

SCALED COMPOSITES, LLC



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The rocket oxidizer cold-flow test accident of 26 July 2007 at Scaled Composites was a devastating event. It caused the death of three co-workers and serious injuries to three more. It produced untold grief and turmoil for immediate families and friends of those killed and injured, as well as to the Scaled family. All of our lives were changed that day.

It should go without saying that we were completely surprised by this accident, as we had conducted numerous tests, without incident, on similar systems including the SpaceShipOne rocket motor. The body of knowledge about nitrous oxide (N₂O) used as a rocket motor oxidizer did not indicate to us even the possibility of such an event. However, because this serious and unanticipated accident had occurred, we had to look back at what had happened and where we go from there.

After doing our best to take care of the families and each other, the first order of business was to work with Cal OSHA in its investigation of the accident. Cal OSHA took through the end of January this year to complete its investigation. The agency did not determine a cause for the accident. We are continuing to work with Cal OSHA. In doing so, we hope to support Scaled's needs as well as the ongoing efforts of others in this developing industry.

In addition to the OSHA investigation, we put in place our own Accident Investigation team, composed of 11 members from the industry and from Scaled, with a collective rocket development and testing experience of over 200 years. Scaled also worked with NASA to conduct basic materials incompatibility testing.

Based on the findings of this Accident Investigation team, Scaled has implemented a variety of improvements to enhance the safety of the N₂O hybrid rocket motor.

The improvements and plans include:

Conducting increased compatibility testing between N₂O and any materials that contact it in the tank and eliminate incompatible materials in the flow path;

Revising cleaning procedures to further minimize the risk of contaminants in the system;

Replacing the composite liner in the N₂O tank with a metal tank liner;

Diluting N₂O vapor in the tank with Nitrogen or another inert gas to decrease its volatility and/or act as a pressurant;

Designing additional safety systems for the N₂O tank to minimize the danger due to tank overpressure; for example, a burst disk feature; and

Increasing the amount of testing during the development program to demonstrate that these design changes, and any improvements to system components, prevent the sequence of events that led to the accident.

Finally, we have formed an Advisory Board comprised of rocket industry experts to oversee the implementation of our improved designs and procedures going forward. These procedures, as well as the improved test site safety procedures that we hope to develop with Cal OSHA, will greatly enhance program safety for the future.

The industry will be provided with any pertinent materials compatibility data and/or testing protocols we develop as we move forward.