

First Consultation on the Site Characterisation Guidance - Log of comments and responses			
Please note the following:			
(I) Responding as an individual			
(O) Responding on behalf of an organisation or constituency			
Name	Organisation	Comments	Response
Question 1: The first version of the Site Characterisation guidance has been one of the most downloaded SAFEGROUNDS documents. What aspects of the guidance have proved most useful?			
Doug Graham (I)	UKAEA	Section 4: Planning the site investigation	
John Kelly (I)	Oxfordshire CC	Most useful for me are any guidance for citizens	
Andy Thomas (I)	Future Solutions	No comment	
Hugh Richards (I)	Magnox Electric Ltd (North)	<ul style="list-style-type: none"> • First and foremost: signposting of other guidance. This of course needs updating. • Almost as important – the fact that this is more or less a ‘one stop’ manual for practitioners is very valuable and should not be lost. • Guidance on background levels of radionuclides in rocks/soils (in existing section 2). A link to the discussion in section 5.4.7.1 is needed, and this could be further expanded to deal in more detail with 3-dimensional heterogeneity of background radioactivity when considering land contamination. • Systematic consideration of the varying reasons for undertaking site characterisation and monitoring (existing Section 4.1). This needs updating and also expanding to include monitoring as part of a ‘maintenance schedule’ in support of a ‘nuclear’ safety case and characterisation in support of planning applications and EIA. • Description of different types of radiological surveys (existing Section 6.1). This needs updating in light of technical advances (e.g. increased use of Exploranium, etc) and experience of using different survey methods on UK sites (e.g. in de-licensing surveys). • Suggested good practice on backfilling of investigation holes (in Section 6.3.4). • Guidance on analysis of radioactivity in soils and water (Section 6.4.4). • Suggested generic reporting structure (separating factual and interpretative) (Section 8.1). 	
Kim Baines (I)	RSK Geoconsult	I have not recently viewed the document to comment	
	DE	H&S/protection, Objectives, Planning a SI, characterisation and waste management	
Mike Wyatt (O)	UKAEA	Sections 4-8 – Essentially the planning, doing and interpreting sections. Section 6.4.3 – Analytical Testing Strategy (for radionuclides). Section 6.4.4 – Analysis of Radioactivity in Soils and Waters. Section 7.1.2 – Waste Categorisation (for radioactive wastes).	

		Section 7.1.3 – Key Issues for Waste Management (for radioactive materials)	
Peter Booth (O)	Nexia Solutions	<p>One of the most important aspects of the document has been the “one stop” approach to Site characterisation. Although not all sections are highly detailed, each section gives a good overview of the topic and each flows to the next in a logical and easy to follow manor. In addition, each section is well referenced directing the reader to further reading with respect to the specific area of interest, should more in depth information on the topic be required. This is one of the strengths of the document.</p> <p>The sections on methods of characterisation and waste management and transportation of radioactive materials area also useful.</p>	
Sue Brett (O)	Cumbria County Council	chapters 5, 6 and 7 have been most useful, in providing greater insight into how characterisation is best carried out	
Sean Amos (O)	AWE	<p>There have been a number of aspects that have proved of value. Firstly it has been a useful document to give to new members of the contaminated land community at AWE to give them insight as to some of the problems as well as some of the solutions to contaminated land issues found at AWE.</p> <p>It has also been noticeable that companies bidding to undertake ground works at AWE who have read and comprehended the guidance do submit high quality proposals even if they have not previously worked at an NII/Defence site.</p>	
Dick Haworth	HSE	I have not used it.	
Question 2: Do you agree with the proposal that the revised document focuses on providing specific guidance on the process of site characterisation, with overlaps with LMGv2 being removed and other guidance documents being signposted for information on associated topics e.g. waste management?			
Doug Graham (I)	UKAEA	Yes, let's get the document focused, remove the flannel.	
John Kelly (I)	Oxfordshire CC	Yes	
Andy Thomas (I)	Future Solutions	Remove overlaps only where there is duplication – document should still substantially be stand alone for the user where specific information is essential or helpful to complete characterisation tasks	
Hugh Richards (I)	Magnox Electric Ltd (North)	<p>Yes, in general terms.</p> <p>However, the way in which the original document deals with these ‘areas of overlap’ is</p>	

