



State of Oregon
Department of Environmental Quality
Memorandum

To: 2012 Integrated Report File

Date: October 21, 2013

Prepared By: Karla Urbanowicz, *WQ Assessment Program Coordinator*

Subject: Category 4B Demonstration Addressing Pentachlorophenol in Willamette River Sediments

This memo demonstrates that alternative pollution control requirements are stringent enough to implement water quality standards in Willamette River sediments at the McCormick & Baxter Superfund Site and justify removing this segment from the Section 303(d) list for pentachlorophenol. Information to support the Category 4B demonstration is summarized from the most recent joint EPA/DEQ report on status and progress of Superfund remediation activities.¹

1. Identification of segment and statement of problem causing the impairment

With Oregon's 1998 water quality assessment, DEQ added a listing to the final 1998 303(d) list:

Name & Description	Parameter	Criteria	Supporting Data or Information	Changes From 1994/96
Willamette River Near McCormack and Baxter Facility	Toxics	Tissue/Sediment - Pentachlorophenol, Arsenic	OSHD alert regarding fishing and swimming in the area of McCormick and Baxter due to soils and sediment contaminated by creosote.	Addition

DEQ based the listing on an Oregon Health Division advisory issued July 2, 1991 that, while not identifying specific toxic pollutants, advised against harvesting crayfish in the vicinity of the McCormick and Baxter site on the Willamette River. (Attachment 1)

¹ DEQ/EPA, 2011. Third Five-Year Review Report for McCormick & Baxter Creosoting Company Superfund Site. Oregon Department of Environmental Quality and U.S. Environmental Protection Agency, September 2011.
http://www.epa.gov/region10/pdf/sites/mccormick_baxter/m&b_five_year_review_sept_2011.pdf

The listed segment is identified on the current 2010 303(d) list as:

Basin Name	Willamette
Subbasin	Lower Willamette
4th Field HUC	17090012
Record ID	6763
Water Body	Willamette River
LLID	1227618456580
River Miles	0 to 24.8
Segment Miles	24.8
Pollutant	Pentachlorophenol

The McCormick and Baxter site is a former wood-treating facility on the east bank of the Willamette River in Portland, Oregon. Site inspections and investigations in the 1980's documented soil, groundwater, and sediment contamination at the property. DEQ began a Remedial Investigation and Feasibility Study in 1990. The site was added to the Superfund National Priority List in 1994. DEQ and EPA have completed the Superfund Remedial Investigation/Feasibility Study; issued the Record of Decision (ROD) on remedial actions for soil, groundwater, and sediment at the site; implemented and completed remedial actions in 2005; completed three Five-Year Reviews to determine whether the selected remedies at the site are protective of human health and the environment; and determined that the upland soil and inwater sediment remedies are Operational and Functional. An overview of the site history, remedial investigations, and remedial actions along with a complete reference list of reports documenting each phase of the process are contained in the Third Five-Year Review Report.

The Superfund site covers approximately 43 acres of land adjacent to the Willamette River and 23 acres of contaminated river sediments. Operations, spills, and waste disposal activities at the site resulted in soil, groundwater, and river sediment contamination. Contaminants detected at the site included polynuclear aromatic hydrocarbons (PAHs, comprising 85 percent of the creosote), pentachlorophenol (PCP), arsenic, chromium, copper, zinc, and dioxins/furans. Contaminant releases from three source areas on land impacted groundwater and sediments. The current site layout and features with Figures III-2 and III-3 of the Third Five-Year Review Report.

2. Description of pollution controls and how they will achieve water quality standards

The remedial actions taken at the site to control pollution are described in the Third Five-Year Review *IV. Remedial Actions* (Page 6 - 18). Remedial actions include:

- Removal, treatment or off-site disposal, and capping of remaining contaminated soils
- Groundwater and Nonaqueous Phase Liquids (NAPL) extraction and treatment
- Installation of a vertical impermeable subsurface barrier wall to contain NAPL migration
- Sediment capping
- Monitoring
- Institutional controls

As described in Third Five-Year Review Page 7:

The overall remedy is designed to function as an integrated containment system. The entire Site is capped; the combined upland capping extends to the riparian area along the shoreline where it meets the sediment cap. The capping works in conjunction with

the barrier wall, as a complementary system, to meet the Site Remedial Action Objectives (RAOs) and prevent contaminated groundwater from adversely impacting the Willamette River.

