Quarterly Management Report

WBS Element	Project Title	Contract Number	Contract Start	Contract End
ANL-4	Development of Nondestructive Evaluation Methods for Structural and Functional Materials	49640	10/01/74	09/30/08

Performer Name and Address	Principal Investigator(s)
Argonne National Laboratory 9700 S. Cass Ave. Argonne, IL 60439	K. Natesan

BUDGET AND COST REPORT

Prior Year Funds [$K]			70									
Total Current Year Commitment $K]			175									
Projected Current Year Costs [$K]												
	O	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**
Planned Costs	20	40	65	80	100	120	135	155	170	180	190	205
Actual Costs	18	40	69									
Variance	2	0	(4)	80	100	120	135	155	170	180	190	205

MILESTONE REPORT

Milestone Designation	Milestone Description	Due Date	Revised Due Date	Completion Date
ANL 4-1	Continue corrosion tests on advanced nickel-base alloys in presence of sulfate deposits at temps. between 650 & 800°C w/variation in deposit chemistry	09/30/04		
ANL 4-2	Continue corrosion evaluation of advanced nickel-base alloys in presence of alkali sulfate/alkali chloride vapor in simulated fireside combustion environments	09/30/04		
ANL 4-3	Evaluate corrosion performance of metallic and ceramic materials exposed in NETL and North Dakota coal cumbustors	09/30/04		

TECHNICAL HIGHLIGHTS

ANL-4 Corrosion and Mechanical Properties of Materials in Combustion and Mixed-Gas Environments

During this period, corrosion testing is continued on several Ni-base alloys in the presence of coal-ash in support of advanced steam-cycle conditions. Experiments were completed at 725°C. Two ash chemistries that included ash constituents, alkali sulfates and NaCl were used in the experiments. Several of the specimens, exposed at the three temperatures of 650, 725, and 800°C, were mounted in metallographic mounts and polished. Optically examination of the specimens is currently in progress. We have taken slivers of each specimen after 925-h and 1008-h exposures to Ash 1 and Ash 3, respectively, for metallographic examination.

Corrosion study was completed on specimens of Fe-base alloys, that were exposed for a period of time ranging from 336 to 1680 h in the presence of simulated coal ash containing 10 wt.% of Na_2SO_4 and K_2SO_4 in the ratio of 1:1 and with additions of 1% NaCl, was completed. After each exposure period, the specimens were retrieved and cleaned of the ash and weighed. Subsequently the exposures were continued with the specimens but in the presence of fresh ash addition. All of the exposures were performed in a flowing gas environment that has a composition of air plus 1 vol.% SO_2. The alloys selected for the tests included HR3C, HR120, Save 25, NF709, modified 800, 347 stainless steel, HCM12A, Fe3Al clad 304, 671 clad 800H, and 310TaN.

Several of the specimens (from different runs) were examined in detail to evaluate their performance from the standpoint of scaling, internal penetration, corrosion product chemistry and phases. The results were compared with earlier-developed data on alloys exposed to coal ash/alkali sulfate mixture that contained 5 wt.% NaCl.

We plan to have a detailed report on the analysis of the corrosion performance of Fe-base alloys in about 3 months time after the metallographic examination.

ISSUES

Report Prepared By	Date
K. Natesan	01/26/04