Naturally Wallace
CONSULTING

Total Pilot System % N Removed

LOCATION
Corvallis, Oregon

PROJECT TYPE
Landfill Leachate

COMPLETION DATE
2008

DESIGN FLOW
8 gpd
0.03 m³/d

TREATMENT
Anammox Treatment Cells
Aerated Wetland Cells
Metals Removal Bioreactor

PROJECT:

Coffin Butte Landfill
Pilot Testing

NEED

Republic Services operates the Coffin Butte Landfill, a regional facility providing solid waste disposal around the Corvallis, Oregon area. As part of long-term facility planning for the landfill, a variety of leachate management options were evaluated, including the use of constructed wetlands. Because of the low ratio of carbon to nitrogen in the leachate, conventional nitrification/denitrification would not provide sufficient nitrogen removal without purchasing significant amounts of chemicals on an on-going basis to support the treatment process.
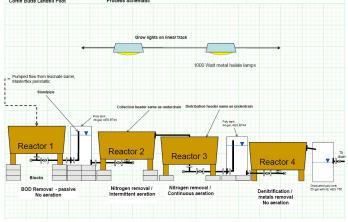
SOLUTION

Because wetlands are known to be capable of supporting non-traditional nitrogen removal mechanisms, NWC (then NAWE) designed a multi-stage treatment process capable of removing $CBOD_5$, nitrogen, and metals from the landfill leachate. The cornerstone of the process was an intermittently-aerated treatment unit that was specifically designed to remove nitrogen through annamox; the anaerobic oxidation and removal of ammonia via nitrite. This process was only recently discovered by microbiologists at the time, and the Coffin Butte pilot was one of the first wetland reactors specifically designed to remove nitrogen via anammox.

BENEFIT

Removal of nitrogen in the pilot using anammox bacteria was successful, providing Republic Services and the State of Oregon key information on how a full-scale treatment system would perform. A key aspect of the overall process demonstrated by the pilot was a 77% reduction in the amount of aeration required, and a significant reduction in the amount of chemicals needed, by eliminating the need to add supplemental organic carbon.