

SIZEWELL A RESPONSES TO CONSULTANT PAPER R3093-A1

Response to a report by Large & Associates, commissioned by the Shut Down Sizewell Campaign, examining the ‘Adequacy of the Sizewell A Fuel Element Debris Consultation Documentation and Information’

Introduction

Magnox South is pleased to have the opportunity to respond to the paper mentioned above which was produced in order to take advantage of the provision for comments to be submitted on the adequacy of background documentation in respect of management options for Sizewell A (SZA) Fuel Element Debris. The papers under consideration are:

‘**Briefing Paper** for the Assessment of Short-listed Options for the Management of Fuel Element Debris at Sizewell A site’ and

‘**Technical Paper** for the Assessment of Short-listed Options for the Management of Fuel Element Debris at Sizewell A site’.

The response to those papers in terms of their adequacy for the purpose of assessing the performance of the short-listed options was contained in the Large & Associates paper R3093-A1, which was considered at a meeting held on October the 9th 2007 at the offices of Herb Cruickshank at Sizewell A. Present were:

Herb Cruickshank – Waste Manager

Tim Gifford-Nash – Waste Strategy Co-ordinator

Donna Lugo – Project Assistant

Pete Wilkinson – External Consultant engaged in stakeholder assessment programme

Response procedure

The Sizewell A team primarily considered the document’s summary and the 33 recommendations contained in the report, and used the supporting text for clarification as required. All parties present had read the report thoroughly before arriving at the meeting.

NB: The views expressed below and the decisions made in response to Large & Associates’ paper are those of Sizewell A team and should not be ascribed to the external consultant, who was present at the meeting in an advisory capacity only.

Reactions to the Headline Concerns Expressed in the Report

Before considering each recommendation individually, those present expressed their views as to the overall tenor of the report. The reports summary expressed a view that:

- previous FED management experience at other sites had proved to be problematic and that such experience was not discussed in the two documents prepared by SZA.
- there was a ‘company view’ of the option preference and that this was not expressed in the background documentation.
- the requirements of the OSPAR agreement at Sintra in 1998 provided an incentive which pushed Magnox South (MS) in the direction of dissolution.
- only pressure from the Shut Down Sizewell Campaign (SDSC) resulted in the provision of the second paper from MS – i.e. the 36 page technical note.
- when seeking further information for the review of the papers, ‘the response was at best uncooperative and, perhaps, obstructive’.

- the papers were ‘full of jargon’, ‘findings... are presented subjectively’ and the range of potentially viable solutions are restricted.
- the process towards the FED consultation has ‘not been clear’ and information has been ‘insufficient’.
- in addition, the accompanying email from Dr John Large contained the suggestion that the report R3093-A1 be circulated to all stakeholders.

The Sizewell A team responded to these headline issues in the following way:

- There was no attempt to cover up the problems relating to previous FED management regimes which were encountered at the inception of FED handling over 20 years ago. As such, these are not seen as germane to the current situation at SZA as the proposed handling processes under review are now seen as routine and technically mature. It is MS’s view that the early problems associated with FED management were due to the novelty of the processes but that the majority of these issues have now been resolved and such management is now routine.
- There is no ‘company view’ and the assumption that there is a preferred process is incorrect. The process is designed to identify the best FED management option and MS is genuinely interested in and keen to know the views of its stakeholders before making a decision.
- The OSPAR requirements do not affect the options review as the process of dissolution – should that be the management method determined – will be completed by 2016 at the latest, well within the 2020 deadline set by OSPAR for an end to discharges, and any dissolution discharges fall well within the current limits of authorised discharges from the plant.
- Sizewell A point out that the 36 page ‘Technical Paper’ (referred to by Large & Associates in their report as the ‘issues’ paper) was not produced as a result of pressure as to the perceived inadequacy of the original ‘Briefing Paper’: the production of the ‘Technical Paper’ was planned from the start, is referred to in the ‘Briefing Paper’ (pages 9 & 15) and was seen as a reference document which those consultees, who required more detailed information on the issues raised in the original briefing, could use to gain greater understanding of the technical aspects of the options to be considered.
- While they acknowledge and regret the difficulties experienced in obtaining further information from the NDA, there was no attempt by MS to be anything other than co-operative and helpful in providing Large & Associates with further information regarding the material they were reviewing.
- SZA regrets that Large & Associates found the papers jargon-laden. That was not the intention and MS were sensitive from the beginning to the difficulties inherent in explaining a technical issue to a stakeholder group of which many are lay. As for the charge that all possible management options are not examined in detail, they were clearly identified in the ‘Briefing Paper’ Appendix 1 and we refer to the response to recommendation 6, below.
- SZA disagrees that the process has been unclear and that the information has been insufficient, notwithstanding the decision to provide stakeholders with relevant additional information as described in the recommendations section below¹. It has provided what it believes is appropriate information to a level required in order to assist stakeholders to arrive at an informed view as to the performances of a range of short-listed options against a set of attributes. It has made provision for a feed-back loop (which SDSC has

