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HEALTH AND SAFETY COMMISSION

UPDATE ON PROGRESS WITH GENERIC DESIGN ASSESSMENTS OF NEW NUCLEAR REACTORS

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Issue

1. To respond to an action from the May HSC meeting by providing an update on the work of HSE's Nuclear Directorate in undertaking generic design assessments of potential new nuclear power stations.

Timing

2. Routine.

Recommendation

3. The Commission is invited to note the contents of this paper.

Background

4. Paper HSC 07/45 explained HSE's proposed staged approach to undertaking generic design assessments (GDA) for potential new nuclear power station designs. Annex 1 summarises this process.

5. The Commission were informed in May that although the Government had expressed itself in favour, in principle, of new nuclear build, it had not established a firm policy on whether to take facilitative actions to support it. A public consultation on the future of nuclear power was launched alongside the Government's Energy White Paper on May 23rd, and this closed on October 10th. An announcement from the Government on the results of that consultation is expected before the end of this year. HSC 07/45 explained that, in advance of the Government establishing a policy position in HSE's view it was prudent for it to respond to requests from the industry and make a start on the first steps in the GDA process so as to be able to respond quickly in the event of a positive outcome to the consultation processes. In particular:

- An early start on GDA would allow HSE to make timely steps towards securing the protection of society - workers and the public – when considering

anticipated site licence applications, without reducing its immediate focus on nuclear safety at operating nuclear sites.

- Preparatory work on GDA would place HSE in a better position to manage anticipated work flows over coming years.
- No staff would be moved from site inspection or other safety critical work to secure the safety of existing operating nuclear facilities without back-filling of those posts, and staff could readily be moved from GDA if needed on higher priority work.
- Starting Step 2 (basic design assessment) work was sensible pre-planning for one possible outcome of the Government's consultation later in the year. It would be more damaging to other nuclear safety priorities if Nuclear Directorate were unable to pre-plan and then needed to pull inspection staff out at short notice to handle a peak of design assessment work which it had not anticipated or planned for.
- Maximum use would be made of staff moved back into Nuclear Directorate from other HSE policy, research and strategy functions. Recent recruitment from elsewhere in HSE was also seen as allowing some flexibility in reallocation of existing Nuclear Directorate staff.

6. In order for HSE to be in a better position to begin generic design assessments, and to recover its costs from the 'requesting parties', at the May meeting HSC agreed to direct HSE under section 11(4) of the HSWA to exercise on behalf of HSC the function conferred on the Commission by s11(1) of that Act. The Direction was subsequently issued on May 31st 2007 (see Annex 2).

7. Also at the May meeting, the Commission agreed that it would recommend to the DWP ministers that the 2007 Health & Safety (Fees) Regulations were amended to introduce a provision for charging for GDA work. Those amended regulations were subsequently signed by the Minister and came into force on 2nd July.

8. While giving its support for HSE starting work on GDA, the Commission raised concerns over the implications of the work for Nuclear Directorate's resources and ND's ability to deliver its wider business plan. HSE reassured the Commission that it would not undertake or continue with GDA work at the expense of its safety critical work related to the operational safety of licensed nuclear sites and that the situation would be kept under constant review. An action was placed on HSE to report back to the Commission in autumn 2007 on developments with the GDA process, before moving beyond the initial Step 2 to the more resource intensive Steps 3 and 4.

Argument

(i) Progress with GDA

9. As discussed earlier, alongside the publication of the Energy White Paper on May 23rd, the Government launched its consultation on the future of nuclear, which closed on 10 October. Although it is not expected to announce the results of this

consultation until towards the end of the year, the Government decided that work preparatory to possible new nuclear power stations should continue on a 'contingent basis'. Consequently, if the Government decides against new nuclear build then HSE expects that it will cease all work on generic design assessments and reallocate staff to other duties.

10. In anticipation of approaches from the industry, on July 2nd Nuclear Directorate set up a new Division (Division 6) to prepare for and ultimately to undertake GDA work on multiple reactor designs. On July 5th the Government announced that 4 designs of potential new nuclear power stations had passed its 'viability' test (which included a declaration of support from potential operators) and consequently HSE (and our colleagues in the Environment Agency) accepted these designs for GDA. The four designs are:

- AREVA/EdF EPR (French)
- AECL – ACR1000 (Canadian)
- GE/Hitachi – ESBWR (US)
- Westinghouse AP1000 (US)

11. Extensive discussions with each vendor took place during July and August to ensure that the design safety, security and environmental documents which were being prepared for submission to the regulators were suitable and sufficient to allow assessments to begin. This culminated in formal submissions being made by all four vendors to HSE and the Environment Agency in mid-August.

