

Nuclear Safety Directorate  
HM Nuclear Installations Inspectorate  
Director and HM Chief Inspector : [REDACTED]

[REDACTED]  
Station Director  
Hinkley Point B Power Station  
Near Bridgwater  
Somerset  
TA5 1UD

Unique No: HPB 71030R

File reference: [REDACTED] 7/2001  
NUC 452/3/2 P3 E24

Date: 4 May 2006

Direct line : [REDACTED]

For the attention of [REDACTED]

Dear [REDACTED]

#### HINKLEY POINT B POWER STATION

"A revised safety case for the graphite core: Inspection and monitoring proposals for 2005 - 2008." May 2005. Nuclear Safety Committee paper NSC/05/2184 Revision 000, NP/SC 7147 Addendum 2 Revision 000.

We recently completed our assessment of the above safety case for the graphite cores at Hinkley Point B and Hunterston B. I write to advise you of the issues arising from this assessment.

#### Core Inspection Frequency

Issue 1: Based on the current safety case we judge that there is a need for more frequent inspection of the graphite core.

#### Comments

At the Level 4 graphite meeting held on 6/7 March 2006 we were apprised of significant changes to the safety case for the return to service of Reactor 3 following its periodic shutdown in [REDACTED]. A series of meetings are planned, the first was held on 5 April, to discuss these changes to aid our assessment of the Reactor 3 safety case. Therefore whilst this is a key conclusion from the assessment we plan to consider the benefit that may be derived from the enhanced monitoring leg, further developed consequences leg and developed inspection leg of the safety case before reaching a final decision regarding the need for more frequent inspection. However, if we are unable to share your view of the enhancements for the Reactor 3 safety case we will be seeking a resolution of this issue before return to service of Reactor 3 following its periodic shutdown in [REDACTED].

[REDACTED]

## Detection and Sizing of Part Through-Thickness Cracks

Issue 2. We judge that there is a need to develop inspection techniques capable of detecting and sizing part through-thickness cracks. Until such capability is demonstrated and implemented we believe that it is reasonably practicable to undertake CBMU on every channel that is examined by TV inspection as this has the potential to reveal sub-surface defects. Please present proposals for:

- a. CBMU of each and every channel defuelled for inspection commencing at the periodic shutdown of Reactor 3 in [REDACTED], alternatively provide a robust justification explaining why you consider that it is not reasonably practicable to do so.
- b. How the capability of core inspection may be enhanced such that part through-thickness cracks may be detected and sized.

## Predictions of Core Displacement

Issue 3. Please present proposals for further modelling to ensure that the predictions of core displacement, for a given configuration of cracked bricks, are insensitive to time that the cracked brick configuration occurs.

### *Comments*

The stated BE intention is to make the bounding core distortion assessment independent of the irradiation at which a particular degree of cracking is reached. However, given the complex progression of the different aspects of core free space available to accommodate brick movement, it is difficult to know when the most severe combination (i.e. that giving the greatest freedom for brick movement) of brick spacing, keyway closing, crack opening etc will be reached and with what extent of brick cracking, distribution and cluster population they will be associated.

## Safety Margin Between Model Predictions and Actual Component and Core Condition

Issue 4. Before start-up of Reactor 3, following its periodic shutdown in [REDACTED] please present proposals for the development of an appropriate safety margin between actual component and core condition and the currently defined limit of the safety case, in terms of the frequency of cracked bricks. Our expectation is that this should include as a minimum: a review of uncertainties in input data; and errors between model predictions and rig validation tests.

## Materials Testing Reactor Experiment

Issue 5. We judge that there is a pressing need for a Materials Testing Reactor experiment to obtain materials data, including dimensional change, irradiation creep behaviour and mechanical properties at high weight loss that bounds any future operating condition. We look forward to the opportunity to discuss your detailed proposals and how the experiments may be optimised to achieve the maximum

