ALCOA, INC.

DAVENPORT

MONICA HEMINGWAY
CHEMICAL ENGINEERING
THE UNIVERSITY OF IOWA

COMPANY PROFILE
Alcoa, Inc. has been a global leader in the aluminum industry since 1888 and currently has locations in 30 countries around the world. The Davenport facility opened in 1948 and currently employs more than 2,500 people. Alcoa supplies aluminum and aluminum alloys to various industries including food packaging, air travel, automotive transportation, and space exploration. The company supports numerous programs dedicated to preserving and benefiting the environment, such as the *10 Million Trees Initiative*, in which Alcoa aims to plant 10 million trees worldwide by the year 2020.

PROJECT BACKGROUND
All waste streams collected throughout the Davenport facility were comingled and re-separated at a waste processing facility which is a time intensive process. This objective of this project was to establish an effective of point-of-generation collection system to improve the efficiency of solid waste segregation and handling processes. A point-of-generation sorting system will streamline the waste handling process and improve the efficiency of separating recyclable materials from the waste stream at inception rather than downstream.

INCENTIVES TO CHANGE
Alcoa is committed to environmental stewardship and community initiatives. The company has set an environmental goal to be landfill free at the Davenport plant by the year 2030. This year's P2 intern project will move them closer to that goal by introducing a process modification that could allow more recyclable material to be recovered in the production area and reduce the amount of production waste going to the landfill. The process modification is expected to improve the overall efficiency of waste handling procedures. Decreasing the amount of waste going to landfills has numerous environmental benefits, including the ability to save landfill space, conserve energy by promoting recycling rather than creation of new materials, and decrease total emissions of pollutants into the environment. There is also a cost savings associated with diverting wastes from the landfill.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
MATERIAL HANDLING PROCESS IMPROVEMENTS (IPS & FLAT)	$16,855	832 tons	IN PROGRESS
MATERIAL HANDLING PROCESS IMPROVEMENTS (PLANT WIDE)	$22,500	1,875 tons	RECOMMENDED

RESULTS
Initially, five equipment options were investigated to pursue in this project. Four of the five options involved various scenarios of purchasing an industrial dual-shaft shredder, baler, and forklift. The fifth option only accounted for purchasing the bins for the sorting system. These options were run through a Complete Cost Analysis Calculator created in Excel. After taking into account operation and production parameters, Option 5 was the optimum solution for the project's 10 year lifetime.

Material Handling Process Improvements (IPS & Flat): A waste profile was generated for two departments in Alcoa's Davenport Works facility, IPS and Flat. These departments will act as a pilot, with the idea that any recommendations implemented can be tested and later rolled out plant-wide. The creation of the waste profile illustrated inefficiencies in capturing recyclable materials through the current waste handling process. For example, a considerable amount of cardboard, paper, and wood had been sent to the landfill rather than to a contracted recycler. Utilizing this information, a sorting system was developed to separate the waste streams into categories relating to their composition. This system allows for complete segregation of fiber streams from polymer streams, and ensures that all currently recycled streams do indeed end up at the recycler rather than the landfill.

To make up the system, bins were set up for segregation of the waste at the point of generation instead of being sent to the waste processing facility. The bins for this project were designed to stand in half the footprint of the existing bins to allow for separation of multiple waste streams within the same area. An education system was created to get all production floor and trucking employees on the same page. The education materials include factoids about the environmental impact as a result of following the sorting system, the immediate results in terms of increased sorting efficiency felt within the Davenport Works facility, and advancement towards Alcoa's corporate zero-landfill goal by 2030.

Material Handling Process Improvements (Plant Wide): It is recommended that the two departments participating in the pilot continue to utilize the point-of-generation sorting system for a minimum period of one year. A one-year test phase will allow the facility to identify challenges throughout the year and make adjustments to overcome the challenges. At the end of one year, the EHS team of the Davenport Works facility would then order additional bins to replicate the improved point-of-generation sorting system throughout the entire facility. Proper implementation and management of this process modification would drastically boost the facility towards the corporate goal of certified landfill-free status by the year 2030.