ALUMINUM

Project Fact Sheet

RECYCLING OF ALUMINUM DROSS/SALTCAKE

BENEFITS

- Annual energy savings exceeding 19 trillion Btu if 80 percent of current aluminum black dross/salt cake landfill waste is processed
- 1.6 billion pound waste reduction per year through diversion of that 80 percent of saltcake from landfills
- 50 percent reduction in CO_2 emissions from energy use
- Greenhouse gas emission reductions exceeding 1 million tons per year at an 80 percent utilization level

APPLICATIONS

- Provides complete closed-loop recycling of secondary aluminum black dross/saltcake waste streams
- Steel-making slag products and ceramic fiber feedstock developed from waste material

MANUFACTURING CERAMIC PRODUCTS FROM RECYCLED ALUMINUM WASTE SUBSTANTIALLY REDUCES LANDFILLING

Approximately 2 billion pounds of aluminum dross and saltcake materials are landfilled annually in the United States. In conventional aluminum recycling, dross processors simply break down the black dross to recover only the largest pieces of aluminum, which typically constitute 3 to 10 percent of the dross. The remaining 90+ percent of the dross, still containing some aluminum plus the salt and non-metallic portion (NMP, which is predominantly metal oxides and other compounds) is then landfilled.

ALUMITECH Inc., in conjunction with the Ohio Department of Development, used NICE^3 funding for the construction and start-up of a commercial facility for closed-loop aluminum dross/saltcake processing. Effective closed-loop processing requires a universal "front-end" process for making the NMP amenable to further processing into end-use products for different market applications and multiple "back-end" final product lines designed for specific NMP products. The new commercial facility consists of both. The "front-end" system developed by ALUMITECH is capable of processing approximately 240 million pounds of dross or more per year, recovering approximately 15 million pounds of aluminum and 158 million pounds of NMP that would otherwise be landfilled. If 80 percent of the 2 billion pounds of dross currently discarded were processed rather than landfilled, the total annual energy savings expected to result from this recycling and waste recovery process would exceed 19 trillion Btu.

RECYCLING AND WASTE RECOVERY

The aluminum recycling industry landfills approximately 2 billion pounds of black dross and saltcake each year. ALUMITECH, Inc.'s, closed-loop recycling system recovers aluminum and non-metallic materials from that waste stream and converts them into feedstocks and products.

Project Description

The objective of the project is to commercialize the process technology to eliminate all landfill waste associated with black dross and saltcake generated from aluminum recycling in the United States.

Goals:

- Construct a commercial facility to process dross/saltcake that can closed-loop recycle the NMP by utilizing it as a raw material for manufacturing useful industrial products. The NICE^3 -funded project includes 1) a universal process facility to produce a semi-finished NMP amenable for conversion to a final product, and 2) a final product facility with a processing line capable of converting semi-finished NMP to saleable products with significant market potential.
- Successfully commercialize the process of converting aluminum waste by-products into commercially viable, profitable products through successful production of bulk tonnage with customer acceptance and continued demand.

The primary scope of the project involved the design, construction, and start-up of the new universal process facility for preparing NMP for subsequent use. The second phase of the project involves commercialization of a "back-end" product line for manufacturing fiber feedstock and multiple products for the steel industry, such as engineered refining slag, alumina additives, and deoxidation products. Although salt processing is not part of the NICE^3 scope, the universal process facility was designed to facilitate flexibility for modifications to serve as the first stage of brine processing in salt recovery.

Progress and Milestones

Both the front-end facility and back-end final production line were brought on-line in September 1997. Through December 1997 the back-end production line manufactured roughly 300 tons of calcium aluminate engineered ceramic slag, which was sold for evaluation in full-scale steel-making trials. The trial results generated market acceptance to the extent that demand for the product outstripped production capabilities. As a result, ALUMITECH designated all of the NMP generated at the front end for production of calcium aluminate engineered slag. Based on this success, a new facility with four times the capacity was fully funded and constructed by ALUMITECH. This system began operating in August 1998.

ALUMITECH recognizes that more potential applications and markets can be developed for NMP. Development of a second level semi-finishing process for further modifying the NMP is necessary for that purpose. ALUMITECH is actively identifying additional end-use products and developing secondary processing lines based on market demand.

Industry of the Future—Aluminum

Through OIT's Industries of the Future initiative, the Aluminum Association, Inc., on behalf of the aluminum industry, has partnered with the U.S. Department of Energy (DOE) to spur technological innovations that will reduce energy consumption, pollution, and production costs. In March 1996, the industry outlined its vision for maintaining and building its competitive position in the world market in the document, ***Aluminum Industry: Industry/Government Partnerships for the Future****.*

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NICE3—National Industrial Competitiveness through Energy, Environment and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies.Total project cost for a single award must be cost-shared at a minimum of 50% by a combination of state and industrial partner dollars. The DOE share for each award shall not exceed $400,000 to the industrial partner and up to $25,000 to the sponsoring state agency for a maximum of $425,000. Each award may cover a project period of up to three years.

Project Partners

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Washington, DC

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Ohio Department of Development
Office of Energy Efficiency
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