Fact-finding session on Geological Disposal Facility  
Committee Room 7, House of Commons  
Thursday 10 January 2013 11:00-13:00

The Committee
- Sir Tony Cunningham MP (Chair)
- Tim Farron MP
- Jamie Reed MP
- John Stevenson MP
- Rory Stewart MP
- John Woodcock MP
- Secretariat
- Professor John Fyfe (advisory role)

Expert witnesses
- Professor Stuart Haszeldine, Professor of Carbon Capture and Storage at the School of GeoSciences, University of Edinburgh
- Bruce McKirdy, Managing Director for the Radioactive Waste Management Directorate of the NDA
- Professor Bruce Yardley, Professor of Metamorphic Geochemistry, University of Leeds

Transcript of discussion (not verbatim, and not to be quoted as such)

1 SIR TONY CUNNINGHAM MP: To provide some background, it has been the practice of this group of Cumbrian MPs to come together every now and again on areas where there is frequently common interest, if not always agreement. We have had the Chief Constable, the Lake District National Park, the Vice Chancellor of the University and other people. Today’s meeting may be in a formal setting but it is my intention to conduct the meeting in as informal a manner as possible. I will start by introducing Professor Fyfe.

2 PROF JOHN FYFE: I want to note that I am here not as an MP or a geologist or engineer, but as an ambassador for Cumbria, invited by the MPs in a supporting capacity.

3 SIR TONY CUNNINGHAM MP: Could the panel each begin by providing five minutes on your view of the subject, after which I will open to my colleagues for questions?

4 PROF STUART HASZELDINE: I am very pleased to be here and thank you for the opportunity and your time. I am here in my own capacity and not representing the University or any other body. I also represent the views of Professor David Smythe, who sends apologies for not being present in person due to his location in France and his wife’s medical condition.

5 SIR TONY CUNNINGHAM MP: We understand, of course.
PROF STUART HASZELDINE: To summarise my views and those of Professor Smythe, radwaste is clearly a serious problem and needs a national UK solution: the question remains of how we go about identifying a suitable site at a UK level. The MRWS [Managing Radioactive Waste Safely] process as originally conceived is not the way the process is running now. The process for regional siting is currently based on community volunteering rather than a technical geological reason for the suitability of a site. It is clear that both geology and the engineering surroundings combine in the effectiveness of a repository. I disagree, however, with NDA that the engineering can solve all the problems that geology cannot. I consider that the process of identifying a suitable site for a GDF [Geological Disposal Facility] has been falsely linked both with the feasibility of proceeding with a programme of nuclear new build, and the long-term future of Sellafield, but these are not in fact linked. The decision of siting a GDF should be made on its own merits based on what is sensible for the wider UK, and not falsely linked to these matters. A good deal of geological information is known about West Cumbria from geological exploration (for coal, limestone, iron ore) plus the former Nirex process, which considered West Cumbria in detail. Professor Smythe and I know a great deal about West Cumbrian geology already and we know that the area has failed on surface planning reasons and on technical subsurface reasons of geology and hydrogeology. It was therefore a great surprise to us when Cumbrian Councils expressed an interest in participating, based on the public inquiry’s previous failure. Professor Smythe and I have taken it upon ourselves to voluntarily assess that process. Especially noting that not all the evidence to do so has been made widely available, we have taken it upon ourselves to inform an interested public. I consider that we do know enough to know that all of West Cumbria is an unsuitable area – if the UK is serious in finding a site, the UK should look elsewhere rather than pursuing the same cul-de-sac that has been explored previously.

BRUCE MCKIRDY: I lead the Radioactive Waste Management Directorate within the NDA [Nuclear Decommissioning Authority], and it is our aim that this will eventually be a wholly-owned subsidiary of the NDA—in line with other NDA Site Licence Companies—to allow for regulatory accountability and scrutiny. My position is that it is appropriate to proceed to the next stage of the MRWS process in West Cumbria for three reasons. Firstly, there are reasonable prospects of finding a suitable site in West Cumbria. I would agree with Professor Haszeldine that there is significant geological evidence available on the region, but disagree with the professor over his interpretation of the evidence. NDA considers that the groundwater return times in the region are actually slower than in some overseas cases of repositories such as Finland and Sweden. The chemical conditions in the area are also potentially suitable and this evidence is available. Secondly, it is worth moving forward because moving to Stage Four is not about a commitment to host a geological disposal facility, it is about finding out more about the geology of region and other aspects of
suitability. The suitability of the region is a question of the combination of engineered and natural barriers that can be created. I would not argue that we can engineer our way into any geological system but the system does need to be tailored. For example, in Sweden a large amount has been invested into the engineered barrier within a repository and the role of geology is to provide protection for the engineered barriers. In France, where the site is situated in a region of slower groundwater return, the requirements placed on the engineering and canister are less stringent. There is clearly a trade off between the two factors, but I wouldn’t argue that we can engineer a GDF into any setting. Finally, it is worth noting that proceeding to Stage Four is not an irreversible decision. We need to look at Cumbrian geology in stages. If at any stage it is not possible to make a clear safety case, the project cannot proceed. If a community wanted to pull out it could do so; the right to withdraw is embedded within the process. DECC [Department of Energy and Climate Change] has recently committed to looking at how to put this right to withdraw on a firmer legal footing, but we do know from experience overseas that trying to impose a repository on a community without a volunteer-led approach will not work.

