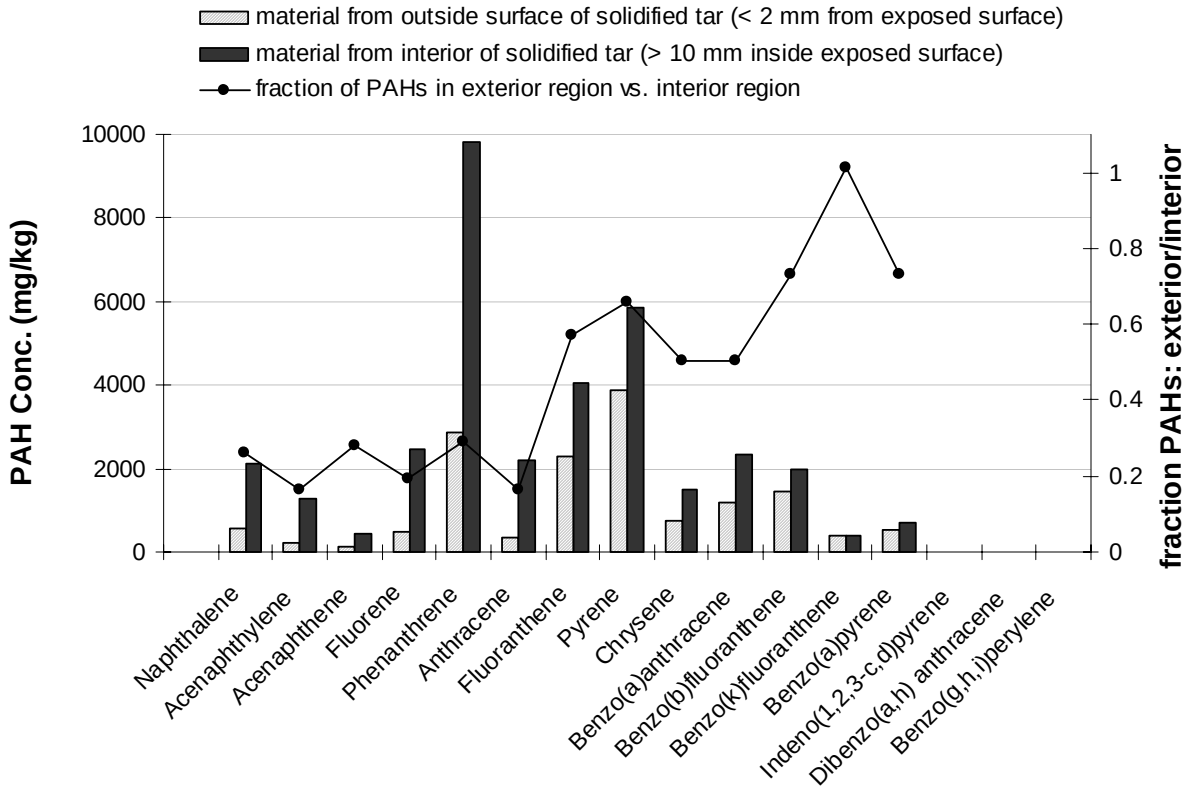

Figure S1. PAH analysis on interior vs. exterior portions of a weathered coal tar particle obtained from the field demonstrates higher PAH levels in the interior compared to the exterior. Also, a more pronounced weathering of the lower molecular weight PAHs is evident in the external region of the weathered pitch particle.

