

**Final Report Summaries - #12 Projects
As of January 2014**

#12-30 Development of Commercially Viable Metallic Nanoparticle Filters to Remove Mercury from Coal Fired Power Plant Flue Gas

Kumar Ganesan – Montana Tech – Butte

\$87,163

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Summary

This research focused on evaluating the commercial viability of the metallic nano particle filter by testing in an actual coal fired power plant flue gas. The filter is porous and withstands high temperatures. Used filters saturated with mercury can be heated to regenerate the filter as well as to recover the mercury captured on the ceramics. It also actually removes the mercury from the system and eliminates its potential contamination into the fly ash and waste streams. In addition to reducing the environmental impact of treated flue gas, this removal feature reduces potential long-term liability for companies.

The project performed six tasks: (1) Preparation of bulk metallic nanoparticle filter media; (2) Process optimization and thermal desorption; (3) Field testing; (4) Data analysis; (5) Marketability analysis; and (6) Evaluating the commercialization potential of the mercury filter.

The research indicates the filter has very high commercial viability; however, best success may be achieved by designing the system for treating smaller gas streams than very large flow systems like power plant flue gas streams.

The project has been very successful and has added significant value to the existing knowledge.

Commercialization

The PI is the inventor of the new filter and is a licensed Professional Engineer who has been involved in the research, development and demonstration of air-pollution control devices, including mercury control devices, for over three decades. He is aware of the need to develop the technology as a marketable product. He has been in discussion with University officials for the transfer of the technology to a new company established by the PI. This company will license the technology from the University with the intent to move it toward commercialization. Preferably, it will be manufactured and sold by a Montana company.

- **Product description**

- Ceramic based metallic nanoparticle filters that have been proven to remove mercury from coal-fired power plant flue gas

- **Target market including size**

- The current market is predicted to be \$2.4 to \$3.36 billion in the United States alone. Globally, coal-fired power plants are expected to grow significantly,

especially in China and India and the potential for the mercury technology being exported to these countries is very high.

- **Marketing strategy**
- **Production or manufacturing plan**
- **Business risk assessment**
- **Estimate of sales revenues for five-year period into the future**

Conclusion

This is a viable technology to separate mercury from flue gas. It has been proven to remove mercury from coal-fired power plant flue as at or above 90% efficiency. In addition, the system has the added advantage over current systems in that it is able to recover the captured mercury. The cost for use in large systems is substantial and, therefore, the application may be best for smaller operations. The PI is exploring this avenue to market the filters.