		often presented in a way that is particularly well suited to the specific audience for site characterisation guidance – e.g. flow charts for categorising wastes	
Kim Baines (I)	RSK Geoconsult	I think a brief synopsis of the associated topics should be given with clear details (full title, ISBN, etc and where the document is obtainable from) given for other supporting information to include non CIRIA documents as well as CIRIA documents where appropriate.	
	DE	Yes	
Mike Wyatt (O)	UKAEA	<p>Yes – focus the document. Remove the unnecessary padding as this just makes the document too lengthy and not particularly user-friendly. The current document appears in places not necessarily to offer best nuclear industry practice, but rather a lengthy account of available guidance offering little more than is already provided within BS10175 for example. The document should provide a stand-alone, prescriptive document, providing the necessary ‘tools’ to help determine how many sampling locations are required, where these should be located, what analysis should be undertaken, what should be done with investigation-derived waste and how the samples should be transported – all in accordance with best-practice on nuclear licensed sites.</p> <p>Needs to incorporate the overall SAFEGROUNDS flow diagrams and reference those parts of the flow diagrams the new characterisation doc applies to. Sub-flow diagrams specifically related to site characterisation and linked to the main flow diagram would be useful. These sub-flow diagrams may also be useful in rationalising the text as the diagrams could reference existing documentation (without needing to copy it) and focus on those aspects (mainly radiological) for which there is little guidance.</p> <p>Needs to emphasise that site characterisation should be driven by objective setting (ie the reason for carrying out the investigation) and should emphasise that “truth tests” should be developed during the planning of the investigation which should then addressed in the assessment/interpretation- to show that the objectives have been achieved.</p> <p>It is unlikely that “waste management” could be signposted. The issue is “waste management during site characterisation” – this particular subject can drive the chosen investigation technique – eg minimising radioactive waste spoil arisings during investigation can drive the intrusive investigation method used (boreholes in preference to trial pits). There is also the specific problem of whether the backfilling of boreholes with excavated radioactive spoil is permissible without waste disposal authorisation.</p>	

Peter Booth (O)	Nexia Solutions	The more focussed the document can be the better, bearing in mind the other documents that are being produced. So yes, reference out where possible. Importantly however, the balance needs to be right because constant referencing out to other documents can become confusing and frustrating to the reader.	
Sue Brett (O)	Cumbria County Council	yes, this seems sensible – but hyperlinks within the document would be better than just a reference, which you then need to search for	
Colin Rogers (O)	Parents concerned about Hinkley	As long as references to guidance documents (& relevant LMGv2 details) are clearly visible & easy to access	
Sean Amos (O)	AWE	It was accepted that the revised document be focussed more on the specific process of site characterisation, but with signposts incorporated to the other sections of the original report outlining the more general / introductory information. That way it was felt that the document would not become too unwieldy and also be easier to update on a regular basis as only information pertaining to site characterisations need to be considered.	
Dick Haworth	HSE	Yes (as long as the "overlaps" are place fully in context - i.e. the need is explained fully in the characterisation document - and the reference out is made clearly.	
Question 3: Is it sufficient to reference the SAFEGROUNDS regulatory framework paper or should the revised document include an updated section on the regulatory aspects relevant to site characterisation?			
Doug Graham (I)	UKAEA	I would include an updated section (albeit brief and focused) on the regulatory aspects relevant to site characterisation	
John Kelly (I)	Oxfordshire CC	Updated section on regulations to be included	
Andy Thomas (I)	Future Solutions	Include those elements relevant to the execution of site characterisation programmes	
Hugh Richards (I)	Magnox Electric Ltd (North)	A distinction needs to be drawn between regulatory requirements/regimes that can lead to the need for site characterisation and the regulatory requirements to be met during site characterisation. Updated sections on both aspects should be included, which should reference the SAFEGROUNDS regulatory framework paper where that paper provides more detail than is needed in the site characterisation guidance.	
Kim Baines (I)	RSK Geoconsult	It should refer to all aspects relevant to site characterisation rather than just the SAFEGROUNDS regulatory framework	
	DE	Only if the paper is updated regularly as and when legislation changes	
Mike Wyatt (O)	UKAEA	The revised document should include a brief updated section on the regulatory aspects relevant to site characterisation on nuclear licensed sites. It should specify what is required to ensure regulatory compliance on such sites. Needs to include waste and road	

		transport. Note the comment on waste management in Q2, which is a particular regulatory issue for excavated spoil.	
Peter Booth (O)	Nexia Solutions	The regulatory framework is extremely important when considering site characterisation work. The section needs to be retained but perhaps made more succinct and reference the regulatory framework paper for a more in depth understanding. Flow diagrams may also assist in complementing the text.	
Sue Brett (O)	Cumbria County Council	if access to the SAFEGROUNDS regulatory framework is 'just one click away', I think that this is sufficient.	
Colin Rogers (O)	Parents concerned about Hinkley	Section 1.4: I prefer to refer readers to the SAFEGROUNDS Regulatory framework paper	
Sean Amos (O)	AWE	It was agreed that a section be included but there were diverging views on the level of detail that that would entail. Varying from a brief summary with directions to more detail through to detailed enough that it could make the Regulatory Framework paper obsolete. Overall there is value to having some information present within the guidance and the stand alone popularity of the Regulatory Paper indicates the value that that paper has that should encourage its retention until such time as support wanes.	
Dick Haworth	HSE	I believe it may be helpful at this point to summarise the main regulatory requirements, regulators guidance and good practice requirements and explain the basis for each of these requirements. Then it will be appropriate to reference out to the original documents themselves (quite possibly via the medium of the regulatory framework paper).	
Question 4: Do you think that the revised document should continue to provide basic information on radioactivity in the environment? If yes, which aspects are most important?			
Doug Graham (I)	UKAEA	This topic is relevant to the measurements and should be included, as long as the section is up-to-date, useful for the field operative and very brief with references out to more detailed sources.	
John Kelly (I)	Oxfordshire CC	I think that we need to repeat basic information as reader will rarely go to other documents. Better to have all information in one document. I will have to leave the content to those more qualified in explaining the basics.	
Andy Thomas (I)	Future Solutions	No , this should be covered in LMG2 and signposted	

