

Open Government Status: Fully Open

**HEALTH AND SAFETY COMMISSION
NUCLEAR SAFETY ADVISORY COMMITTEE**

Meeting Date - 23 February 2006

**The Review of NII's SAPs
A Status Report**

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Cover Note

Issue

The project to benchmark and review NII's Safety Assessment Principles is in the final editorial phase. A text is to be issued for public consultation on 31 March 2006.

Action

The attached Status Report is being issued for information. NuSAC is invited to note the work undertaken to benchmark the SAPs against IAEA standards and to address key issues. Attention is also drawn to the process to seek early engagement with principal stakeholders to achieve a draft for public consultation.

Background

The project was started in January 2004 and terms of reference and an outline project plan were presented to NuSAC in March 2004 (NuSAC (2004) P4). In July 2004 a further presentation was made (NuSAC (2004) P10) on the progress with addressing the key issues, with commencing the benchmarking and the intentions in regard of the structure and architecture of the revised documents. Since then NuSAC has monitored the project through the reports of the Chief inspector and specific engagement by members of sub-group RG1.

Summary

The project is in the final editorial phase in preparation for publishing a text for public consultation on 31 March 2006. A major part of this project has been to benchmark its 1992 SAPs and supporting technical assessment guides against the IAEA Requirements and Safety Guides. The results of the benchmarking have been used in the redrafting of the SAPs. All the technical issues identified early in the project have been addressed, although the approach to societal risk still needs confirming. NII took the risk of making the early draft sections available to stakeholders via a SAPs web page, despite known inconsistencies at that stage. Resources shortfalls have led to slippage and a much narrower window of opportunity for comments than originally intended. The resultant SAPs provide important guidance on the application of ALARP and proportionality and on expectations for safety cases and safety management systems. NII believes that they will be fit for purpose for any future assessment of new facilities and clearer in their application to existing facilities.

Status Report

INTRODUCTION

1. The permissioning process of HSE's Nuclear Installation's Inspectorate (NII) includes assessment of safety submissions made by licensees of nuclear installations, to determine if the safety measures for any proposed activity meet legal requirements. NII has developed regulatory assessment guidance for its inspectors, including its published Safety Assessment Principles (SAPs). Since these were last revised in 1992 there have been several developments leading to the conclusion that a review and revision of the SAPs was timely. Among these are the publication of HSE's Reducing Risks, Protecting People (R2P2) (HSE Books, 2001) and Guidance on ALARP - As Low as Reasonably Practicable (<http://www.hse.gov.uk/risk/theory/alarp.htm>) and changes in the focus of work in the nuclear industry towards decommissioning. Another driver is the UK's work with its partners in the Western European Nuclear Regulators Association (WENRA) to harmonise regulatory standards. Within this context NII has benchmarked its Safety Assessment Principles against IAEA standards and is revising them accordingly.

BACKGROUND

2. The 1992 SAPs were themselves a revision of earlier guidance and incorporated revisions arising from the public inquiry into the building of the Sizewell B PWR. However, because they were primarily developed to provide guidance to NII's inspectors in the assessment of the construction and commissioning stages of a new nuclear power plant, there has had to be considerable discretion and judgement from individual inspectors when it has come to applying the guidance to ageing plant undergoing periodic review and to the expanding programmes of decommissioning and site remediation in the UK.
3. The 1992 SAPs required additional detailed guidance and a series of so called Technical Assessment Guides (TAGs) were produced over several years on an "as needed" basis by NII's various specialist groups, more recently formalised into a number of Nuclear Topic Groups (NTGs). The TAGs are not comprehensive and many are in need of major review. Recently all that are fully open have been published. (http://www.hse.gov.uk/foi/internalops/nsd/tech_asst_guides/index.htm)
4. A review was started in 1999 with a view to a revision of the SAPs by the time of their 10th anniversary. This identified that there were omissions and areas needing clarification, but proposed that the changes be kept to a minimum. However, the then Chief Inspector of Nuclear Installations, Mr Laurence Williams decided that the international drive towards better harmonisation required a much more substantial project including a benchmarking against relevant international good practice. It was the UK view that the IAEA Requirements and associated Safety Guides represented the international consensus on relevant good practice, and no longer the lowest common denominator, as they had been regarded in the past.
5. At the same time a strong message from licensees was being put to the HSE that, with the increasing focus of the industry on decommissioning, any revision of the SAPs should address this activity and that the guidance should recognise the need for a proportionate approach as hazards are reduced.
6. In 2003 therefore the author was invited to stay on beyond retirement in order to lead a project to review and revise the SAPs with the following two objectives:

