Chapter A: Definition of Needs and Requirements

About 7 percent of the earth’s crust is aluminum, which makes it one of the most abundant elements in the world. First aluminum starts off as a mineral Bauxite that is located close to the surface. Bauxite contains 45-60 percent aluminum. Bauxite is mainly mined from Jamaica, Brazil, Guinea, India, China, and Australia. After the Bauxite is mined it is transported to a processing plant where the Bauxite is washed and separated from the clay. The three biggest processing companies for aluminum is United Co. Rusal, Rio Tinto Group, and Alcoa Inc. The clay is then shipped out to a tailing pond for replanting. Once the bauxite gets washed and separated from the clay, aluminum is manufactured by making the bauxite go through two phases. The first phase is the payer process which refines the bauxite ore to obtain aluminum oxide. The second phase is the Hall-Heroul process of smelting that takes the aluminum oxide and releases pure aluminum. After the pure aluminum is produced, many products are then formed with the help of aluminum. Some examples are, laptops, benches, cans, foil, baseball bats, auto parts, and faucets.
One Penn State University Park system that uses aluminum, is the Beaver Stadium. The thousands of benches in the stadium are made of aluminum and used by tens of thousands of Penn State students each year. These benches bend and twist while hundreds of students stand on them for hours on end, this can cause them to break. The life cycle of this aluminum starts with the aluminum being mined, refined, and smelted. It is then cast into a bench and sold to consumers, like Penn State University. Penn State University then installs them into the stadium for the students and fans. When these benches break they are replaced by new benches and the old ones are recycled. When they are recycled they are reused so the life cycle remains sustainable.

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