



## **Hybrid 320 Ton Off Highway Haul Truck: Quarterly Technical Status Report 9, DOE/AL68080-TSR09**

This ninth quarterly status report for the Hybrid Off Highway Vehicle (OHV) project, DOE Award DE-FC04-2002AL68080 presents the project status at the end of December 2004, and covers activities in the ninth project quarter, October – December 2004.

### **Project Management Events**

An annual technical report was filed with the Department of Energy for review.

A team meeting was held at Komatsu America in Peoria, IL to discuss integration details. Komatsu will be applying resources to identify structural support members and other required modifications to support the weight of the hybrid energy storage system and related controls. In addition, discussions were opened regarding potential demonstration scenarios and logistics related to the use of the KAC's Proving Ground in Tucson, AZ. Attendees were Tim Richter (GRC), Henry Young and Tarun Shivilani (GERail), and Kim Byard (Komatsu).

### **Technical Status**

The full-scale static test equipment at GE Rail in Erie, PA is nearly complete. All components have been fully specified and ordered. Eight (8) of the twelve Z12 ZEBRA batteries have passed acceptance testing at Global Research and have been installed in the test fixture at Erie. The remaining batteries will be installed in early January. A Failure Modes and Effects Analysis (FMEA) has been performed to identify potential failure modes within the test configuration.

Fabricators have been selected to perform design and fabrication tasks for the hybrid component enclosures. Conceptual designs for all enclosures have been developed and will be finalized in the next quarter as they are integrated with Komatsu's truck design.

Life testing of the Zebra batteries at MES-DEA has shown over 3,000 cycles with no significant increase in cell resistance. Cell resistance is the primary indicator of cell life. The demonstration is expected to exercise approximately 1,000 cycles. Life testing will continue to aid in life estimations for commercialization. One cell failure (out of 10) has occurred; the analysis clearly showed mishandling of the cell following production caused a shift of electrode material within the cell. Excessive current concentration overheated and fractured the ceramic. This failure mode has not been observed in production cells.