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## Green Chemistry Project

by William Jasen Mummert

(Chemistry 1105)

In today's fast paced, get it now world, where everything is done out of convenience and cost efficiency, it seems that most of us just believe that the world will continue to rotate and give us whatever we need with little thought as to how our actions affect the planet that we live on. This planet is, even by astronomical or cosmic terms, extremely unique. The fact we even exist is almost an anomaly in itself, considering our sun's prime location in the Milky Way and Earth's proximity to that sun, a combination that famous physicist Neil deGrasse Tyson calls "The Goldilocks Zone."<sup>1</sup> Earth also benefits from an abnormally large moon which stabilizes its rotation and thus gives stability to our weather patterns and seasonal changes. Add to that the noble chemical content and pressure of our atmosphere, tectonic plating, a strong magnetic field, and of course the water that is so vital to every living thing on the planet. Water itself is so incredibly unique, acting as an acid to bases, as a base to acids, having appropriate polarity and the very unique property of losing density as it becomes a frozen solid, enabling it to float on its liquid form, which keeps all of the usable fresh water on the planet from eventually sinking below the liquid, which then would freeze, and so on. Because of the delicacy of this circle of life, it is important that we be responsible with what we have been charged with, while still being able to fulfill our human desire to live in a civilized and modern world and reach our personal and sociological goals. This relatively new line of thinking is called "The Green Initiative" or "going green," which basically means consuming products and living a lifestyle that uses as many renewable and sustainable sources as possible and lowering the carbon-footprint that is raging out of control, especially in modern Western society.<sup>2</sup>

The problem with "being green" is the cost associated with organic or clean processes when compared with more engrained and traditional methods of production which end up causing unwanted effects on our planet. People in modern society are, by nature, extremely selfish and don't always think about how things end up affecting future generations, so long as they "look out for Number One." However, one company that has been relatively successful despite an economic disadvantage is Seventh Generation, Inc., a manufacturer and supplier of green products ranging from dish soap to diapers to facial cloths.<sup>3</sup> Founded in 1988 in Burlington, Virginia, Seventh Generation's corporate goal is to reduce the amount of natural resources that they consume in the manufacturing process and to strive to keep the products themselves organic, so that they break down more easily and release less harmful chemicals into nature, most notably phosphates and chlorine.<sup>4</sup>

Seventh Generation, gets its name from an old American Indian proverb, namely the Great Law of the Haudenosaunee (the Iroquois Confederacy), which says that "In our every deliberation,

<sup>1</sup> Albo M. An Environmental Cleanup in Every Aisle. New York Times [serial online]. April 9, 2009:4. Available from: Academic Search Premier, Ipswich MA. Accessed May 4, 2013.

<sup>2</sup> <http://www.happi.com/articles/2010/07/42-seventh-generation>

<sup>3</sup> Wong E. Seventh Generation Asks Bloggers to Lay It on the Line. Brandweek [serial online]. June 28, 2010; 51(26):26. Available from: Academic Search Premier, Ipswich, MA. Accessed May 4, 2013.

<sup>4</sup> <http://www.seventhgeneration.com/responsibility>

we must consider the impact of our decisions on the next seven generations.”<sup>5</sup> 7G has been awarded for its efforts many times over the years, generally by organizations that promote such Earth Friendly ideas. For example, in 2007 7G was awarded with The Association for Sustainability’s top award, and also was named one of the Top 10 Responsible Brands in America 2004, where they finished as the 7th most responsible brand in America by the College Explorer study sponsored by Alloy Media & Marketing.<sup>6</sup> According to the corporate website, in 2011 7G use by consumers saved 77,000 full growth trees, 28,000,000 gallons of water, and 203,000 cubic feet of landfill while preventing 35,000 pounds of chlorine being released into our water supply.

As is customary with most Earth-friendly products, Seventh Generations products cost more than their traditional rivals. For example, at Target as of May 2013, a 252 count box of 7G’s Free & Clear Baby Wipes cost \$9.99, while the long trusted Pampers Hypoallergenic Perfume Free wipes cost \$199 for a 440 count box, over 40% less per wipe, and Up & Up, Target’s house/generic brand, cost only \$12.99 for 792 wipes, well under half the cost.<sup>7</sup> Despite this, they remain one of the most profitable companies around today, in fact in 2010, the company claimed to have \$150 Million in annual revenue and in 2009 they were Vermont’s second most profitable company.<sup>8</sup>

But how green are they? For this paper, we will look at two of the company’s top products, their laundry soaps and diapers. According to the eco-friendly site SmartKlean, 7G uses chemicals such as Sodium Lauryl Sulfate in many of their products including dish-washing liquids, hand soaps, disinfectants and laundry detergents, including their baby laundry detergent.