PROF BRUCE YARDLEY: I am here not having a stake on either side, as I explained in my written evidence. I want to say clearly that the waste is in Cumbria now, and will stay there in one form of another if it is not removed. This waste is much more dangerous now than it will be in the future; this is not a case of a situation which is benign now and dangerous in the future - it will become progressively more difficult. Whether you are concerned about terrorism, or the projections in the Stern Review that we will be less able to afford to handle these issues in future, we should act now. I agree with Professor Haszeldine that there could be better sites than Cumbria found in the UK. The French repository site is placed in a geological unit known as “Oxford clay” - this language provides a hint that there are other suitable sites in the UK! Nonetheless, the challenge is to design a repository site that can suit the geology in question. What works in clay wouldn’t work well in crystalline rock. I am confused by claims that the geology of the region is well understood - I have led a number of student field trips to the region, and it is well enough known at the level of resolution which allows us to create 1:500000 maps, but this is not the same as having a detailed knowledge of how the rocks look to the water flowing through them. The resolution must be greatly improved to understand these issues. It is disappointing that Professors Haszeldine and Smythe do not give due credence to the material produced during the Nirex 97 investigations. This work was conducted after the Nirex inquiry had finished - it included new scientific analysis, which was published. That work established more information about the actual fractures in the area and how water was flowing through fractures at a subsurface level. It is clear that previous work, including work conducted by Professor Haszeldine in the 1990s using
a general field model, must by virtue of its methodology be based on assumptions about fractures, including assumptions that fractures are widely present, whereas in reality these are present in some areas but not others.\(^1\) Nirex would have benefited significantly from carrying out their work earlier – it is very unfortunate that they did not do so and I simply cannot understand why they did not. But the later work does demonstrate that it is possible to conduct further analysis to progress our understanding of the region, and it is not easy to say that the region is definitely not suitable. On the issue of the chemistry of the region, I would be happy to “go to blows” with Professor Haszeldine on issues such as the solubility of uranium at any time.

SIR TONY CUNNINGHAM MP: Thank you to all of you.

TIM FARRON MP: Thank you. That clearly involved some contradiction, but was helpful. We know enough from the BGS [British Geological Survey] unsuitability study of the region that up to 25% of the area is deemed unsuitable to house a repository. I would be keen to know from Bruce or all of you, on what basis it was possible to deem those areas unsuitable, if we understand so little about the suitability of the rock, and on what basis it can therefore be asserted that the remaining rock is more likely to be suitable.

BRUCE MCKIRDY: This unsuitability study was conducted using two main criteria: are there areas that are likely to be mined in future for minerals or hydrocarbons, and are there areas where at the depth of a potential repository (200-1000m) there are large aquifers.

TIM FARRON MP: Okay, so one reason is a matter of industrial intentions and the other is water flow.

PROF STUART HASZELDINE: I feel that this has been misinterpreted in two important ways. First, that the exclusions were made based on the presence of aquifers, and secondly, the interpretation that BGS concluded that the area remaining was suitable. That was not the intention of the report – it does not conclude that remaining areas are definitely suitable. We did some further investigation and examined some of the areas of West Cumbria that the BGS report had failed to exclude. Firstly, it is confusing to consider why the North Solway Plain and Silloth have not been excluded since the area is manifestly hosting an aquifer. Secondly, there is an inconsistency in that DECC attempted to offer shale gas licensing for a large area of coastal West Cumbria in 2011.\(^2\) It is clear that DECC therefore considers this region to be potentially suitable for exploration – although this is a different part of DECC to the Office for Nuclear

\(^1\) Professor Yardley has clarified that his intention was to say that we now understand that flow is not uniform through deep fractures, but is localised in specific zones only.

\(^2\) Professor Haszeldine has clarified that the relevant information is at Figure 2 of https://www.og.decc.gov.uk/UKpromote/onshore_paper/UK_onshore_shalegas.pdf
Development which is responsible for a repository. One can argue that it is not actually licensed yet, but there is clearly a difference between areas with real potential and those not yet excluded. In previous investigations, Nirex excluded areas in the National Park but in the current criteria, these have been retained for now. It is important to be clear that areas of outstanding natural beauty have been left in and considered as areas that are potentially suitable.

BRUCE MCKIRDY: I wish to respond as I raised this question of shale gas licensing with DECC the other day. In fact, there was no consideration of licences made on the basis of shale gas but on coal-bed methane. The area considered relevant for methane is precisely the same area which has already been ruled out by BGS. Any difference between the areas is down to the granularity of the map in question. To be clear - this response was not provided by the Office for Nuclear Development, but from the responsible team within DECC: this is all within the area that is shaded pink on the BGS report.