¹ Italicised text in this document indicates those issues which will be addressed by MS and included in an addendum to the original background papers.

made good use of), for the retention of other, long-listed options to be brought onto the short-list and has provided in documentation a clear audit trail of how the short-list was arrived at.

- In respect of Dr Large's proposal that the report be sent to all stakeholders, MS felt this would not be appropriate as no other stakeholder had expressed a wish to receive information beyond that provided in the original MS papers. It was felt, therefore, that providing a full response to the paper commissioned by SDSC would be sufficient and this response sent only to Large & Associates and SDSC. For those issues raised which MS felt were germane to the task of providing consultees with sufficient and additional information, an addendum would be prepared and sent to consultees. However, since Large & Associates have now put their report on their website, hence making it publicly accessible, SZA decided that they should distribute both the Large & Associates' report and the SZA response to it in order to allow a balanced view upon which consultees could base their judgements. The decision to distribute these papers was discussed and agreed with both Dr Large and, Large & Associates' client, the Shut Down Sizewell Campaign.

Responses to the individual recommendations

Recommendation 1

- 1) It is not that clear from the issues paper that the driving objective of the FED consultation is to determine the BPEO management solution so i) consultees might benefit from an introductory explanation of BPEO, ALARP, etc., prior to the consultation process; and, similarly, it is unclear how the outcome of the consultation meeting is to be conscientiously taken into account when the ultimate decision is taken so ii) this should be explained to consultees.

MS believes that the BPEO process and the objective of the assessment is clearly and adequately explained in the 'Briefing Paper' documentation (p4 & 5). *However, MS agrees that stakeholders should be made aware of the fact that the process is consultative and that MS retains the responsibility for making the decisions as to the final management option to be employed but its decision will be informed by the views and opinions of stakeholders as expressed through the assessment process. This will be included in the addendum to be sent to stakeholders.*

Recommendation 2

- 2) A previous BPEO study has been undertaken for FED management at Sizewell A (along with Oldbury, Hinkley Point and Bradwell) which, together with a strategy and updating papers, should be made available to consultees for information.

It is good practise to review a BPEO when there are environmental, political, social or legislative changes which could change the originally stated outcome. Thus SZA have reviewed the previous FED BPEO's, and have determined that there is no clear decisive answer. It was also seen in the reviews that previous optioneering had not engaged fully with stakeholders, and thus SZA are redoing the engagement process.

MS believes that sufficient and adequate summaries of previous BPEO documentation have been provided to the consultees in the 'Briefing Paper' and that the provision of further paperwork, for stakeholders who have not requested it, is unnecessary. *A statement of the reasons why other BPEO and strategy work is not relevant to the engagement process will be included in the addendum.*

Recommendation 3

- 3) Consultees should be made aware that in 2001 Magnox Generation (now MS) stated that 'the dissolution option should be maintained as the preferred option for management of all of the FED wastes at Dungeness A and as the fallback option for the remaining sites'.

This quotation refers only to dissolution being maintained as the preferred option at Dungeness A but only, as it states, 'as the fallback option' (i.e. not the preferred option) at the remaining sites. At the

time of writing this strategy document in 2001, encapsulation of FED as ILW was the preferred option (or ‘baseline’) for these remaining sites, namely Hinkley Point A, Oldbury, Bradwell and Sizewell A, as it was the most technically achievable option which had Regulatory approval. Dissolution was the fallback due to Magnox Electric’s concern at the time that the regulators perceived it to be a ‘dilute and disperse’ option. This concern has subsequently been allayed.

