



DuPage River Salt Creek Workgroup

DuPage River Salt Creek Workgroup Refined Coal Tar MOU Summary

Summary

Surveys by the State of Illinois list the rivers in the upper DuPage and Salt Creek basins as failing to support the State's aquatic life designated use. This designation has led to increased scrutiny and restrictions on NPDES permit holders that discharge to these waterways. Sampling and analysis by the DRSCW has determined that high concentrations of polycyclic aromatic hydrocarbons (PAHs) are one factor degrading aquatic communities in these waterways. While PAHs have multiple sources, recent research has determined that parking surfaces treated with refined coal tar (CT) sealant are major sources of PAHs to lake sediment in urbanized areas of the Midwest. DRSCW proposes that its NPDES permit holding members voluntarily abstain from the use of CT sealants in all their operational duties.

Issue

Aquatic life surveys are used by the State of Illinois to regulate local governments' NPDES permits. NPDES permit holders are assigned tighter limits on pollutant discharges for river segments which fail to meet designated uses. All assessed segments of the Upper DuPage River and Salt Creek fail to meet the aquatic life designated use. DRSCW analysis of river sediments at 42 sites in the Upper DuPage and Salt Creek watersheds found PAH concentrations greater than those known to be harmful to aquatic life at all 42 sites.

DRSCW will be investigating a number of strategies to reduce PAHs in stormwater runoff. Reducing or eliminating the use of refined coal tar sealant is recommended due to the fact that it is increasingly cited in surface water management literature as a principle source of PAH contamination in Midwestern urbanized areas.

Selected Research

- Coal tar and coal-tar pitch are listed as Group 1 (carcinogenic to humans) carcinogens. The U.S. EPA, U.S. Department of Health and Human Services (HHS) and the International Agency for Research on Cancer (IARC) currently classify seven PAH compounds as probable human carcinogens. The carcinogenicity of certain PAHs is well established in laboratory animals and aquatic organisms are known to adsorb and accumulate PAHs from water. Contamination of sediments with PAHs at concentrations of 250 mg/kg was associated with hepatic tumors in free-living fish. CT sealant is >50% of PAHs by volume.

- “Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban Stormwater, Madison, Wisconsin, 2005–08” W. S. Selbig 2009 - Studied PAH loadings from 6 urban source areas in Madison, Wisconsin. Found that geometric mean concentrations for most individual PAH compounds were significantly greater for parking lots that were sealed than for lots that were not sealed.
- Work completed by the Minnesota Pollution Control Agency (MPCA) on sources of PAHs to stormwater pond sediments in Minnesota found that >50% of PAHs in metro area stormwater detention ponds came from parking surfaces treated with CT based sealants. The MPCA estimates the cost of disposing of the contaminated sediments will be in the billions of dollars for the seven-county Twin Cities metropolitan area.
- “Contribution of PAHs from coal-tar pavement sealcoat and other sources to 40 US lakes”. P.C. Van Metre and B.J. Mahler 2010 – Concluded that CT sealants were the largest PAH source in urban lake sediment when averaged across all lakes in the study, ahead of both vehicle and coal combustion sources. Midwestern and east coast sites had the percentage of total PAHs attributed to CT sources.
- The University of New Hampshire Stormwater Center conducted field experiments comparing CT sealed and unsealed parking lots under similar use patterns to quantify PAH release from parking lots in cold climates. PAH loadings in stormwater were 17 to 32 times higher from CT sealed lots than the unsealed lots during the two years after sealant application. Even more CT sealant was removed by snow plowing activities. Soils adjacent to the CT sealed lots had PAH concentrations up to 400 parts per million, and 80 times higher than those of the control site (deposited by snow plowing). Dust on the surface of the CT sealed lots had concentrations up to 100 times higher than dust on the unsealed lots.

Recommendation

NPDES permit holding members of the DRSCW should discontinue use of refined coal tar sealant in their operations, including use by contractors. Asphalt emulsion based sealers are comparable alternatives at competitive prices that contain approximately 1/1000 of PAHs by volume compared with CT based sealants.

