

## **Development and Field Trial of an Advanced Indirect Heating System for Metal heat Treating Applications.**

Through this project, the partnering team is jointly proposing to finalize development and demonstration of a novel industrial indirect heating concept at the Ohio-based heat treating facility. This technology will provide energy, environmental and economic benefits to the end-user in ferrous heat treating applications.

Total project cost: \$764,780

Funding request: \$342,080

Project Lead: Ohio Department of Development

Project Participants: GTI Sustaining Membership Program, Akron Steel Treating Company, North American Manufacturing Company, University of Texas at Austin, Energy Solutions Center.

Start Date: June 1, 2006

End Date: December 1, 2007

### Presentations/Publications

A presentation regarding this project was made to the Technical Guidance Committee (TGC) of the Sustaining Membership Program (SMP) on August 10, 2006 at GTI Headquarters.

### Patents

None.

### Progress in Past Quarter and Current Status

*\*\*All attachments referenced in this report are available upon request.*

Activities performed during the reporting period

- Project contractually initiated in July 2006 with a period of performance from July 1, 2006 to December 31, 2007.
- Project Kick-off meeting August 2, 2006
- Task 1 work was initiated

### *Kickoff Meeting*

A kickoff meeting was held on August 2, 2006 at Akron Steel Treating Co. (Akron, Ohio) and the key elements of the project were reviewed. A site walk down followed the meeting allowing the partners to observe the target demonstration heat treat furnace and discuss project logistics. (See Attachment No.1)

In addition, GTI maintained phone contact with Akron Steel Treating to ensure that the design specifications for the furnace retrofit are complete. Some forward planning was also done to prepare for the baseline tests.

### *Task 1: Optimization and Finalization of the AIHS*

- a. Engineer and fabricate a pre-prototype AIHS
- b. Install the AIHS in GTI's full-scale heat treat furnace
- c. Test and evaluate AIHS performance
- d. Further modify and retest until design is finalized

*Current Milestone and Status related to Task 1- Alternative AIHS designs evaluated; highest potential design selected - Pending (See Attachment No. 2)*

*Task 2: Field Trial*

- a. Host site to determine field trial specifications
- b. Install on-site instrumentation package to record baseline data
- c. Fabricated prototype AIH Systems (estimate: 4 to 6)
- d. Remove existing radiant tubes and retrofit with AIH Systems
- e. Monitor heat treating operation and accumulate necessary data
- f. Evaluate results and prepare a final draft technical report
- a. Host site evaluation and field trial specifications

Working out the logistics for the eventual field trial was initiated. Although no major activity was scheduled for Task 2 during this quarter, these logistics arrangements are necessary to the field trial's success and are therefore documented in this quarterly report. During the kickoff meeting, information for furnace retrofit was collected, and a brief discussion was held on the strategy for capturing representative information of the process. Three to four weeks will be required for a retrofit (some fabrication can be done in advance).

In summary a computer model of the RASERT burner and heat exchanger inside of the radiant tube has been run, and troubleshooting is underway to finalize a working model.

Plans for Next Quarter:

Per Task 1: Computer modeling is projected to be completed. Simulations using this model and altered models will identify a number of candidate design changes that will be reviewed and prioritized during the teleconferences. A target design (modification) will be selected for fabrication. Per Task 2: A gas meter will be installed at the Akron Steel Treating Company to collect baseline fuel usage for the existing burners.