Hugh Richards (I)	Magnox Electric Ltd (North)	Yes, the sections on background radioactivity are a key 'added value' aspect of this guidance document. There seems to be little benefit in trying to cut down Section 2 if this is just to reduce the 'page count'.	
Kim Baines (I)	RSK Geoconsult	In theory the new document will be used by those with a radiochemistry or nuclear background, therefore the very basic radiochemistry should be removed. However I think that the sections on principal radionuclide relevant to contaminated land and background concentrations information would be useful to help contextualise the scope of a site investigation where radionuclides may be present.	
	DE	Yes, aspects 2.1 to 2.3 as shown in the document are the most important	
Mike Wyatt (O)	UKAEA	Yes – include a range of background activities associated with fall-out/weapons testing etc and naturally occurring activity across the UK. A table of 'typical' background activity would be useful as this would be helpful in providing a reality check for site-derived data analytical. References to where information on background radioactivity across the country would be useful (which is not in the current doc). The current section on background activity says nothing about how to determine what background activity for a site. Some guidance on how to go about doing this would be useful	
Peter Booth (O)	Nexia Solutions	This section is important in giving context to the subject of radioactivity in the environment and should be retained. Sections 2.2, 2.3 and 2.4 specifically are important for individuals undertaking the characterisation of potentially radioactively contaminated land, and should be updated and presented within the revised document. Section 2.1 is more general and could be omitted from the revised document, especially if similar text will appear in the revised LMG.	
Sue Brett (O)	Cumbria County Council	yes, this appears to be the best location for this information – we have found that section 2.3 is the most useful, but in terms of importance, sections 2.1, 2.2 and 2.3 are equal	

Colin Rogers (O)	Parents concerned about Hinkley	Yes: studies on background radiation, before & after generation should be closely monitored & then clearly referenced in the report 2.4	
Sean Amos (O)	AWE	Based on the fact that the whole point of these documents is addressed at part of the contaminated land community not well supported by other guidance documents then it is imperative that this aspect is maintained, if updated. It helps put other aspects of the guidance in context and explains a number of concepts, that although may be covered by Citizen Guides, are useful aide memories within this document.	
Dick Haworth	HSE	Yes, this could be helpful although I continue to have concern that the document should not be aimed at giving little knowledge to untrained and/or inexperienced operators.	
Question 5: : Do you think that the document should continue to provide information on health, safety and environmental protection? If yes, which topics would you like to see addressed?			
Doug Graham (I)	UKAEA	It should not provide information on health, safety and the environment. However it ought to include references to useful up-to-date documents on these subjects.	
John Kelly (I)	Oxfordshire CC	Again, I think that all information should be in one document with simple first aid precautions after any contact with radioactivity	
Andy Thomas (I)	Future Solutions	Yes, wherever this is relevant to the practical implementation of work in the field and in the laboratory	
Hugh Richards (I)	Magnox Electric Ltd (North)	Yes. Perhaps some parts of the existing report dealing with dosimetry and implementation of IRR99 could be cut down or consigned to an appendix. However, again, this is useful guidance to contractors/consultants who may be new to nuclear sites/radioactivity, and again illustrates the value of a 'one-stop' manual.	
Kim Baines (I)	RSK Geoconsult	I think a summary of the key legislation would be useful and details where to find additional information.	
	DE	Yes, these are key. The aspects 3.2 to 3.9 as shown in the document should be addressed as the minimum. The application of ALARP, good housekeeping, risk assessment, work control documents, PPE and safe systems of work need to be addressed.	
Mike Wyatt (O)	UKAEA	Yes – Highlighting the documentation required prior to undertaking intrusive investigations on <u>nuclear licensed sites</u> – risk assessment, H&S plan, method statements, excavation permit etc (as provided in Annex B of BS10175).	
		Include NLS-specific issues such as poorly controlled environments with wind and rain,	