Recommendation 4

4) Consultees would benefit from further explanation of the MAUA process, perhaps running through a straightforward illustrative example prior to their engagement in the FED process, together with an outline of the rigour of analysis that is to be adopted by the facilitator in the post-meeting processing of the FED consultation inputs.

The proposed process is not a MAUA. As mentioned in Large & Associates’ report, this process is usually used for technical or engineering assessments. The process to be used will be a best practical environmental optioneering analysis, following regulatory policy documentation such as ‘Policy for the Long Term Management of Solid Low Level Radioactive Waste in the United Kingdom’ and before that, Cm2919. The BPEO process is a sub-group of a MADA, but specifically focuses on providing the most benefit or least damage to the environment as a whole. The process has been summarised in Part 6 of the ‘Briefing Paper’ and Part 1 of the ‘Technical Paper’ and will be explained in detail by the facilitator before commencement of proceedings on the day of the assessment.

Recommendation 5

5) The independence of the MAUA facilitator should be established, particularly if NNC is to provide this service noting that its holding parent is the construction company AMEC which has a strong commercial interest in nuclear decommissioning works.

The facilitator for the day will be Stephanie Wagstaff, who has 16 years experience of working with environmental consultancies and directly in industry, both nuclear and non-nuclear. Her work has focussed on contaminated land (radiological and non-radiological) and general water resources, including time as a technical officer for the National Rivers Authority, a precursor of the Environment Agency. Specific projects have included Integrated Pollution Prevention Control (IPPC) Environmental Reviews for brick works, tile manufacturers, a zinc galvanising and steel fabrication plant and conducting BPEO studies for specific waste streams on nuclear sites.

Although she works for AMEC Nuclear, neither she nor SZA believe this biases her in any way and the independence of her as a facilitator will be addressed at the beginning of the meeting. NNC is now defunct.

Recommendation 6

6) The issues paper should have included, at least, i) a listing of all of the options considered by MS prior to the 4 option short list being settled, and ii) the methodology of how the range of solutions had been reduced to the options short list should have been explained.

The long-list of options is given in Part 4 of the original ‘Briefing Paper’. Appendix 1 of that paper gives the short-listing rationale. Both SDSC and Large & Associates have also been provided with copies of May Yeung’s ‘Technical Optioneering Report’ which elaborates on the entire process and how the long list of options was short-listed.

Recommendation 7

7) Consultees might wish to explore the ‘do nothing’ FED management option, particularly with reference to the OSPAR agreement requiring a reduction of discharges by 2020.

The consultees were invited to re-introduce any of the options which were listed in the ‘Briefing Paper’ Appendix 1, if they felt they warranted further assessment during the process. The ‘do nothing’ option is one of those options but in reality it is not one MS can consider, given that the regulators require the FED to be dealt with in a timely manner. However, to reiterate, it is an option which can be brought back onto the short-list through the provision SZA has made for additional options to be considered.

Recommendation 8

8) Consultees might wish to consider if the ‘operational restraints’ referred to in the issues paper (p2) leading to the cessation of desplitting at Sizewell in or about 1994 had any material bearing on the final short listed options.

MS believes that these ‘operational restraints’ are described adequately in the ‘Briefing Paper’ (p6) documentation. However, the impact of the cessation of desplitting at SZA in 1994 does indeed have an impact on the final short-list of options, in that it allows disposal of the waste as LLW to be put into the assessment options. SZA was the first Magnox site to contemplate this opportunity, as the waste has been able to benefit from the radioactive decay processes.

Recommendation 9

9) The issues paper (p26) refers to the ‘regulators nor the NDA’s favoured option’ so it might be useful for the consultees to be informed of this ‘favoured option’.

It is the fact that options which do not remove the waste from the site are, defacto, not the NDA’s favoured option, the same as options which interfere with site clearance. Both of these are the cases for the encapsulation of FED as ILW, as it requires the construction of a new ILW store and the waste remains on site. This does not mean, however, that there are preferred options beyond those which allow the decommissioning programme to move forward. Therefore, as there are options in both dissolution and encapsulation which accommodate off-site disposal of the waste with no delays to site clearance, there are no preferences or favoured options, as long as the option selected provides safe and justifiable management of the waste stream.

