

IRON REDUCTION FROM CLOSED LANDFILL LEACHATE

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ABSTRACT

Iron is usually present in landfill leachate in its soluble form (Fe^{2+} ions). Aging leachate often contain high levels of total iron. If an uncontrolled discharge enters oxygenated surface water Fe^{2+} ions will oxidise into its insoluble state Fe^{3+} ions, or rust. Resulting in the depletion of oxygen and a detrimental impact on aquatic life. The poster discusses the problems associated with iron in an aging landfill leachate and the issues that need to be addressed in order to safely dispose of the leachate to surface water.

A successful case study of a leachate treatment plant in Mid Wales, UK, shows how the problem was overcome at minimal cost to the Local Authority. The plant also had to be capable of treating high ammonia levels, by converting ammonia to nitrate and reducing the nitrate loading using a series of reed and gravel beds. Previous experience demonstrated that soluble iron II ions infiltrate the pore spaces in gravel beds, before oxidising and blocking the pores with (solid) iron III. It was therefore essential that the majority of the iron was removed prior to the leachate entering the gravel beds. This was achieved by constructing two aeration towers filled with a lightweight polypropylene media, with a large surface area to volume ratio. Leachate was pumped through the towers at a high flow rate, $\text{Fe}^{2+}_{(\text{aq})}$ was rapidly oxidised to $\text{Fe}^{3+}_{(\text{s})}$, the resulting iron III deposits as a film on the media. Finer iron sediments precipitate out in two underground storage tanks. With the majority of the iron removed the leachate could pass for further treatment before being discharged under consent to surface water.