**Thermo-hydraulic studies for the ALLEGRO core optimization**

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The original 75 MW CEA 2009 ALLEGRO design was investigated and found that the desired power level is too high in some safety studies. In this analysis the maximum allowable linear heat rate of the two-loop ALLEGRO is investigated. We selected the hot duct break initiating event as the basis of our calculations. Since this initiating event belongs to the design basis of ALLEGRO, the failure of the intact loop was taken into account as a single failure. During the calculations the CEA 2009 ALLEGRO 75 MW core geometry was unchanged, and the reactor power and radial peaking factor was varied. The CATHARE calculations showed that the maximum linear heat rate of the two-loop CEA 2009 ALLEGRO concept must be decreased significantly.