Recommendation 10

10) For and prior to the stage of the process at which consultees are expected to agree the attributes list, the consultees should have reference to MS’s objectives and principles, the NII regulatory requirements, and government policy directives for radioactive waste.

MS agrees that internet links to appropriate and relevant policy directives should be made available. These will be included in the addendum.

Recommendation 11

11) An attribute covering company or corporate risk should be included in the MAUA.

This assumes that MS has a preferred option which is not the case. The risks posed to MS by any of the options should not be and are not relevant to a public consultation. Although not costed, the majority of the risks to the company are covered in the attributes of 4.1 ‘Technical Maturity’, 4.2 ‘Technical Reliability’ and 5.2 ‘Stakeholder Acceptability’.

Recommendation 12

12) It will also be necessary to make consultees aware of any discharge (both marine and atmospheric) authorisations that may be required, depending on the particular option and the time and (radio) activity limitations imposed by international treaty, such as OSPAR and/or local classifications such as RAMSAR (Wetlands Convention), along with progress on the Environmental Impact Assessment for the site and the final option.

Discharge profiles for the options are discussed in the ‘Technical Paper’ documentation. No new authorisations will be required for any of the options under consideration. The site has already completed its Environmental Impact Assessment for Decommissioning (EIAD), which was issued for public consultation in September 2005 and approved by the HSE in May 2006. Any further EIA requirements will be undertaken only after the decision is made over the management option. RAMSAR considerations did form part of the EIAD. All FED management operations, including discharges to air or water at Sizewell are expected to be completed by 2016.

However, the OSPAR requirements are implemented in the UK through the UK strategy for radioactive discharges 2001-2004 issued by DEFRA. The current targets set in this document set limits for critical

group doses of the general public to an estimated mean dose of no more than 0.02 mSv a year from liquid discharges from 2020 onward. Sizewell A RSA authorisation limits for liquid discharges are already well below this limit at 0.00065 mSv per year. Of course the application of BPEO/BPM will ensure discharges will be driven to maintain critical doses ALARP.

Recommendation 13

13) The existing nominated attributes do not include for a number of important issue, for example i) malevolent acts (terrorist, sabotage, etc), ii) extension of the overall operating time for the FED management process at the Sizewell site, iii) storage of processed products in the longer term, and iv) the justification and sustainability of the process and its outcome.

(i) SZA believe that FED is not considered a prime terrorist target since it is stored in flooded cells and given that other targets more attractive to terrorists exist on site, such as the spent fuel. None of the options for the management of FED at Sizewell A present a heightened target for terrorism and all options will have the necessary precautions put in place against the risk of terrorism during the design stage.

(ii) Attribute 4.3 ‘Timescale (Implementation / Processing)’ adequately covers the issue of any extensions to the operating time for FED management.

(iii) ILW storage as a means by which the overall time for FED management at SZA might be extended are discussed in Part 1 of the ‘Technical Paper’, as is the issue of LLW management.

(iv) SZA believes that there are adequate attributes to cover the sustainability and justification issues in the proposed assessment process but these can be challenged. Sustainability is covered by the employment of the ALARP principle in attributes 3.1 ‘Primary Radioactive Waste Volume’ and 3.3 ‘Radioactive Discharges’, which assess the issues of meeting the needs of the present generation, without compromising those of future generations. Attributes 4.1 ‘Technical Maturity’ and 4.2 ‘Technical Reliability’ are germane to the issue of justification.

Recommendation 14

14) The MS list of attributes needs to be reviewed with certain attributes being defined as binary, that is those that do not require the extensive assessment that a quantitative MAUA requires to obtain a robust choice result – in this respect, limiting the number of primary attributes to six for four options will be more suited to the time allocated for the FED MAUA process.

The binary nature of the attributes is something the facilitator will be asked to assess, as mentioned in both the ‘Briefing Paper’ (p14) and the ‘Technical Paper’ (p7). *Further clarification of revising the number of attributes will be included in the addendum.*

Recommendation 15

15) Consultees should be cautioned about prejudging the attribute rating by reference to certain of the entries of the MS issues paper, although note the caveat in PART 3 of the issues paper.

