The Secret Life of A Cola

The Oklahoma Department of Environmental Quality is encouraging citizens to think about all the consequences of their consumption through the proclamation of the third Use Less Stuff Week April 19-26, 2003. DEQ has provided a series of articles such as this one based on the book, Stuff--The Secret Lives of Everyday Things by John C. Ryan. When speaking at the Oklahoma Association for Environmental Education's EE Expo in February of last year, Ryan told the crowd, "Confronting resource consumption is North Americans' principal environmental challenge, although few realize this fact because impacts of consumption are mostly invisible to the consumer. The United States, with less than 5 percent of world population, consumes 24 percent of the world's energy and similar shares of other commodities."

This article outlines the "ecological wake" of cola (aka soda pop). Americans drink more water carbonated in soda than they drink plain from the tap. The world drinks about 70 million gallons of soda every day. Following are the resources used to get you that can of pop.

Corn Syrup. The cola contained high-fructose corn syrup from Iowa, a state where even the rain usually contains traces of pesticides. A milling plant used water, enzymes, acids, heat, grinders, and centrifuges to turn corn kernels into starch and then corn syrup. Making syrup is the second largest use of corn in North America; feeding livestock is the largest. On average, Americans consume 48 pounds of corn syrup a year.

To make your cola, the bottling plant combined corn syrup, citric acid, and flavor concentrate (a secret recipe containing flavors, preservatives, caffeine, and artificial coloring) first with water and then with carbon dioxide. The same corn-milling plant in Iowa fermented corn to make the carbon dioxide. The caffeine was a by-product of making decaffeinated coffee.

Bauxite. Your last cola was in an aluminum can weighing 15 grams (about half an ounce). Five grams was recycled from melted-down cans and scrap. The other 10 grams began as 40 grams of bauxite ore in the Australian outback. Massive machines with 15-foot-high tires and shovels big enough to scoop up a car, strip-mined the ore from a thin layer of underground rock. Bauxite mining destroys more surface area than mining of any other ore.

Near the mine, the bauxite was crushed, washed, dried, pulverized, mixed with caustic soda from California, heated, pressurized, settled, filtered, and roasted with calcium oxide from Japan. Forty grams of bauxite yielded 20 grams of the aluminum oxide powder known as alumina, which looks like wet sugar crystals. Most of the caustic soda was captured for reuse. The process also created 16 grams of “red mud”, a skin-burning mixture of oxidized metals and other contaminants. Pipes siphoned the mud to a settling pond, where a fraction of it leached into groundwater.

A Korean freighter hauled the alumina across the Pacific Ocean to the wall of breakers at the Columbia River bar, the four-mile-wide river mouth that Lewis and Clark called “that seven-shouldered horror.” The ship’s captain used sonar and satellite linkups to plot his course through the bar’s chaotic waves and shifting sands. He motored between the two-mile-long jetties. He entered the deep channel dredged into the Columbia’s shallow estuary by the Army Corps of Engineers. Jetties, dikes, and dredges have washed away or filled in two-thirds of the river’s tidal marshes. Tidal marshes and other estuary habitats are nurse beds for aquatic life, sheltering young fish, birds, and many other animals.

Despite all the electronic gadgetry and all the effort to tame the river, the bar--where the misnamed Pacific Ocean and the biggest river on the west coast of the Americas pound against each other--remained the most dangerous part of the freighter's 24-day journey. Once past the entrance, it was smooth sailing upriver toward the aluminum smelter in eastern Washington.

Smelting. The smelter dissolved the aluminum oxide in giant steel pots filled with a bath of cryolite (sodium aluminum fluoride). Carbon electrodes (made from Alaskan petroleum) were lowered into the pots and delivered a massive 100,000-amp jolt of electricity. The powerful charge broke oxygen atoms away from the aluminum and attached them to the carbon, forming carbon dioxide. Small amounts of fluorine attached to the carbon and escaped the smelter in the form of perfluorocarbons (PFCs)-greenhouse gases that trap thousands of times more heat per molecule than carbon dioxide. Few processes are as damaging to the global climate as aluminum smelting.

Electricity. The smelter ran on purchased hydropower 24 hours a day. The smelter bought the electricity at discount rates from the Bonneville Power Administration (BPA), the Pacific Northwest's main provider of electricity. BPA markets power from 29 federal dams and a nuclear power plant. Eight of these dams along the main stems of the Columbia and Snake Rivers annually kill millions of young salmon heading to the Pacific. Dams, damaged stream habitats, hatcheries, and overfishing have eliminated more than 97 percent of wild salmon in the Columbia Basin.

Aluminum smelters use almost one-fifth of the electricity sold by BPA, but the eight aluminum smelters in Oregon and Washington provide only about 7,500 jobs--one-tenth of 1 percent of the regional total. The same smelters drink up to 16 percent of all electricity used in the two states-more than the million residents of Portland and Seattle combined. The average household served by BPA pays about $2 per month extra to subsidize the smelters.

Can. The smelters' end products--giant slabs, or ingots, of aluminum--were trucked to the Seattle area. There, a mill pressed each thick ingot into a thin rolled sheet of aluminum. Then, at another factory, a high-powered press punched cups resembling tuna cans out of the aluminum sheet. Other machines stretched your can out to its final height, trimmed its edge, printed its colorful design, and applied a clear protective varnish. Ovens baked the can twice, once to dry the printing and once to cure a synthetic coating sprayed on the inside of the can. At the bottling plant, machines filled the can with near-freezing soda and immediately crimped the top on. The can cost more than the soda inside.If you threw your cola can into a recycling bin, it was one of 100 billion beverage cans used each year in the United States; 40 billon are tossed into landfills, and 60 billion are recycled. Your can was later trucked to a recycling center, shredded, and melted down. Within two months of being tossed, it reappeared as a new can. Recycling the can took 5 percent of the energy required to mine and smelt a fresh one.

What to Do? Drink less soda. It's just fizzy sugar water. Have some water instead.