
PROBLEM 3-8N QUESTION

Decay Power Calculations Of A 3-Batch PWR Core

A PWR core has been operated on a three-batch fuel management scheme on an 18-month refueling cycle, e.g., at every 18 months, one third the core loading is replaced with fresh fuel. A new batch is first loaded into the core in a distributed fashion such that it generates 43% of the core power. After 18 months of operation, it is shuffled to other core locations where it generates 33% of the core power. After another 18 months, it is moved to other core locations where it generates 24% of the core power.

QUESTION

The plant rating is a 3400 MWth. Assume it is shutdown after an 18-month operating cycle. What is the decay power of the plant one hour after shutdown if it has operated continuously at 100% power during each of the preceding three 18-month operating cycles and the shutdown periods for refueling were each of 35 days duration.

Solve this problem in two ways.

- a) Consider the explicit operating history of each of the three batches to the core decay power.
- b) Assume the whole core had been operating for a infinite period before shutdown.