		consequences of encumbered working (e.g. respirators, air-line suits), tented investigations and control of contaminated drilling returns.	
Peter Booth (O)	Nexia Solutions	<p>Again a high level summary with adequate referencing out could be sufficient. This would allow the H&S guidance to be updated separately when new guidance is issued and would also allow the case studies and examples of best practice to cover this aspect of the work. As the document notes, individual nuclear licenced sites will have their own guidance on this matter but this may differ slightly between sites. Ideally the document needs to reflect this.</p> <p>From past experience however, there is always the potential to underestimate what is actually required to move from a site characterisation design to actual implementation on a nuclear licensed site. Is it worth providing a "check list" of the types of things that could trip a contractor up if not considered at the front end of any particular project?</p>	
Sue Brett (O)	Cumbria County Council	as long as there is clear and easy access to these areas of guidance, it seems sensible NOT to retain this section	
Colin Rogers (O)	Parents concerned about Hinkley	Yes: 3.2 3.6 & 3.9 are of particular relevance to public scrutiny and should be <u>easy to find & read</u> in the reference system. <u>Access to incident reports</u> should also be available for inspection as a priority. (see other comments)	
Sean Amos (O)	AWE	There were not strong views one way or the other, but the general view was that yes Health safety and Environmental Protection did have a place within the document at a broad brush level with signposts to more detailed references.	
Dick Haworth	HSE	I would wish to discuss this at the sub-group in view of the gaps in the table.	
Question 6: : Are there any site characterisation practices and techniques contained in the existing guidance that are now considered redundant and are no longer best practice, or have previously unrecognised limitations?			
Doug Graham (I)	UKAEA	All current practices and techniques are still relevant. There should not be a move towards high tech away from tried and trusted techniques. Don't throw the baby out with the bathwater.	
John Kelly (I)	Oxfordshire CC	Not qualified to answer this	
Andy Thomas (I)	Future Solutions	No comment	
Hugh Richards (I)	Magnox Electric Ltd (North)	None identified.	
Kim Baines (I)	RSK Geoconsult	No	
	DE	Not aware of any.	

Mike Wyatt (O)	UKAEA	Prior to the collection of groundwater samples, borehole purging is often replaced by 'micro-purge' and 'low-flow' sampling techniques in order to reduce the volume of potentially contaminated wastewater requiring disposal.	
Peter Booth (O)	Nexia Solutions	Most if not all site characterisation practices and techniques in the existing guidance can still be considered best practice and therefore should not be seen as redundant. The new techniques and practices should be used where other methods cannot or must not, be used, or to enhance existing methods.	
Sue Brett (O)	Cumbria County Council	no comment – not within our scope of knowledge	
Colin Rogers (O)	Parents concerned about Hinkley	Websites & documentation should always be sensitive to change. Reference systems to be designed to note disbanded practices for a while before they are archived. (see other comments)	
Sean Amos (O)	AWE	None of the respondents believed that there was anything specifically redundant etc. There was a view that more experience had been gained by problem holders since the original guidance had been published and that this may be able to provide site specific case studies that would support future implementation of the guidance.	
Dick Haworth	HSE	No comment	
Question 7: Are there evolving site characterisation practices and techniques that have proved successful, which should be included?			
Doug Graham (I)	UKAEA	Include more up-to-date advice on characterisation of (a) heterogeneously distributed particulate activity in the environment and (b) low level alpha contamination	
John Kelly (I)	Oxfordshire CC	As above	
Andy Thomas (I)	Future Solutions	No comment	
Hugh Richards (I)	Magnox Electric Ltd (North)	<p>Yes.Examples:</p> <ul style="list-style-type: none"> • Improvements in radiological survey methods and/or applicability to land contamination (e.g. use of portable gamma spectrometry tools such as Exploranium. • Better integration of diverse radiometric methods for intrusive investigations, ranging from portable detectors through on-site temporary/mobile laboratories to accredited laboratory analyses – validating the lower cost, high number measurements with the higher cost analyses. • Sonic drilling. • Improvements in geophysical methods. • Refer to improvements in non-radiological analysis methods (including field measurements) but don't go into details. 	

Kim Baines (I)	RSK Geoconsult	Not that I can think of at the moment	
	DE	Not aware of any	
Mike Wyatt (O)	UKAEA	<p>'Sonic' drilling, micro-drilling, micro-purge and low-flow groundwater sampling may be worthy of consideration as would the following practices/approaches/tools –</p> <ul style="list-style-type: none"> • USEPA - Data Quality Objectives approach, • USEPA – Visual Sample Plan • US DOE Triad Approach (use of in-situ measurements) <p>• Use of GIS to visualise the results</p>	
Peter Booth (O)	Nexia Solutions	<p>With increased pressure on reducing cost, potential dose to workers and spoil there is a requirement to look for new technologies and innovation. Real time data capture and analysis, specific drilling techniques for certain types of rocks/sediments, less intrusive methods which minimise waste/dose etc, in-situ analysis using (for example LIF and MIF probes) are worth capturing. If the document is to be the main document to look at the practical aspects of site characterisation then this section should cover all the possible techniques in detail.</p> <p>The use of 3D geological modelling and GIS is proving very useful not just in subsequent characterisation and interpretation of the surface and sub-surface geology and contamination, but also in the collection of data, with hand held GPS and GIS devices proving their usefulness. Methods such as these could perhaps get a mention.</p>	
Sue Brett (O)	Cumbria County Council	no comment – not within our scope of knowledge	
Colin Rogers (O)	Parents concerned about Hinkley	A reference to new practices should be also flagged until they have become standard. (see other comments)	
Sean Amos (O)	AWE	AWE has had success with CPT investigations that have provided detailed site investigations with minimal waste production and shorter disruption to operations. The CPT operators are also developing a wider range of instrumentation that can be fielded which will widen the appeal of the technology. In addition to the above, field screening technologies and remote sensing systems have improved and there are now a number of initiatives including FASA and IPM-net that are looking to improve this sector.	
Dick Haworth	HSE	These will be site specific in many cases.	

