SMITHFIELD SIOUX CITY

EMILY MEERDINK
ENVIRONMENTAL ENGINEERING
SOUTH DAKOTA STATE UNIVERSITY

COMPANY PROFILE

Smithfield is a global company founded in 1936 in Smithfield, Virginia. The company has grown to employ 52,000 people and leads the nation in pork processing and packaged meats. The Sioux City, Iowa, plant is part of Smithfield's packaged meats division. Smithfield Sioux City (Smithfield) has 673 employees and is capable of producing more than 270 different products. The Smithfield plant originally operated as Curly's and has its origins in selling specialty cut ribs. Smithfield still specializes in barbeque meats and precooked ribs.

PROJECT BACKGROUND

The project goal was to improve grease recovery from Smithfield's wastewater. On-site storage and increasing the volume of collected grease were priorities. The secondary project was to identify opportunities to reduce waste going to the landfill with a specific emphasis on the plastic waste stream. Concerns included plastic with meat or sauce residue. These waste streams are largely undesirable to recycling companies due to their contamination.

INCENTIVES TO CHANGE

Smithfield is committed to continuous improvement and its responsibility to the community as well as the environment. Smithfield maintains a grease pit as part of their wastewater system and previously ran a rope skimmer to collect grease. Incentives to resume and improve grease recovery include potential financial gains and ease of cleaning the grease pit. Smithfield has a goal of zero-waste to landfill by 2020. This is a corporate goal and will meet Smithfield's sustainability requirements.

RESULTS

Surface Sludge Scraper: A surface sludge scraper would provide effective grease removal from the on-site grease pit. This type of equipment is recommended due to limitations incurred by Smithfield's current infrastructure and grease characteristics that make other recovery systems infeasible. Currently, the pit is cleaned weekly and the removed solids are landfilled. An effective collection process could enable the grease to be sold to a local rendering company for reuse.

To fully implement this recommendation, Smithfield would also need appropriate on-site storage for the grease. For effective and efficient containment, a double-walled storage tank that is heated and insulated was recommended. The tank must be heated so the grease can be pumped. A tank designed with a cone bottom is recommended to decant water. Improved recovery and sale of the grease for reuse could yield annual revenue of approximately $38,770 and divert 5.4 tons from the landfill.

Dry Cleaning: Observations were made while working in the grease pit that indicated an opportunity for improving dry clean-up procedures. Whole meat scraps in the wastewater contribute to the total suspended solids of the effluent. Additionally, other solid items make pit clean-out more challenging. Specific process areas were identified by the intern for Smithfield to target for improved dry clean-up practices. Economic benefits of improving dry clean-up include reduced effluent surcharges and decreased pit cleaning frequency. Improved dry clean-up would also result in reduced waste to landfill, as captured solids could be used by a local rendering vendor.

Wood Ash Reuse: Smithfield produces wood ash from its smokehouses and currently landfills the ash. Wood ash can be used as a soil amendment as it contains lime and potassium as well as other nutrients. Potential beneficial use outlets for composting or land application were identified, but continued exploration is required. In addition to acquiring an end user, the material should be tested for nutrient content and various compositional characteristics. By donating its wood ash to a beneficial use, Smithfield will be contributing to the local community, diverting 31 tons of waste from the landfill each year, and saving $5,700 annually.

Contaminated LDPE: A local recycling company will take Smithfield's clean LDPE plastic free of charge, but a significant percentage of the LDPE waste generated at the Sioux City plant is considered contaminated due to a meat or sauce residue. This residue can interfere with the recycling process so there are limited options for vendors in Smithfield Sioux City's geographical area that will accept contaminated plastic for recycling. A non-local company was identified that would accept contaminated plastic; however, Smithfield Sioux City does not produce a large enough volume to sustain the increased transportation costs. Collaborating with other nearby Smithfield plants to group shipments of LDPE plastic could provide a cost effective strategy for diverting this waste stream from the landfill.

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
SURFACE SLUDGE SCRAPER & STORAGE TANK	$38,770	5.4 tons	RECOMMENDED
DRY CLEANING	-	-	RECOMMENDED
GREASE RECOVERY ANALYSIS	$10,800 (one time)	-	IMPLEMENTED
WOOD ASH REUSE	$5,700	31 tons	RECOMMENDED
CONTAMINATED LDPE	-	155 tons	RECOMMENDED
LANDFILL REDUCTION ANALYSIS	$12,600 (one time)	-	IMPLEMENTED