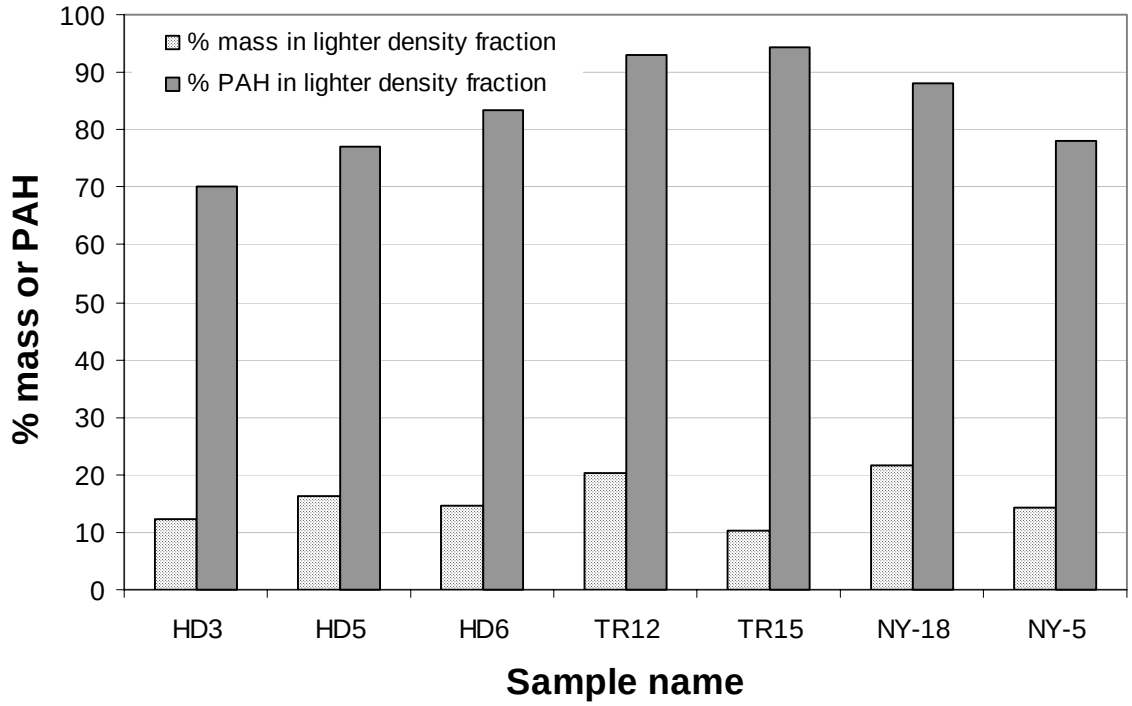

Figure S2. Sediment mass and PAHs contributed by the lighter density particle fraction (< 1.8 specific gravity).