Question 8: Have any changes in policy or regulation affected your approach to site characterisation?		
Doug Graham (I)	UKAEA	It will be very important what the NDA/regulators/government/local authorities views are on site end states. Lessons should be learnt from this before finalising (any) new Safegrounds documents.
John Kelly (I)	Oxfordshire CC	Only the warning and informing part of the Civil Contingencies Act
Andy Thomas (I)	Future Solutions	No comment
Hugh Richards (I)	Magnox Electric Ltd (North)	Tighter regulation of management of solid and liquid waste arisings from investigation holes (trial pits & boreholes) is becoming an increasing challenge, with trial pitting in particular becoming more difficult, despite advantages of cost and better visual conceptualisation of ground conditions. Publication of HSE's risk-based de-licensing criterion (2005) is leading to different approaches to de-licensing surveys.
Kim Baines (I)	RSK Geoconsult	Ecology could have an effect especially in areas that are generally not disturbed by human activity. Many Brownfield site are now requiring additional assessment with respect to plant and animal protected species. Ground gas assessment for re-development, although this was mentioned in the consultation document.
	DE	No
Mike Wyatt (O)	UKAEA	No
Peter Booth (O)	Nexia Solutions	Maybe not changes in policy but the approach to site characterisation is being driven towards the real time collection and analysis of data which is what we are always striving towards. This is complimentary to the US Triad approach and appears to be one of the main considerations for site characterisation in the future. Site specific health and safety procedures often influence the chosen site characterisation approach and technologies.
Sue Brett (O)	Cumbria County Council	no comment – not within our scope of knowledge
Colin Rogers (O)	Parents concerned about Hinkley	Yes. Every change towards government interest in nuclear power upsets the relationship between N.G.O's & site operators. For example, moving waste off existing sites can be seen as opening the flood gate to a proliferation of more nuclear waste & an excuse to build more nuclear reactors etc.
Sean Amos (O)	AWE	No

Dick Haworth	HSE	The considerations/decisions in respect of the RCL Regs (and the requirements on nuclear licensed sites) have consolidated my views on this.	
Question 9: Do you think that the document should continue to provide information on waste management and the transport of radioactive materials? If yes, which aspects are most important?			
Doug Graham (I)	UKAEA	I believe so, splitting off this topic could lead to field operatives losing sight of an important aspect of the process, one which if not sorted can lead to the characterisation project being delayed unnecessarily.	
John Kelly (I)	Oxfordshire CC	Yes and in particular some detailed guidance from recent Home Office/DTI (DBERR) guidance on site clearance post CBRN	
Andy Thomas (I)	Future Solutions	Yes, in relation to the storage and disposal of samples and by-products of sampling, e.g. drilling cores	
Hugh Richards (I)	Magnox Electric Ltd (North)	Yes, with emphasis on how to deal with solid and liquid waste arisings from investigation holes and also 'waste' issues associated with management of samples for off-site analysis. Again, keep the 'one-stop' manual.	
Kim Baines (I)	RSK Geoconsult	Yes An overview of the regulatory requirements. Details on the classification of whether a material is radioactive is very important given the limited regulatory guidance.	
	DE	Yes, how waste is classified and what if any special management measures are to be applied on site and when in transit. For instance what if any monitoring is required.	
Mike Wyatt (O)	UKAEA	Yes – with respect to the management and handling investigation-derived waste (spoil, well-purge/development water (and PPE if used within a radiation controlled area)), and Sample transport – RAM transfer etc. See also response to Q2	
Peter Booth (O)	Nexia Solutions	Yes because these issues can impact on time and cost as well as the overall site characterisation approach taken. It should also discuss methods of waste minimisation during site characterisation. The section on Transport regulations is crucial as breaching of these regulations could potentially cause site characterisation practitioners and their customer's serious problems. Of particular use is information on the types of landfill that radioactive waste should go to depending on its level of radioactivity.	
Sue Brett (O)	Cumbria County Council	we consider this an important and useful section – however, if the updated information is available elsewhere, and can be clearly and easily accessed, this would be a satisfactory solution	
Colin Rogers (O)	Parents concerned about	Yes to 7.1, 7.2, 7.3 see 'other comments'. Off site transport is of particular interest to	

