Fiji Islands' Naboro Landfill Leachate Quality Analysis and the Applicability of Developed versus Small Island Developing State Discharge Standards

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The characteristics of leachate can vary widely due to a number of site specific factors. The manner in which the resulting leachate is collected, treated, and released are a function of the initial water quality, the design of the overall landfill area, and the desired or regulated effluent water quality standards. (Johannessen, 1999) The standards to which leachate must adhere for landfills within developed nations have all been established by the extensive research performed on solid waste compositions, landfills in general, and the subsequent leachate studied over the past century in these countries. However, for landfills built within developing nations, such as Fiji, comparatively little research has been performed in order to justify any sort of criteria for leachate effluent and the necessary treatment required to reach those levels.

Consequently, the leachate standards that have been set by the few developing nations with the funding to build engineered landfills have been based on developed world standards. Yet, site specific factors that characterize the initial leachate produced are for the most part drastically different in developing nations from that seen amongst the developed nations; in particular, waste composition and climate. Furthermore, the leachate treatment systems available to developing nations are generally more constrained due to financial limitations for installation as well as operation, maintenance, and monitoring of these systems.

A number of leachate quality sampling events have been performed on the leachate treatment train since the start of operations. The objectives of this research report are to compile all leachate quality analyses performed on Naboro Landfill leachate treatment system since the commencement of operations and compare to leachate analyses performed in the developed world; analyze and compare leachate sampling results recorded for Naboro Landfill with established standards and values set for leachate being discharged into a surface water stream; and determine if the leachate quality achieved at Naboro Landfill, or any other future landfills located in a similar climate and waste composition, should be required to meet the same standards of water quality as landfills in developed countries.

The Naboro Landfill leachate data used for this research was minimal, with only five sampling events, as well as inconsistent in the constituents tested. In comparing the overall strength of the initial leachate produced at Naboro Landfill, pH, TDS, Ammonia, BOD and COD were compared to a range of values observed in developing countries' leachate. The leachate being generated at Naboro Landfill is considered to be weak relative to other countries which are likely a result of the dilution factor provided by the high annual rainfall. When applying the United States Environmental Protection Agency's effluent limitations guidelines for the landfills point source category and Fiji Regulations for National Liquid Waste Standards to Naboro's effluent leachate, it was found that both standards were unattainable for the current effluent concentrations being reported at Naboro.