RORY STEWART MP: I want to take some time to better understand the geology. Would you agree that if you were working simply from first principles and not in a process guided by community views, prima facie in a country where there are clay soils available and where there are lower hydraulic gradients available, you would naturally assume that that would be a better place to site a repository? Is it true that siting a repository in those conditions would require less reliance on assumptions that can be difficult to prove about the extent to which engineered barriers can last?

PROF BRUCE YARDLEY: It is important to note that this is not purely a question of geology since there are also risks in transport. That would require comparison of, for example, a geologically safe site that was difficult to transport waste to, and a less geologically safe site on the doorstep of the waste. It is clear that when those siting a French repository compared crystalline rocks with clay formations, they went for the clay formation. If it were possible to find thick enough clay, this French experience suggests that one would go ahead with that option.

RORY STEWART MP: In Sweden, why was a crystalline rock chosen to site a repository?

PROF BRUCE YARDLEY: That was because they don’t have thick clays of the right sort. We need very thick sequences of the right kind of clay. When we make geological maps, we colour things in at a scale that is suitable for what we walk over. But that doesn’t actually mean that all the orange colour is exactly one thing, and the blue colour next to it is something else. Actually, all of them are a multitude of layers that we lump together so that we can make some sense of them in a geological map. You
have to understand in a little more detail about exactly what types of rocks are available.

**RORY STEWART MP:** In your professional opinion, is it right to say there is a high probability that the UK is more likely to contain suitable clay rocks than Sweden?

**PROF BRUCE YARDLEY:** Yes.

**RORY STEWART MP:** So to summarise those responses, Sweden chose crystalline rocks to host a GDF because there was not enough suitable clay but there is a high probability that Britain would have clays that might be more suitable than exist in Sweden. Putting aside issues of transportation...

**SIR TONY CUNNINGHAM MP:** Which are important...

**RORY STEWART MP:** Indeed, but if you were starting purely from a point of view of trying to find somewhere to deal with the possibility that over 150,000 years the concrete bunker or copper bunker or whatever you have built corrodes and you are dependent on the surrounding rock conditions to protect the waste, all other things being equal, one would proceed with flatter clay geology?

**PROF BRUCE YARDLEY:** Just within those terms, yes, that is true – although obviously there are other parameters.

**BRUCE MCKIRDY:** It is important to note that it is never just within those terms – the total safety case includes the transportation safety and the long-term safety case, as well as the actual feasibility of delivery. If one looks purely theoretically, a clay geology in an area that hadn’t volunteered to participate may seem better, but if the area doesn’t volunteer to participate, I believe, and CORWM [the Committee on Radioactive Waste Management] believed that it would not be possible to actually site a repository there.

**JAMIE REED MP:** Is it correct to assert that there isn’t a place in the world where a repository siting has proceeded without volunteerism? Is it correct to assert as did Professor Neil Chapman from the University of Sheffield that failure is almost guaranteed if we use a purely technically-led approach and that voluntarism brings with it a more demanding technical programme than a purely technical-led approach ever would? Is that accurate?

**PROF BRUCE YARDLEY:** Yes, that is clearly the case. One only has to look at what Nirex did 20 years ago to see that if one takes a purely technical approach, unless it works for the community it will not be feasible to implement.
PROF STUART HASZELDINE: I would like to note on the point of volunteering that the process as currently enacted by DECC and NDA requires communities to volunteer without any detailed knowledge of geology on which they sit.

JAMIE REED MP: But they are volunteering to enquire about the geology.

PROF STUART HASZELDINE: The limit to volunteerism is that the communities do not know whether their geology is poor, good, or adequate when compared to other sites on a UK level, and this matters in the UK perspective. Some of the best sites to house a repository may in the end have had few or no people living on them. How would such a site volunteer to be part of the process? DECC has tried to engage with local councils in the spirit of voluntarism but it is unclear from outside of DECC how robust or targeted that process has been, outside of pursuing the rather short-term option of West Cumbria. I agree that transport is an issue, but the NDA have made a strong claim on the NDA website and in its wider documentation that nuclear waste has been transported more than 10 million miles in total without incident.\(^3\) We must also look at the future and the potential for a the building of new nuclear reactors. There would be waste from both existing and future reactors which required transportation to Cumbria. Even the waste already in Cumbria will need packaging for transport from the Sellafield works or store to a GDF entrance, passing through a public space, to the same high safety standards. Whichever way transport is considered, it is clear that there will need to be transport of waste either to or from West Cumbria. On that basis, the transport argument is somewhat spurious.

BRUCE MCKIRDY: I would absolutely agree that a volunteer-led approach has higher technical demands, which requires the repository programme to accommodate a whole number of factors that might otherwise not have been done. Nonetheless this is a price worth paying because the chance of success is considerably higher.

JAMIE REED MP: Stuart, do you recognise the right of people of West Cumbria to want to volunteer and to want to know whether the geology of their region is suitable? There can really be no logical opposition to moving to Stage Four, can there?