	Hinkley	N.G.O	
Sean Amos (O)	AWE	It was agreed that elements of waste management need to be covered, specifically that relating to the characterisation of waste for disposal purposes and guidance on specific requirements concerning the loading, packing and transport of such waste off site. Other areas can be addressed simply through signposting to other information sources.	
Dick Haworth	HSE	No (with the caution described under Question 3(c))	
Question 10: What guidance should be given regarding the management of uncertainties and the fact that sites can never completely characterise contamination and need to infer the extent and magnitude from a few measurements?			
Doug Graham (I)	UKAEA	I think you need something on this, but it needs to be written well and sensibly. Include it and let people see the first draft. It will evolve from there.	
John Kelly (I)	Oxfordshire CC	Some national standard of clearance levels , particularly for deliberate contamination caused by an attck	
Hugh Richards (I)	Magnox Electric Ltd (North)	The existing guidance in Section 8.3.1 and Box 8.4 is OK as far as it goes, but the whole issue of uncertainty should be flagged up much earlier in the report and a forward reference made to where it is discussed in more detail. Section 8 as a whole is one of the weaker sections of the existing report, which will need a thorough revision, especially to take account of the new 'record-keeping' guidance.	
Kim Baines (I)	RSK Geoconsult	Should this not include the education of stakeholders on the uncertainties related to site investigations? Statistical test are used within the CLR7 methodology for human health assessment – is there scope for similar tests being used?	
	DE	This is a difficult one. Guidance is needed on what if any statistical approaches can be applied to site characterisation to minimise the uncertainty. Also what level of risk reduction should we be aiming for when determining the site end point/clean-up criteria. Should we be aiming to achieve a risk of 10-6 to future users and as a minimum achieve 10-5? What is current best practice?	

<p>Mike Wyatt (O)</p>	<p>UKAEA</p>	<p>The sampling strategy should define the investigation confidence limits – if best practice is achieving a 95% confidence of locating a hot-spot of a specific size, then this strategy is the one which should be proposed in the guidance. If a greater confidence (or a smaller hot-spot) is required (maybe during a secondary investigation) the sample spacing can be reduced accordingly.</p> <p>Expand Section 8.3.1 and Box 8.4 with respect to reducing uncertainty, particularly the “Site Investigation” row of Box 8.4: E.g. (i) uncertainty in the conceptual model, thus poor understanding of how contamination occurs. Potential solutions – phased investigation, taking lots of samples, use of lots of low resolution in-field measurements, Triad approach. (ii) uncertainty in rad and chem analysis. Potential solutions – give examples of how labs can reduce analytical uncertainty. (iii) spatial uncertainty – potential solutions OCLI (Optimised Contaminated Land Investigation) approach (iv) sample preparation uncertainty. Possible solutions – ensure representative sample mixing, splitting etc</p> <p>Include best practice relating to record keeping, data quality (especially uncertainty, detection limits and below detection), handling suspected data errors, and inferring information from data.</p>	
<p>Peter Booth (O)</p>	<p>Nexia Solutions</p>	<p>This is an important area. There are clearly a number of drivers for the collection of site characterisation data. The quality of that data will link into the ability to build up a sound or sufficient understanding of the site in question and is likely to also feed into environmental risk assessment work. Uncertainty in the results as well as perceived data gaps will need to be carefully understood and managed.</p> <p>Guidance could be given on how the person undertaking characterisation should present assumptions. Unless one has 100% data coverage one cannot in theory completely characterise contamination. It is important to recognise that uncertainty can never be completely eliminated. Thus there is a need to present assumptions that ensure the reader completely understands that the extent and magnitude of contamination is predicted from a selected number of measurements. These assumptions are often not clearly presented in documents reporting the results of contaminated land characterisation, sometimes leading the reader to believe that the extent and magnitude of contamination is known in full, when in some instances it may not be.</p>	

		The different kinds of uncertainty (numerical, parameters, model, measurement, conceptual etc) could be highlighted. This subject could be covered in one of the case studies and referenced accordingly.	
Sue Brett (O)	Cumbria County Council	no comment	
Colin Rogers (O)	Parents concerned about Hinkley	Analysing what could have prevented an accident; a regular reading of incidents reports; The work culture must favour reporting near-accidents; regular sessions of brainstorming should include solutions to worst case scenarios; measuring & monitoring needs to lead research opportunities & accident prevention.	
Sean Amos (O)	AWE	It was pointed out that guidance on this subject is not RA specific. As such any such guidance should reflect that provided by others on the subject regarding sampling rates in relation to site size and the scope of the works (reconnaissance vs. targeted investigation) etc with due regard to the various risks associated with underestimating the extent of liabilities. AWE has been applying the Data Quality Objectives approach to RA clearance with the principles expanded to cover chemical and explosive contamination. The basis of the approach is statistical in nature with risk factors applied based on business risk models.	
Dick Haworth	HSE	I am not happy with the implication of complacency and inadequate quality work given by the question. The nature of and response to uncertainties needs to be thoroughly addressed (and the requirements to handle it appropriately) should be emphasised in the document).	
Question 11: Do you agree that case studies and associated discussion is best provided via the SAFEGROUNDS website?			

