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Table 1: Shoreline Oil Terminology/Codes for Spills of Black Oil

<u>Oil Distribution</u>			<u>Surface Oiling Descriptors - Width</u>	
C	Continuous	91 - 100%	Very Narrow	< ____ m
B	Broken	51 - 90%	Narrow	> ____ - < ____ m
P	Patchy	11 - 50%	Medium	> ____ - < ____ m
S	Sporadic	1 - 10%	Wide	< ____ m
T	Trace	<1%		

  

<u>Surface Oiling Descriptors - Thickness</u>	
PO	Pooled Oil (fresh oil or mousse > 1 cm thick)
CV	Cover (oil or mousse from >0.1 cm to <1 cm on any surface)
CT	Coat (visible oil <0.1 cm, which can be scraped off with fingernail)
ST	Stain (visible oil, which cannot be scraped off with fingernail)
FL	Film (transparent or iridescent sheen, or oily film)

  

<u>Surface Oiling Descriptors - Type</u>	
FR	Fresh Oil (unweathered, liquid oil)
MS	Mousse (emulsified oil occurring over broad areas)
TB	Tarballs (discrete accumulations of oil <10 cm in diameter)
PT	Patties (discrete accumulations of oil >10 cm in diameter)
TC	Tar (highly weathered oil, of tarry, nearly solid consistency)
SR	Surface Oil Residue (non-cohesive, heavily oiled surface sediments, characterized as soft, incipient asphalt pavements)
AP	Asphalt Pavement (cohesive, heavily oiled surface sediments)
NO	No Oil
DB	Debris: logs, vegetation, rubbish, garbage, and response items such as booms

  

<u>Subsurface Oiling Descriptors</u>	
SAP	Subsurface asphalt pavement (cohesive)
OP	Oil-Filled Pores (pore spaces are completely filled with oil to the extent that the oil flows out of the sediments when disturbed). May also consist of weathered oil, such as a buried lens of asphalt pavement.
PP	Partially Filled Pores (pore spaces partially filled with oil, but the oil does not flow out of the sediments when disturbed)
OR	Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces).
OF	Oil Film (sediments are lightly oiled with an oil film, or stain, on the clasts)
TR	Trace (discontinuous film or spots of oil, an odor, or tackiness)
NO	No Oil (no evidence of any type of oil)

  

<u>Sediment Types</u>			
R	Bedrock outcrops	S	Sand (0.06-2 mm)
B	Boulder (>256 mm in diameter)	M	Mud (silt and clay, <0.06 mm)
C	Cobble (64-256 mm)	RR	Riprap (man-made permeable rubble)
P	Pebble (4-64 mm)	SW	Seawalls (impermeable)
G	Granule (2- mm)		

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## Kalamazoo River/Enbridge Spill - Cleanup Recommendation Methods

**Date: September 14, 2010** (May be revised/updated, and new date provided)

### 5-STEP APPROVAL PROCESS

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| • SCAT Review (Shoreline and Overbank) |
| • Operations / Cleanup                 |
| • Site Inspection                      |
| • SCAT Reassessment                    |
| • EPA Division Chief Signoff           |

Habitat Type or feature	Cleanup Recommendation:	Cleanup Objective
Shoreline	<ul style="list-style-type: none"> <li>• Cut and bag low hanging limbs extending over and into the water 2" above oiling level.</li> <li>• Remove oiled vegetation leaving roots intact up to 10' from waterline.</li> <li>• Do not remove woody plants greater than 2" diameter (as measured one foot above ground surface).</li> <li>• No scraping, leave oiled soil in place.</li> </ul>	<p>*Meet Operational Endpoint.                      **Additional cleanup activities may damage the environment, result in soil erosion, and significant adverse habitat impact.</p>
Floodplain, Oxbows, and mud areas (see attached supplement for more detail)	<ul style="list-style-type: none"> <li>• Do not remove woody plants greater than 2" diameter (as measured one foot above ground surface).</li> <li>• Minimize ingress and egress to the least amount necessary to remove pooled oil and use planks where necessary to avoid leaving deep footprints that may drive oil into soils.</li> <li>• In areas categorized as pooled oil, remove oil using portable vacuum or absorption techniques (e.g. snare/pom-poms, sorbent pads). Cut and remove vegetation from around these oil pools to up to 10 ft. as needed to detect other pools of oil.</li> <li>• In areas with pooled oil where persistent oil occurs in moderate to heavy amounts or when oil has formed semi-solid to solid masses, manually remove oil and contaminated soil by scooping with flat shovels, rags, sorbent pads, gentle raking, gloved hands, hand tools, or similar manual methods.</li> <li>• In areas where absorptions and/or manual removal techniques have proven ineffective, more mechanized approaches or other countermeasures may be proposed to EPA Operations in consultation with SCAT for approval.</li> <li>• Do not replace removed soil with new fill.</li> <li>• Overbank areas greater than 100 feet from the river shoreline or an oxbow lake/pond may be addressed through natural attenuation when oil staining is minimal, or exists only as small patches or oiled deadfall.</li> </ul>	<p>*Meet Operational Endpoint.                      **Additional cleanup activities, including low pressure cold-water flushing, results in large amounts of residual oil being released into the environment and yields minimal to no removal of oil.                      **Unnecessary disturbance may result in substrate contamination, habitat disruption, and is not balanced by benefits of oil removal.</p>