As noted in the ‘adequacy review’, a caveat to this effect is contained in the ‘Technical Paper’. A similar caveat was also included in the covering letter which accompanied it. However, the facilitator will be asked to reiterate, on the day, the caution about not being led by the ratings.

Recommendation 16

16) If the issues paper attribute ratings (ie Negligible, Marginal etc) are to be relied upon then further explanation and definition should be provided to the consultees.

SZA will undertake to give definitions of the rankings it has provided, as a guide from ‘negligible’ to ‘critical’ and will provide these in the addendum. The justification for the ranking is contained in the supporting information provided for each option in the ‘Technical Paper’.

Recommendation 17

17) None of the four options seem to give account to the gaseous discharges of tritium and C-14 that are likely to arise in the FED handling and processing for all options, albeit in different amounts.

There is expected to be no C-14 in gaseous discharges. Tritium is mentioned in the option supporting information but is thought to be negligible in impact, i.e. unquantifiable. *However, SZA undertake to investigate this issue further and to report back its findings in the addendum.*

Recommendation 18

18) Rather than make a comparison with a commercial aircraft flight (ie the claimed dose equivalence of 5 seconds at 30,000 ft), the consultees might prefer to consider the proportion that the FED discharges represent to i) other decommissioning discharges and ii) to the Sizewell site overall - the comparison of FED dissolution discharges to normal discharges over the entire site (penultimate para p19 issues paper) at a rate of 2% is at odds with the projections given for Dungeness FED.

(i) FED discharges are expressed as circa 2% of overall site discharges and represent figures provided by the EA. MS feels this gives a clear view of the scale of discharges associated with FED management options.

Projections contained in papers referenced at footnotes 33 and 34 were ‘desk top’ predicted discharges estimates based on pessimistic assumptions which did not materialise operationally. The figures quoted for SZA have the benefit of being projected after 20 years of operational experience at Dungeness. In addition, the FED at SZA has been decaying for 20 years and therefore gives good grounds for the accuracy of the projections made.

(ii) The stakeholder engagement process endeavours to draw in members of the public from all walks of life. Many of these stakeholders are not familiar with units of radiation dose and therefore have to be provided with a familiar gauge that will allow them to understand the significance of the exposures from FED processing. The analogy that is often used is the comparison to background radiation that we all are exposed to. The analogy of increased cosmic radiation received during an airline flight provides a proper gauge to judge the added radiation exposure from FED processing. This type of analogy is also used by government in the above referenced document, UK strategy for radioactive discharges 2001-2004, which implements the OSPAR agreements. In this document the government states that the 2020 goal of 0.02 mSv per year is equivalent to the dose received by a person taking one return flight between London and the Canary Islands.

Large & Associates commented that the statement by MS, claiming that the radiological impact and resulting critical group dose at Sizewell for about the same level of overfall discharges is about one-sixth of that at Dungeness, is not substantiated in the issue paper. MS would point out that the information provided in the ‘Technical Paper’ in table 7, which points out this difference, was taken directly from the 2001 Environment Agency Proposed Decision Document and needs no further substantiation.

Recommendation 19

19) There is some confusion about the applicability of the issues paper 0.003 $\mu\text{Sv}/\text{yr}$ public dose for Sizewell A, particularly when compared to similar projections for Dungeness A, Bradwell and an earlier analysis for Sizewell A, with the issues paper critical group dose for the FED dissolution process being uncharacteristically low at 0.003 $\mu\text{Sv}/\text{yr}$.

The footnote 39 refers to the zero discharge option at Bradwell and is therefore inappropriate data.

The performance data from the FED Dissolution Plant at Dungeness A (DNA) was used to determine the effectiveness of a similar plant proposed for dissolution of the FED at Sizewell A (SZA). Data was taken from two studies that characterised the FED at DNA. The first study was conducted in 1984 by the Central Electricity Generating Board (CEGB) and supplied characterisation data for the FED splitters. The second study was done in March 2004 and describes the radiological characterisation of the DNA lugs.