Doug Graham (I)	UKAEA	<p>Case Studies are important. HOWEVER, Dounreay was included as a case study the last time and I was not too happy with what was actually recorded in the document. It rapidly became out of date, included inaccuracies and gave the wrong impression. Since it was in a document then these inaccuracies existed as long as the document existed – it was getting embarrassing.</p> <p>Therefore putting them on the website allows them to be monitored and kept up to date, and separate from the guidance and advice. An excellent idea.</p> <p>That gets round inaccurate and out-of-date information. HOWEVER, I recognise that case studies in the document have some benefit. THEREFORE, I'd include some generic cases – some examples are:</p> <ul style="list-style-type: none"> - Tritium, Cs137 and SDr90 leak into soil from a low active effluent pipeline - Contaminated groundwater downstream from a radioactive waste disposal facility into fractured rock - Contaminated groundwater downstream from a radioactive waste disposal facility into till - Rain Wash out and settling from gaseous effluent leaving an authorised stack - Particulate surface contamination on soil from a spill - or similar..... 	
John Kelly(I)	Oxfordshire CC	Yes	
Hugh Richards (I)	Magnox Electric Ltd (North)	Yes.	
Kim Baines (I)	RSK Geoconsult	Yes as long as a summary and references are provided.	
	DE	Yes	
Mike Wyatt (O)	UKAEA	<p>Yes – However, a number of high-level generic scenarios covering 'typical' NLS characterisation projects should be included within the guidance. These should be designed in accordance with the Safegrounds guidance hence follow the 'best-practice' approach.</p> <p>A scenario using real-time investigation techniques would be useful e.g.</p> <ul style="list-style-type: none"> • GPS-based gamma flux surveys • radon sniffers, • in-situ downhole radiological measurements, • and rapid on-site radiological measurements 	
Peter Booth (O)	Nexia Solutions	Yes, as long as we are confident that all intended readers and users of the guidance have internet access.	
Sue Brett (O)	Cumbria County Council	again, as long as the case studies can be accessed clearly and quickly, this would be a satisfactory solution	

Colin Rogers (O)	Parents concerned about Hinkley	No "not only but also": various means of discussing case studies should be available. Reliance on one method would hide the weaknesses of that method.	
Sean Amos (O)	AWE	It was agreed that the website would be a good place to host the case studies as a wider range of media could be supported and studies could be updated and info disseminated in a more proactive manner.	
Dick Haworth	HSE	Yes - if the case studies are easy to access and are treated as and managed as a live appendix to the main document.	
Other Comments on the revision of the SAFEGROUNDS site characterisation			
Please enter here any other comments on the revision of the SAFEGROUNDS site characterisation guidance? e.g. sources of information or guidance that you feel should be referenced and any other topics that you think the guidance should address.			
Doug Graham (I)	UKAEA	No other comments	
Hugh Richards (I)	Magnox Electric Ltd (North)	<p>The title of the guidance document should be changed from 'Best Practice...' to 'Good Practice...'. Re-reading the existing document for the purposes of this consultation highlights just what a comprehensive and high quality document it is, suggesting that it should be updated rather than comprehensively revised. That said, the document should focus primarily on characterisation of radioactive contamination and not seek to be a 'final authority' on non-radiological contamination matters. In particular, the publication of BS10175 (formerly DD175) provides an opportunity to more systematically comment on:</p> <ul style="list-style-type: none"> • Particular guidance on characterisation of radioactive contamination that go beyond what is in BS10175; • Any topics which are not covered by BS10175 which are considered important in the SAFEGROUNDS guidance context; • Any shortcomings in BS10175 that are generally recognised. <p>The scope boundary between guidance on 'characterisation' and 'risk assessment' is not easy to draw, especially because some form of risk assessment has to be undertaken as part of the preliminary investigation (desk study), and subsequently in order to prioritise targeted characterisation works. The existing SAFEGROUNDS 'risk assessment' report (G Smith, 2005) is focused on radiological risk assessment as an input to remedial options assessment, and does not give much guidance on preliminary qualitative risk assessments of the kind envisaged in CLR-11 or 'screening' risk assessments in the terms of Section 4.3.1.3 of the current SAFEGROUNDS guidance.</p> <p>Preliminary qualitative risk assessments submitted by consultants to us over the past few</p>	

