

## A Study on Enhancement of Ex-Vessel Melt Retention

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### Abstract

In- and ex-vessel melt retentions are two widely applied severe accident mitigation strategies for light water reactors. Both of them are realized by cooling external surfaces of a melt pool. Motivated by improvement of the cooling limit, the present study introduced a set of perforated pipes which penetrate through a melt pool, and has internal flow of coolant driven by natural circulation. This paper first describes the conceptual design of such a device for ex-vessel melt retention, and then analyzes its efficacy in coolability enhancement. Finally, an experimental investigation is proposed, including facility design and instrumentation, to address the effect of penetrations cooling on melt coolability.

**Keywords:** severe accident, melt retention, coolability enhancement