

Case Study – Cost-effective open dump up-grade

Summary: Samoa's main tip was converted from a smoldering open dump to a sanitary landfill for under \$500k with simple low tech solutions. At the same time, the improved site has less environmental impact.

In late 2002, the open dump for Samoa's main island of Upolo, was a smelly, smoking mess like many similar open dumps in the Pacific. With the assistance of the Japan International Co-operation Agency (JICA) and the Secretariat of the Pacific Regional Environment Programme (SPREP), a major up-grade was begun to a sanitary landfill using the Fukuoka semi aerobic method. The basic engineering saw the access road up-graded to allow all weather access to stop roadside dumping.



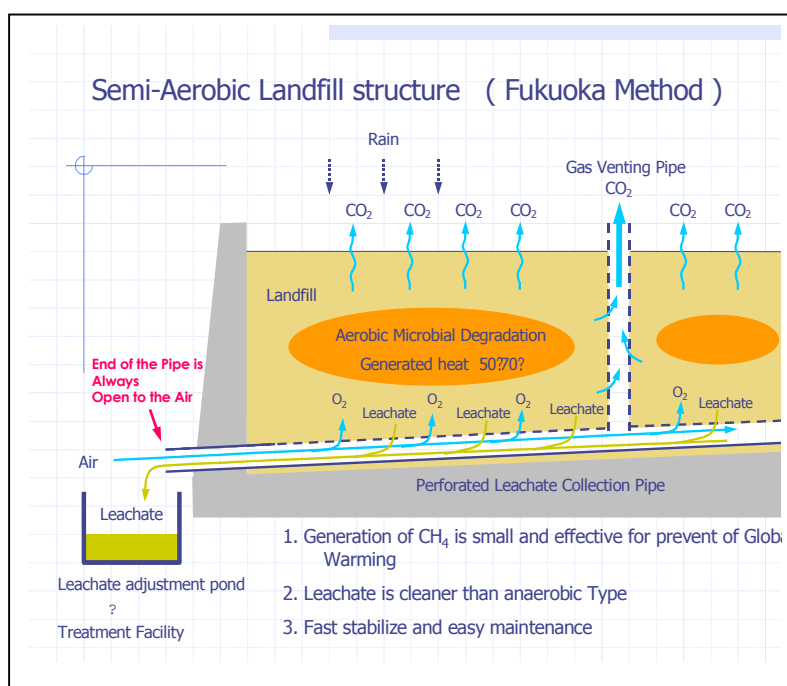
The old rubbish, covered in dirt, was used



to build the bund walls to contain the new waste and the floor was rolled and compacted to minimize any leachate leaking into the ground.

The Fukuoka method uses over-size leachate pipes to allow oxygen into the waste pile through passive ventilation. This requires that the waste pile be higher than the outlet for the leachate into the collection pond. The decomposing organic wastes give off warm carbon dioxide which passively draws the cooler oxygen-rich air into the base of the waste.

The raised pile and the large leachate pipes help prevent the waste from getting water-logged and turning anaerobic. This reduces the odour associated with anaerobic decomposition and also the inflammable methane. The methane reduction reduces the risk of fire and, because methane is such a potent greenhouse gas, significantly reduces



the impact on climate change.

Following the construction of the bund walls, further work involved a gatehouse and office, establishment of recycling areas and then the leachate treatment system. This treatment system is able to be far simpler as the leachate from a semi-aerobic landfill is more dilute and weaker in COD and BOD. The leachate collection pond was connected to a re-circulating trickling filter and then through a series of biological treatment stages and acidity neutralization. The final result is discharged to a absorption zone where most is transpired or evaporated.



The outstanding aspects about this conversion are

1. **cost** – not counting the Japanese supervision costs or land acquisition, the make-over was under US\$500,000. This includes all the peripheral works like the access road and gatehouse buildings but not capital equipment like bulldozers. The lack of liner contributes to the comparatively cheap costs.
2. **conversion of the existing site** – due to customary ownership and community fears, it is often simpler to convert an existing dump into a sanitary landfill.
3. **environmental improvement** – the reduction in greenhouse gases, odours, litter and freshwater impacts has been based on simple low tech solutions requiring little maintenance, overseas parts and energy consumption.
4. **local empowerment** – the simplicity of the up-grade has encouraged the local waste professionals into doing it themselves. A new semi-aerobic landfill is being constructed on Savaii to service the other major Samoan island and the visual improvement has given the politicians and businesses confidence in the new system.

For more details on the semi-aerobic method or the Samoan landfill conversion, see other sections in this kit, visit the website www.spre.org.ws or contact the solid waste officer, Mark Ricketts at markr@sprep.org.