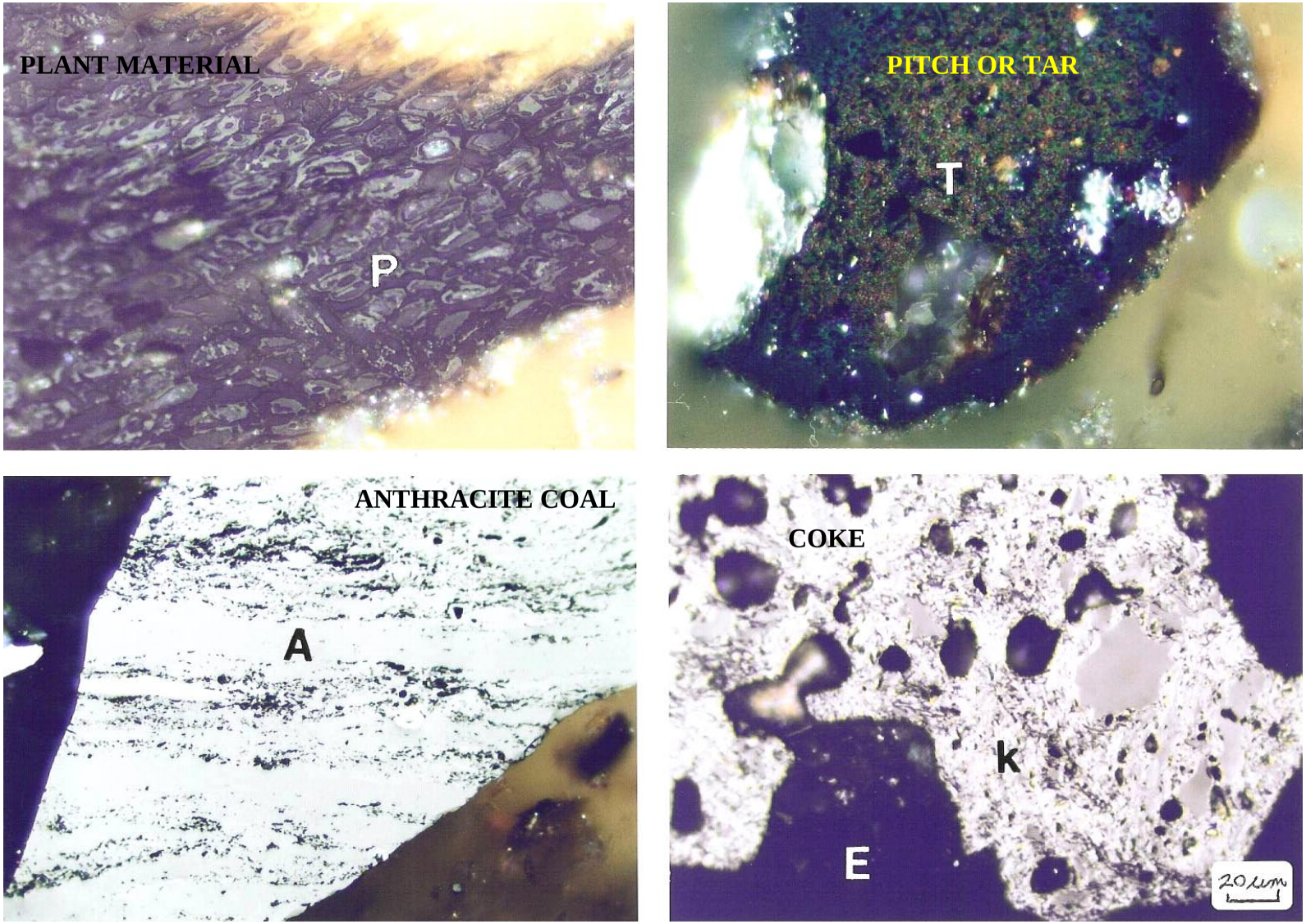

Figure S3. Petrography images of sediment HD-3 showing: plant material with cellular structure (P); pitch or tar like material (T); anthracite coal (A); coke (K); epoxy mounting media (E). Images taken in reflected light in oil at 600x.