The remedy addressing the contaminated Willamette River sediments is designed to prevent human exposure under a recreational scenario from direct contact with contaminated sediment and to prevent exposure of benthic organisms to sediment contamination. The pollution controls include capping contaminated sediment to prevent human and benthic organism contact, and institutional controls to prohibit disturbing the sediments. The sediment cap covers approximately 23 acres and is constructed of 2 to 5 feet of sand and 600 tons of organophilic clay, overlain with geotextile fabric, and armored with articulated concrete block mats and rock riprap. The sediment cap was completed in 2005. Institutional controls include an easement from the Oregon Department of State Lands to prohibit anchoring and operation of non-recreational vessels in the vicinity of the sediment cap, buoys marking navigational hazards, and a U.S. Coast Guard rule establishing a Regulated Navigational Area in and around the site sediment cap. All institutional controls were obtained and put in place by 2011.

The performance standards of the sediment cap were specified in the Operation and Maintenance Plan to maintain contaminant concentrations in sediments above the cap at levels below risk-based cleanup goals, and to minimize releases of contaminants from sediment into the Willamette River to below federal and state ambient water quality criteria (AWQC). The water quality criteria selected were those in effect at the time of the Record of Decision in 1996:

- Arsenic (III) – 190 micrograms per liter ($\mu\text{g/L}$)
- Chromium (III) – 210 $\mu\text{g/L}$
- Copper – 12 $\mu\text{g/L}$
- Zinc – 110 $\mu\text{g/L}$
- PCP – 13 $\mu\text{g/L}$
- Acenaphthene – 520 $\mu\text{g/L}$
- Fluoranthene – 54 $\mu\text{g/L}$
- Naphthalene – 620 $\mu\text{g/L}$
- Total cPAHs – 0.031 $\mu\text{g/L}$
- Dioxins/furans – 1×10^{-5} nanograms per liter (ng/L)

Water quality criteria have changed since that time. In 2007, DEQ and EPA added five criteria to include for reviewing performance of the sediment cap:

- Two AWQCs in effect at the time the ROD was issued
 - 1996 criteria for chronic effects to aquatic life
 - 1996 criteria for human health, based on fish consumption
- Two 2007 National Recommended Water Quality Criteria (NRWQCs)
 - 2007 criteria for chronic effects to aquatic life
 - 2007 criteria for human health (consumption of organisms)
- Current maximum contaminant levels (MCLs).

The criteria are summarized in **Table IV-2: Sediment Cap Water Quality Comparison Criteria** in the Third Five-Year Review Report and include:

Site COCs		1996 AWQCs ¹		2007 NRWQCs ²		2007 NPDWRs ³	Summary
		Aquatic Life (chronic)	Human Health (fish consumption only)	Aquatic Life (chronic)	Human Health (consumption of organism only)	MCLs	Minimum of 1996 and 2007 Comparison Criteria
Pentachlorophenol	µg/L	13		15	3	1	1

¹ AWQCs in effect in 1996, when the ROD was issued.

² NRWQCs published as of August 15, 2007 are included for comparison.

Key:

AWQCs = Aquatic Water Quality Criteria

COC = constituent of concern

MCLs = Maximum Contaminant Levels

µg/L = micrograms per liter

NPDWRs = National Primary Drinking Water Regulations

NRWQCs = National Recommended Water Quality Criteria

ROD = Record of Decision

Oregon's current water quality standards (WQS) do not include numeric criteria for toxic pollutants in sediment or fish, but do include narrative criteria:

**Oregon Administrative Rules
340-041-0033
Toxic Substances**

...