PROF STUART HASZELDINE: I do recognise those communities’ rights to volunteer, but I also recognise the rights of the rest of the citizens of UK to compare the choice of West Cumbria with other parts of the UK that are less demanding in engineering terms. This would be a case of putting all our eggs into the basket of engineering a repository, rather than choosing region where geology acts as a positive attribute for safety and performance of a facility. We have seen catastrophes of engineering failures in civil engineering and civil nuclear history. If we find in 50

\(^3\) Professor Haszeldine has clarified that DRS is the transport subsidiary of NDA for moving radioactive waste: [http://www.directrailservices.com/Services/SpecialistFreight.aspx](http://www.directrailservices.com/Services/SpecialistFreight.aspx)
years’ time that we have made a poor engineering choice it would be difficult to back out of those choices – this is not as simple as building a supermarket.

PROF BRUCE YARDLEY: I disagree – there is evidence that basement rocks in West Cumbria can be extremely impermeable and this can be seen in road sections or quarry walls in basement rocks. Yes, it is possible to see fracture zones, but it is also clear that there are intervening volumes of solid rock with low permeability. The real challenge is being able to identify where flow zones will be before excavations begin. This is not without precedent. Large mining companies must make similar assessments when creating underground mines. Given the economic incentives to ensure that oil fields are well exploited, oil fields are well known to have been exploited even when broken up by faults. It is possible to make the assumption that all faults transport fluids, but in fact the experience of oil companies often demonstrates that they find faults that nothing moves along. We do have relevant industrial expertise in the past 20 years on how to understand and work with these issues.

BRUCE MCKIRDY: It is absolutely right to know how any site in Cumbria would compare with other sites. It is imperative that this project is conducted under the proper process of the European Strategic Environmental Assessment Directive. This Directive requires us to consider reasonable alternatives. This consideration includes both reasonable alternative routes for waste management, and also alternative sites for a repository. If sites are volunteered, it will be vital to know how a volunteered site would compare with other sites that may have been identified if it had not been taken forward in a volunteered process. This is important to fully understand the environmental implications of the volunteer-led process. This must include the impacts of transport, the non-radiological impacts of transport and all wider considerations. This is an embedded part of the process.

JAMIE REED MP: Could you each expand on the impact that the nature of any particular geology would have on the safety case? I understand that whether the geology is simple or complex, the level of public protection is exactly the same – is that correct?

PROF STUART HASZELDINE: Yes, any site would be subject to the same regulatory demands. The question is about the spread of risk - for example, taking security, which cannot be accurately measured. The analogy of mining and oil companies is limited in its application – these companies admit that they don’t know everything about the site even after exploited, but their ability to demonstrate that faults can be managed in a mine for 15-20 years is very different to demonstrating this on the timescales associated with a repository, which could be thousands or millions of years. It is clear that there may be a number of options for very permeable pathways - it is not the case of having a single fault
running through the facility. Water may be able to enter through one fault
and leave through another. We must assess and handle the probability that
engineering will not perform as is currently planned. Sweden provides a
good example – the KBS3 proposition was adopted by the nuclear industry
from SKB in Sweden on the basis that the use of copper canisters was a key
part of the proposition, but subsequent further experiments have shown
that those canisters erode very rapidly. It is therefore evident that we
cannot be clear about how these barriers would handle over long terms.

PROF BRUCE YARDLEY: On the issue of measuring the long-term performance of
fractures and flow, it is true that mining is a short-term activity. However, the Nirex 97 analysis was able to identify both actively flowing
fractures and also other fractures where it was clear from mineral
deposits that there has been flow in the area in geologically recent time,
by which I mean tens of thousands of years. Techniques are available to
identify this. A key difference to the exploration conducted for mining is
limiting the number of holes that would be created during the
investigations – as soon as you make the access holes you are disrupting
the environment in a way that must be managed accordingly.

JOHN WOODCOCK MP: As a supplementary question, are you saying that you
accept the regulatory safeguards but you don’t think that Cumbrian geology
can adequately perform to them in the long term, or that you question over
regulatory framework itself?

PROF STUART HASZELDINE: The regulatory framework looks both robust and
sensible. However, this deals with probability, and does not provide a
single answer. The analogy of rolling a dice is relevant. It is
particularly important to consider the probabilities that a repository
would perform in the poor performance zone. The average numbers may be
fine in a number of repository scenarios, but it is clear that the risks
in the poor performance zone could be much smaller or eliminated in a
scenario with better geology.

JOHN WOODCOCK MP: Can I ask you all briefly what your stance is on nuclear
power?

PROF STUART HASZELDINE: The UK has been a pioneer of civil nuclear power,
this technology exists and is a useful contribution to the range of low-
carbon generation options. If a fleet of new nuclear stations can be built
safely, then that would clearly be a useful addition. The challenge for
the UK is to balance the cost with benefits. There is evidence that with
the reactor type favoured by EDF, the wholesale price of energy would
increase substantially to about double, and it is not clear that the true

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4 Professor Haszeldine has clarified that Sweden and possibly Finland have consequently halted their licensing process for a GDF whilst this is investigated with further information available at:
JOHN WOODCOCK MP: So based on current estimates of the situation, it would not be right to go ahead?

