



## **Consequence Modeling on Subsea Release Using PLUMERISE and Numerical Model**

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### **Abstract**

As more offshore installations are developed in deep and ultra-deep water, subsea release, including a range of accident scenarios like the release of hydrocarbon inventory from topside process equipment, subsea pipelines, risers, or blowout events, has raised more concerns. Subsea release will result in dispersion of the hydrocarbon as it rises to the sea surface, and potentially a pool could form on the surface depending on components and conditions of the released material.

In this presentation, the author reviews the previous methodologies on vapor dispersion and pool fire modeling for subsea release, and then PLUMERISE model developed by DNV is introduced for subsea release modeling. This program calculates the boil area on the sea surface and the gas concentration above the sea surface from underwater blowout. The gas dispersion in the sea and the initial mixing with air just above the sea level are calculated as the source term to other dispersion modeling on the dispersion in the air.

The pool spread on sea surface was simulated by a comprehensive numerical model. The results were compared with the common methodologies used for pool/pool fire consequence modeling.

The tools developed for subsea release modeling has facilitated the offshore installation layout design, like the location section on living quarters, and provided the risk profile for subsea operations decisions like subsea pipeline routing.

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