Emergent Wetlands (non-wooded)	<ul style="list-style-type: none"> <li>Minimize entry (to prevent unnecessary substrate contamination).</li> <li>SCAT Team should provide cleanup recommendations on a case by case basis (recommended in areas used by sensitive wildlife).</li> <li>Passive sorbent use to minimize disturbance of substrate and vegetation and to prevent excess waste generation.</li> </ul>	<p>*Meet Operational Endpoint.                  **Unnecessary disturbance may result in substrate contamination, habitat disruption, and is not balanced by the benefits of oil removal.</p>
Oiled debris	<ul style="list-style-type: none"> <li>Mobilize and capture oil with boom or sorbent material before and during moving debris.</li> <li>Manual removal of oiled debris.</li> </ul>	<p>*Meet Operational Endpoint.</p>
Oiled Manmade Structures and larger rocks	<ul style="list-style-type: none"> <li>Manual removal (scraping or wiping with sorbents on oil &lt; 0.1 cm)</li> <li>High pressure, cold water wash on oil covers (oil &gt; 0.1cm to &lt;1 cm thick)</li> <li>Visible oil that can't be scraped off may be left in place.</li> </ul>	<p>*Meet Operational Endpoint.                  **Additional cleanup activities yield minimal to no removal of oil.</p>
Large Woody Debris	<ul style="list-style-type: none"> <li>Oiled woody debris larger than 4" diameter should not be removed, unless it poses a safety hazard.</li> <li>Mobilize and capture oil with boom or sorbent material before and during moving debris.</li> <li>Oiled branches that are smaller and non-anchored to riverbank or bottom should be removed.</li> </ul>	<p>*Meet Operational Endpoint                  **Further removal may destroy existing habitats.</p>
Aquatic vegetation holding floating oil [water lilies, grasses, etc.]	<ul style="list-style-type: none"> <li>Cut vegetation when the risk of oiled vegetation contaminating wildlife is greater than the value of the vegetation that is to be cut and there is no less destructive method that removes or reduces the risk to acceptable levels. Cut below low water's surface, leaving roots to allow re-growth.</li> <li>Use snares to collect released oil.</li> <li>Bag vegetation for disposal.</li> <li>Operations must be strictly monitored to minimize effect of root destruction and mixing of oil deeper into the sediment.</li> </ul>	<p>*Meet Operational Endpoint.                  **Unnecessary disturbance may result in substrate contamination, habitat disruption, and is not balanced by benefits of oil removal.</p>
Oiled mixed sand and gravel	<ul style="list-style-type: none"> <li>Boom prior to treatment.</li> <li>Manual removal when significant oil presence observed.</li> <li>Low pressure, cold water flushing if practical and oil can be captured.</li> </ul>	<p>*Meet Operational Endpoint.</p>
Turf (private/public lawns)	<ul style="list-style-type: none"> <li>Boom prior to treatment.</li> <li>Low pressure, cold water flushing if practical and oil can be captured.</li> <li>Remove sod (top 2") and replace with new sod (or add soil and reseed) in areas with high oil adhesion.</li> <li>Layers of solid oil, tar material, and tarmats may be removed using manual methods that may include gentle raking, removal by hand (with appropriate PPE - gloves), and hand tools.</li> </ul>	<p>*Meet Operational Endpoint</p>
Islands	<ul style="list-style-type: none"> <li>Categorize each island based on above listed habitat type or feature.</li> <li>Use cleanup recommendations for that category.</li> <li>Island may be flushed to facilitate capture of oil.</li> <li>Layers of solid oil, tar material, and tar mats may be removed using manual methods that may include gentle raking, removal by hand (with appropriate PPE - gloves), and hand tools.</li> </ul>	<p>*Meet Operational Endpoint.</p>

\*Remove oil and eliminate source of sheen

\*\*Justifications/Environmental Effects