



July 30, 2020

MS JANE PATARCITY
BEAZER EAST INC
1910 COCHRAN RD
MANOR OAK ONE STE 200
PITTSBURGH PA 15220-1273

Subject: Site-Specific Clean-up Levels for Soil and Sediment
Off-Site Portion of the Koppers Inc. Facility, 3185 South CTH A, Superior, Wisconsin
DNR BRRTS Activity #02-16-000484

Dear Ms. Patarcity:

The purpose of this letter is to share site-specific clean-up levels (CULs) for soil and sediment pertaining to the off-site portion of the Koppers Inc. facility (Site) that, if proposed by Beazer East, Inc. as part of the Focused Feasibility Study, would be acceptable to the Wisconsin Department of Natural Resources (DNR). The site-specific CULs, developed in a manner consistent with Wisconsin Administrative Code chapters NR 720 and 722, have been calculated by the DNR and are intended to be protective of human health and the environment based on a non-industrial land use classification, in accordance with Wis. Admin. Code ch. NR 720.

The soil CULs were developed using publicly available tools and procedures under Wis. Admin. Code ch. NR 720. The acceptable soil and sediment CULs developed for this part of the site are consistent with sediment and soil CULs at other similar sites in Wisconsin.

This letter is a follow-up to the DNR letter to Beazer East, Inc., dated March 20, 2020, regarding the Human Health and Ecological Risk Assessment for the Site. In that letter, DNR stated it could not approve of the Risk Assessment because the assessment did not comply with applicable state laws and administrative code. In order to expedite the cleanup of this site, DNR indicated that it would instead be offering site-specific CULs by calculating residual contaminant levels that meet the requirements of Wis. Admin. Code chs. NR 720 and 722. To that end, the site-specific CULs developed by DNR are included in the attached memo (*Cleanup Levels for Crawford Creek Great Lakes Legacy Act (GLLA) Project, Koppers, Inc., Superior, Wisconsin*).

In the interest of expediting remedial action selection, design, and implementation, DNR suggests Beazer Inc. apply these CULs when developing the remedial footprint and remedial alternatives as part of the Focused Feasibility Study (i.e., the ch. NR 722 remedial actions option report) being conducted with and partially funded by U.S. EPA's Great Lakes National Program Office. Use of the proposed site-specific CULs will ensure that remedial action implemented at the site will move forward with partner funding, be compliant with Wis. Admin. Code § NR 722.09(2), and that the remedy will be protective of public health, safety and welfare and the environment.

As we discussed on our July 27, 2020 project team call, the project team will discuss the CULs during the team call on August 17, 2020. In the meantime, please contact me at (715) 685-2920 or by email at Christopher.Saari@Wisconsin.gov if you have questions about this letter.

Sincerely,



Christopher A. Saari
Northern Region Team Supervisor
Remediation and Redevelopment Program

Attachment:

- *Cleanup Levels for Crawford Creek Great Lakes Legacy Act (GLLA) Project, Koppers, Inc., Superior, Wisconsin, DNR, June 24, 2020*

cc: Diana Mally – USEPA GLNPO
Scott Cieniawski – USEPA GLNPO
Dave Bessingpas – Arcadis
Stu Messur – Anchor QEA
Dave Klatt – Jacobs
Clara Jeong – Wisconsin Department of Health Services
Judy Fassbender – DNR Madison
Steve Galarneau – DNR Madison
Joe Graham – DNR Spooner
John Sager – DNR Superior

DATE: June 24, 2020

FILE REF: BRRTS 02-16-000484

TO: Chris Saari, Joe Graham, John Sager
Remediation and Redevelopment

FROM: Erin Endsley
Remediation and Redevelopment

SUBJECT: Cleanup Levels for Crawford Creek Great Lakes Legacy Act (GLLA) Project
Koppers, Inc., Superior, Wisconsin

The purpose of this memo is to present cleanup levels (CULs) that the Wisconsin Department of Natural Resources (DNR) considers protective of human health and the environment for a proposed off-site corrective action at the Koppers, Inc. site in Superior, WI, BRRTS ID 02-16-000484 (Site). The DNR prepared these CULs in order to facilitate remedial alternatives development, selection, and implementation. Beazer East is the responsible party for the Site.