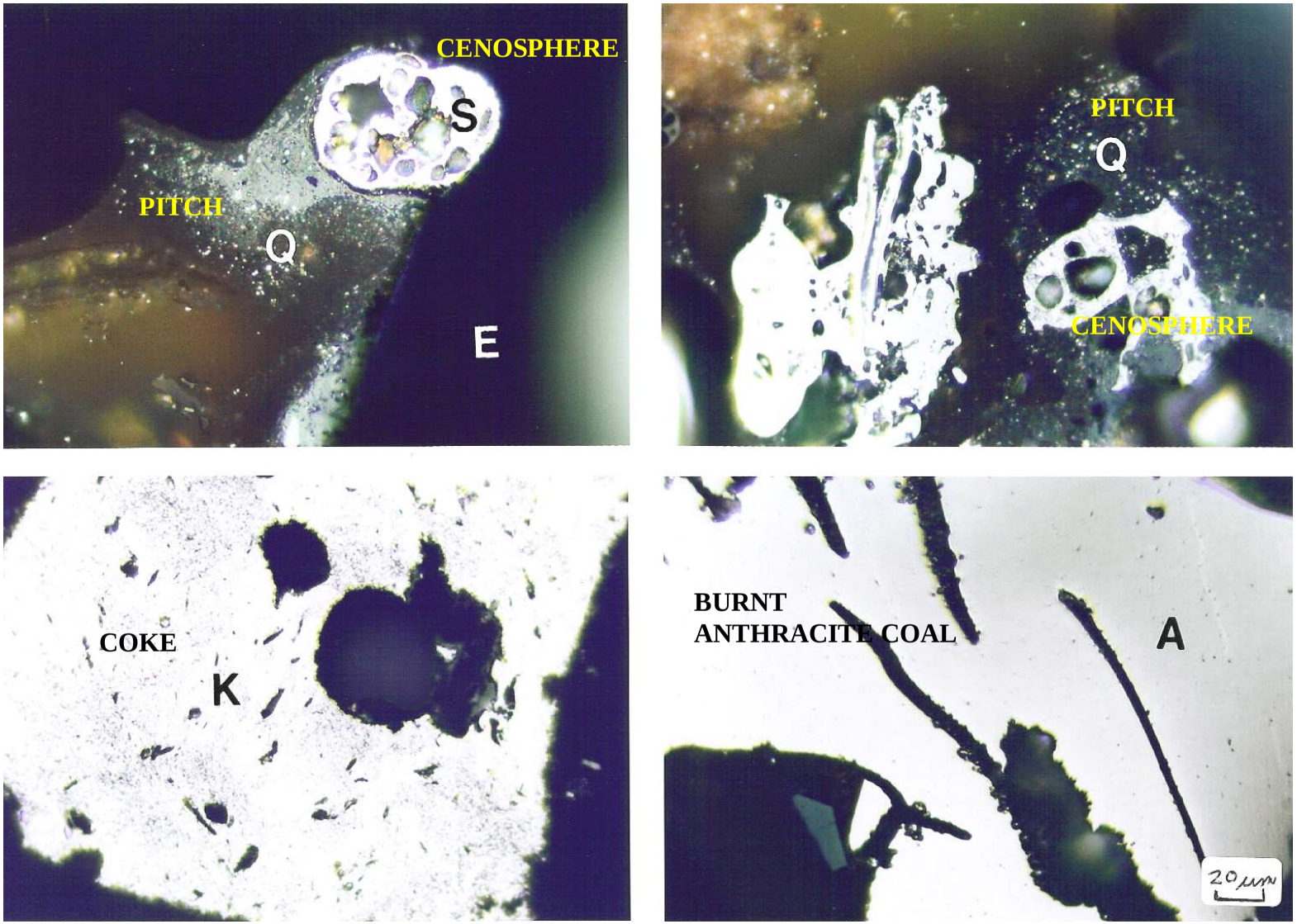

Figure S4. Petrography images of sediment TR-12 showing: burnt anthracite coal (A); pitch-like material with normal QI coating a cenosphere (Q); cenosphere (S); coke (K); and epoxy mounting media (E). Images taken in reflected light in oil at 600x.

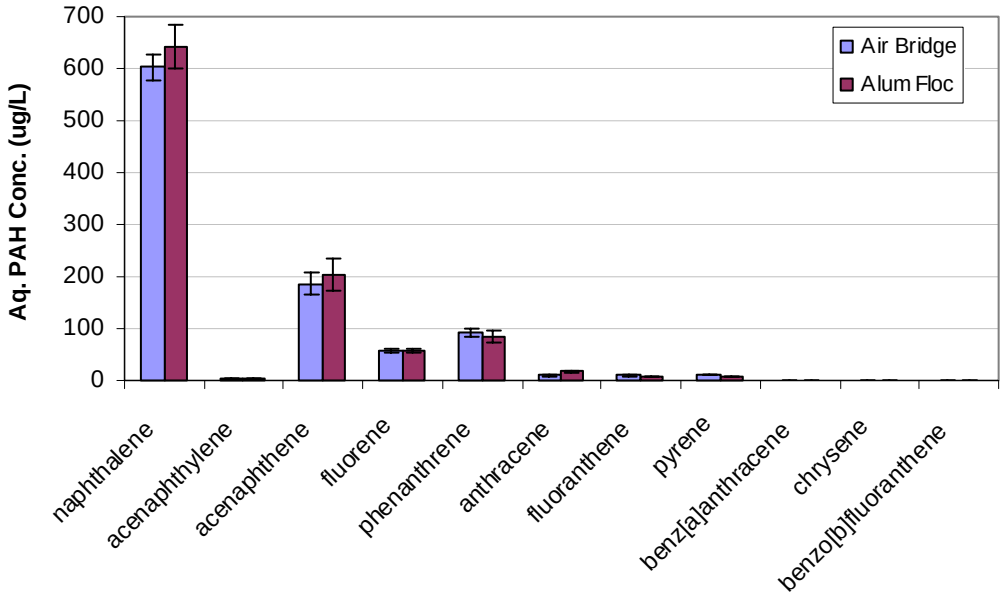

Figure S5. Comparison of average aqueous equilibrium concentrations measured using the air bridge and alum flocculation methods for sediment sample HD3. Error bars indicate ±1 standard deviation

