

An analysis of the heavy metals concentration in sewage
sludge produced by the Solar Aquatics wastewater
treatment facility

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Abstract

Solar Aquatics is an alternative method of wastewater treatment that utilizes communities of organisms to purify municipal sewage waters. In its four years of operation at the Field's Point wastewater treatment facility property, the new system has performed commendably, often removing a greater percentage of contaminants from the waste stream than its larger, state-of-the-art conventional treatment neighbor. However, because of its young age, there is still a great deal to be learned about the mechanisms which enable solar aquatics to so effectively treat wastewater. One such problem is that of metals mass balancing: determining where in the system the metals are being sequestered.

This paper reports and discusses the results obtained from a metals analysis of the sludge generated by the facility. Metals analyzed for were: Pb, Zn, Cu, Ni, Cr, Cd, and Ag. Copper zinc and nickel were by far the most abundant metals found in the sludge, with each being present in concentrations greater than 1000 ppm by weight. Cadmium was found in the lowest concentration with approximately 50 ppm. A rough mass balance was calculated based on the obtained sludge volume & metals concentrations, and past years' data on influent and effluent values. Using these data, it was found that the sludge accounted for approximately 10% of the removed metals. These unexpectedly low values are believed to be caused by a gross underestimation of the sludge layer present at the time of sampling. The mass balance calculation was revised, using data on sludge volume measured in previous years. With these data, the sludge was estimated to account for approximately 100% of the removed metals.

Also, by comparing the sludge from solar aquatics to the that of Field's Point, it was found that solar aquatics sludge is significantly higher in metals content.