Background

Crawford Creek, in South Superior, WI, is a tributary of the Nemadji River and is within the current boundary of the St Louis River Area of Concern (AOC). Crawford Creek is listed as an impaired water on Wisconsin's 303(d) list due to creosote. A tributary of Crawford Creek, Crawford Creek and their associated floodplain wetlands have been impacted by discharges of creosote, pentachlorophenol (PCP), and dioxins/furans from wood treatment operations from the Site. Multiple phases of investigation of impacts from historical wood treatment operations have been conducted at the Site since 1981.

Site Description

The tributary and Crawford Creek areas of the Site are relatively pristine and undeveloped wetland and floodplain environments that include a tributary to Crawford Creek, the length of Crawford Creek to its confluence with the Nemadji River, and the floodplain areas surrounding the tributary and Crawford Creek. For the purposes of site investigation, and the evaluation and selection of remedial alternatives, the Site has been divided into four sub-areas. Current land use is residential, recreational, commercial/industrial, and railroad. Property owners include Beazer East, Douglas County, BNSF Railway Company, Soo Line Railroad, and three private owners.

CULs

Contaminants of concern include polycyclic aromatic hydrocarbons (PAHs), PCP, and dioxins/furans (DF). The CULs determined by DNR for site sediment and soil and are summarized in Table 1. Non-aqueous phase liquid (NAPL) is present in fractures and sand seams within the clay matrix at the Site and represents a risk to human health and the environment.

Sediment

Aside from direct exposure to NAPL, exposure to sediments contaminated with PAHs represents the highest likelihood of significant effects to benthic invertebrates and the highest risk to human health through direct contact with contaminated sediments.

CULs established for protection of benthic organisms are based on Wisconsin's Consensus-Based Sediment Quality Guidelines (CBSQGs). The CBSQGs are effects-based concentrations for protection of benthic invertebrates and represent guidelines that can be used for making sediment management decisions as part of a weight-of-evidence approach.

Threshold Effects Concentrations (TECs) represent contaminant concentrations below which harmful effects to sediment dwelling organisms are unlikely to be observed, and Probable Effects Concentrations (PECs)

represent contaminant concentrations above which harmful effects to sediment-dwelling organisms are likely to be observed. The Midpoint Effects Concentration (MEC) is the concentration midway between the TEC and PEC for a given contaminant. The MEC has often been approved as the CUL at contaminated sediment sites in the St. Louis River AOC, as well as elsewhere in Wisconsin. See Attachment 1 for a summary of PAH CULs established for these sediment sites.

PAHs have been identified as the primary contaminant of concern for Site sediments, and the MEC for Total PAHs (12.2 mg/kg) has been identified as the CUL for the protection of ecological receptors. The MEC for PAHs has already been used as the CUL for multiple sites in the St. Louis River AOC, including the majority of sites with PAH contamination funded by GLLA. As many of those sites are located within an industrial harbor, and the Crawford Creek Site is located in a pristine upstream setting, it is not possible to justify a less-restrictive value than the MEC for the sediment CUL at the Site. Also, as the MECs established for individual PAHs are typically lower than the human health risk-based concentrations (see Tables 1 and 2), the CUL for Total PAHs based on ecological receptors is considered to be a protective level to address human health risk from exposure to contaminated sediments.

The calculation of Total PAH will include the 17 PAH compounds listed in Table 2, based on the compounds reported in the Assessment of Contaminated Sediments in the Crawford Creek/Nemadji River (EPA/Jacobs 2014) and also reported in previous investigations of the Site by Beazer East. This CUL is intended to be applied to all sediment depths, including the bioactive zone where biological receptors may be present, as well as sediments deeper than the bioactive zone that have potential to become the upper strata due to various mechanisms including but not limited to diffusion, advection, scouring, or other erosional forces present in specific stream sections.