		<p>years have followed a wide variety of formats and methodologies, making it difficult to compare different assessments made at different times for different sites. This appears to reflect a gap in guidance/standards within the wider land contamination sector. However, the problem is compounded when qualitative or screening risk assessments are applied to radioactive contamination. This is partly due to the fact that controlled waters do not represent 'receptors' for radioactive contamination in terms of regulatory regimes, and there are no generally accepted screening criteria for radioactive contaminants in soils or waters. Furthermore, even among consultants, there seems to be a tendency to give radioactive contamination a higher 'risk' rating than what might be more serious (but familiar) non-radioactive contamination.</p> <p>It may be that the revised characterisation guidance is not the place to fill this gap in guidance. However, it should at least be stated that it is good practice to set out (and adhere to) a consistent set of definitions of risk based on magnitude of hazard, sensitivity of receptor and probability of the impact occurring (see example attached). Other suggestions have been made in supplementary comments in relation to the specific questions raised.</p>	
Kim Baines (I)	RSK Geoconsult	<p>I think it is important that the principles should be inline with those given in CLR11. It becomes confusing and unhelpful guidance for essentially similar practices i.e. site investigation on rad and non-rad sites are different. Do we need to make unnecessary changes or use a different guidance frameworks just because it was written by someone else? Obviously it is important to update and amend where the a framework is incorrect but please only when this is necessary.</p>	
	DE	<p>CLR 11 Model Procedures: The CLR11 approach is followed on defence sites, as best practice, for chemical and radiological contaminants albeit within the flexible structured framework provided by the Safegrounds Key Principles and supporting guidance. We see no conflict particularly now that part IIa has been extended to radioactively contaminated land. This needs to be reflected in the document and LMG. The management of radioactive land contamination on nuclear and defence sites must be consistent with current good, if not best practice and at present this is CLR11.</p> <p>If for what ever reason nuclear sites are unable to adopt/follow CLR 11 within the framework provided by the Safegrounds Key Principles and supporting guidance then the distinction between them and defence sites should be made, but this should not be done in such a way as to imply that following CLR 11 in this manner is in some way less onerous</p>	

		<p>or incompatible with the Safegrounds Key Principles.</p> <p>End Points: What about defence sites? The use and limitations of RCLEA vs NRPB-W36 methodology for estimating the doses to members of the public from the future use of land previously contaminated with radioactivity in deriving site end points needs to be resolved. Also the issue over the level of residual risk post clean-up needs to be addressed. Should it be 10-5 or 10-6?</p>	
Mike Wyatt (O)	UKAEA	<p>It is often the case that at the time environmental site characterisation is required (e.g. just prior to decommissioning), geotechnical investigations are also required for new-build projects (e.g. for the construction of and ILW store). Where possible (in order to save time, money and ultimately reduce risk) best practice would be to combine borehole investigations where possible. Each borehole could therefore provide samples for both environmental analysis and geotechnical testing.</p> <p>- How to analyse the results so that they can be used to assess whether contamination is an issue (even if this is only a summary with appropriate refs) e.g. statistical analysis (distribution curves, mean, median, max, etc.)</p> <p>- Records – cross ref to SAFEGROUNDS Records Good Practice</p>	
Peter Booth (O)	Nexia Solutions	<p>The guidance should reflect the general trend towards the real time collection, analysis and interpretation of <u>high quality</u> robust data. A stronger emphasis on quality management and control of sampling and result collection should be included.</p> <p>The case studies should endeavour to capture as many of the themes within this documents as possible.</p>	
Sue Brett (O)	Cumbria County Council	<p>can we assume that the end points information in 4.2 will include implications for the planning regime and knock on effects in local plans (e.g. Minerals and Waste Development Frameworks), regional plans (e.g. Regional Spatial Strategies) and national plans (e.g. Planning Policy Statements)?</p>	
Colin Rogers (O)	Parents concerned about Hinkley	<p>2.4 / 3.10 / 4.4 / 5.5 / 6.5 / 7.3 / 8.4 / 9.4 The main document need not be burdened with the details of each chapter, as long as clear references are available on each topic. Provision of an updated reference section for all to see both in bulletin and electronic form. To include: (1) An incident report (2) Changes in practices as covered in questions 6 & 7</p>	
Dick Haworth	HSE	<p>a) The title of Section 3.2 is not consistent with the words used in the first paragraph of this section: The title suggests the matter under consideration is the full obligation for site characterisation whereas the text refers only to environmental regulator's aspects.</p>	

		<p>b) The references to "stakeholder involvement throughout" will need discussion by the sub-group: there is a risk that a recommendation to apply CLR11 approach (only?) could be at variance to other regulatory requirements e.g. when mixed contamination is involved.</p> <p>c) regarding the "Chapter1: Introduction" text paragraph: Whilst I agree with the general principal, I believe that more caution should be given than the blunt statement that "Material addressed ... will be removed". It is likely to be necessary to retain or introduce text to ensure that fundamental points are not removed and to ensure the document retains clarity and flow.</p> <p>d) Table "Sections 1.1, 1.2, 1.3 and 1.4" I agree with the proposal in each case - subject to the caution above.</p> <p>e) Table "Section 1.4": include BOTH</p>	
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