

USE OF ENGINEERED WETLANDS TO PHYTOREMEDIATE EXPLOSIVES
CONTAMINATED SURFACE WATER AT THE IOWA ARMY AMMUNITION
PLANT, MIDDLETOWN, IOWA

Most Department of Defense installations have environmental sites with contaminated ground and surface water, including streams and impoundments. Traditionally, contaminated water has been remediated using industrial treatment processes such as “pump and treat” systems. Phytoremediation, a rapidly developing alternative technology, can be used to treat contaminated water and sediments. Phytoremediation is the use of plants to uptake and degrade contaminants. Phytoremediation works in synergy with other natural processes that degrade contaminants including photolysis and indigenous soil microbes. To take advantage of these natural processes, several engineered wetlands have been constructed at the Iowa Army Ammunition Plant (IAAAP) in order to phytoremediate residual explosives contaminated surface water.

The construction of the engineered wetlands at the IAAAP is the first full-scale implementation of a phytoremediation system designed to treat explosives contaminated surface water. The wetlands successfully remediated RDX in surface water from approximately 800 ppb to non-detect (0.25 ppb) levels. Explosives levels were monitored in the surface water, sediments and in the plant tissues. Added benefits of using wetlands versus a structural treatment system are numerous. The wetlands add aesthetic and ecological value to the environment and do not require energy to operate.