At this time, DNR will not be determining a sediment CUL for DFs until further evaluation is completed. During the FFS, if data evaluation demonstrates that the presence of DF-contaminated sediment is co-located with PAH-contaminated sediment and/or NAPL and is largely within the remedial footprint as defined by the PAH CUL or NAPL, then the remedial action will be driven by the PAH CUL. If this cannot be demonstrated, then DNR will determine a site-specific DF CUL for sediment for protection of human health and the environment.

In addition to the numeric CUL for total PAHs and potentially DFs, NAPL present at the Site will be remediated to the extent practicable, with visual and analytical confirmation.

Soil

The CULs proposed for soil are based on current use of the land that has been impacted by hazardous substance discharges from the Site. This includes residential, recreational, and commercial/industrial use. These areas are depicted on Figure 1. Under Wis. Admin. Code s. NR 720.12(2), residual contaminant levels (RCLs) to protect public health from direct contact with soil contamination must be developed using the default exposure assumptions identified in Wis. Admin. Code s. NR 720.12(3), unless alternative assumptions are specifically approved by the department in writing.

For areas of the Site that are residential (non-industrial), and for areas that are commercial/industrial, the default Wis. Admin Code NR 720 RCLs are applied as CULs for the Site (Table 1). For the land that is currently used for recreational activities, the DNR developed site-specific RCLs for use as CULs based on a recreational exposure scenario for protection of human health, in consultation with the Wisconsin Department of Health Services.

Exposures are expected to occur during recreational activities of the affected private landowners and users of county-owned property, via exposure to contaminated floodplain and streambank soils. People can get exposed to contaminants through accidental ingestion of soil or through dermal contact of soil. A conservative exposure scenario should be applied to ensure people's health who can access Crawford creek area without restriction. Site-specific RCLs were calculated using the USEPA's Regional Screening Levels Calculator, utilizing the Recreational Scenario, 1×10^{-6} Excess Lifetime Cancer Risk (ELCR) and a Hazard Quotient of 1, adjustments to exposure duration and frequency, and modifications to default parameters.

Specific adjustments considered appropriate for recreational exposure included reducing exposure frequency from 350 days/yr for residential exposure to 175 days/yr for recreational exposure. This is based on the assumption that recreational access to affected Site areas occurs 5 times per week for 35 weeks excluding the winter months with frozen ground conditions, or that snow-covered ground is preventing exposure to Site soils during winter months. Exposure time was set to four hours per event, using information from USEPA's Exposure Factor Handbook (2011) for typical time spent outdoors. For the parcels identified in Figure 1 as recreational land use, DNR considers these modifications appropriate for those portions of the Site, and would not support further reductions in exposure factor inputs. The exposure factors utilized by DNR in the recreational exposure scenario are summarized below.

Recreational Exposure Scenario for Crawford Creek – Exposure Factor Inputs:

Age Segment (yr)	Adherence Factor (AF) (mg/cm ²)	Body Weight (BW) (kg)	Exposure Duration (ED) (yr)	Exposure Frequency ¹ (EF) (day/yr)	Exposure Time ² (ET) (hr/event)	Intake Rate (IRS) (mg/day)	Skin Surface Area (SA) (cm ² /day)
Child (2-6)	0.2	15	4	175	4	200	2,373
Adult (6-26)	0.07	80	20	175	4	100	6,032

Notes: Default values from USEPA's RSL Calculator for recreational exposures, with the following site-specific changes:

1. Exposure Frequency based on climate data for National Weather Service station in Duluth, MN.
2. Exposure Time based on time spent outdoors from USEPA's Exposure Factor Handbook (2011).
3. Climatic conditions in RSL Calculator set for Minneapolis, MN.

