



Continuation and Expansion of Data Collection for Sewage Treatment Pilot Study on Yap with Addition of a Composting Pilot Test for Reuse of Waste Sludge



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On the island of Yap in the Federated States of Micronesia (FSM) the centralized sewage treatment plant (STP) is designed to provide only a primary level of treatment. Though the plant is functioning well in accordance with its design, the treatment level is clearly inadequate, resulting in the discharge of nearly raw sewage to the ocean. Furthermore, raw sludge from the STP is being used for crop production by the local population, which constitutes a potentially hazardous situation.

A pilot test was started (USGS 2014) to investigate the use of an attached-growth medium in the existing treatment unit to serve as a biocarrier, which would allow for retention of beneficial biomass and thus potentially enhance treatment efficiency. That pilot testing unit is in place and is functioning properly; however, because of extremely erratic influent concentrations due to dilution from storm-water intrusion into the collection network, data suitable for making statistically significant inferences are yet lacking. (A dependable stretch of dry-



Dried sludge at the Yap Wastewater Treatment Plant

season weather for sample collection would be most helpful.) Accordingly, continuation of COD data collection for the current project is still necessary. In addition, it is deemed desirable to also expand data collection to include testing for nitrogenous compounds (total nitrogen, NH_4^+ , NO_3^- , NO_2^-), which would yield additional valuable information about system performance. Furthermore, addition of a composting pilot test is needed to assess the adequacy of this natural technology for treating the waste sludge produced at the STP.

The results of these pilot tests would allow for making designed-based estimates for upgrading the STP and related sludge handling/ treatment practices to a level that would meet treatment goals acceptable to the state of Yap and potentially the whole of the FSM. Furthermore, future consideration could be given to the implementation of a zoned aeration plan in conjunction with the attached-growth scheme that would further enhance COD removal while also enabling nitrogen removal (via nitrification and denitrification). The step-by-step benefits of this plan would potentially lead to improvements in the quality of the seawater in the shallow bay where the STP discharges. In addition, production of a composted sludge would allow for recycling of the nutrients and organic matter in a form that would be safe for use as a fertilizer or soil conditioner, thus enhancing the environmental sustainability of the island and reducing risks to public health.