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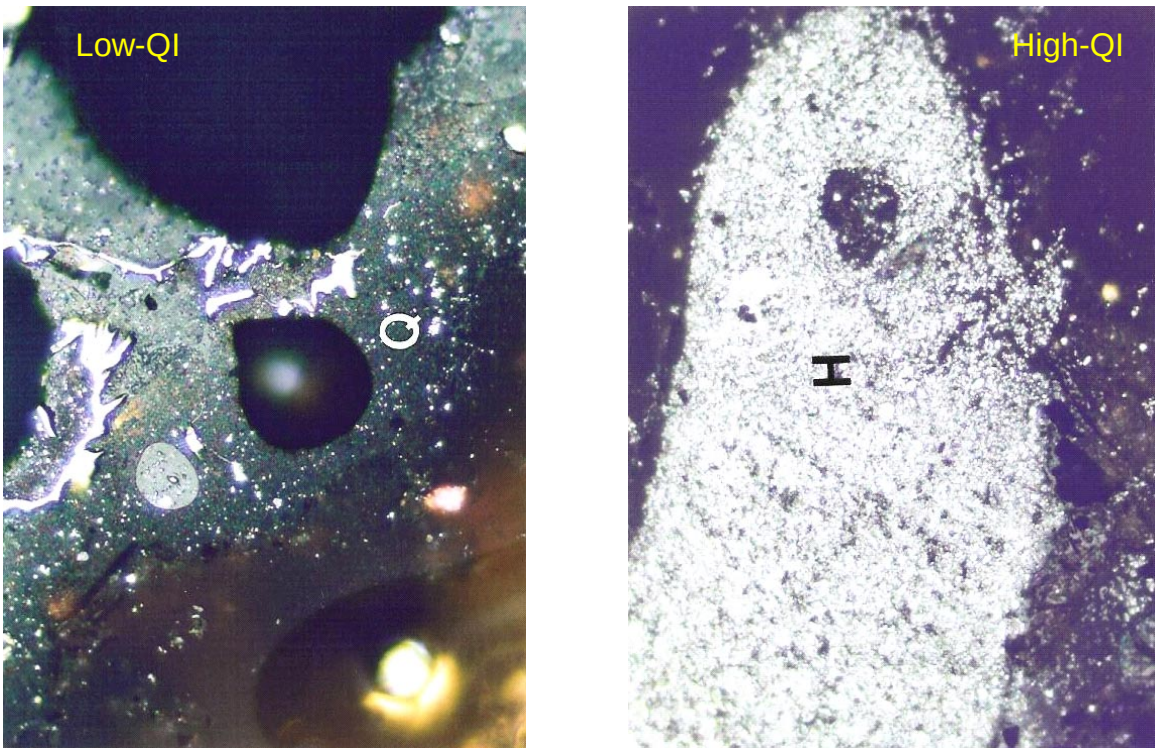

Figure S6. Petrography images of pitch from Hudson sediment samples showing pitch material with low content of quinoline insolubles on the left (less shiny particle inclusions in the pitch) versus pitch material with high content of quinoline insolubles on the right (abundant shiny particle inclusions in the pitch).

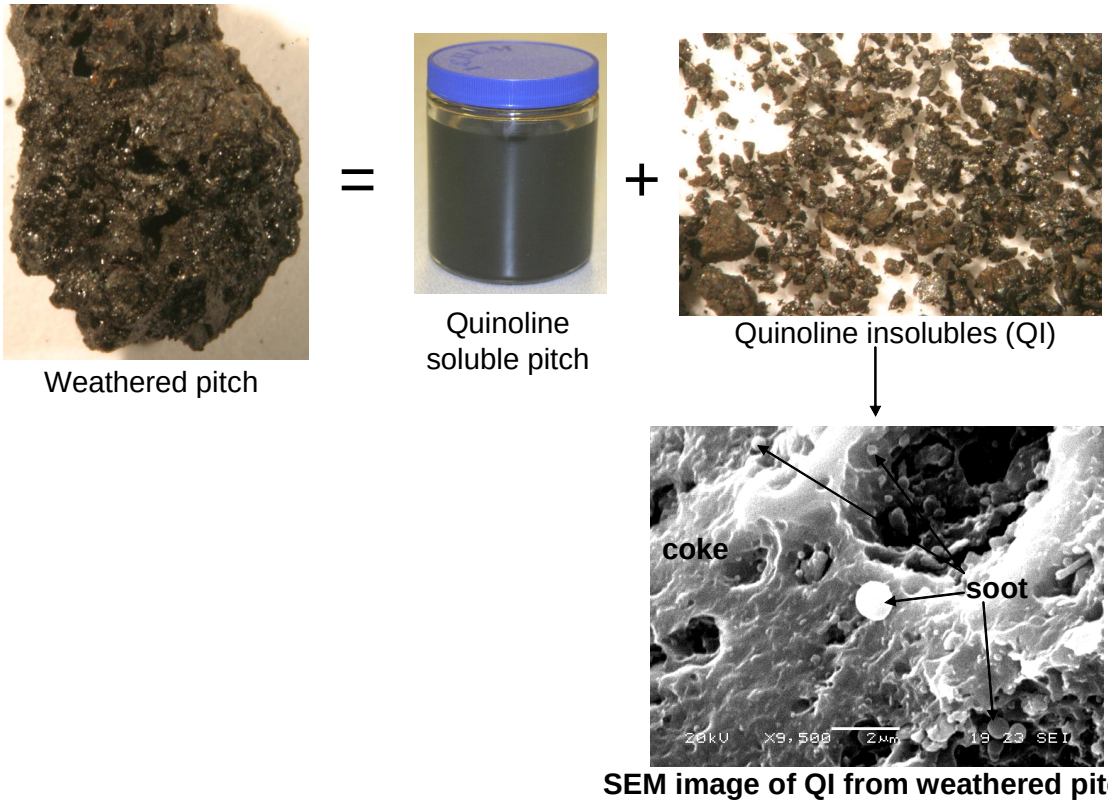

Figure S7. A weathered pitch sample collected at a MGP site shows the presence of 56% by weight of quinoline inextractable matter (QI), mostly coke, and soot.

