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**W76-1 Qualification Simulations Completed with Sandia's Engineering Codes on Red Storm**

Intense computational efforts with Sandia's engineering codes were completed on Red Storm to support the qualification of the arming, fuzing and firing (AF&F) system for the W76-1 Life Extension Program. This effort included several diverse sets of high-fidelity simulations in which uncertainties were quantified in each application. The applications included the behavior of the AF&F under abnormal drop conditions, system behavior under normal thermal environments, radiation transport to the AF&F under hostile radiation environments, and the structural dynamics response of the AF&F to hostile environments. These applications required the use of the explicit dynamics, thermal, and structural dynamics capabilities in SIERRA Mechanics and the radiation transport capabilities in RAMSES. SIERRA Mechanics and RAMSES are two of Sandia's engineering codes that provide mechanical/thermal/fluid and radiation/electrical capabilities, respectively. The calculations required 35% of Red Storm for more than three months ending in January 2007.