- a. Undertake a review of NII's SAPs and TAGs by benchmarking against IAEA Standards to identify whether the relevant safety principles, requirements and good practice, set out in IAEA Safety Fundamentals, Requirements and Guides, have an equivalence in NII SAPs and TAGs; and vice versa.
 - b. Manage the revision of the NII SAPs in order to meet the needs of the future radioactive waste management, remediation and decommissioning activities of the industry and taking account of the results of the benchmarking.
7. It should be noted that in embarking upon this project NII was not expecting any step changes in its assessment philosophy and neither was it attempting make its SAPs into a clone of the IAEA standards. The SAPs are guidance to NII's own inspectors to aid their assessment of licensees' submissions within the UK legal framework. The SAPs are not intended to be design principles for the licensees. The relevant IAEA standards are available for that purpose.
 8. The project started in January 2004 and a strategy was developed for the new SAPs to be an electronic document with a structure that would enable it to be further developed in future revisions to form part of wider principles for regulation, as opposed to being focused only on safety assessment as in the present review. The original intention was for a text to be issued for public consultation at the end of November 2005. Due to NSD's resource shortfall, the NSD Management Board (NMB) decided to extend the date for going out to public consultation to the 31st March 2006, but achieving this has still proved a challenge.
 9. Late in the project the government announced its energy review. The revision of the SAPs is clearly of significance in that the new SAPs need to be in place as the basis for any pre-licensing assessment that might be requested of HSE. The timescales are such that it is important for the SAPs to be issued, consulted upon, and finalised before the outcome of the review is announced later this year. The plan is therefore to publish a draft document on 31st March 2006 with 2 months for public consultation. The final version should then be available in October 2006. The revision of the supporting TAGs is a separate project to be started in 2006.

THE PURPOSE OF THE REVISED SAPS

10. The primary purpose of the SAPs is to provide NII's inspectors with guidance as to what they should have a reasonable expectation of finding in a safety case and in the associated management arrangements for its preparation and implementation. The law in the UK requires that the risks arising from work activities, to both workers and the public, must be reduced so far as is reasonably practicable. Thus the SAPs are not lists of requirement to be complied with, but expectations to be met so far as is reasonably practical.
11. A subsidiary purpose is that by publishing them, they should provide operators of nuclear facilities with guidance on the development and presentation of a written assessment of the safety of a nuclear facility. This is a requirement on regulators set out in the IAEA Requirements document GS-R-1 (Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety).
12. The project also fulfils a further requirement on regulators in GS-R-1, which is that they should keep their principles, regulations and guidance under review, taking account of international standards.

TECHNICAL ISSUES

13. A major issue was a realisation that the 1992 SAPs inadvertently encouraged licensees to produce safety cases that were based primarily on demonstrating that probabilistic risk targets were met rather than first demonstrating how the engineering good practice would deliver safety with PRA being used to demonstrate a balance of risk across the design. This was thought to be mainly a presentational problem, as there was no guidance on the regulatory expectations from a safety case and the section on risk criteria preceded the section on engineering with little explanation as to the relationship between the two. Associated with this was the identified need to give much more guidance on demonstrating that an activity or design met the legal requirement to be "ALARP". Within the series of TAGs, one on ALARP and two others on safety cases were subsequently developed with an understanding that any subsequent review of the SAPs would need to provide a high level link to them.
14. Another key issue was that of societal risk. The 1992 SAPs used a surrogate approach by stating the permitted amounts of iodine and/or caesium equivalent that could be released in a major accident. Subsequently it has been shown that the quoted release quantities did not produce the level of consequence that had been assumed back in 1992, where societal risk was taken to have consequences of one to several hundred cancer deaths, as adopted in the Hinkley Point C public inquiry report by Michael Barnes QC. R2P2 also addressed the topic of multiple fatality accidents by proposing that an accident producing 50 deaths or more from a single event was intolerable if it had a frequency greater than one in five thousand per annum. However, it did not discuss events where the consequences were stochastic and may include delayed deaths. Neither did it recognise in detail the other measurable societal effects such as evacuation and food bans.
15. The studies undertaken in support of this project are investigating an approach that sets a BSO and BSL for 100 cancer deaths as a site risk (the 1992 SAPs surrogate approach related to a single facility), but this is not yet established nor agreed.
16. It should be noted that the more recent major facilities were approved for construction before the 1992 SAPs were published. Regulatory approval was based on detailed cases that fully assessed the consequences of accidents and applied an ALARP approach.
17. The 1992 SAPs were written in terms of a single facility, stating that the risk from a site with 2 or 3 facilities would not be significantly different enough to require additional site criteria. Since 1993 however it has been realised that there are one or two multi-facility sites where the site risk from the addition of many facilities is a significant issue. It has therefore been deemed necessary to add guidance and additional criteria to address this.
18. Among the other issues identified in the 1999 review the most significant one was the need to include more guidance to our assessors on aspects of managing for safety and on human factors. The treatment of these topics in the 1992 SAPs had been felt to be rather superficial. We have also attempted to rectify the absence in the 1992 SAPs of guidance on the purpose, content and use of safety cases.