The DNA characterisation data from the above reports was decay corrected to the date of decay correction of the SZA FED (February 06) cited in the Sizewell A FED characterisation report issued by WMT (WMT 06 P116 Issue 1, ‘Technical Paper’ Reference 4). This allows a direct comparison of the activity of the FED between the two plants.

The decay corrected comparison shows that the activity between the two stations is essentially equal with DNA being 8.41 GBq/t compared to 7.48 GBq/t for SZA. Doses related to discharges in Large & Associates’ referenced projections were calculated based on FED activity at the time of the proposed discharges. The current estimation of dose due to discharges benefits from 20 more years of radioactive decay and so the doses are naturally much lower, due to radioactive decay of the principle isotopes (i.e. Fe-55, Ni-63, Co-60).

The specific activity of the FED in many BPEO studies (e.g. BPEO for Management of FED at Bradwell, Hinkley Point A, Oldbury and Sizewell A, TE/GEN/REP/0153/96, July 1997) was based on Nirex 1994 inventory data which is a calculated activity and results in a conservative estimate of the FED activity, of approximately 3 orders of magnitude greater than recent characterisation data obtained in 2006 from direct sampling of the FED. This has a significant impact on critical dose calculations for dissolution discharges. This resulted in a Nirex based critical dose estimates of 22 μSv over 5 years starting in 2004 or 4.5 $\mu\text{Sv/yr}$. If this number is reduced by 3 orders of magnitude to match current characterisation data the dose is 0.004 $\mu\text{Sv/yr}$, which is very close to the current critical dose estimate of 0.003 $\mu\text{Sv/yr}$ based on actual FED sample data.

Recommendation 20

20) It would assist the comparison between the different Magnox stations if the FED tonnage, public critical groups and dominant dose uptake paths for each location is provided to the consultees.

Comparisons between different Magnox stations are useful in regards to end results of options as measured by the dose to the critical group from discharges. Information comparing Dungeness discharges to Sizewell A discharges and the resulting doses to the critical group was provided in the ‘Technical Paper’. Detailed discussions of uptake paths are beyond the scope of the engagement, other than that the critical groups for the discharge paths have been identified and that approved pathway models were used to calculate the doses. FED volumes, tonnes, physical characteristics, present conditions, isotopic distribution etc. are widely varied between sites and do not add any clarity to the SZA optioneering.

Recommendation 21

21) It would be useful for the consultees to know if the dose predictions of options 1 and 2 include for any additional campaign to deal with the Magnox lugs (if stored separately at Sizewell as at Dungeness).

As is detailed in the ‘Technical Paper’ introduction (p 2), Magnox lugs are mixed in together with the splitters and not stored separately, and therefore form part of the overall retrieval and processing project.

Recommendation 22

22) It would be useful if consultees were able to compare the monetary worth per man-Sv for the 4 options examined applied to operator collective dose.

Health Protection Agency guidance recommends against comparing monetary value against dose. Comparison of the dose uptake for each option is comparable enough for the consultees. Assigning a monetary value to this would merely be multiplying all these dose uptakes by a fixed amount, giving no further clarity.

Recommendation 23

23) Explanation of the reasons for the differences in the operator doses for different Magnox power stations might be helpful to the consultees

The reason for the differences in operator doses between different Magnox stations is that at SZA, retrieval is included as part of the assessment for all options, whereas at Bradwell, the dose indicated in Large & Associates' report is purely for the processing of the FED, through dissolution, encapsulation and transportation of the material and does not relate to the retrieval operations required to recover the waste prior to this processing. It should also be noted that the values quoted in the SZA 'Technical Paper' are total dose to operators and not per annum doses, as misquoted in Large & Associates' report, where-as the Bradwell data is per annum, and so total operating time needs to be taken into account.

Recommendation 24

24) A copy of the MS paper Technical Specification for a Fuel Element Debris Retrieval and Processing Facility might assist the understanding of the consultees as to why these significant operator dose differences arise from station to station.

Footnote 41 refers to a commercial tender document and is therefore subject to commercial confidentiality restrictions. However, the requisite pertinent information from this document was used to develop the 'Technical Paper'.

Recommendation 25

25) Explanation of the reasons for the significant differences in the projected operator doses for over the Magnox power stations might be helpful to the consultees.

See response to recommendation 23.