12. To address the Step 2 requirement a small team of dedicated ND inspectors has been gradually built up by transferring staff to Division 6 from elsewhere in NII and is now engaged in leading Step 2 assessments of each design. Our expectation is that the Step 2 assessments will be completed early in 2008 with the results being published before Easter. In coming to its views following the completion of each Step 2 assessment, the assessment team will be able to draw on consultancy advice from work that is being undertaken at HSE's request by an international team of experts from the International Atomic Energy Agency (IAEA). HSE is also looking to utilise, where possible and appropriate, any assessment work that has been undertaken on these designs by regulatory colleagues overseas. Discussions to achieve this are well advanced.

13. At an early stage, it was agreed by all the key UK regulators (then HSE, OCNS, Environment Agency, SEPA) that the new build assessment programme should be managed in a co-ordinated manner to ensure efficient and effective collaborative working, and to minimise the administrative burden imposed on industry (the 'requesting parties'). This is also in line with Better Regulation principles and the recommendations arising from the Hampton Review. A Joint Programme Office (JPO) has therefore been set up to act as a 'one-stop shop' for the vendors – acting as a primary point of contact and administering the assessment projects for all submitted designs on behalf of HSE (NII and OCNS) and the Environment Agency. Due to the changed policy of the Scottish Executive, SEPA are now taking no part in the assessment process.

14. HSE and the Environment Agency are committed to making sure the generic design assessment is conducted in an open and transparent manner that allows the public to contribute to the process. Each vendor has agreed to give the public access to all the documentation that they submit to the regulators, so far as this can be done without compromising security or commercial interests. The vendors have placed the Step 2 submissions on their websites along with an invitation to the public to submit comments relevant to the safety, security or environmental effects of the design, which the vendors will answer. The regulators, through the Joint Programme Office, will monitor the submitted comments and the vendors' responses and take account of these, where appropriate, in their assessments.

15. In addition, ND has made considerable efforts to inform and engage with key stakeholders regarding its activities on potential new build. In addition to meetings and correspondence with key NGOs (when possible), HSE and the Environment Agency are jointly publishing an information leaflet which will be distributed to public libraries throughout the UK. A dedicated web-page has also been set up on HSE's website which explains the role of HSE in the GDA process and provides links to the websites of other regulators and departments as well as those of the reactor vendors.

16. Currently, it is expected that both HSE and the Environment Agency will complete their Step 2 assessments in time for reports on the findings for each design to be published around Easter 2008.

(ii) ND Staffing

17. As anticipated in May, the current low level of staffing within ND's new build assessment unit has been achieved without detriment to ND's safety critical, higher priority work. Supplemented by the work being undertaken by the IAEA and, where possible, drawing on experience of overseas regulators, it is anticipated that this staffing level will be sufficient to complete step 2 assessments for each design by the target date of March 2008.

18. Progressing to Step 3 (and beyond) poses more of a problem, however, as making judgements based on the more detailed assessment of complex system behaviour and design within the predicted timescales will necessitate a staffing level considerably higher than that needed for step 2. The projected timescales for completion of Steps 3 and 4 were predicated on being able to adequately staff up the ND assessment teams. If the low levels of recruitment that have been achieved in recent months continue, then achieving the Steps 3 and 4 completion targets will not be possible. ND management are keeping the staffing across the whole of the Directorate under close scrutiny. As explained at the May meeting, Inspectors will not be transferred into Division 6 from elsewhere in ND at the expense of ND's safety critical, higher priority work (see Annex 3).

Consultation

19. Members of the HSE Board and legal advisers office have been consulted.

Presentation

20. Continuation of the step 2 GDA work will be contingent on the Government reaching a decision in favour of new build later this year. Beyond Step 2, significant delays in the completion of GDA assessments will occur if ND cannot achieve the necessary levels of staffing through inspector recruitment. Any decisions by HSE to delay or defer continuation of GDA work beyond step 2 will be unwelcome by the vendors and may create presentational difficulties for both HSE and for the Government in the event that the Government decides to include new nuclear power as part of the future UK energy mix.