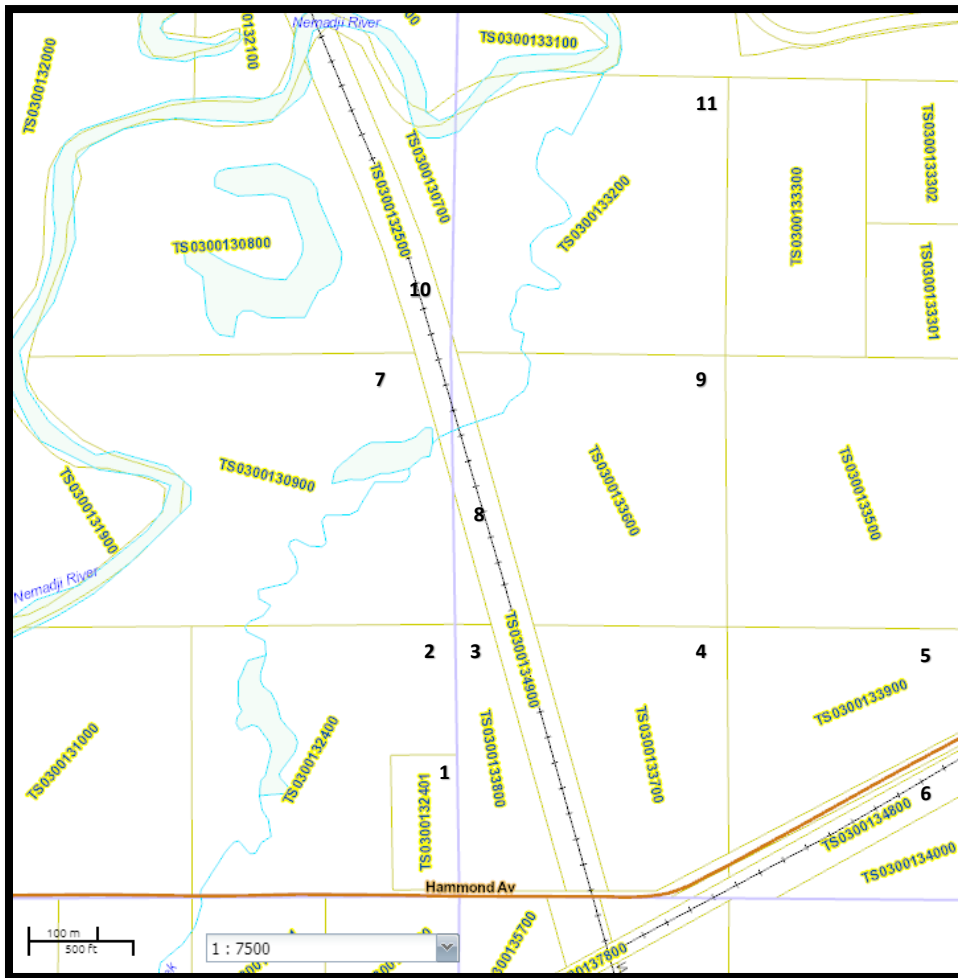
Site-specific CULs for soil were developed using this process for site contaminants of concern, including PAHs and DFs, and are summarized in Table 1. For the seven carcinogenic PAHs utilized in the benzo(a)pyrene equivalency calculation, an ELCR of 1×10^{-5} is applied, on the basis of proposed changes to Wis. Admin. Code ch. NR 720 and the development of RCLs for PAHs. Direct contact RCLs are intended to be applied to soil depths from zero to four feet.

For DFs, the CUL is based on 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) equivalents and is expressed in nanograms TEQ/kilogram. The World Health Organization's (WHO) 2005 toxicity equivalency factors (TEFs) are used to evaluate potential human health risk from Site soils contaminated by DFs by multiplying individual dioxin-like compounds by the corresponding TEF value to obtain an individual TCDD equivalent concentration. These individual TCDD equivalent concentrations are summed for all dioxin-like compounds to arrive at a total TCDD equivalent concentration that is compared to the site-specific CUL.

