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Dumping the Dump

We've all heard that we are a consumer nation. That is true and it's not a bad thing. We are also a disposal nation. When we buy stuff, we throw stuff out. This includes Xboxes, new faucets, pencils, sheets, toothpaste…you can fill this in with whatever you bought yesterday. We also buy food, some in boxes, some in cans, some in plastic bags, some raw…you get it. And unlike other countries we are blessed with a "waste management system" (we used to call it garbage, but apparently that is not politically correct) that allows us to end our view of trash when we dump it into a can, bin or some other receptacle. Even a good portion of our litter (still drives me nuts when I see someone flick a cigarette out their car window) disappears from its resting place.

I can already he hear many of you saying that we don't have a good system, that there are holes in the system, that there are problems with landfills, etc. You are right, and I am not saying we are 100% fine and dandy. But I want you to stop and compare what you see out your window at work and at home and compare it to places like Port-au-Prince, Haiti; the Citarum River in Indonesia's West Java; and the Yamuna River, India.

Don't ask me why (I wouldn't even ask my shrink…if I had one…don't need one…maybe) but when I started to think about writing about this issue I started thinking about the Sci-Fi movie, *District 9*. For those of you who haven't seen it, (shame on you) it touches on many political, racism and xenophobic issues. It begins in 1982, when an alien ship appears over Johannesburg, South Africa. When a population of sick and malnourished insect-like aliens is found aboard the ship, the South African government confines them to an internment camp called District 9. District 9 becomes a cesspool. (For the sake of watching you have to suspend your disbelief. These folks traveled a zillion light years to get here and can't build a trash truck that runs on carrot juice or something like that; can't use some sophisticated ray gun to make garbage disappear or morph into a Tootsie Roll. It would appear that when they were exposed to our air they lost their minds and their technology evaporated.)

There are many statistics about what we toss out; they vary from year to year, state to state, methods of data collection, yada yada yada. Here are some that are certainly compelling:

- 4.4 pounds (although some other often cited sources say 7 pounds): The amount of trash generated daily, on average, by every American.

- 254 million tons of trash that Americans generate in a year.
- 28 billion pounds of food a year gets tossed.
- 5.7 million tons of carpet a year.
- 22 billion plastic bottles thrown out yearly.
- 4.5 million tons of office paper a year.
- 12 feet: The height of a wall from Los Angeles to New York City that could be made from tossed office paper every year.
- 300: Laps around the equator that could be made in paper and plastic cups, forks, and spoons disposed of annually.

And within this list of goodies we have growth. In particular, electronic waste has grown to over 3.2 million tons of waste put in U.S. landfills yearly. This includes: 51,900,000 computers, 35,800,000 monitors, 33,600,000 hard copy devices, 82,200,000 keyboards and mice, 28,500,000 televisions and 152,000,000 mobile devices. (Each replaced with new ones that are kept for a few years, until the next new and greatest comes out and then those are tossed out until the next latest and greatest comes out and then…)

Where does all this go? The usual response is "to the dump". This conjures up visions of piles of "stuff" (old refrigerators, banana peels, bulging green/black plastic bags, newspapers, etc.) just laying around, usually with a swarm or two of birds dive-bombing and looking for goodies. The place smells, well…like garbage. But today we should properly refer to the "dump" as a solid waste landfill, as there have been rules and regulations relating to how to deal with garbage disposal now for about 20 years. Modern landfills, at a minimum, meet four basic criteria:

- Full or partial hydrogeological isolation: if a site cannot be located on land which naturally contains leachate security, additional lining materials should be brought to the site to reduce leakage from the base of the site (leachate) and help reduce contamination of groundwater and surrounding soil. If a liner - soil or synthetic - is provided without a system of leachate collection, all leachate will eventually reach the surrounding environment. Leachate collection and treatment must be stressed as a basic requirement.
- Formal engineering preparations: designs should be developed from local geological and hydrogeological investigations. A waste disposal plan and a final restoration plan should also be developed.
- Permanent control: trained staff should be based at the landfill to supervise site preparation and construction, the depositing of waste and the regular operation and maintenance.
- Planned waste emplacement and covering: waste should be spread in layers and compacted. A small working area which is covered daily helps make the waste less accessible to pests and vermin.

So now you know the end of the story and it's my pleasure to bring you back to the beginning to see how we got to where we are.