PROF STUART HASZELDINE: The issue of new nuclear build should be decoupled from the question of waste disposal.

JOHN WOODCOCK MP: Nonetheless, I wish to understand your views on civil nuclear power to provide relevant context.

PROF STUART HASZELDINE: I am entirely agnostic. I wish to be clear that my career is now heavily focused on options for low-carbon generation, and if the UK can build a nuclear fleet safely, and this is cost-effective and can compete with renewables and other low-carbon generation, that would be a useful addition. However, cost-effectiveness is important. The price of future electricity from nuclear stations is not publically known, but there are media reports that £150 per MWh has been asked by EDF, but this does not include all the costs. This could add up to £150 per MWh, but the debt of clean up employment would remain in addition, noting that the clean up could be valuable for Sellafield and the local environment for 150 years according to the NDA. It is clear that the UK is not yet paying the full costs for nuclear generation.

JAMIE REED MP: To refine John’s question slightly in light of that answer, do you support plans for new nuclear build as they currently stand? Do you support the current new build programme, including the new site development at Sellafield?

PROF STUART HASZELDINE: I support the current programme, yes, but the caveat is commercial viability, and the performance and safety of reactors. I will not support new nuclear investments if the electricity would be treble the cost of energy from another source, as this is not competitive.

BRUCE MCKIRDY: The NDA position is that NDA is agnostic on new build – the role of the NDA is to decommission existing stations, and to handle legacy waste safely. Personally I support new nuclear build as a low-carbon technology.

PROF BRUCE YARDLEY: I agree with Stuart, although in slightly less detail.

JOHN WOODCOCK MP: On the idea of repository, what are people’s views on the concept of building a repository to house nuclear waste? Is this the right idea for dealing with the waste, on balance?

PROF BRUCE YARDLEY: Yes, this is clearly the right approach. We cannot guarantee human civilisation for the next 5,000-10,000 years so we need to deal with this issue now in a way that the waste does not present a hazard.
to people in future generations who may not even know what nuclear power is. It is clear that all countries who have considered the issue agree that you need to have a repository. I also think it is important to put the waste somewhere where people cannot tinker with it. Some people have expressed a desire to build a repository in a way that people would be able to go and “open a door and check on the waste”. People are not small creatures: if the purpose of the repository design is to prevent a single molecule of water reaching the waste, we do not want access for people to the waste. I do believe that once placed the waste must be closed in.

PROF STUART HASZELDINE: I agree with that point: I think that closure needs to mean closure, and retrievability is a spurious attempt to have one’s cake and eat it too. There are, however, two caveats. If a repository design involves a lot of copper, we need to consider the risk that this creates a useful copper deposit and people in future centuries may wish to steal this in the way that metals can be stolen from railway lines today. Secondly, while I do support geological disposal, I am not sure that this is appropriate for all the waste sited at the moment. Spent fuel and plutonium may not actually need disposal. The General Electric PRISM [Power Reactor Innovative Small Module] reactor could potentially turn some of these materials into a positively useful fuel. Subject to verifiable audit this may remove the need to dispose of some of the most toxic and radioactive elements of the waste inventory that may otherwise be sited in a repository.

BRUCE MCKIRDY: I agree that a GDF is absolutely essential for the legacy waste that we have already, as well as any waste that would result from a new build programme. This is essential to deal with waste and spent fuel, even in the event of new reactor designs such as PRISM or Generation IV reactors. NDA has currently been analysing projections of spent fuel from PRISM reactors. Whilst burning plutonium in PRISM could reduce the quantity of plutonium by 50%, the requirement for plutonium to provided in the form of a metal confers some additional challenges, when compared to an oxide form. It is clear that new technologies will help to optimise the system and the waste produced, but these technologies will not eliminate the need for geological disposal.

JOHN STEVENSON MP: I would like to ask a practical question in relation to the decision. As I understand it, we are accepting that Cumbria is not a perfect solution, but nevertheless some of you have said that it could be a solution, and moving to Stage Four of the process is an issue of finding out more to see whether it is feasible or not. I understand this to be the decision that Cumbria will make in deciding whether to move to Stage Four. My question is: how much will this cost?

BRUCE MCKIRDY: We estimate that Stage Four activities will cost about £10 million per year for four to five years. My total budget is of the order of £20 million per year. The remaining budget funds continued work.
doing generic research into materials and the behaviour of these
materials, and also funds our ongoing work on packaging of existing
nuclear material.

JOHN STEVENSON MP: Assuming that this goes ahead to Stage Four, how
confident are you that this process will result in sufficient evidence to
give a definitive answer as to whether or not to proceed beyond Stage
Four?

