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CORRESPONDENCE CONTROL TICKET

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**AFFILIATION:** WEC

**ADDRESSEE:** Mr. Dennis Spurgeon (DOE)

**SUBJECT:** Informs of new development in the field of nuclear fuel for use in existing and new commercial light water reactors

**ACTION:** Information

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Dyer, NRR

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**Westinghouse**

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May 14, 2007

Mr. Dennis Spurgeon  
Assistant Secretary for Nuclear Energy  
US Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585

Dear Mr. Spurgeon:

We at Westinghouse are pleased with the extraordinary support from this Administration, and the Nation as a whole, for expanding the use of clean nuclear energy in the US, and are ready to do our part in terms of licensing and building new plants, and continuing the excellent safety and economic record of the current plants. We thank you for your personal leadership in support of the expansion of civilian nuclear energy.

The purpose of this letter is to inform you of a new development in the field of nuclear fuel for use in existing and new commercial light water reactors, and to ask that you make available DOE laboratory facilities, including the High Flux Isotope Reactor (HFIR) at ORNL, and associated hot cell facilities, to test this new fuel. This new technology has the potential to dramatically increase the energy derived from LWR fuel. Our objective is to double the energy derived from each fuel assembly, thereby cutting in half the volume of spent fuel that must be reprocessed or emplaced in a repository. A brief description of this advanced fuel is provided in attachment 1. The initial R&D for the new cladding was funded by DOE-NE through NERI and SBIR projects; Westinghouse then provided supplementary funding for clad irradiation in the MIT test reactor; Westinghouse has also funded all R&D on new fuel pellet materials.

We are now beginning the steps needed to commercialize the technology, including acquiring regulatory review, and ultimate approval, from the NRC. Initial operation of advanced fuel lead test assemblies in commercial reactors is targeted in ten years. A critical prerequisite to commercial testing is a combined test of both the new cladding and the new fuel form in the HFIR reactor. That reactor is capable of higher neutron flux, and more tailored fuel performance testing than other reactors in the world, and is particularly well suited for these tests. ORNL staff has been working with us on a collaborative effort, and will be requesting LDRD (Laboratory Directed Research and Development) funding for the initial two years of effort, including design, fabrication and insertion of the experiment in the HFIR, and covering a brief initial exposure period. Westinghouse will be investing in the design, development and fabrication of the advanced fuel test articles. We and ORNL plan to begin the actual testing in HFIR late in FY 2008 or early in FY 2009.

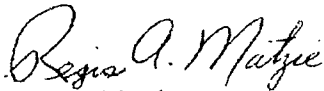
Testing at HFIR beyond FY 2009, including the crucial Post Irradiation Examination (PIE) phase, requires funding from the DOE nuclear energy program. So we are asking that you consider adding a funding component for advanced LWR fuel testing, beginning in your FY 2009 program budget proposal to Congress. For FY 2009, we suggest a \$1 million planning effort for testing of high burnup LWR fuels, possibly as part of the NP 2010 program. We estimate that the funds required beyond FY 2010 would be on the order of \$3 to \$5 million per year over a period of 4 to 5 years. This activity directly supports and expands the current DOE/Industry cost shared program to expand the use of advanced standardized light water reactors.


We are not seeking a special treatment for Westinghouse, or an industry subsidy. We believe similar "testing" support for other advanced fuel testing would be appropriate for other nuclear fuel vendors, should they have advanced fuel technologies that support the DOE's nuclear missions. Should DOE be willing to fund this type of fuel testing program at DOE National Laboratories, Westinghouse envisions providing private sector funding for product development activities.


We would greatly appreciate the opportunity to meet with you and/or your staff in the near future to describe in greater detail the basis for our new advanced fuel technology, and to help make the case for this new initiative on advanced LWR fuels in the DOE FY 2009 nuclear program budget.

We look forward to a favorable reply to this request for an initial meeting, and inclusion of a high burnup fuel planning item in your FY 2009 budget proposal to Congress.