BENCHMARKING THE SAPS AGAINST IAEA REQUIREMENTS AND GUIDES

19. This was a 1-year exercise undertaken on HSE’s behalf by 3 consultants that included 2 recently retired Deputy Chief Inspectors and completed in April 2005. The scope of the work included the TAGs as well as the SAPs and the benchmarks were the IAEA suite of Fundamentals, Requirements and Safety Guide documents. Documents on topics outside of NII’s responsibilities such as transport, waste disposal, ore mining, etc. and certain draft documents were excluded. The requirement document NS-R-4, on Research Reactors, was also omitted at first but was later added because of its guidance on the proportionate approach. The project also reviewed the output from the WENRA harmonisation project to ensure the two were consistent and that the benchmarking had not missed any important issues.
20. It has been NII’s intention for the SAPs to have equivalence to the relevant IAEA Requirements, although there are points in the Safety Guides that were felt useful to retain at the SAPs level. The problem for the project was the very large number of “shall” statements in the 10 Requirements documents (600 plus), many of which were felt to be too detailed and prescriptive. It was necessary therefore to make a judgement as to which were the substantive high-level requirements and which were subordinate. It has been a recommendation to the IAEA to consider identifying the more important substantive requirements in future requirement documents, with other material used as high level supporting guidance necessary to clarify understanding.
21. The benchmarking exercise resulted in about 280 recommendations for the SAPs, which have been used as an input to the redrafting stage of the project. There were many more recommendations for the TAGs. Although the project did not set out to identify recommendations for the IAEA, about 20 issues were identified in passing, which have been fed back to the Agency. The UK reservations with the IAEA standards are principally that
 - a. The requirements are generally too detailed and prescriptive and are at too low a level to be formulated as principles, and
 - b. The concept behind the IAEA hierarchical structure does not fit well with the UK’s legal framework. (See Fig. 1).

IAEA documentation	Purpose	UK Position
Fundamental Principles	Government Policy	Including in SAPs as appropriate
Safety Requirements	Law and or regulations (mandatory), phrased as “shall” statements	UK regulation is non prescriptive. Cannot use “shall” in Guidance
Safety Guides	Good Practice Guidance (non-mandatory), phrased as “should” statements	We will adopt or refer out wherever possible

FIG. 1 The IAEA Document Structure

22. The main issue relates to the IAEA expectation that Requirements should translate into regulations in member states. The UK law in respect of health and

safety is non-prescriptive and goal setting. Regulatory expectations as to what might be regarded as suitable and sufficient to satisfy legal requirements is set out in guidance to inspectors, of which the SAPs form part. Since such documents are not in themselves regulations they cannot use the word “shall”. However, in judging that duty holders have reduced risk so far as is reasonably practical (which is what UK law requires) reference is made by inspectors to “relevant good practice”, and the IAEA requirements and guidance would fall into that category.

