



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

PAH Monitoring of Pavement Sealants

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Pavement Sealants

- Low traffic surface sealant used to recondition asphalt surfaces
- Sealants are commonly coal tar-based but can be asphalt-based or a mixture
- Coal tar is a byproduct of the coking of coal



PAHs



Polycyclic aromatic hydrocarbons:

A group of over 100 different chemicals formed during the incomplete burning of coal



Coal tar-based sealants contain high PAHs which are toxic to aquatic organisms and listed by EPA as a probable human carcinogen

Transport pathways for PAHs from coal-tar-based sealcoat



(Credit: Barbara Mahler, USGS. Public domain.)



Studies – USGS and University of New Hampshire's Stormwater Center



PAH concentrations in coal tar-based sealants are **1000X** higher than those in asphalt-based sealants



Stormwater runoff transports high concentrations of PAHs directly and indirectly to surface waters



PAH Concentrations

Average PAH content of sealcoats

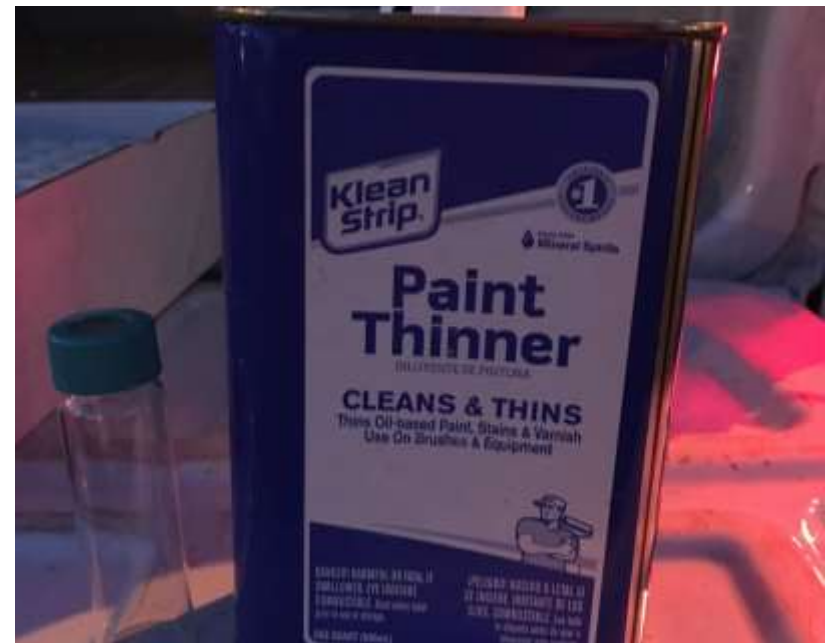
- Coal Tar-Based >50,000 ppm
- Asphalt-Based <500 ppm



Stormwater Infrastructure

Even a small amount of coal tar-based sealant can be dominant source of PAHs to sediment collected in a detention basin or other stormwater best management practices.

Sampling Methods





Results

Quick Field Test Results

Location	Coal-Tar Sealed	Mix Sealed	Asphalt Sealed
Ann Arbor	14	1	0
Kalamazoo/Portage	5	0	0
Lansing	1	0	0
Manistee	1	0	1
Southeast Michigan*	10	1	0
Traverse City	5	1	0
Total (40 locations)	36	3	1
Percent %	90%	7.5%	2.5%