Dealing with garbage is nothing new. It is steeped in the rich history of mankind's existence, during which time we created garbage. (We will skip ahead toward the time when there is some written record because no one really knows where the uneaten portions of the woolly mammoth were dumped.) Somewhere around 3000 B.C., the first landfill was developed when folks in Knossos, Crete, dug large holes for refuse, and not unlike our modern landfills, covered with dirt. In 2000 B.C., China developed methods of composting and recycling bronze for later use. (Hippies weren't invented yet, believe it or not). In 500 B.C., Athens, Greece, developed a new law claiming garbage must be dumped at least one mile from the city.

Around 1350, Britain passed a law mandating a clean front yard, but it was a colossal failure as most garbage was still burned outside in fires, probably in the front yard. In 1388, the English Parliament banned the dumping of waste in ditches and public waterways. In 1407, Britain introduced their first garbage men, perhaps the first official garbage men in history. (We now call them waste management technicians). They called themselves "rakers" (which is a good name for a heavy metal band) and their job was simply to rake up trash into a cart, on a weekly basis. (For your information there is a National Garbage Man Day, which is posted on the internet as the "week of June 17th". There is an official emblem and slogan – "Love your garbage man!") In 1634, not to be outdone by those across the pond, Boston officials prohibited disposing of fish and garbage near the common landing.

We owe our modern garbage removal processes to Corbyn Morris (1710 –1779) who called for the establishment of a municipal authority with waste removal powers. In 1751, he proposed that "...as the preservation of the health of the people is of great importance, it is proposed that the cleaning of this city, should be put under one uniform public management, and all the filth be...conveyed by the Thames to proper distance in the country". (In1744, Mr. Morris also wrote a spell binding pamphlet called "A Letter Balancing the Causes of the Present Scarcity of Our Silver Coin, and the Means of Immediate Remedy, and Future Prevention of This Evil." It's still available on Amazon for $14.63 and with used versions as low as $10.11)

Sometime later in the 18th century, dust yards sprung up in London where coal ash was dumped. (This was really coal ash, which we know today is quite an issue).

In 1739, Benjamin Franklin and his neighbors unsuccessfully petitioned the Pennsylvania Assembly to stop waste dumping and remove tanneries from Philadelphia's commercial district. He followed up in 1757 by starting the first street cleaning service and encouraged the public to dig pits to dispose of their waste. (In between 1739 and 1757 he flew his famous kite in the thunderstorm. The actual date is June 10, 1752, which we should all mark on our calendars and pause for a minute to be thankful he didn't fry himself to a crisp.)

In 1846, London passed the Nuisance Removal and Disease Prevention Act establishing the Metropolitan Board of Works as the first citywide authority that centralized sanitation regulation. Later the Public Health Act 1875 made it compulsory for every household to deposit their weekly waste in "moveable receptacles" for disposal – perhaps the first concept of the garbage can (excuse me refuse and/or waste receptacles). Because the load of waste increased, the first incinerator was built in Nottingham by Manlove Alliott & Co. Ltd., thanks to the design of Albert Fryer. Not surprisingly, these were met with opposition due to the large amounts of ash they produced, which wafted over the neighboring areas. (Some things never change).

In 1855, New York City stepped up to become the first city to have an organized garbage disposal agency and built America's first incinerator on Governors Island, New York in 1885.

Garbage remained garbage until after World War I when the post-war economy boomed with a concurrent increase in solid waste that needed to be managed. Municipalities began to realize some sort of citywide waste collection and disposal service was needed and began providing such services. But, by the late 1920s, waste collection and disposal costs had soared in the wake of expanding city limits, forcing local governments to begin looking for ways to curb those costs. Focus, however, was directed toward contracting out such services and implementing mechanized collection, rather than development of integrated waste management systems. During this period, municipalities began using transfer stations to centralize wastes and use larger vehicles, barges, and railroads to transport waste from the transfer station to a disposal site.

While more waste was being generated and more efficiently managed during the interwar period, land disposal was still the primary method of final disposition. Many locations had the city or town "dump" where its waste was disposed. (Let's take it to the dump, Opie!) Though easy to construct and relatively cheap to operate, the dumps were generally located near rivers and streams, where liquids and refuse from the dumps could easily enter the water and threaten water supplies (Duh!). In addition, they were extremely unsanitary, attracted vermin, gave off repugnant odors, and were fire hazards. It was not until 1929 that the federal government issued the first location restriction for disposal sites by recommending, but not requiring, dumps to be located away from river banks.

From the beginning of the Great Depression to the end of World War II, various state laws and court rulings prohibited certain disposal practices. For instance, in 1934, the United States Supreme Court upheld a lower court ruling requiring New York City to cease disposal of its municipal waste at sea. In the 1930s, California passed laws prohibiting disposal of garbage within 20 miles of shore. (We are always the first). While these actions may have helped remove refuse from the waters near America's shores, they did not address the real question, "What is the best way to manage garbage?"