21. HSE proposes to return to the Commission in April 2008 to report on the findings of its Step 2 assessments and to provide an update on its preparedness for continuing GDA into step 3 and beyond.

Financial/Resource Implications for HSE

22. The amended Health & Safety (Fees) regulations are providing HSE with the means to recover all of its costs for GDA work from each requesting party.

Environmental and Other Implications

23. None.

Action

24. That HSC notes that:

- Good progress is being made on Step 2 of generic design assessment for each of the four designs;
- Resourcing for Step 3 and beyond poses a significant risk to the completion of GDAs within the original 3.5 year timescale unless significant recruitment of the right calibre of staff is achieved in a relatively short period;
- A further report will be made to the HSC in April 2008 following completion of Step 2 of the four GDAs.

Annex 1

SUMMARY OF HSE's NUCLEAR POWER STATION GENERIC DESIGN ASSESSMENT PROCESS

1. HSE's expert report to the Government's 2006 Energy Review proposed that it would revise and update its procedures for granting a licence for the start of construction. HSE proposed a two-phase process: the first phase would be a review of the safety features and ultimate acceptability of a nuclear reactor design as the basis for granting a nuclear site licence. If successful, this would lead to the issuing of a statement of 'Design Acceptance' by HSE, which would remain valid for a number of years. The second phase would involve an applicant seeking a nuclear site licence to construct such a reactor at a specific site.
2. The Government's Energy Review report, published in July 2006, welcomed HSE's proposals, and asked HSE to develop a system for assessing nuclear reactor designs, and to publish guidance early in 2007. That guidance was published in January 2007.
3. Proposals for building new power reactors in the UK would be subject to a 2 phase process:
 - Phase One, Design Acceptance, is HSE's assessment of the safety case for a generic design, leading to issue of Design Acceptance Confirmation if the outcome is positive.
 - Phase Two, Nuclear site licensing, is HSE's assessment of the application for a nuclear site licence and is thus site, reactor type and operator specific.
4. This process is presented in the table with approximate timescales. Phase One is divided into 4 steps. These steps, which culminate in the issuing of a Design Acceptance Confirmation.

Phase One: Design Acceptance		
Step	Process	Approx Timescale
1	Design and safety case preparation based on generic site envelope	Requesting party is responsible
2	Fundamental safety overview	6-8 months
3	Overall design safety review	6-12 months
4	Design Acceptance Assessment	Up to 2 years
Phase Two: Nuclear Site Licensing		
	Site licence assessment, with subsequent issue of site licence if application is judged to be acceptable	6-12 months

KEY FEATURES OF THE PROCESS

Step 1 – Design and Safety Case Submission Preparation

Step 1 is the preparatory part of the design assessment process. The bulk of the work will be undertaken by the requesting party in assembling the safety submissions for Step 2. It also involves discussions between the requesting party and HSE to ensure a full understanding of the requirements and processes that will be applied.

Step 2 – Fundamental safety overview

Step 2 is an overview of the fundamental acceptability of the proposed reactor design concept within the UK regulatory regime. This step is expected to take from 6 to 8 months. The aim is to identify any fundamental design aspects or safety shortfalls that could prevent the proposed design from being licensed in the UK. It will also introduce HSE inspectors to the fundamentals of the design and provide a basis for planning subsequent assessment.

Step 2 – HSE Output

- A public HSE statement on whether any fundamental safety issues had been identified that might prevent Design Acceptance in the UK or that have to be addressed to secure acceptance.
- A short report to support this statement.
- Confirmation that HSE will move to Step 3.

Step 3 – Design Safety Overview

Step 3 is a broad HSE review of the safety aspects of the proposed reactor design. This step may take from 6 to 12 months. The general intention will be to move from the fundamentals of the previous step to an analysis of the design, primarily by examination at the system level and by analysis of the requesting party's supporting arguments. The specific aims of this step are:

- To improve HSE knowledge of the design.
- To identify all significant issues.
- To identify whether any significant design or safety case changes may be needed.
- To identify major issues that may affect design acceptance and attempt to resolve them.
- To achieve a significant reduction in regulatory uncertainty.

