Quarterly Management Report

WBS Element	Project Title	Contract Number	Contract Start	Contract End
ORNL-1(A)	Chemically Vapor Deposited YSZ for Thermal and Environmental Barrier Coatings	FEAA028	10/01/82	09/30/04

Performer Name and Address	Principal Investigator(s)
Oak Ridge National Laboratory P. O. Box 2008 Oak Ridge, TN 37831-6063	T. M. Besmann

BUDGET AND COST REPORT

Prior Year Funds [$K]	(1)
Total Current Year Commitment $K]	225
Projected Current Year Costs [$K]	224

	O	N	D	J	F	M	A	M	J	J	A	S
Planned Costs	18	36	54	72	90	108	126	144	162	180	198	224
Actual Costs	15	32	52	77	100	127						
Variance	3	5	2	(5)	(10)	(19)	126	144	162	180	198	224

MILESTONE REPORT

Milestone Designation	Milestone Description	Due Date	Revised Due Date	Completion Date
ORNL-1(A) 1	Sets of nickel-superalloy samples with appropriate bond coats will be coated with YSZ and subject to evaluation.	09/30/03	05/31/04	05/31/04
ORNL-1(A) 2	An open literature publication o n the use of CVD YSZ on turbine blades will be submitted for publication.	03/30/04	05/31/04	05/31/04
ORNL-1(A) 3	Microstructure of the deposited YSZ coating will be optimized through a parametric study.	06/30/04		
ORNL-1(A) 4	An open literature publication will be submitted on the microstructure of CVD YSZ TBCs.	09/30/04		
ORNL-1(A) 5	Utilizing the modeling results of the companion effort at the University of Louisville, a system to uniformly coat a prototypical turbine blade will be designed	03/30/05		
ORNL-1(A) 6	A system to uniformly coat a prototypical turbine blade will be constructed and operated.	09/30/05		

TECHNICAL HIGHLIGHTS

The MOCVD unit and the attendant facilities were reconditioned to allow more efficient operation. The series of coatings on alumina and FeCrAlY substrates were completed. A blank and coated FeCrAlY substrate, one each with no surface preparation and another with a polished, preoxidized surface, have been undergoing thermal cycling. The uncoated substrate is experiencing slow weight gain due to surface oxidation. The coated substrate that was not pretreated rapidly spalled during thermal cycling, surviving only a few cycles. The surface pretreated sample has to date survived 300, 1-hour cycles to 1100C without significant weight loss or change in appearance.

Samples are not being produced on nickel aluminide substrates, more typical of turbine blade coatings than the developmental FeCrAlY material. Samples are being prepared for thermal cycling and for composition and microstructure evaluation. Design is underway for a scale-up system to allow prototypcial turbine blade coating.

ISSUES

Report Prepared By	Date