Municipal solid waste essay examples

Religion, Bible

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Environmental Science Unit 4

Environmental Hazards and Human Health

Municipal Solid Waste

Municipal solid waste (MSW) includes all the kinds of garbage that city dwellers make. The World Bank explains that each city has different types of waste because conditions are different in each city. In general it is composed of non-combustibles such as “ coal ash, glass, and metals” and combustibles such as “ paper, rubber, plastic, fabric, leather, vegetable/decaying material, and wood” (Wilson, et al., 2001, World Bank)

History

Throughout history waste has either been saved if it can be reused, dumped into a pile, burned, or somehow minimized. The Connecticut Resources Recovery Authority (2009) repeats an old New England saying about wastes “ Use it up, wear it up, and make it do or do without” (CRRA, 2009, crra. org).

Today’s activities for taking care of solid wastes have not changed very much from earlier centuries. Now the saying to describe what to do with solid wastes is based on the ‘ four rs’ reduce, recycle, recover or reuse.

Spiegelman (2005) explains that during the twentieth century inorganic wastes were no longer placed with MSW. Coal ash was the largest amount of inorganic waste and it is now considered an industrial waste. She depicts a table titled the “ Change of Waste” which shows that in New York City in 1900 the amount of inorganic waste per year amounted to about 965 pounds per capita/year. The amount of inorganic wastes included with municipal garbage in the whole USA in 2000 amounted to approximately 25 pounds per capita/year.

On the other hand Spiegelman (2007) describes a tenfold increase in manufactured product wastes during the twentieth century from about 92 to 1, 242 pounds per capita/year. Spiegelman and Sheehan (2007) reported on a forty year study during which the EPA evaluated MSW. From 1960 to 2000 the amount of product waste generated more than tripled. In 1960 the product waste generated was about 54. 6 MT/year. By the year 2000 the product waste generated equaled about 174. 8 MT/year. Biowastes and inorganics increased parallel to the increase in population growth from about 34MT/year to 58 MT/year. (Spiegleman & Sheehan, 2005, 3).

Types of Dumps and Waste

An open dump is a place where people throw garbage, all types of municipal solid waste, into a gulley or pile at the edge of town. There is no management at the site and no controls to protect the environment. Open

dump type landfills were used in the 1920s but increasingly during the 1950s, 1960s and 1070s the landfills started to be considered as “ crisis” and public health risks (Spiegelman & Sheehan, 2005, 4). The health problems from open dumps are serious. Open dumps held everything from industrial wastes to hazardous waste to municipal wastes. Birds swoop down to grab garbage and mice on the surface of the landfills. Mice and rats scavenge for food in the garbage. Wind blows garbage off the top of the dump. When it rains the water soaks into the dump’s garbage then leaches into surface water, groundwater, and into the soil. The leachate has not been treated so it is unsanitary and could be hazardous.

Decomposition in the presence of oxygen is called aerobic decomposition. When oxygen is not available then anaerobic decomposition takes place, this is the second step of breaking down the wastes. Fungi and bacteria work to breakdown the wastes anaerobically. At the end of the anaerobic process two bio-gases are formed methane gas (CH4) and carbon dioxide (CO2). Methane gas (CH4) is another hazard. Methane is formed then the organic wastes decompose under anaerobic conditions. Methane gas is colorless and non-poisonous but it is flammable. Plastics cannot be biodegraded in this way and are left incompletely decomposed. As the process of decomposition occur in the landfill the bulk of the garbage shifts and settles lower into the landfill.

Requirements.

The EPA started setting requirements for where to put landfills and how they were to be built. The regulations protect the water and other problems that

threaten human health from garbage. For example in order to protect the groundwater, wells and soil from the leachate liners are required to make sure the leachate stays inside the landfill. The two most used materials for liners are clay and plastic. The first step of making a new landfill is to find an appropriate site. At this point it is very important to have public input from the community. Landfills now have to get permits from the state government. Not only are the landfills required to have liners they are also required to have a cover. Water quality is monitored regularly. Improvements must be made when necessary. Landfills are only permitted to hold certain types of waste. Landfills are only allowed to operate until a particular capacity appropriate for the landfill is reached. The amount is usually agreed upon by the community and regulators.

Puente Hills Landfill.

QED Environmental Systems reports that the Puente Hills Landfill, Los Angeles, California is the largest landfill in North America. QED pumps are used to pump out the leachate with success. The construction of the landfill started in 1957 and by April, 2008 solid waste of approximately 118 million tons. When the landfill was designed “ it was known that someday the site would require liquid management, so both 2-inch and 4-inch leachate wells were drilled throughout the landfill during construction” (Rugged, n. d., QED).

Since that time new monitoring wells have been built. Some were built to replace the old wells that were shut down and one hundred fifty new wells were drilled in 2002. The pumps used worked well in a vacuum and deep into

the landfill at about 200 or even 300 feet. The Puente Hills Landfill encountered a problem in Phase Two with the pumps. The pumps which had been installed were plugging up with calcium carbonate crystallization. The wells were plugging up the same way. The pumps were difficult to retrieve so that they could be cleaned. The pumps were remediation piston pumps and were not appropriate for the needs of the landfill. The landfill needed strong, heavy-duty pumps that could work twenty four hours a day, seven days a week without plugging up. The QED engineers designed a " heavy duty, long-lasting piston pump: The Iron Horse™" (Rugged, n. d., QED). The Iron Horse™ design worked out very well. The pumps required no maintenance and lasted up to 18 months.

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