PROFESSOR BRUCE YARDLEY: I believe that the process will result in enough
information to allow a well-informed decision to be made at the end of the
process. There is still going to be an extent to which this process
results in answers such as “there is X amount of fluid flow, can you live
with it?” The next stage of the process is not intended to find an exact
spot, which would be the equivalent of locating the needle in the
haystack. Instead, it is a process of identifying those areas within the
region where groundwater flow is sufficiently low and the chemical
environment sufficiently good. Assuming that the budget is spent
intelligently, and that Stage Four is conducted by smart people with
relevant international experience from overseas projects, it should be
feasible to identify sites and characterise them well enough to make a
decision. In doing so, it is important not to turn the land mass into a
sieve: when searching for copper or coal deposits, it is relatively easy
to drill lots of holes to look for the material. If looking for areas of
water impermeability, by definition we don’t want to drill too much and
increase the permeability of the rock. I believe that if the expenditure
was focused on individual areas, rather than spread across all areas of
the region, the process can deliver the level of certainty. It is
important to note that this may either result in a clear signal that we
have two orders of magnitude more safety than needed—and the process can
proceed to later stages—or that the safety is two orders of magnitude too
low, and the process cannot proceed. Either way this should be clear by
the end of Stage Four.

PROF STUART HASZELDINE: What I am failing to see from the NDA is
information on where the candidate regions in West Cumbria would be. If
Councils decide to go forward, what would be the hypothesis for the
further testing? How would the NDA demonstrate success or failure in Stage
Four of the process? Clear criteria for site selection are notably absent
from the information that has been provided by the NDA.

BRUCE MCKIRDY: The NDA is clear that we have not identified sites yet.
This is the first element of Stage Four of the MRWS process – this work
would not be undertaken alone, but would be conducted with community
involvement. Around six months ago, DECC published, following
consultation, a document about the framework within which that site
identification and assessment process will be conducted, including
criteria. This is the first step of Stage Four, which will make use of all
the available data, and will ensure this is thoroughly examined and used properly.

PROF STUART HASZELDINE: How is it possible to say that there is promising geology within the region if there is no idea of where sites would be sited? This is a clear contradiction.

BRUCE MCKIRDY: I believe that there are reasonable prospects for this, based on the evidence that is available at the moment. We know that 75% of the area has been left after the BGS study, and we have a reasonable idea of the underlying geology. We have data from the Nirex investigations during the 1990s, and on that basis we believe there is a reasonable prospect. We don’t know that there is definitely somewhere suitable, but that is the purpose of Stage Four – to work with communities to establish this.

PROF STUART HASZELDINE: Is the National Park not excluded from the regions that would be considered?

BRUCE MCKIRDY: The National Park may be excluded based on the site-selection criteria for housing the above-ground elements of a GDF. Criteria for areas suitable for surface facilities and those suitable for underground facilities would be considered independently, and the surface criteria may rule out the National Park. The output of this process will produce a picture of the areas suitable for surface and underground operations, and there will be an attempt to match the two together, to find an area of overall suitability for both surface and subsurface facilities. These facilities may be directly above each other, or up to 10-15 km apart.

PROF STUART HASZELDINE: It is noteworthy that NDA has retained ownership of the Longlands Farm site near Sellafield, and has also retained mining rights to the area. We know that areas of granite rock are located around 10-15 km away from this site in Ennerdale. This raises the issue of whether it would be possible to build a tunnel from the Longlands Farm site 5-10 km sideways, to beneath the National Park.

BRUCE MCKIRDY: It should be noted that ownership of the Longlands Farm site transferred to NDA naturally from BNFL [British Nuclear Fuels Limited]. NDA has not sold this land since acquiring it, but there are other areas of land that were transferred to NDA from BNFL that have also not been sold.

PROF STUART HASZELDINE: To summarise what I believe has been said, you claim that the search for a site would not look at the National Park, but could feasibly look beneath it. I want to be clear about spending £10 million assessing existing information: I have considered the existing information in great detail and it is unclear to me how you can analyse this existing information to identify a single site. It is not clear that
it would be possible to establish this without invasive work drilling from the surface.

PROFESSOR BRUCE YARDLEY: I hope this is not going to be a case of spending £10 million per year reassessing existing information. If so, I would find myself on Professor Haszeldine's side of the argument on this point. The new work conducted under Nirex 97 was published, and this shows what investigations can feasibly be conducted. This underlines the extent of what can be demonstrated with borehole testing to characterise the flow of the region - we can certainly make reasonable progress. I am not very happy looking at the slides that Professor Haszeldine and Professor Smythe have previously made public and the claims they make about the coverage of past analysis. To take an excerpt from Professor Smythe's written submission, he claims that “my analysis of the modelling used to predict the water flow shows that the effect of the faults cutting the rocks has been ignored.” In fact, the 2003 Nirex paper in question has as the first three words of its title “fracture-dominated flows”, suggesting that Professor Smythe's analysis was not very thorough. Of course this aspect has been studied in the past. I am very incensed that misleading phrases have been bandied around regarding analyses of published work; in contrast, the published work to date covers exactly those questions that Professor Smythe says must be addressed.

JOHN STEVENSON MP: To be clear, at the end of the desktop survey, can we expect to have a decent analysis of the situation to make a decision?