*SEMI included Novi, Wixom, Waterford, Southfield and Sterling Heights

Sampling Methods



Draft: Sediment Quality Guideline Exceedances

Locations	PAH16 (>22,800 ug/kg)	ESBTU (>1.0)	PEC-Q _{PAH} (>0.5)
Detention Ponds			
Ann Arbor – Det Ponds (6)	6 (65,700 - 743,500)	3 (1.46 - 10.58)	6 (0.50 – 3.84)
Southeast Michigan* – Det Ponds (1)	1 (72,950)	1 (2.80)	1 (0.97)
Streams			
Kalamazoo (4 of 5)	3 (20,130 – 349,450)	3 (0.78 – 7.91)	2 (1.54 – 2.69)
Southeast Michigan* - Streams (16 of 16)	13 (7,855 – 509,450)	10 (0.42 - 25.11)	10 (0.55 – 9.28)
Traverse City (6 of 11)	1 (9,390 – 30,075)	2 (0.28 – 1.45)	0 (0.09 – 0.49)
Ann Arbor – Streams (3 of 3)	2 (19,565 – 60,150)	3 (2.29 - 6.54)	3 (0.78 - 2.26)
Flint (5 of 5)	4 (4,460 – 828,300)	4 (0.54 – 3.39) [^]	3 (0.73 – 1.18)
 Percent % Exceeding SQG	73%	63%	61%

*SEMI included Novi, Wixom, Waterford, Southfield, Ecorse and Sterling Heights

[^]Missing TOC data for some locations

Traverse City Sediment Sampling 2018



0 1,000 2,000 3,000 4,000 US Feet

EGLE

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Sediment Sampling Results in Traverse City

Water Resources Division

EGLE

Traverse City Sediment Sampling 2018

Table 1. Sediment Sampling locations and exceedances to Sediment Quality Guidelines

Location	Site ID	Latitude	Longitude	Total PAH16 ug/kg	ESBTU16 No Unit	PEC-Q16 No Unit
Manistee Map						
Manistee River d-s Maple St Bridge	1	44.2496	-86.31963	22,970	ND	ND
Traverse City Map						
Kids Creek @ Wadsworth (Mouth)	1	44.76334	-85.62911	9,390	0.40	0.13
Boardman River u-s Union Dam, below Cass St	2	44.7617	-85.62126	20,250	1.43	0.49
Boardman River d-s North Peak Street	3	44.76445	-85.61607	12,475	0.48	0.16
Trib A to Kids Creek u-s Elmwood St Culvert	4	44.75991	-85.63985	30,075	1.45	0.49
Trib A to Kids Creek u-s Sixth St	5	44.76177	-85.64114	9,920	0.13	0.04
Trib A to Kids Creek d-s Beaumont Place	6	44.76296	-85.64092	13,540	0.40	0.13
Kids Creek u-s Seventh St d-s Conf with Trib A	7	44.7601	-85.63597	4,800	0.24	0.08
Trib D to Kids Creek u-s Conf	8	44.74282	-85.64129	9,510	0.28	0.09
Kids Creek d-s Big Boy, u-s Conf Trib D	9	44.74258	-85.64135	5,165	0.08	0.03
Kids Creek d-s Big Boy, u-s Conf Trib D (Field Duplicate)	10	44.74258	-85.64135	4,950	0.22	0.07
Trib D d-s McDonalds and Hyundai Surface Lot	11	44.73994	-85.64368	7,110	0.16	0.05



Legislative Efforts

Proposed Legislation

- HB 4719

Statewide Bans

- Minnesota
- Washington
- Washington D.C.

Bans

Almont
Ann Arbor
Ann Arbor Township
Clarkston
Dexter
Grosse Ile
Hamburg Township
Pittsfield Township
Scio Township
Spring Lake Township
Van Buren Township
Warren
West Bloomfield Township
Wolverine Lake
Ypsilanti

Restrictions

MDOT
Albert Township
Byron Township
Clark Township
Charlevoix
Erie Township
Fruitland Township
Laketon Township
Powell Township
Village of Shepherd
Village of St. Charles
Whitehall
Whitehall Township
White River Township
University of Michigan
Lake Superior State University
Kalamazoo College



Stormwater Infrastructure

- Increased storm intensity and frequency
- Stormwater detention ponds are 20-30 years old and full of sediment
- Dredging of the sediment is necessary to restore storage and treatment
- Requires a funding mechanism
- EPA permitting

More Information

Huron River Watershed Council

www.hrwc.org/coaltar

Minnesota Pollution Control Agency

www.pca.state.mn.us/water/restriction-coal-tar-based-selants

Washington D.C. – Department of Energy and Environment

www.doe.dc.gov/coaltar

Michigan Department of
Environment, Great Lakes, and Energy

800-662-9278

www.Michigan.gov/EGLE



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