Recommendation 26

26) For both critical group (public) and operator (on-site) dose assessments it might be useful for consultees to have reference to the pertinent collective doses (man Sv).

ICRP 60, Basic Radiation Safety Standards and Ionising Radiation Regulations (IRR99) recommend control of public exposure by implementing controls at the source through the practice of constrained optimisation and the use of prescriptive limits through the concept of the critical group. The control of the source is provided in the discharge activity limits set by the EA for the site in the RSA and was provided in table 7 of the 'Technical Paper'. The dose limits for the public is set in IRR 99, Schedule 4, at 1 mSv per calendar year for any person other than an employee or trainee, including any person below the age of 16. This information was provided in the 'Briefing Paper' (p5). The ICRP guidance is based on mean dose in the critical group not the collective dose of the critical group.

Collective dose for operators is provided as a comparison of options on page 12 of the 'Technical Paper'.

Recommendation 27

27) Very little detail or explanation is provided in the issues paper on accidents and the risks and radiological impacts arising therefrom. For this information the consultees will need to refer to further information given in other documentation that has not been provided in advance of the consultation.

Data on the consequences of accidents has not yet been calculated. This data will form part of the safety case and therefore calculations will only be undertaken as an exercise after selection of the preferred option. It should be pointed out that should the FED be disposed of as LLW it will not have any higher risk for accidents or terrorist attack than any other LLW shipment that is routinely shipped from the site. Current safety cases, security procedures, quality plans, and transportation regulations will govern the routine shipment of LLW.

Recommendation 28

28) Accident probability and severity should be expressed in terms compatible with the SAPs, which should also be made familiar to consultees.

The safety case for the preferred option to manage FED at SZA has not yet been undertaken but SAPs will be used when writing the safety case, when calculating accident probability and severity.

Recommendation 29

29) Further consideration should be given to the risk of pyrophoricity for all 4 options of FED management.

It is acknowledged that there is a risk of fire in respect of Magnox metal from the ignition of uranium hydride which can be produced in FED storage vaults. The uranium hydride issue for FED at SZA has been covered in a safety case, which has been reviewed by an Independent Nuclear Safety Assessment (INSA) panel and the risk of pyrophoricity dismissed due to the cells in which it is stored being flooded with demineralised water. *A statement to this effect will be included in the addendum.*

Recommendation 30

30) Consultees might wish to consider the possibility of irradiated uranium being present in the Sizewell FED and the accompanying risk of ignition (and caesium leaching into the FED).

The ‘Technical Paper’ (p3) provided expresses the view that there is very little chance of fuel and therefore uranium being present in the FED and the safety case mentioned above has assessed and dismissed the risk of ignition. This view is based on sampling, inventory logs and surveys of the FED content. In the event that uranium was to be found in the FED, controls as to its handling, retrieval and dispatch from site, separate to the FED, will be in place to deal with this unlikely eventuality.

Recommendation 31

31) Consultees should have access to the Reactor Decommissioning Unit Risk Register that includes risks associated with the FED options of dissolution and encapsulation.

SZA is unfamiliar with this document ‘Reactor Decommissioning Unit Risk Register’. The Reactor Decommissioning Unit was disbanded in 2000 and a new group, Environmental Services formed. This group later became Project Services, now a separate company and this risk register amalgamated into new registers, to manage the risks. Although the content of this Risk Register is likely to be informative, it is now outdated and due to SZA’s inability to find a copy of this document, it cannot comment or share these risks with the consultees.

Recommendation 32

32) Construction traffic data for option 3 should be provided to substantiate that the risk of accident is significant.

Traffic data is supplied in the ‘Technical Paper’ for each option and the proposed rankings as to the impact of this traffic in that document, will be defined in the definitions of the rankings, as mentioned in recommendation 16 above.

Recommendation 33

33) The vulnerability to terrorist acts, etc., of the plants and processes used for the options should included as an attribute applied to transport and all other activities associated with the FED options.

As stated above in recommendation 13, SZA does not feel that FED is subject to a plausible terrorist risk. In addition, FED represents no greater or lesser risk than that posed by the presence of other LLW on site. *Nonetheless, MS will make a statement in its addendum paper on the issue of terrorism and threats therefrom.*