Summary

The CULs presented by the DNR are intended to be protective of human health and the environment, and consistent with comparable sites, including those in the St. Louis River AOC. The DNR is establishing these site-specific CULs to ensure that the proposed remedial actions at the Site are designed to meet Site criteria and be compliant with Wis. Admin. Codes NR 700-799. Landowner consent will be needed in order to apply a recreational use exposure scenario for soils on the identified recreational use parcels at this Site. DNR does not have legal authority to impose as a continuing obligation a limited use scenario beyond the default exposure assumptions for non-industrial land use (i.e., 350 days per year) in Wis. Admin. Code NR 720. Property owners must be provided information about the degree and extent of contamination on their property, and DNR must receive documentation that property owners have received this information, including signed consent they accept the continuing obligation on their property. Without this consent, standard non-industrial land use assumptions will apply, and default Wis. Admin. Code ch. NR 720 non-industrial direct contact RCLs will apply.

Figure 1. Affected parcels and associated land use and applicable CULs. Parcel data is from Douglas County Land Records, and affected parcels are identified based on extent of study area depicted in Figure 3, Site Plan and Property Ownership (Arcadis, 2020). Note: Landowner consent will be needed in order to apply the site-specific recreational RCLs for soils on the identified recreational land use parcels. If landowner consent is not granted, then NR 720 non-industrial direct contact RCLs will apply.



#	Parcel #	Owner	Zoning Designation	Land Use	Applicable CUL
1	TS-030-01324-01	Kolanczyk	Residential	Residential	Non-industrial DC RCLs
2	TS-030-01324-00	Kolanczyk	Resource Conservation	Recreational	Site-Specific RCLs
3	TS-030-01338-00	Kolanczyk	Resource Conservation	Recreational	Site-Specific RCLs
4	TS-030-01337-00	Beazer East, Inc	Resource Conservation	Recreational	Site-Specific RCLs
5	TS-030-01339-00	Reuille	Resource Conservation	Recreational	Site-Specific RCLs
6	TS-030-01348-00	Burlington Northern Dock Corp	Industrial	Industrial	Industrial DC RCLs
7	TS-030-01309-00	Douglas County	Resource Conservation	Recreational	Site-Specific RCLs
8	TS-030-01349-00	Soo Line Railroad Co	Resource Conservation	Industrial	Industrial DC RCLs
9	TS-030-01336-00	Reuille	Resource Conservation	Recreational	Site-Specific RCLs
10	TS-030-01325-00	Soo Line Railroad Co	Resource Conservation	Industrial	Industrial DC RCLs
11	TS-030-01332-00	Laurvick	Resource Conservation	Recreational	Site-Specific RCLs

Table 1. Site-Specific Cleanup Levels (CULs)

Sediment	CBSQG MEC (mg/kg)
Total PAHs	12.2

Soil CULs by Property Use	NR 720 Non-industrial direct contact RCLs**		Site-Specific Recreational Exposure RCLs		NR 720 Industrial direct contact RCLs***	
	10-6 (mg/kg)	10-5 (mg/kg)	10-6 (mg/kg)	10-5 (mg/kg)	10-6 (mg/kg)	10-5 (mg/kg)
PAHs						
Acenaphthene	3,590		7,170		45,200	
Anthracene	17,900		35,900		100,000	
Benz[a]anthracene*	1.13	11.3	5.08	50.8	20.7	207
Benzo(j)fluoranthene	0.424		1.120		1.76	
Benzo[a]pyrene*	0.115	1.15	0.509	5.09	2.11	21.1
Benzo[b]fluoranthene*	1.15	11.5	5.09	50.9	21.1	211
Benzo[k]fluoranthene*	11.5	115	50.9	509	211	2110
Chrysene*	115	1,150	509	5,090	2,110	21,100
Dibenz[a,h]anthracene*	0.115	1.15	0.509	5.09	2.11	21.1
Dibenzo(a,e)pyrene	0.0424		0.1120		0.176	
Dimethylbenz(a)anthracene,	0.000459		0.00204		0.00844	
Fluoranthene	2,390		4,780		30,100	
Fluorene	2,390		4,780		30,100	
Indeno[1,2,3-cd]pyrene*	1.15	11.5	5.09	50.9	21.1	211
Methylnaphthalene, 1-	17.6		46.4		72.7	
Methylnaphthalene, 2-	239		478		3,010	
Naphthalene	5.52		9.63		9.96	
Nitropyrene, 4-	0.424		1.12		1.76	
Pyrene	1,790		3,590		22,600	
Dioxins/Furans	ng TEQ/kg		ng TEQ/kg		ng TEQ/kg	
2,3,7,8 TCDD equivalents	5		13		22	