Table S1. Petrographic Analysis of the Indicated Sediment Samples.

Sediment Name	HD-3 250-1000 um Light	HD-5 250-1000 um Light	NY -18 250-1000 um Light	TR-12 250-1000 um Light
Coal, Coke & Byproduct Carbons	Volume %	Volume %	Volume %	Volume %
High Vol. Coal (bituminous)	1.6	1.0	2.2	1.0
Anthracite Coal	4.2	2.8	5.8	1.0
Oxidized Coal	1.6	0.8	1.2	0.4
Total Coal	7.4	4.6	9.2	2.4
Coke	1.0	3.0	1.6	3.6
Cenospheres	1.8	1.0	3.0	4.4
Oxidized Coke	---	---	1.0	0.4
Charcoal	0.4	0.4	0.4	0.2
Other Carbons	0.4	0.2	---	1.2
Total Coke Related	3.6	4.6	6.0	9.8
High QI Pitch	2.6	11.4	0.2	0.6
Low QI Pitch	1.8	7.6	3.8	9.8
Total Pitch Related	4.4	19.0	4.0	10.4
Humic Material				
Cellular Plant Structure	54.4	48.4	44.8	44.4
Fragments of Plant Structure	16.0	12.2	10.4	14.8
Others - fibers, etc.	3.8	1.4	3.0	3.2
Total Plant Related	74.2	62.0	58.2	62.4
Organic Animals				
Shells	0.8	1.0	3.0	1.0
Body Parts	---	0.4	1.8	1.0
Total organic Animals	0.8	1.4	4.8	2.0
Mineral Matter				
Soil Aggregates	4.2	4.0	7.4	4.4
Soil Aggregates – w/ carbon fragments	---	2.4	1.0	1.2
Quartz – single grain	1.6	0.8	5.0	3.0
Quartz Aggregate	1.8	---	2.0	0.4
Slag	1.4	---	0.6	3.0
Pyrite	0.4	---	1.0	0.4
Metallic	0.2	0.6	---	0.2
Mineral Matter - W/ Iron Oxide	---	0.6	0.8	0.4
Total Inorganics	9.6	8.4	17.8	13.0
Grand Total	100.0	100.0	100.0	100.0

Table S2. Calculated K_p values for weathered coal tar pitch sample.

	Pitch PAH mg/kg	Aq. PAH ug/L	log K_p	log K_{oc} Karickhoff(3)	log K_{oc} Xia(20)
Naphthalene	522 ±43	483 ±31	3.39	3.09	3.08
Acenaphthylene	2,475 ±132	188 ±22	4.48	3.73	3.70
Acenaphthene	360 ±21	35.1 ±2.5	4.37	3.71	3.68
Fluorene	3,223 ±152	165 ±7.1	4.65	3.97	3.93
Phenanthrene	12,950 ±679	149 ±6.4	5.30	4.25	4.21
Anthracene	5295 ±99	46.5 ±3.2	5.41	4.24	4.20
Fluoranthene	13,930 ±893	41.2 ±2.7	5.89	4.74	4.68
Pyrene	9,554 ±530	23.3 ±1.9	5.97	4.67	4.61
Benz[a]anthracene	5,580 ±326	4.55 ±0.32	6.45	5.45	5.37
Chrysene	6,130 ±219	3.29 ±0.21	6.63	5.45	5.37
Benzo[b]fluoranthene	3,971 ±129	1.12 ±0.09	6.91	5.91	5.82
Benzo[k]fluoranthene	3,482 ±152	1.00 ±0.12	6.90	5.91	5.82
Benzo[a]pyrene	3,626 ±384	1.17 ±0.21	6.85	5.76	5.67
Indeno[1,2,3-cd]pyrene	1,732 ±93	0.52 ±0.09	6.88	6.37	6.26
Dibenz[a,h]anthracene	409 ±29	0.12 ±0.02	6.88	6.29	6.19
Benzo[ghi]perylene	1,525 ±73	0.40 ±0.08	6.94	6.37	6.26