SLS, which is used as a foaming agent, penetrates the skin and its health hazards include reproductive and developmental toxicity, tissue damage that could result in chronic liver, brain, heart, lung damage and may include cancer. SLS has been found in the tissue of these organs so we know it accumulates in the body. SLS also can cause eye damage, affect the immune system and irritate the skin. It has also been shown to cause eczema, and if ingested can lead to damage to tissues in the mouth, ulcers in the mouth and gum disease. Using shampoo with SLS can cause dandruff and hair loss. In fact, the Environment Canada Domestic Substance List classifies SLS as expected to be toxic or harmful, and as a medium human health priority. Not exactly what one would expect from a company that cloaks itself as being environmentally safe.<sup>9</sup>

As far as diapers, 7G’s Free & Clear diapers are marketed as being chlorine free and biodegradable. However, the corporate website says that the light brown texture is not due to the “natural” color, but rather they use brown pigments to help distinguish Seventh Generation Chlorine Free Diapers from others in the marketplace that are bleached with chlorine-containing substances as we aim to offer an alternative that is not bleached with chemicals containing chlorine, and are working hard to further improve the sustainability of our diaper products.” According to the USDA, the brown coloring is made with pigments that cause no known harm or effects. It also may be surprising that 7G’s diapers are not biodegradable, but the process of making them has significantly less of an impact on the earth than ordinary disposables.<sup>10</sup> It has been shown that the materials used in 7G’s Free & Clear Diapers is far better for infants in avoiding diaper rash and other skin irritations because of its lack of chlorine and use of cleaner virgin fibers which have not been

<sup>5</sup> <http://www.gobehindthebrand.com/Behind-the-Brand-Seventh-Generation-Jeffrey-Hollender-Founder/.UYWQW7WsiSo>

<sup>6</sup> Alliance for Sustainability - Previous Events: First Annual Sustainability Awards

<sup>7</sup> [Target.com/baby\\_wipes\\_sales\\_circular](http://Target.com/baby_wipes_sales_circular)

<sup>8</sup> [fastcompany.com](http://fastcompany.com), "Profits with Purpose: Seventh Generation". Accessed May 4, 2013.

<sup>9</sup> <http://smartklean.wordpress.com/2011/04/29/seventh-generation-method-and-ecover-not-so-safe-after-all/>

<sup>10</sup> <http://www.hormonal-imbalances.com/2010/08/seventh-generation-diaperswipes-review/>

processed thru traditional means. This makes sense when you think about it, for example when one leaves a pool, they wash off the chlorine. Add to that when a diaper is treated in chlorine to make it white, and a child later urinates into the diaper, it can release the chlorine and often times react with it. When a diaper is left on for a number of hours, it can lead to diaper rash or other skin irritations much quicker than 7G's diapers which do not have any chlorine treatment and are made with post-consumer recycled paper and fibers which are cleaned and treated naturally.<sup>11</sup>

While the diapers seem to make the grade, the question remains whether or not the soap does. One may have the thought that just because something is eco-friendly does not directly correlate to being safe for human beings. However when compared to Tide or Cheer, the Center for Disease Control released a statement in 2012 after analyzing 1,000 reported cases in which children were exposed to any kind of laundry detergent and found those who got their hands (and often their mouths) on the concentrated packets were more likely to vomit, choke, cough and become lethargic than those exposed to other kinds of detergent. The cases were first reported in the spring but experts still don't know why the detergent packets make kids so sick, although carcinogens and phosphates which are not used in 7G's product are thought to be the primary cause.<sup>12</sup>

In closing, it is clear that Seventh Generation is trying, and that they are steadily although slowly earning the trust of the American consumer. That being said, they still have a long way to go, as is also true with much of the relatively new 'green chemistry,' 'green science' and 'green engineering' methods that are beginning to inundate us day to day due to their being supported by agenda-seeking political lobbyists as well as other organizations. For now, the best advice is to read the labels, do the research and to make the best decision and most responsible decision not only for our planet, but for our human health, for now, as well as, as Seventh Generations' motto says, "...for the next seven generations." As science and chemistry will most certainly continue to test and try to improve in a number of different areas that are necessary to make the switch to affordable sustainable resources, time will tell if we as stewards of our planet are taking the appropriate actions on its behalf and to gradually as a society make a needed change our "me first" psychological behavior.

<sup>11</sup> Start 'Em Young. Sierra [serial online]. May 2009; 94(3):14. Available from: Academic Search Premier, Ipswich, MA. Accessed May 4, 2013.

<sup>12</sup> <http://www.usatoday.com/story/news/nation/2012/10/19/cdc-warns-laundry-detergent-pods-uncrustable-recall/1643467/>