



# **Early Returns on GAIN Voucher: Dynamic Natural Convection for Passive Heat Removal**

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The DOE Office of Nuclear Energy GAIN Initiative Voucher program recently awarded a voucher to DYNAC Systems, LLC in order to simulate the performance of a Dynamic Natural Convection (DNC) system with the Idaho National Laboratory's (INL) RELAP5-3D code. It combined the most sophisticated nuclear safety code with the most extensive experience in nuclear safety analysis accumulated at INL. The first RELAP results gained in only 4 weeks of effort are already proving very valuable to DYNAC. Initial results showed that following a station black-out (SBO) in a 3-loop Pressurized Water Reactor (PWR) outfitted with DNC systems, reactor pressures and temperatures drop continuously without safety valves ever opening. As a consequence, no water is lost from the Reactor Coolant Systems (RCS) or the steam generators throughout the event. Initial RELAP5-3D results compared favorably with those provided earlier by another code (MAAP) in demonstrating the effectiveness of DNC in terminating severe external events in Light Water Reactors.