




HEALTH & SAFETY EXECUTIVE
NUCLEAR SAFETY DIRECTORATE
ASSESSMENT REPORT

Site : Hinkley Point B and Hunterston B
Project : Second Periodic Safety Review
Title : Graphite Core
Licence No. 52 and Sc11
Licence Condition No. 14, 15
Service Order No. 4033864 and 4035633
Assessment Rating: Adequate (Green)
Time spent on S/O: 6 staff-days

Author:  Signed: Date:

Accepted:  Signed: Date:
(Unit 1D SI)

Distribution: 

File: NUC 452/70/15/1/4 Part 2 Enclosure 53
NUC 453/70/15/1/4 Part 2 Enclosure 53
NUC 452/3/2 Part 3 Enclosure 29
NUC 453/3/2 Part 3 Enclosure 14
NUC 133/13/4 Part 1 Enclosure 61

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

This page intentionally blank.

SUMMARY

Objective and Scope

1. The objective of this assessment is to establish the adequacy of the periodic safety review of the graphite reactor core for the next ten years of operation at Hinkley Point B and Hunterston B. The assessment was undertaken in accordance with NSD guidance on Periodic Safety Reviews. My assessment also considered the impact of associated systems, structures and components on the safety functionality of the graphite reactor cores.

Conclusions

2. BE predict that during the period covered by the PSR2 [REDACTED] the majority of fuel moderator bricks will develop a single through-thickness crack from a keyway root. Some of these may develop a second keyway root crack such that the brick may be in halves. It is also expected that some proportion of the fuel moderator bricks will develop bore cracks of circumferential, axial or lasso morphology. Through-thickness axial cracks have the potential to affect the function of the brick keying system, and doubly axial-cracked bricks have the potential for shear and separation. Therefore brick cracking could affect channel straightness and the ability of the graphite core to meet its fundamental nuclear safety requirements.

3. PSR2 recognises that core lifetime is probably the dominant station life-limiting feature and that it is currently not possible to make a safety case for the graphite core to [REDACTED]

4. The current safety case will expire during the PSR2 period and BE's strategy is to develop, in a step-wise manner, a safety case that is based explicitly upon the fundamental nuclear safety functions.

5. BE therefore propose to review the safety case through the PSR period. It is intended that reviews will be undertaken and reported in [REDACTED]
[REDACTED] I judge that the frequency for interim reviews is adequate.

6. A strategy is in place to secure the safety case for the graphite cores as they age and component degradation progresses. This is based upon establishing operable limits of the graphite core and undertaking work to identify and implement any reasonably practicable modifications to the plant and safety case. I am closely monitoring developments through continued dialogue with British Energy.

7. PSR2 identifies a need for overall company programme and practices used for managing ageing to be revised and updated to align them more closely with international standards. This would then align the strategy for management of ageing of the graphite core with other structures, systems and components. This is categorised as a Category B shortfall.

Recommendations

8. I recommend continued monitoring of BE's strategy to secure the safety case for operation of the reactor cores at Hinkley Point B and Hunterston B [REDACTED]

This page intentionally blank.

PAGES 4 → 9

THESE PAGES ARE SAFETY CASE
DETAILED MATERIAL.

EXEMPT UNDER O.C.N.S GUIDANCE
' FINDING THE BALANCE '

Issue 8

PSR Specification for the Core System excludes assessment of core safety functionality during external hazards (eg seismic) as this will be covered under hazards in Chapter 4 (R4.5). As the core safety case addresses external hazards it is considered appropriate to review the core seismic safety case under the PSR Specification for the Core System.

37. This is addressed in Refs. 8 and 20.

38. I judge that all the above issues are adequately addressed in the PSR 2 submissions on the graphite core.

NUCLEAR SAFETY COMMITTEE COMMENTS

39. Not applicable.

INSA

40. Not applicable.

CONCLUSIONS

41. BE predict that during the period covered by the PSR2 [REDACTED] the majority of fuel moderator bricks will develop a single through-thickness crack from a keyway root. Some of these may develop a second keyway root crack such that the brick may be in halves. It is also expected that some proportion of the fuel moderator bricks will develop bore cracks of circumferential, axial or lasso morphology. Through-thickness axial cracks have the potential to affect the function of the brick keying system, and doubly axial-cracked bricks have the potential for shear and separation. Therefore brick cracking could affect channel straightness and the ability of the graphite core to meet its fundamental nuclear safety requirements.

42. PSR2 recognises that core lifetime is probably the dominant station life-limiting feature and that it is currently not possible to make a safety case for the graphite core to [REDACTED]

43. The current safety case will expire during the PSR2 period and BE's strategy is to develop, in a step-wise manner, a safety case that is based explicitly upon the fundamental nuclear safety functions.

44. BE therefore propose to review the safety case through the PSR period. It is intended that reviews will be undertaken and reported in [REDACTED] [REDACTED] I judge that the frequency for interim reviews is adequate.

45. A strategy is in place to secure the safety case for the graphite cores as they age and component degradation progresses. This is based upon establishing operable limits of the graphite core and undertaking work to identify and implement any reasonably practicable modifications to the plant and safety case. I am closely monitoring developments through continued dialogue with British Energy.

46. PSR2 identifies a need for overall company programme and practices used for managing ageing to be revised and updated to align them more closely with international standards. This would then align the strategy for management of ageing

of the graphite core with other structures, systems and components. This is categorised as a Category B shortfall.

RECOMMENDATIONS

Those requiring assessment action

47. I recommend continued monitoring of BE's strategy to secure the safety case for operation of the reactor cores at Hinkley Point B and Hunterston B to [REDACTED]