PROFESSOR BRUCE YARDLEY: I want to see more than desktop survey: a desktop survey would be the very first part of Stage Four of the MRWS process, but the next stage would be to identify several contrasting types of geology and identify the potential of these rocks. In the event that one of these types of geology were considered to have appropriate potential, the next step would be to look more widely for other sites in the region with similar geology. In this way, the process would start with range of potential sites, identify which of these is likely to work, then apply this learning more broadly to other similar square kilometres of the region. I will not be responsible for handling the process, but if I were in charge, that’s how I would do it.

JOHN STEVENSON MP: And you would expect this to throw up whether some geologies are suitable or none?

PROF BRUCE YARDLEY: Yes.

RORY STEWART MP: From the point of view of my constituents and the public more generally it is reasonable to ask, if we spent up to £50 million on this process, what are the criteria under which you or they assess the outputs of the research. For example - what is the amount of fluid flow that is acceptable, what is an acceptable rate of return to the biosphere, and can we live with it? Is someone going to define publically the
criteria for success or failure? Will someone say “these are our assumptions made about what can be done by engineering and these are the minimum standard required from geology that would need to be demonstrated”?

PROF BRUCE YARDLEY: It would be possible to define criteria in that way – but it should be noted that the two members of this panel could each provide a different set of criteria and requirements to ensure that the process resulted in the outcome they desired. These would be subject to interpretation.

RORY STEWART MP: Can I push harder on this point? Recognising that, is there any way to get clarity for the public? It is clearly not reassuring for the public to consider that the criteria for safety may depend on an individual’s perspective.

PROF BRUCE YARDLEY: Yes, but this is complex. For example, does one look at the velocity of fluid flows, or the volume of the fluid? There are clearly different ways to look at this.

RORY STEWART MP: I agree it is complicated but surely the idea of this five year £50 million research is to get an answer at the end. There must be a hypothesis that can be tested and proven or not, which implies there must be criteria to work with.

PROF BRUCE YARDLEY: Yes, that is possible – but I want to be clear that we need to give this careful thought so that those wanting an answer do not set the criteria in a way that they get the answer they want. As long as the criteria could be properly thought through, I agree we do need these.

RORY STEWART MP: And these would need to be defined before the process could begin, surely, so we know what we are assessing?

PROF BRUCE YARDLEY: I am not an expert in this specific matter, but the international guidelines from the IAEA [International Atomic Energy Agency] could be expected to form a starting point. These guidelines are already more extensive now than they were in the mid 1990s and I would expect these to be able to lay out the very basic needs for a repository, which could be followed.

PROF STUART HASZELDINE: The international requirements for suitable geology are already clear: the geology should have predictable characteristics, low flow of groundwater, and preferably small volumes of flow as well as having the correct geochemistry. It is worth noting that no other country has gone into this type of rock when building a repository. No other country has sited a repository next to a huge drive of water flow, or in an area that is so fractured and complex with a great deal of water flows underground. Effectively we have a roundabout of factors combining in this region, which make the region very difficult to
predict. This would mean that in the event of siting a repository in West Cumbria, we would need to place huge faith in our ability to engineer barriers to contain the waste. The process we are faced with resembles a clearly premature rush into accepting the first community to volunteer, when in fact there are other communities that would be more suitable. For UK as a whole, I consider that we would be better advised to park this process, to look at other sites and to cultivate volunteerism as the original CORNW report intended. This requires the Government to actively cultivate voluntarism around the UK. This has never been carried out.

BRUCE MCKIRDY: The IAEA does have guidelines for siting a repository but they specifically do not set out any prescriptive criteria – and these guidelines are applied in a way such that account is taken of all these guidelines on the whole system. That is because no one factor can be considered in isolation and it is required to be able to look in combination at the factors altogether. It should be noted that no other countries have specific numerical criteria for geology that need to be met. In every case, what is paramount is the need to demonstrate that barriers work together. In a scenario where the geology is not so favourable, then the challenge is to engineer the system differently. NDA would never go forward in a scenario that required us to rely 100% on an engineered barrier indefinitely into the future and no other engineers would do this. However, there aren’t specific numerical requirements – these are general guidelines that must be considered in combination.

JAMIE REED MP: I understand that Stage Four should answer many of these questions and address the uncertainties we have discussed. My question is: what is to be lost in proceeding to Stage Four?

PROF STUART HASZELDINE: I have not heard a clear response from NDA on what they actually want to do in Stage Four.

JAMIE REED MP: Can you answer that specific question?

PROF STUART HASZELDINE: I hold significant amounts of information from archives, and so-called legacy information. Reanalysis of that information can be done. However, that level of geological information does not exist at all for sites inside the National Park, which requires generic assumptions to be made in those areas. We now know enough about these areas to know that the area around Silloth is an aquifer. It is really not clear what new certainty will be generated by further NDA analysis, without conducting invasive drilling from the surface. Nirex 95 and 97 investigations are both good examples of this point. In addition both of these examples show that this repository siting fails in the area. All that is different now is the potential inclusion of high-level waste and spent fuel within the inventory for disposal. It should be noted that this high-level waste produces extra heat, and this heat can accelerate groundwater movement by a factor of 10. Where groundwater may originally
have been expected to return to the surface in many thousands of years, the presence of heat could mean this becomes hundreds of years. The circulation clearly accelerates in this scenario. All of this work can be done in principle, and it has already been done in principle: it shows that the process in West Cumbria is a cul-de-sac which represents overall bad value. Proceeding at this stage merely sets us up for the prospect of failure at the start of MRWS Stage Six, just as the Nirex investigation failed at the equivalent point.