As an aside, moving garbage was initially done by horse drawn carts (adding their own garbage as they moved down the street). With the development of the internal combustion engine, trucks slowly took

over in the early part of the 20th century and the first close body trucks to eliminate odors with a dumping lever mechanism were introduced in the 1920s in Britain. These were soon equipped with 'hopper mechanisms' where the scooper was loaded at floor level and then hoisted mechanically to deposit the waste in the truck. In the U.S., the Garwood Load Packer was the first truck in 1938 to incorporate a hydraulic compactor. (By the way, I was informed that the proper name for such a truck is a “Refuse Handling Vehicle”, which is really political correctness run amok.)

OK, back to garbage dumps.

The concept of a "sanitary landfill" was being developed in Great Britain in the 1920s. The British called this practice "controlled tipping" from which the term "tipping fee", the fee charged by landfill operators to dispose of waste at their facility, was probably coined. (My research is inconclusive, but this name was either derived from the tipping of the truck beds to empty the garbage or it could be that there would be a fee for dumping and the actual art of tipping for service was becoming vogue.)

While open dumping had been practiced for years, the idea of an engineered fill was quite unique. By alternating layers of waste and either soil or another non-putrefying material, the belief was that vermin populations, odors, and fires could be reduced, making land disposal less smelly and more "sanitary" and acceptable. The first modern "sanitary landfill" in the U.S., built by British design, began operation in Fresno, California, in 1934.

After WWII, open burning dumps and backyard waste burning was prohibited in most areas and the momentum of appropriate disposal of waste slowly shifted toward the use of sanitary landfills across the nation. Of course, the old dump sites still existed and continued to smell.

In 1965, Congress passed the Solid Waste Disposal Act (SWDA), the federal government's first effort to implement a comprehensive management framework for the nation's solid waste. The SWDA was designed to assist state and local governments with the technical and financial aspects of developing and managing waste disposal programs and to promote the development of guidelines for waste collection, transportation, recovery, and disposal. Amazingly, when the SWDA was passed, there were less than 10 full-time employees in state solid waste programs nationwide. (A college graduate was smart if she/he looked at this as a career opportunity.) Furthermore, no state had any real solid waste legislation; solid wastes were indirectly covered under health and nuisance statutes. Then, in 1970, Congress passed the Resource Recovery Act, shifting the emphasis of federal involvement from disposal to recycling, resource recovery, and conversion of waste to energy. It also stipulated that a national system for hazardous waste management be implemented. Also, in 1970, the Environmental Protection Agency (EPA) was born, which started enforcing the laws.

In 1976, Congress expanded the federal government's role in waste management by passing the Resource Conservation and Recovery Act (RCRA), to be implemented by the EPA. The goals of RCRA were

to protect the environment, conserve resources and reduce the amount of waste being generated. RCRA was divided into various Subtitles, two of which dealt directly with waste management issues. Subtitle C required development of a comprehensive hazardous waste management scheme to ensure those wastes were safely managed from the moment they were generated until final disposal (affectionately known as "cradle-to-grave"). Subtitle D was designed to deal with disposal of non-hazardous wastes and ensure non-hazardous waste disposal sites were constructed in a manner to greatly reduce environmental impacts.

In 1980, in response to RCRA Subtitle C, the EPA promulgated its first regulations for the management of hazardous waste. The regulations implemented several requirements: identification of solid and hazardous wastes, standards for generators of hazardous waste, standards for transporters of hazardous waste, standards for hazardous waste disposal facilities, and requirements that must be met to receive permits to operate a hazardous waste disposal facility.

In 1984, Congress amended RCRA by passing the Hazardous and Solid Waste Amendments of 1984 (HSWA). HSWA not only put into effect tough, new requirements for hazardous waste management and disposal, but also mandated that the EPA develop criteria for new solid waste landfills to drastically reduce the likelihood that new Superfund sites would be created due to poorly constructed and operated landfills. Thus, in 1991, the EPA promulgated a regulatory framework for the construction and operation of landfills receiving municipal solid waste. The criteria required all existing municipal waste landfills in the nation to either: (1) install a comprehensive groundwater and gas monitoring program, establish financial assurance to ensure funds were available for proper closure and monitoring after closure, and meet certain operational requirements; or (2) close. New landfills were required to be constructed with an engineered liner system capable of preventing landfill liquids from migrating into groundwater, in addition to implementing the groundwater and gas monitoring, financial assurance, and more stringent operational requirements.

From a regulatory standpoint, the "open dump" had been dumped. So long dump, it’s been good to know you!