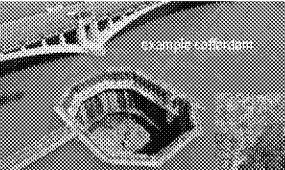
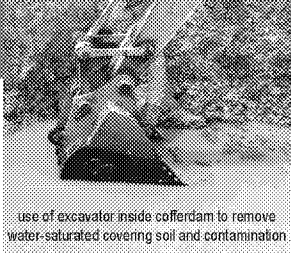
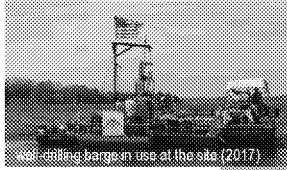
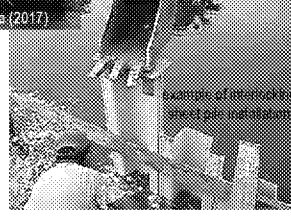


<p><b>RN2: Dock Relocation, Cofferdam Construction, Excavation, and Disposal</b></p>	<p><b>Modified RN2: Removal and Containment</b></p>
 <p>example cofferdam</p>  <p>use of excavator inside cofferdam to remove water-saturated covering soil and contamination.</p>	 <p>well drilling barge in use at the site (2017)</p>  <p>example of interlocking sheet pile installation</p>
<p><b>Scope</b></p>	
<ul style="list-style-type: none"> <li>Excavation, requiring relocation of operating barge dock, followed by construction of massive cofferdam (extending 40' into air above low river level to address river level change). Once excavation begins, removal of covering soil ranging from 7 to 25 feet thick, takes place before encountering deep contamination zone</li> </ul>	<ul style="list-style-type: none"> <li>Pumped extraction of contamination through use of a river barge, without interrupting use of dock, through a methodology already used at site as shown in above photo, followed by installation of engineered interlocking sheet pile</li> </ul>
<p><b>Complexity</b></p>	
<ul style="list-style-type: none"> <li>Because the dock must be relocated, no remedial work can take place until a new temporary dock can be designed and built, the existing dock removed, and a temporary cofferdam installed</li> <li>Complex design, not just for the cofferdam and dock construction, but also for logistics of access for excavation inside 30' deep hole and routing of 13,000 dump trucks of soil through the site and onto public roads</li> </ul>	<ul style="list-style-type: none"> <li>All of the work is done by barge, without interrupting existing operations and not requiring dock relocation</li> </ul>
<p><b>Timing</b></p>	
<ul style="list-style-type: none"> <li>2 year design, with at least 3 more years until removal</li> <li>At least 6 permits needed to commence removal</li> </ul>	<ul style="list-style-type: none"> <li>2 month design, with immediate removal following</li> <li>No permits needed for removal</li> </ul>
<p><b>Remedy Effectiveness</b></p>	
<ul style="list-style-type: none"> <li>Hypothetical 100% removal</li> </ul>	<ul style="list-style-type: none"> <li>100% containment after 95% removal/immobilization</li> </ul>
<p><b>Cost Effectiveness</b></p>	
<ul style="list-style-type: none"> <li>EPA estimated \$144M total project cost <ul style="list-style-type: none"> <li>60% of the costs are actually "non-value added" work, not performing remediation <ul style="list-style-type: none"> <li>\$36M to build temporary dock and infrastructure</li> <li>\$50M to relocate endangered mussels, install cofferdam, backfill the hole, and remove cofferdam</li> </ul> </li> </ul> </li> <li>Only 40% of the total costs are spent on remediation <ul style="list-style-type: none"> <li>The majority of those costs -- \$36M -- is spent on relocating the waste soils to a landfill</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>\$8M total project cost <ul style="list-style-type: none"> <li>100% of it focused <u>directly</u> on remedy <ul style="list-style-type: none"> <li>\$3.2M removal through wells</li> <li>\$3.2M installation of containment</li> </ul> </li> </ul> </li> </ul>