Inventions & Innovation Project Abstract

Advanced Process Heater for the Steel, Aluminum, and Chemical Industries of the Future

STORM Development, LLC will work with Penn State University's Applied Research and Design Center (ARDC), and Spinworks, LLC to continue the development of the Advanced Process Heater (APH). This team will be the first to combine the most advanced radiant tube heat transfer components in one high performance package for industries requiring high performance heating (e.g. Steel, Aluminum, & Petroleum).

The primary goal of this development phase will be to design, manufacture and test a commercial APH prototype by integrating three components: (1) Helical Heat Exchanger, (2) Shared Wall Radiant U-tube, and (3) Helical Flame Stabilization Element. This goal will be accomplished using a near net shape powder ceramic Si-SiC low cost forming process.

STORM's previous I&I award entitled "Proof of Concept of an Advanced Process Heater (APH) for Steel, Aluminum, and Petroleum Industries of the Future" met the technical feasibility goals of: (1) doubling the heat transfer rates (2) improving thermal efficiencies by 20%, (3) improving temperature uniformity by 100 ^{o}F and (4) simultaneously reducing NO_x and CO_2 emissions. The APH addresses EERE's primary mission of increasing efficiency/reducing fuel usage in energy intensive industries. Once fully commercialized, the APH energy savings potential is 339 trillion BTUs annually in the U.S. with the ability to process 1.5 million tons of product annually without major capital equipment expenditures.

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