The exact scope and focus will depend on the design and on the outcome of Step 2.

Step 3 – HSE Output

- A public HSE statement on the adequacy of the assessed safety features of the design, including safety issues with the potential to lead to significant design or safety case changes, or to prevent successful Design Acceptance.
- A report to support this statement.
- Confirmation that HSE will move to Step 4.

Step 4 – Design Acceptance Assessment

Step 4 is an in-depth HSE assessment of the safety case and generic site envelope submitted. This step may take about 2 years.

The general intention of this step is to move from the system level assessment of Step 3 to a fully detailed examination of the evidence, on a sampling basis, given by the safety analyses.

The aim of this step is:

- To confirm that the higher level claims such as system functionality are properly justified.
- To complete sufficient detailed assessment to allow HSE to come to a judgment on if a Design Acceptance Confirmation can be issued.

The exact scope and focus will depend on the design and on the outcome of Step 3.

Step 4 – HSE Output

- A public HSE statement providing a Design Acceptance Confirmation (if the design is judged to be acceptable).
- A report to support this statement.

Annex 2

Direction under section 11(4) of the Health and Safety at Work Act 1974 issued by the Health & Safety Commission, 31 May 2007

1. In pursuance of an authorisation given by the Health and Safety Commission on 15th May 2007 and on the Commission's behalf, I hereby direct the Health and Safety Executive ("the Executive") to exercise, on behalf of the Commission, the function conferred on the Commission by section 11(1) of the Health and Safety at Work Act 1974, by virtue of section 1(1)(c) of that Act, as regards assessing any design proposal.

2. In this Direction-

(a) "design proposal" means —

a proposal for any new nuclear installation, including matters relating to the installation's construction, commissioning, operation and decommissioning, which is to be assessed prior to any application to the Executive for a licence under section 1(1) of the Nuclear Installations Act 1965 which may be made based upon that design proposal; and

(b) "nuclear installation" means a nuclear reactor or an installation within the meaning of section 1(1)(b) of the Nuclear Installations Act 1965.

Signed Bill Callaghan

Chairman
Health and Safety Commission
Date 31st May 2007

Annex 3

Nuclear Directorate Staffing for Generic Design Assessments

HSE accepted industry proposals for Generic Design Assessments (on a contingent basis, dependent on the outcome of the Government's consultation on the future of nuclear power), with the proviso that the work could be undertaken by the Nuclear Directorate without staff being taken from site inspection or other safety critical work. The Commission has been assured by HSE on this both verbally (Chief Inspector, December 2006 meeting) and in writing (HSC/07/45, May 2007). This will remain the position throughout the GDA process.

Currently, inspector staffing in the new Division 6 is very limited and has been achieved by transferring-in nuclear specialist staff from non-site inspection duties in ND, with any necessary backfilling facilitated by recall of ND staff from elsewhere in HSE and from limited recruitment from HSE's other specialist divisions. In the first 6 months of the current financial year, Division 6 accounted for just over 3% of overall ND inspector effort. With the addition of a small number of additional staff to the existing Division 6 assessment team, we anticipate that by the end of the financial year this will have risen to no more than 5% of total effort.

No staff have been transferred into Division 6 at the expense of site inspection effort, and that work has continued to be given the highest priority. There is, however, some evidence that ND's permissioning activities that are not safety critical but have commercial implications (e.g. NDA competition schedules and safety case assessment to permit plant re-starts) have seen some delays, but this is largely to do due to ND resourcing difficulties more generally rather than to the deployment of experienced staff into the new Division. In itself, this does not imperil the safety of nuclear activities, but may be leading, for instance, to delays in giving permission for plant restarts. Such delays are unfortunate (and potentially costly to the nuclear industry) and are minimised wherever possible by careful management. ND is planning to address its current staffing shortfall, and to staff up Division 6 to allow step 3 assessments to meet planned completion targets by recruiting new staff over the next few months. If numbers recruited turn out to be less than required, then difficult decisions will need to be made regarding the utilisation of ND's resources, including the allocation of ND staff to GDA work in 2008/9. This has to be seen against the age profile of nuclear inspectors and increasing demands for regulatory attention from other sectors of the civil and defence nuclear industries.