(2) Toxic substances may not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare or aquatic life, wildlife, or other designated beneficial uses.

...

(5) To establish permit or other regulatory limits for toxic substances for which criteria are not included in Tables 20, 33A, or 33B, the department may use the guidance values in Table 33C, public health advisories, and other published scientific literature. The department may also require or conduct bio-assessment studies to monitor the toxicity to aquatic life of complex effluents, other suspected discharges, or chemical substances without numeric criteria.

Most recently, revisions to Oregon's human health numeric criteria for surface water in OAR 340-041-0033 Table 40 were approved by EPA in 2011 and updated aquatic life numeric criteria were approved in 2013. The current Oregon numeric criteria for PCP are:

Human Health Criteria		Aquatic Life Criteria
Water + Organism (µg/L)	Organism Only (µg/L)	Freshwater Chronic (CCC) and Acute (CMC)
0.15	0.30	Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC=(exp(1.005(pH)-4.869)); CCC=exp(1.005(pH)-5.134).

With the preparation of the next Five-Year Review due in 2016, DEQ and EPA will review and incorporate updated ambient water quality criteria into the review process to compare to sediment cap water samples that will be collected in 2015.

The pollution controls in effect for the McCormick & Baxter Superfund Site meet Oregon's narrative and numeric water quality standards. The combination of sediment cap and institutional controls contain, control, and prevent future releases of contaminants into the sediments in the Willamette River and protect beneficial uses. The target for performance of the sediment cap includes preventing contamination moving into sediments and water in the Willamette River and protecting the designated beneficial uses.

3. An estimate of the time when water quality standards will be met

Remedial actions at the McCormick & Baxter Superfund Site have been implemented and completed. The Third Five-Year Review Report has found (Page ii):

Sediment Operable Unit: The remedy for the sediment OU is protective of human health and the environment because the remedy required by the ROD has been implemented, and is working as intended.

An assessment of contaminants in crayfish at the site was done after installation of the sediment cap. The purpose was to "provide the Oregon Department of Human Services (DHS) with data to reevaluate a health advisory in effect since July 2, 1991, for commercial harvesting of crayfish in the Willamette River near the Site." (page 38, Third Five-Year Review Report). The results showed contaminant concentration in crayfish have declined. Based on the assessment report, DHS removed the health advisory on February 25, 2010. (Attachment 2)

At this time, Oregon water quality standards protecting beneficial uses of the Willamette River in the vicinity of the site have been met. Continued operation, maintenance, and monitoring will be reviewed every five years to confirm the sediment remedy continues to work as intended. The next Five-Year Review will be conducted before October 1, 2016.

4. Schedule for implementing pollution controls

Remedial actions at the McCormick & Baxter Superfund Site have been implemented and completed.

5. Monitoring plan to track effectiveness of pollution control

Monitoring at the site is done according to the draft 2013 Operation and Maintenance Plan. A final 2013 Operation and Maintenance Plan will be completed in December 2013.

Monitoring necessary to demonstrate the sediment cap is protective will be conducted prior to each Five-Year Review, per the 2013 Operation and Maintenance Plan. A Five-Year Review Reports is required every 5 years in perpetuity per CERCLA requirements. DEQ's draft 2013 Operation and Maintenance Plan includes representative sampling of surface water and sediment cap interarmor water in 2015 and 2020. For each event, the sampling results will be compared to applicable federal or state Human Health and Chronic Aquatic Life Ambient Water Quality Criteria in effect on the sampling date.

6. Commitment to revise pollution controls as necessary

The remedy at the Site requires continuing Five-Year Reviews. Each review will evaluate the protectiveness of each part of the remedy including the sediment cap and institutional controls related to the cap. Recommendations for follow-up action will be made as needed to assure the

continuing protectiveness of the remedy.

DEQ assumed full operation and monitoring responsibility for the sediment cap on September 25, 2013. DEQ also has financial responsibility to administer the final 2013 Operation and Maintenance Plan to ensure that the sediment cap remedy continues to be protective over time.