Contact

For further information, contact Stephen McCracken at 630 428 4500 x 18, or smccracken@theconservationfoundation.org.

Asphalt and Coal Tar Based Emulsion Sealants Material Cost Comparison

Product Name	Dollar cost: 1 gallon of concentrate	Gallons of concentrate to treat 100 ft2	Dollar Cost: 1lb of sand	lbs sand to cover 100 ft2	Dollar cost of mix for 100 ft2	2nd coat	Dollar cost per 100 ft2 as recommended	Open to traffic in (hrs)	life span (yrs)
PCT Inc MOS-50 (bulk)	4	1.67	\$0.12	0	6.67	No	\$6.67	24	3
PCT Inc MOS-50 (tote)	4.55	1.67	\$0.12	0	7.58	No	\$7.58	24	3
SealMaster Masterseal Concentrate	2.38	0.91	\$0.12	3.64	2.84	Yes	\$5.67	24	3
SealMaster Polymer-Modified MasterSeal (PMM)	2.25	1.11	\$0.12	4.44	3.03	Yes	\$6.05	24	3
Seal Master Coal Tar Concentrate	2.47	0.91	\$0.12	3.64	2.92	Yes	\$5.84	24	3
Neyra PaveShield	2.1	1.11	\$0.12	3.17	2.71	Yes	\$5.42	24	3
Neyra Jennite Asphalt Emulsion (AE)	2.56	1.11	\$0.12	4.60	3.39	Yes	\$6.78	24	3
Neyra Jennite Coal Tar Sealant	2.56	1.11	\$0.12	4.60	3.39	Yes	\$6.78	24	3

Analysis was limited to coal tar based sealants and asphalt emulsion based sealants.

All prices are for 2012. Analysis includes costs for materials only. Analysis does not include labor or equipment costs, local taxes, site preparation. Please see "additional information" sheet.

Costs are in 2012 dollars and rates. Product price can vary widely and depends on the price of raw materials and market demand.

Thanks to Neyra Industries, Inc.; PCT, Inc.; and Sealmaster, Inc. for supplying data for the analysis

Additional Information Sheet

Manufacturer & Product Name	VOC Content: g/L	Additive? (included in cost estimate)	Gallons Water/ 100 Gallons Concentrate	Methods
PCT Inc MOS-50	not available	None	None specified	Distributor truck, hand wand, and/or squeegee
SealMaster MasterSeal Concentrate	<150g/L	2 gal. Zetac or Top Tuff Polymer/ 100 gals.	15-25	Pressurized spray application equipment (capable of spraying pavement sealer with sand added) or self-propelled squeegee equipment with continuous agitation or mixing capabilities
SealMaster Polymer Modified MasterSeal (PMM)	<100g/L	None	"NOTE: if required, a small amount of water may be added to facilitate application of mixed material"	Pressurized spray application equipment (capable of spraying pavement sealer with sand added) or self-propelled squeegee equipment with continuous agitation or mixing capabilities
SealMaster Coal Tar Concentrate	<150g/L	1-2 gals. Sealer VM Polymer/ 100 gals.	30-40	Pressurized spray application equipment (capable of spraying pavement sealer with sand added) or self-propelled squeegee equipment with continuous agitation or mixing capabilities
Neyra PaveShield	<10g/L (0.08 lbs. /gal.)	None	20-25	Specialized equipment is recommended (high volume positive displacement airless spray or mechanical squeegee) or by spray, rubber-bladed squeegee, brush or mechanical equipment specifically designed for this purpose
Neyra Jennite Asphalt Emulsion (AE)	<10g/L (0.08 lbs. /gal.)	None	0-15	Specialized equipment is recommended (high volume positive displacement airless spray or mechanical squeegee) or by spray, rubber-bladed squeegee, brush or mechanical equipment specifically designed for this purpose
Neyra Jennite Coal Tar Sealant	<50g/L (0.42 lbs. /gal.)	None	0-15	Specialized equipment is recommended (high volume positive displacement airless spray or mechanical squeegee) or by spray, rubber-bladed squeegee, brush or mechanical equipment specifically designed for this purpose