

HEALTH & SAFETY EXECUTIVE  
NUCLEAR SAFETY DIRECTORATE  
ASSESSMENT REPORT

Site : Hinkley Point B  
Project : Periodic Shutdown of [REDACTED]  
Title : Assessment of implications of full length axial crack in a graphite moderator brick  
Licence No. 62  
Licence Condition No. 22, 28, 29, 30  
ARF No. 19422/1  
Assessment Rating: See Appendix 1  
Time spent on ARF: 15 staff-days

Author: [REDACTED] Signed: ..... Date: .....

Accepted: [REDACTED] Signed: ..... Date: .....

(Unit 1E SI)

Distribution: [REDACTED]

File: NUC 493/1/3/4 Part 1 Enclosure 7  
NUC 133/13/1 Part 1 Enclosure 144

HM Nuclear Installations Inspectorate  
St Peter's House  
Balliol Road  
Bootle  
Merseyside L20 3LZ

---

Before a decision is made on a request to release this report onto the public domain, the licensee should be consulted to determine whether it contains information which is considered to be 'Commercial in Confidence'. (Ref. BMS G/AST/003 Issue 001)

## SUMMARY

### Background

1. During the current periodic shutdown of Hinkley Point B [REDACTED] routine inspections of the fuel channels revealed the presence of a full length axial crack at the bore of a graphite fuel brick at [REDACTED]. This is the first crack of this morphology to be detected at Hinkley Point B or [REDACTED] although two similar cracks were observed during the periodic shutdown of [REDACTED]. This is of particular significance as the full height morphology is one of the main characteristics of a primary crack (which is a crack initiated at a radial keyway root late in life of the reactor and post stress reversal). In addition British Energy predict that when primary cracking occurs it should occur first at Hinkley Point B [REDACTED].
2. The current safety case demonstrates tolerability to a range of bore cracks (axial, lasso and circumferential) with no limit on the number of such cracks. [REDACTED] demonstrated that primary cracking would not occur before [REDACTED]. [REDACTED] Doubly cracked bricks, irrespective of how they arise, are tolerable provided they are low in number such that they are essentially surrounded by intact or singly cracked bricks. It was recognised that significant primary brick cracking was beyond the scope of the safety case. A category 2 safety submission has been presented that reviews the safety case and justifies continued operation. A key aspect of this assessment was therefore to establish if the axial crack observed at [REDACTED] is pre or post stress reversal. This report presents my assessment of the Category 2 submission in support of return to service of [REDACTED] at Hinkley Point B.

### Conclusions

3. I judge that the full-height axial crack at [REDACTED]. From the available evidence it cannot be ascertained from where the cracks initiated. The possibility of initiation from a keyway cannot be discounted.
4. Channel bore measurements and modelling support the view that the cracked brick is pre-stress reversal and therefore does not necessarily undermine the safety case. As the [REDACTED] brick is pre-stress reversal I conclude that by definition the observed axial crack is not a "primary" crack.
5. I judge that core safety functionality is unlikely to be affected by the observed cracks and the frequency of such cracks (in uninspected channels) should not challenge the current safety case.
6. A meeting was held with British Energy to commence consultation under LC 29(1) regarding inspection during the next period of operation in the event of a shutdown. I conclude that the proposals agreed are adequate.

### Recommendations

7. I support granting of consent for start-up of Hinkley Point B [REDACTED]