Conclusions

This demonstration documents that other pollution control requirements at the McCormick & Baxter Superfund Site are sufficient to achieve water quality standards in the Willamette River sediments in the vicinity of the site. With Oregon's 2012 Integrated Report, Record 6763 Willamette River LLID 1227618456580 River Miles 0 to 24.8 Pentachlorophenol will be de-listed from **Category 5: Water Quality Limited and requires a TMDL, 303(d) list** and moved to **Category 4b: Water Quality Limited but a TMDL is not required because other pollution requirements will achieve water quality standards.**

Attachment 1

http://public.health.oregon.gov/HealthyEnvironments/EnvironmentalExposures/ToxicSubstances/Documents/mccormick_baxter_07_02_91.pdf

(503) 229-5022
FAX (503) 229-6462
TDD-Nonvoice (503) 229-5497

Oregon

DEPARTMENT OF
HUMAN
RESOURCES

Health Division

DATE: July 2, 1991

TO: All Oregon Fish and Wildlife Department licensees holding commercial crayfish harvesters licenses and harvesting on the Willamette River

FROM: Oregon Fish and Wildlife Department and Oregon Health Division

Dear Licensee:

The Oregon Health Division is cooperating with the Department of Environmental Quality in assessing the environmental impact of chemicals used at the McCormick and Baxter Creosoting Company plant located on the east bank of the Willamette River about one mile upstream from the St. Johns Bridge. Visual observations and limited testing of sediment from the river in the immediate area of the plant have shown that toxic materials have reached the river. Over the next year, the Health Division and DEQ will be performing additional tests of water, sediment and organisms from the area to determine the extent and seriousness of the contamination.

The testing done so far suggests that fish, crayfish and other organisms caught near the plant may be unsafe for food.

Until further notice, you are advised not to harvest crayfish within a radius of 1000 feet of the Burlington Northern Railroad bridge footing on the east bank of the Willamette River.

The Health Division, Department of Environmental Quality, and Fish and Wildlife Department have arranged for the posting of warning signs and have issued limited media notifications to alert sport fishermen and local recreational users of this area.

If you would like to discuss this request, details of the advisory, or the assessment in general, feel free to call Ken Kauffman (229-5022) or Dr. Roseanne Lorenzana (229-5502).

mr

BARBARA ROBERTS
Governor



1400 SW 5th Avenue
Portland, OR 97201
(503) 229-5599 Emergency
(503) 252-7978 TDD
Emergency

24-26 (Rev. 1-91)

Attachment 2

<http://www.oregon.gov/DHS/news/2010news/2010-0225.pdf>

Date:	Feb. 25, 2010
Contact:	Christine Stone, 971-673-1282, desk; 503-602-8027; christine.l.stone@state.or.us
Headline:	Oregon Public Health officials lift crayfish harvest advisory for the McCormick and Baxter site on the Willamette River
<i>Subhead:</i>	

Oregon Public Health environmental officials are lifting the advisory issued in 1991 against the commercial harvesting of crayfish within a radius of 1,000 feet of the Burlington Northern Railroad Bridge on the Willamette River, the former McCormick and Baxter site near the St. Johns area in Portland.

The contaminated sediment in this 23-acre area was remediated and capped in 2005. The Oregon Department of Environmental Quality sampled this site in 2006 and 2008 for contaminants harmful to human health in crayfish.

Two contaminants most closely scrutinized in the crayfish by public health officials were dioxin and inorganic arsenic. The most recent analyses in 2008 showed that dioxin levels in crayfish were below the minimal risk level for humans established by the Agency for Toxic Substances and Disease Registry of 0.000001 micrograms per kilogram of body weight per day. The inorganic arsenic levels in the crayfish were also below the guidance levels for unrestricted consumption, 0.088 milligrams per kilogram, established by the Environmental Protection Agency for the protection of people who eat fish. Other contaminants were either not found or were well below levels of concern.

This advisory removes the July 2, 1991, advisory issued by Oregon Public Health and the Oregon Department of Fish and Wildlife.

#