Sincerely,

  
Regis A. Matzie  
Chief Technology Officer  
Westinghouse Electric Company

  
Michael Young  
Fuels Division Chief Engineer  
Westinghouse Fuel Company

  
Lars Hallstadius  
Manager  
Westinghouse Center-of-Excellence  
for Fuels Materials

cc:  
Skip Bowman, President, NEI  
Dale Klein, Chairman, Nuclear Regulatory Commission  
Dana Christensen, Associate Lab Director, Oak Ridge National Laboratory  
Herbert Feinroth, CEO, Ceramic Tubular Products, LLC

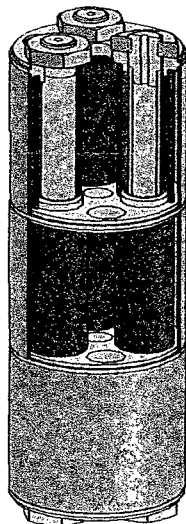
Dennis Miotla, Deputy Assistant Secretary, DOE Office of Nuclear Energy  
Edward Sproat, Director, DOE Office of Civilian Radioactive Waste Management

Attachment to Westinghouse letter to Mr. Dennis Spurgeon Re: Advanced LWR Fuels.

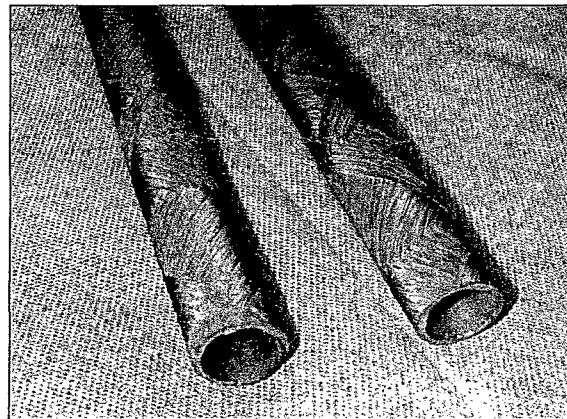
The advanced fuel technology being developed by Westinghouse and CTP is based on a silicon carbide ceramic cladding to replace current Zircaloy cladding, and a uranium nitride fuel pellet to replace the current uranium oxide pellet. Because of its very high temperature tolerance, as compared to current fuels, this new fuel is capable of much higher power density, and at the same time, it reduces the probability and consequences of accidents. Essentially, this new fuel brings passive safety to the heart of the nuclear plant. And because of the higher uranium density in the fuel pellet, and the durability of the silicon carbide in LWR coolant, it can achieve much higher burnup without exceeding current factory enrichment limits of 5% U<sup>235</sup>.

The technology for the new cladding was initially developed as part of DOE's Nuclear Energy Research Initiative (NERI) project 99-0224 awarded to Gamma Engineering Corp. in 1999 for \$465,000. This was followed by several Small Business Innovative Research grants to Gamma Engineering and Ceramic Tubular Products, totaling \$1,198,330. The pictures below show the new silicon carbide cladding, and the new PWR test loop configuration, developed for the MIT test reactor exposure test that is still underway. To supplement the small business funding, which has now expired, Westinghouse has funded the continuation of testing at MIT, where initial results are extremely positive. Westinghouse has also funded all of the development of the uranium nitride (UN) fuel, providing over \$1.5 million for clad testing and UN fuel in the past five years.

MIT Reactor SilCar Test Fixture



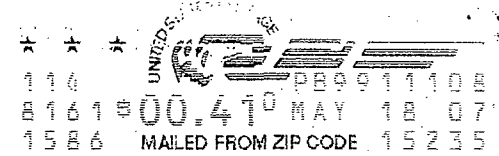
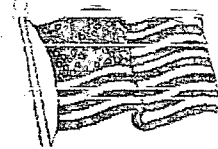
Silicon Carbide Hi-Temp Fuel Cladding





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