HM Nuclear Installations Inspectorate

Safety Assessment Principles for Nuclear Power Reactors

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AMENDMENT SHEET No: 1

(December 1988)

Foreword

Sir Frank Layfield, in his report on the Sizewell B Public Inquiry, recommended (4,d) that 'NII's Safety Assessment Principles and CEGB's Design Safety Criteria and Guidelines should be re-examined to eliminate avoidable inconsistencies and to provide an explanation of justifiable differences between the requirements of the two organisations.'

This Amendment Sheet lists the results of such a re-examination, which has been kept to a minimum for this purpose. A wider review of NII's Safety Assessment Principles (SAPs) is underway in response to Sir Frank's recommendation (4,b), now that the Health and Safety Executive's document entitled 'The Tolerability of Risk from Nuclear Power Stations' has been published.

Fault Conditions

Delete the paragraph "In judging.....bounding case" and the existing SAPs 13 to 16 and insert the following:

13. The predicted accident frequency for doses of 1 Emergency Reference Level (ERL) should not exceed 10^{-4} per reactor year. Accidents resulting in lower doses are acceptable at higher frequencies in accordance with the following table:

Accidental Releases		Total Permissible Frequency per Reactor Year
ERL/1000	to ERL/100	10^{-2}
ERL/100	to ERL/10	10^{-3}
ERL/10	to 1 ERL	10^{-4}

14. For any single accident which could give rise to a large uncontrolled release of radioactivity to the environment resulting from some or all of the protection systems and barriers being breached or failed, then the overall design should ensure that the accident frequency is less than 10^{-7} per reactor year. This is to be interpreted as meaning that the product of the initiating fault frequency and the probability of failure to control the accident should be less than 10^{-7} per reactor year.

15. The total frequency of all accidents leading to uncontrolled releases, as in 14 above, should be less than 10^{-6} per reactor year.

[Reason: to recognise the assessment procedure used for the Sizewell 'B' reactor and accepted as valid at the Sizewell 'B' Inquiry.

Note:

(1) Where the assessment reference levels of 13 to 15 are not achieved the assessor is required to judge whether appropriate consideration has been given to the possibility and costs of further reductions as required by the introduction to this section. For example, in exercising this judgement releases giving doses up to several ERL (not exceeding 10) may be acceptable at frequencies somewhat higher than in 14.

(2) The ERLs to be used are:

Whole body	*100 mSv dose equivalent*
Thyroid, lung or other single organs	*300 mSv dose equivalent*
Skin	*1,000 mSv dose equivalent*

These ERLs are the lower limits for evacuation as specified by the National Radiological Protection Board in its document "ERL 2, Emergency Reference Levels: criteria for limiting doses to the public in the event of accidental exposure to radiation"]

16. Not used.

SAP 17

Amend to read:

"As far as is reasonably practicable the exposure of persons on site as a result of an accident should be restricted and exposures in excess of the statutory dose limits should be avoided".

[Reason: to make it clear that it is the statutory limits, ie those in the IRRs 1985, which are involved and that it refers to all persons on site, not just the occupationally exposed workers.]

SAP 26

Replace the last paragraph "The assessor should…" with:

"The effective barriers principle is intended to satisfy in a simple (and often pessimistic) way the objective that adequate protection should be provided for each fault and that diversity should be provided when necessary so that the probabilistic principles in principles 13-15 are met. This assessment is applied as an initial check where the full fault analysis safety case is not available or an interim view is to be formed. It is not intended to be a comprehensive or the sole means of deciding the adequacy of protection."