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## Analysis of Typical Problems in the Review of the 'Linglong-1' SMR Demonstration Project

**Abstract:** The 'Linglong-1' SMR demonstration project adopts an integrated reactor design, with four main pumps symmetrically arranged around the pressure vessel, which are connected to the pressure vessel through L-shaped receivers, take on the functions of the pump casing and also realise the separation of the coolant flow path. The receiver is designed according to the vessel specification, and the safety analysis does not consider the hypothetical accident condition of double-ended shear fracture.

In the PSAR review stage, through the comparison with the import and export receiver structure of the large pile, the receiver force analysis, vibration characteristic analysis, and reference to foreign similar integrated small pressurised water reactor similar parts of the review of practical experience, it is considered that the double-end shear fracture accident can not be considered.

In the construction design stage, according to the requirements of the reviewer, a fatigue fracture analysis was carried out, LBB monitoring measures were added for the main pump receiver weld, the consequences of the DEC-B condition were supplemented, and the analogy method of engineering experience was adopted to demonstrate that the probability of the receiver fracture was sufficiently low, which further demonstrated that the hypothetical accident of double-ended shear fracture of the main pump receiver could be considered acceptable without considering the design baseline working condition.

**Keywords:** SMR; Linglong-1; safety analysis; main pump receiver; double-ended shear fracture;

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### Confirm that the work is original and has not been published anywhere else

Yes

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