

**Leticia Nocko**

**- My experience doing an internship in the waste industry -**

For years I have been involved in research projects related to municipal solid waste (MSW) landfills, either studying alternative final covers or the variation of settlement rates during the biodegradation process. And if there is something I have learned well is that working with MSW is complex. It is a heterogeneous material which, in landfills, presents variations in space and time of its composition, degree of saturation, density, temperature, decomposition rate – and consequently gas, liquids and heat generation rates. As if that was not enough, climate conditions can affect most of these factors directly, changing how we deal with waste from place to place.

During my internship at Republic Services it was not different. While trying to simulate heat extraction from elevated temperature landfills using borehole heat exchangers (BHE), I quickly learned that it would not be a simple task. The heat generation rate is a variable that is as changeable as it is important. So are properties as thermal conductivity and volumetric heat capacity, for which wide ranges of values can be found in the literature. But in nine weeks of internship, we could look not only at the influence different arrays of BHE have on the profile of temperatures of a MSW cell, but also at how the maximum temperature reached in a cell might vary with waste placement rate, thickness of the waste layer and type of waste received by the landfill.

What I didn't expect to find, though, was an equally complexity within the company. Not just in the Engineering department, which is already responsible for engineering field operations, special waste management, gas extraction, wastewater treatment, and environment compliance, in active and closed landfills. But in the short time I worked in the headquarters of Republic, I watched presentations from different departments of the corporation and got a glimpse of how it is structured, from legal to operations, passing by business transformation, marketing, human resources, information technology, procurement, finances, safety. While visiting a landfill near Phoenix, I learned about the differences in compliance between Arizona and California, where I do my PhD, and noticed differences between the US and Brazil, my country of origin and where I got my Engineering and master's degrees. In a tour of a material recovery facility, I saw how the waste is sorted before recycling and we discussed the new challenges the industry is facing with the recent change in China's waste import policy. I also had the chance to ride along truck drivers and experience a few hours on what I think is the most fundamental activity of the waste industry – and it is a tough one! It is impressive the amount of work and effort there is behind those small waste bins in the corner of our offices and houses.

For me, the internship with the waste industry was a very positive experience and I strongly recommend it to those who are looking into working with solid waste. It taught me some of the main challenges of the industry, and it is helping me to put my research into a better context and focus it on the industry needs. Because in the end, that same complexity that makes this field challenging is also what makes it fascinating.