THE STRUCTURE OF THE NEW SAPS

23. The new SAPs consist of a set of Fundamental Principles, followed by a series of principles for safety and radioactive waste management, set out in thematic chapters. These principles are as generic as possible, equate to the more substantive IAEA Requirements and may have supporting guidance. A chapter setting out numerical targets and deterministic limits supports these. In some cases these limits will be legal ones, such as dose limits. The numerical targets are generally probabilistic, covering such things as worker and public doses in both normal operation and accident conditions.
24. The numerical targets are generally set out as a range. At the lower end is a Basic Safety Objective (BSO), which is a target that if achieved the regulator will not spend effort in seeking further improvement (although the duty holder’s legal obligation to achieve ALARP still applies) and at the upper end is Basic Safety Level (BSL), which is set to provide guidance when making decisions as to whether a risk is tolerable or not. We have redefined the L in BSL as Level rather than Limit (unless the BSL is a deterministic legal limit) so as to emphasise that the BSL as an aid to ALARP decisions and not an absolute criterion.
25. The thematic structure is as follows:
- | | |
|--|---|
| 1. Fundamental Principles | 7. Accident Analysis |
| 2. The regulatory assessment of safety cases | 8. Numerical Targets & Deterministic Limits |
| 3. Management for Safety | 9. Emergency Preparedness |
| 4. Siting | 10. Radioactive Waste Management |
| 5. Engineering Principles | 11. Decommissioning |
| 6. Radiation Protection | 12. Contaminated Land |
26. The Fundamental Principles contain four basic principles of radiological protection taken from the ICRP plus others which attempt to reflect the IAEA’s revised Safety Fundamentals (DS 298) - the difficulty here being that DS 298 has itself been going through substantial change during the same period.
27. The title is to be Safety Assessment Principles for Nuclear Installations (it was Plants). This is linked to a decision to only use the word plant in its colloquial sense. Within the main text the word facility is being substituted where plant had previously been used.

STAKEHOLDER ENGAGEMENT

28. Openness and engagement with principal stakeholders (primarily the licensees and other regulators) has been a key aspect to this project. In December 2004 a discussion document on the architecture of the revised SAPs was issued to stakeholders and placed on the HSE website. In June 2005 the project obtained its own web page (www.hse.gov.uk/nuclear/saps) and between June and

November this year early drafts were placed on the site and comments welcomed. We took a risk in doing this as these early drafts had been generated by various authors with little cross-reference to each other due to the constraints of time and resources. The result has been considerable variation in style and level of detail, despite having guidance notes to authors. Work started in January 2006 to pull all these separate sections into a consistent single document.

29. NII's resource shortfall has led to slippage and most of the draft sections were late appearing on the web. This has given our stakeholders some difficulty as the deadline for accepting comments was end November and many sections were only available 2 weeks (in some cases only 1 week) prior to this. We have therefore decided to accept late comments. Tracking the comments and their acceptance or rejection has proved to be difficult in such circumstances. The end of this phase of the project was marked by a major one-day public workshop on 22nd November organised by I.Mech.E. We have also held 4 other facilitated workshops with principal stakeholders on subjects that they have requested: these being management for safety, radioactive waste management and decommissioning, numerical targets and the application to future new build in the UK. A follow up discussion with the industry on the latter topic focusing on the key issues has also been held
30. The main stakeholder concerns arising from this engagement may be summarised as follows:
- a. *Ratchetting*: It has not been NII's intention to make any step changes in its position, although we have made it clear that there could be some changes as a result of aligning with international good practice. Our expectation is that the changes we have been making will add clarity rather than adding to the regulatory burden. This leads to the second concern.
 - b. *Regulatory impact*: Our intention has been that the changes to the SAPs should be neutral with respect to their impact on licensees. However we recognise that this is somewhat idealistic and we may also have created additional burdens unintentionally. We have therefore asked our stakeholders to draw to our attention any aspects of the draft SAPs that they see as having a negative impact.
 - c. *Flexibility*: The SAPs need to remain equally applicable in all future decommissioning scenarios and for all types of new build situations. The concern is that this may not be achieved unless drafting is very carefully thought through. We have hopefully addressed this through two of the planned facilitated workshops and by taking account of the useful submission sent to us from BNFL's Energy Unit.
 - d. *Transitional Arrangements*: Stakeholders are concerned that there should be clear arrangements for making the revised SAPs active in order to allow time for familiarisation and any training, and that it should be absolutely clear as to when new submissions will start to become subject to them. We have accepted this concern and intend to consult stakeholders on their views about the transitional arrangements as part of the public consultation exercise at the end of March 2006.
31. The I.Mech.E. November workshop attracted about 180 delegates and speakers. It marked the completion of the first drafting stage and early stakeholder engagement and was the start of wider engagement leading up to the public

consultation at the end of March. There were 4 clear issues arising from the workshop discussions:

- a. The needs for a holistic look at the new SAPs to ensure that they are self-consistent and set at the principle level.
 - b. The need to identify adequate resources to achieve the necessary priority for the management of the public consultation phase and subsequent transition to the new SAPs together with the consequential revision of the TAGs.
 - c. The need to ensure consistent and proportionate application of the new SAPs.
 - d. The need to find a means for providing advice to tier 2 contractors on how their designs and processes, which may be offered to more than one licensee, measure up to the required levels of compliance with the SAPs.
32. The first is being address by the Project Board acting as the Editorial Board. The NMB has addressed the second with additional resource released in order to secure the 31 March date for public consultation. Also, because of the strategic significance of the project in relation to the energy review announced by government, Andy Hall, the DCI who is also leading for HSE on its nuclear input to the energy review, has joined the Project Board. The final 2 issues are matters for the NMB.

ALIGNMENT WITH THE NAVAL NUCLEAR REGULATOR

33. The Naval Nuclear Regulatory Panel approached HSE early in 2005 to see if a process of alignment could be achieved through joint working so as to enable the NNRP to adopt the SAPs (except for unavoidable differences) as its assessment standard. This was agreed and a steering group was set up. NNRP used Serco to advise it of changes required to allow alignment, and these have been taken into account in the editing of the SAPs. No major stumbling blocks to alignment have been identified to date and NNRP should be able to adopt a set of SAPs that will only depart from those of NII in minor detail.

EDITORIAL PROCESS

34. The Editorial Board started its work on 11th January and this marked the start of a top down process as opposed to the bottom up process that had been used to produce the first web drafts. Prior to this it was necessary for all the Nuclear Topic Groups to meet and resolve the comments received from the stakeholder engagement in the short period between 1st December and 10th January. This was complicated by the late arrival of comments during December so that comment tracking (identifying which have been accounted for and which have not) has been difficult. The audit trail cannot therefore be guaranteed, but we have made best endeavours in the limited time available to account for as many comments as possible and to make sure that those not considered are taken forward for consideration in the public consultation.
35. The comments addressed in the post-November period included, in addition to those from stakeholders via the web, those from an independent review by Vectra (using the authors that conducted the benchmarking study against IAEA standards) and those from the Naval Nuclear Regulatory Panel (NNRP) as part of the process of alignment.

36. In the final editorial stage the near final text will be subjected to a plain English review and will then have 3 parallel reviews:
- a. A final independent technical review by Dick Taylor (ex BNFL) and Jim Furness (ex NII);
 - b. A final internal review by the Nuclear Topic Leaders and the Chief Inspector;
 - c. A consistency and gap review set against the WENRA commitments.

PUBLIC CONSULTATION

37. A communications plan has been prepared for the consultation. The revised SAPs will be published on the SAPs page of the HSE website in a down-loadable (Acrobat) format. We will print and send copies to those that do not have Internet access. In addition to a press release, we are identifying all interest groups in order to contact them and we are planning a series of regional half-day seminars through BNES at the beginning of April. A consultation paper, setting out the purpose of the consultation and the responses required will be published with the SAPs. This will also contain our preliminary view on the impact of the SAPs upon those we regulate.

CONCLUSIONS

38. NII is approaching the final public consultation phase of this major project to review and revise its safety assessment principles. A major part of this project has been to benchmark its 1992 SAPs and supporting technical assessment guides against the IAEA Requirements and Safety Guides. The UK recognises these as representing the international consensus of relevant good practice in nuclear safety. The results of the benchmarking have been used in the redrafting of the SAPs and NII took the risk of making the early draft sections available to stakeholders despite known inconsistencies at that early stage. All the technical issues identified early in the project have been addressed, although the approach to societal risk still needs confirming. NII's resource shortfall has led to slippage and a much narrower window of opportunity for comments than originally intended, but, despite this, stakeholder engagement has proved very useful in eliminating unnecessary problems and issues and in identifying some key aspects for consideration by the editorial board. This will assist the main public consultation on the revised SAPs, planned from April to May 2006, by ensuring that major issues have been dealt with in advance. It should also ensure that the consultation is completed in the 2 months available, and so enable the conclusions of the consultation to be reported to government before the completion of the energy review. The resultant SAPs provide important guidance on the application of ALARP and proportionality and on expectations for safety cases and safety management systems. NII believes that they will be fit for purpose for any future assessment of new facilities and clearer in their application to existing facilities.

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31 January 2006