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BY *RS Perry* DATE *11/5/91*
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L. M. Raring

Contract AT(30-1)-2789
CNLM-5555
February 25, 1964

J. J. Milich

cc: Messrs.
• E. R. Dytko
• R. W. Kelly
• P. Treciokas
• G. M. Wood
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SNAP-50/SPUR Pump Material Test
Requirements

SPECIAL REREVIEW FINAL DETERMINATION	Reviewers	Class.	Date
Class 4	3BM	4	12-2-81
	TR	4	12-10-81

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Classification

1
Group No.

J. J. Milich
Authorized Classifier

2/25/64
Date

The following material test requirements are based on analytical results from P&WA-CAMEL design efforts and Westinghouse motor design studies, carried out under subcontract. The materials to be evaluated include, D-43, PWC-11, and PWC-33.

It is understood that there are sufficient quantities of PWC-11 and PWC-33 available to permit immediate testing. The D-43 material is scheduled to be on hand April 1, 1964, which would permit initiation of testing early in April.

I. Short Time Tensile Tests

<u>Temperature</u>	<u>Number of Tests/Material</u>
Room Temperature	2
500F	2
1000F	2
1500F	2
2000F	2

The 2000F test point was requested by Metallurgy to aid their extrapolation and evaluation techniques.

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February 25, 1964

II. Creep Tests

<u>Temperature</u>	<u>Stress</u>	<u>Number of Tests/Material</u>
2000F	3000 psi	2
*	*	2

*Second test point to be picked by Metallurgy. This point will be based on the slope of existing 1% creep curve of Cb-1Zr.

III. Stress to Rupture

<u>Temperature</u>	<u>Number of Tests/Material</u>
1600F	1
1800F	1
2000F	1

The above minimum program will permit initiation of preliminary design efforts. There are many other material properties which are required to permit design evaluation by CANEL as well as by the motor subcontractor who will be involved in the design of the pump motor. These are as follows:

- 1) Creep data at 1800 and 2000F for 3000 hours (preliminary strength)
- 2) Yield strength from room temperature to 2200F
- 3) Thermal conductivity
- 4) Thermal expansion
- 5) Modulus of elasticity
- 6) Electrical resistivity
- 7) Hot hardness
- 8) Rubbing compatibility
- 9) Weld studies (E.B. and T.I.G. techniques)
- 10) Rubbing compatibility
- 11) Lithium compatibility of base metals and welds
- 12) Weld transition development
- 13) Compatibility with rotor and stator materials
- 14) Cavitation properties

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In addition, information is required on:

- 1) Outgassing of the rotor and stator
- 2) Lithium permeability of BeO
- 3) Lithium compatibility of BeO-metal braze joint
- 4) A back up material for rotor canning

In order to permit design and analysis, the material properties that are not available will be based on existing Cb-1Zr data. The properties for the three candidate materials must be verified as soon as possible in order to permit continuity and to minimize design changes.

It is suggested that the transfer of material information pertaining to this request be submitted as supplements to CNLM-5555. Any further requests by the Pump and Motor Group will also be as supplements to this memorandum.

J. J. Milich

JJM/jep

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- 1) Outgassing of the rotor and stator
- 2) Lithium permeability of BeO
- 3) Lithium compatibility of BeO-metal braze joint
- 4) A back up material for rotor canning

In order to permit design and analysis, the material properties that are not available will be based on existing Cb-1Zr data. The properties for the three candidate materials must be verified as soon as possible in order to permit continuity and to minimize design changes.

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