

CHAPTER 5 : GENERAL DISCUSSION

The results of the leachate analysis shows that most of the parameters do not comply the Standard A of Sewage And Industrial Effluent, Regulations 1979. Therefore it should not be discharged into the river because there are water intake points downstream at Sungai Langat. However due to improper landfill management, the leachate has been found to pollute Sg Michu for quite some time and the water has been extracted for pipe water supply to the residents in this area.

Generally the leachate collected before the landfill closure was higher in concentration compared to the leachate collected after the landfill was closed. This tallies with other studies which reports that the pollution level decrease as the age of the fill increases. The characteristics of the Ampang non-sanitary landfill leachate was found to be similar to other Malaysian landfill leachates which generally contains high quantities of sodium, potassium and chloride. For example for mature landfills above ten years old, typical concentrations of sodium, potassium and chloride are 100 – 200 mg/l, 50 - 400 mg/l and 100 – 400 mg/l respectively (Agamuthu, 1999), whereas this analysis, the concentration of sodium, potassium and chlorine were 687 ppm, 785 ppm and 2500 ppm. The high salt content in the leachate could be attributed to the large quantity of garbage in the municipal waste. The characteristics of the garbage in turn probably reflect that the food waste disposed in Malaysia is of high salt content.

Comparison with the leachates from the Taman Beringin landfill, Air Hitam landfill and Sabak Bernam landfill shows that the Ampang non-sanitary landfill

leachate has a lower concentration of sodium and zinc but higher in ferum content. The concentration of ferum in the Taman Beringin landfill leachate and Air Hitam landfill leachate was found to be only in the range between 3.2-17.4ppm and 3.6 -15.7 ppm respectively, whereas the Ampang non-sanitary landfill leachate contains 45 ppm of ferum. This is probably due to the high composition of scrap metal being disposed in the Ampang non-sanitary landfill. During the site visit after the landfill was closed, scrap metals, abandoned cars and tractors were still found in the landfill.

The natural processes of attenuation and decomposition can diminish the strength of leachate. As the leachate moves with groundwater, some of the chemicals bind with soil particle and others are naturally degraded by microorganisms living in soil. Once the leachate reaches the point of surface discharge, the concentration will also be diluted by the stream flow. Therefore the concentration of leachate detected in surface water is usually very low.

The water samples collected from the Michu and Sungai Langats, which are located adjacent to the landfill was analysed to investigate the extend of leachate pollution in these rivers. Leachate was found to be one of the main pollutants along the Michu river. The leachate was the main contaminant at the first sampling point at the Sungai Michu which is about 2.0 km from the landfill. The Sungai Michu starts between the valleys in the Bukit Seputeh Forest Reserve where the landfill is located. There is no other source of pollution within the first 2.0 km of the river except for the landfill. Settlements only begins 500m away from this station. Water samples collected from the first sampling point recorded the highest total suspended solid, total solid,

ammoniacal nitrogen, water hardness and total alkalinity values. The levels of ammoniacal nitrogen and total suspended solids were above the limit set in the National Water Quality Standard for Class IIA. Besides the leachate, garbage disposal into the river was also observed to be another source of contamination along this river.

At the Sungai Langat, before joining the Sungai Michu, the main source of pollution was found to be industrial discharges mainly from the timber factories located along this river. This is revealed in the high concentration of COD recorded here. After joining the Sungai Michu, the pollution from the Michu and Langat rivers combines and it is being carried downstream towards the 10th Mile Water Treatment Plant. The water samples from this point shows a relatively higher concentration of cadmium (6.64 ppb), barium (28 ppb) and zinc (70.54 ppb).

The microbiological analysis shows that the Michu and Langat rivers are contaminated. The MPN results for fecal coliform show values above the National Water Quality Standard for Class I. Whereas the Salmonella-Shigella count shows that these pathogens are present at high concentration at the Sungai Langat. The presence of a poultry farm at Geme river probably was the source of pollution at Sungai Langat, whereas sewage pollution and chicken dung could be the main sources of pollution at Sungai Michu.

It is interesting to note that the BOD, COD and ammoniacal nitrogen parameters at the 10th Mile Langat Water Intake point exceeds the standard for Class IIA and the microbiological analysis shows that this point is contaminated. However, the treated pipe water samples collected from one of the residence which is located just after this water intake point indicates that the quality complies with the WHO Guidelines for

Drinking Water. This shows that the water has gone through proper treatment prior to consumption.

The heavy metal analysis reveals that the heavy metals content in the water samples are generally low and does not cause much concern. The concentration of barium, manganese, plumbum and zinc in the water samples were found to be within the National Water Quality Standard set for these metals. The main source of pollution at this station is the leachate which could have entered through groundwater migration or runoff. The levels of cadmium and magnesium at Michu and Langat rivers do not comply the standard and the concentration of magnesium in Sungai Michu was higher compared to Sungai Langat.

It is well known that the leachate from landfills principally affects human health. Leachate which migrates to surface water bodies can impact the integrity of the aquatic ecosystem. Catastrophic events such as fish kills are unlikely especially in a running water, but continuous discharge of contaminated leachate to a surface water body can cause chronic long term effects as the pollutants accumulate in sediments and aquatic organisms. Since the effects are subtle and very gradual, damage may be difficult to assess.