*cPAHs used in BaP equivalency calculation where 10-5 ELCR level applies

**NR 720 Non-industrial RCLs will apply for parcels where property owners do not accept site-specific CULs

Table 2. PAHs to include in Total PAH calculation

Contaminant	MEC (mg/kg)
Acenaphthene	0.048
Acenaphthylene	0.067
Anthracene	0.451
Benz[a]anthracene	0.579
Benzo[a]pyrene	0.8
Benzo[b]fluoranthene	6.82
Benzo(g,h,k)perylene	1.685
Benzo[k]fluoranthene	6.82
Chrysene	0.728
Dibenz[a,h]anthracene	0.084
Fluoranthene	1.327
Fluorene	0.307
Indeno[1,2,3-cd]pyrene	1.7
Methylnaphthalene, 2-	0.111
Naphthalene	0.369
Phenanthrene	0.687
Pyrene	0.858
Total 17 PAH	12.2

Notes:

1. This list includes the 16 EPA priority pollutants plus 2-methylnaphthalene, all of which have individual Wisconsin's CBSQG levels.
2. Benzo(e)pyrene is not included in the total because it had not been reported in previous investigations at this site, though Wisconsin does have CBSQGs for this compound. Worksheet 15-1 of Beazer's September 17, 2019 QAPP for the Supplemental Data Gap Investigation lists 1-methylnaphthalene, but this compound is also not included in the Total PAH since there are no CBSQG values for it.

Attachment 1. Sediment Cleanup Levels (CULs) for Polycyclic Aromatic Hydrocarbons (PAHs) in the St. Louis River Area of Concern and Wisconsin

	Site	Max Conc/ Not to Exceed Value (mg/kg)	SWAC & qualifiers	PAHs	Basis
St. Louis River AOC	Newton Creek GLLA	2.6	5 ppm action level; removal of visual NAPL	total 18	CBSQG TEC; performance standard for NAPL
	Superior Water Light & Power MGP	12.2		total	CBSQG MEC
	Howards Bay GLLA	12.2		total 17	CBSQG MEC
	MN Industrial Slips GLLA Projects (5 sites)	12.3		total 13	MN SQT - MEC
	St. Louis River/Interlake/Duluth Tar SF Site (MN/WI)	13.7		total	Site-specific toxicity testing
	U.S. Steel/Spirit Lake Superfund Site (MN) GLLA	12.3		total 13	MN SQT - MEC
Other Lake Superior	Ashland MGP Superfund Site	22	9.5 ppm SWAC	total 21	Risk Assessment
Other WI Sites	Burlington MGP Site	7	95% samples < max	total	Statewide background assessment
	Camp Marina MGP Site	48		total 13	Risk Assessment
	Kinnickinnic River	37		total	Based on upstream background
	Lincoln Wood Products MGP	12		total 18	CBSQG MEC
	Marinette MGP Site	23		total 13	CBSQG PEC
	Milwaukee Lincoln Park Phase 1	40	20 ppm SWAC per deposit	total 19	Based on upstream background
	Milwaukee Lincoln Park Phase 2	40	20 ppm SWAC per deposit	total 19	Based on upstream background
	Ripon MGP Site	20	0-2 ft, >2 ft. 50 ppm	total 17	Negotiated RAO from CBSQG, engineered cap
	Sheboygan GLLA Project	18		total	
Stevens Point MGP Site	23		total 17	CBSQG PEC	

Notes: MN's Sediment Quality Guidelines (SQTs) are based on the same research as the WI CBSQGs
 TEC = threshold effect concentration
 MEC = midpoint effect concentration
 PEC = probable effect concentration
 SWAC = surface weighted average concentration