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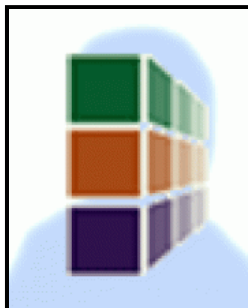| Home | About ▼ | Focus Areas ▼ | Research ▼ | Divisions ▼ | Programs ▼ | News ▼ | Events ▼ | Computing Resources ▼ | Jobs | Contact Us | Log In | LSU ▼ |

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Modeling Oil and Gas Discharges from Deepwater Blowouts

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Johnston Hall 338
September 17, 2007 - 03:00 pm

Abstract:
A computer model (CDOG) developed to simulate the behavior of oil and gas accidentally released from deepwater is presented. Deepwater is considered to be water depths in excess of 800 m. At the present time, deepwater exploration extends to as deep as 3000 m of water. Major areas of deepwater oil and gas exploration and production include Gulf of Mexico, North Seas, West Africa, and Brazil. Japan and Australia are also expected to have deepwater resources. The new discoveries of large deposits of methane hydrates are expected to be a major source of energy for the future. In deepwater, the ultra-high pressure and cold temperature causes phase changes in gases. These combined with relatively strong currents in some deepwater regions presents extraordinary challenges to modeling jets/plumes from deepwater oil and gas blowouts. The present model incorporates the phase changes of gas, associated changes in thermodynamics and its impact on the hydrodynamics of the jet/plume. Hydrate formation, hydrate decomposition, gas dissolution, non-ideal behavior of the gas, and possible gas separation from the main plume due to strong cross currents are integrated with the jet/plume hydrodynamics and thermodynamics. The model formulation and testing of various computational modules with available data will be presented. CDOG model is used to numerically simulate the large-scale and unique field experiments conducted in Norway. The field experiments consisted of two oil and methane gas releases and one methane gas only release from a deepwater location (844m water depth). Comparisons between the simulations and observations will discussed in detail.