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PRATT & WHITNEY AIRCRAFT ENGINES

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CNLM-6092

Contract AT(30-1)-2789

ate January 15, 1965

To Dr. M. A. DeCrescente

From M. S. Freed

Subject Fuel Development Contribution to
Work Statement, FY-1965

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cc: Messrs.
G. U. Parks
L. M. Raring
P. Buco
S. D. Caplow
J. R. Doyle

Classification

1
Group No.

**SPECIAL REVIEW
FINAL
DETERMINATION**

Class: 4

Reviewers	Class.	Date
BBM	4	12-2-81
RRP	4	12-3-81

The major effort of the fuels development program will be concerned with testing of UC and UN fuels under conditions commensurate with the design of 2 Mw(t) SNAP-50/SPUR reactors. An effort will also be pursued to extend the apparent burnup limitations of UC and UN fuels through studies of compositional alloying, dispersion, density, and fuel geometry effects.

A series of experiments to study application of highly-loaded cermet to SNAP-50/SPUR reactors will also be made.

UC and UN fuels will be synthesized, consolidated, inspected and clad to form specimens for 54 inpile capsules and 10 out-of-pile control and spare capsules.

Specimens for eight additional inpile experiments containing UN- or UO_2 -W cermet
will also be fabricated.

Approximately 40 irradiated capsules plus their associated out-of-pile control capsules will be examined. Evaluation of this data will be accomplished and will be integrated into the over-all fuel development program.

Approximately 75 compatibility tests will be conducted on fuels of interest with various refractory metal claddings in appropriate liquid metal coolants.

Developmental testing of compatibility barriers such as tantalum, tungsten and molybdenum will be continued.

Development of vendor capability to produce barrier-lined tubing on a production basis will be continued.

Physical properties measurements will be continued on fuels of interest, including thermal conductivity of UN. Evaluations of other properties such as thermal expansion, thermal stability and fuel strength will be continued at test conditions simulating those of reactor fuel element environment.

Development of synthesis and fabrication techniques will be continued for fuels of interest. Reproducibility of fuel powder composition, particle size and surface area will be improved. Studies of fabrication variables will be continued to improve fuel pellet quality, composition, dimensional reproducibility and ease of fabrication.

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CNLM-6092

Contract AT(30-1)-2789

January 15, 1965

To: Dr. M. A. DeCrescente

Work aimed at understanding irradiation damage mechanisms and at extending operating temperature and burnup limits will be continued for the fuels of interest. Post-irradiation fission gas release studies will be performed on UC and UN.

Approximately 50 points of long-time creep and stress rupture test data will be generated on Cb-1 Zr-0.1 C and Ta-8 W-2 Hf alloys for comparison with Cb-1 Zr alloy data.

Fabrication development for advanced cladding materials such as tungsten alloy tubing will be started.

Inpile fuel test experiments will be improved. Efforts will be made to improve experiment reliability, to minimize cost and to eliminate extraneous variables.

M. S. Freed

MSF:lc

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