JAMIE REED MP: Is it right that you have worked for Greenpeace within this context?

PROF STUART HASZELDINE: No, that is not correct. I was keen to undertake further research and accepted an un-tethered research grant from the Greenpeace Trust to allow me to conduct research, which was later published. I later separately gave evidence on behalf of Greenpeace at the Nirex planning inquiry, using outputs of my earlier research to do so, and was cross examined on that. There is a disconnect between my appearance at the inquiry and the earlier research.

JAMIE REED MP: Is it just that in your 1996 book with Professor Smythe, you cite yourself as being for Greenpeace in the appendix.

PROF STUART HASZELDINE: I was a witness in support of Greenpeace. I should note that this is just as you yourself were employed by Nirex at time of the inquiry.

JAMIE REED MP: I was and I don’t seek to hide that. Thank you for making that explicitly clear. To return to my original question - I am surprised you have forgotten it - a given your concerns, and that Stage Four is designed to investigate these concerns, where is the danger or problem with proceeding?

PROF STUART HASZELDINE: The problem is if there is no new information to be acquired. We have the existing information and known that the areas North and South of Sellafield, including Longlands Farm, fail the criteria. We also know that existing information from other sites is sufficient to conclude that those sites are also not right and suitable. Proceeding in West Cumbria diverts time and money from finding a more suitable site elsewhere.

JAMIE REED MP: I should also note that I was the MP that successfully got rid of Nirex. That was one of my first, most successful and happiest days in my life as an MP.

PROF BRUCE YARDLEY: I wish to make an analogy. Visiting a children’s bookshop, one can no doubt find a good book that has an excellent cut out picture showing just how a nuclear reactor works - this doesn’t mean, however, that the picture would be much use to someone wishing to build a
reactor! The information used in the Nirex appeal process was a broad-brush picture of water flows. I consider that picture to be around the level of detail as the cutaway drawing: to be able to actually build something usable, one would need much higher resolution. The modelling conducted at the time was perfectly good for what was available then – it used a code designed for assessing regional flows and gave a good picture of the overview but failed on the detail required. How these investigations must work is to start with a model, add more detail, re-model, and so on. I do not agree that the original information and modelling solves the problem we are now facing.

BRUCE MCKIRDY: It is not our intention that £10 million per year would be spent merely on analysing the same data. The intention would be to use existing data to undertake feasibility studies, working with different communities at specific sites. The Nirex work focused on the suitability of a single specific site. We do want to peer review the Nirex work and get it more thoroughly examined. However, it is important to note that the context of the Nirex work was very different. During the Nirex investigation there was no locus for regulatory engagement; that meant it was possible to reach the end of the equivalent to Stage Five and then abandon the process. Formal regulatory involvement was only required at the point that an operator wanted to dispose of waste. Now we have a process that includes early regulatory involvement – the plans and work can be scrutinised now. It is vital to note that if we cannot get regulatory buy in at each stage of the process, we cannot proceed. There is certainly a lot that we don’t currently know that we would be able to know if we proceeded to Stage Four.

JAMIE REED MP: I understand that in addition to technical work, Stage Four is the opportunity for the local community to discuss the benefits package and what support may be available to the community on a quid pro quo basis and the investment that may come forward. This is clearly intrinsic to the principle of volunteerism, which is the key principle on which the process is proceeding.

BRUCE MCKIRDY: Yes, that is correct.

TIM FARRON MP: I would like to pick up on Professor Yardley’s point about allowing long-term access to a repository and the view that a repository should be sealed off. It has been put out there by some people that if in future, society were to find a new and wonderful approach to handling this waste, it would be useful to be able to get at the waste to implement this new and wonderful solution. I am keen to understand your views on the benefits and disbenefits of allowing access to continue and what current thinking is. What then are the implications for the kind of site you may choose geologically or otherwise, and whether there are implications in terms of being able to allow some or no access?
PROF STUART HASZELDINE: If we are trying to dispose of the waste safely, we clearly want to minimise water flow and return pathways for gas or water to the surface. This is fundamentally the opposite to creating a human- or machine-sized pathway to the site and the complex network of tunnels housing the waste. It would certainly be very hard to do that without compromising the performance of the repository: you may judge this to be acceptable or unacceptable when weighed against the perceived benefits of retaining access. Crystalline rock may be more challenging in this context than mud or clay rocks which have the capacity to be self-sealing. In a UK context, it should also be noted that gas accumulation in a repository is a relevant issue and it has been widely accepted that radioactive gases would be expected to accumulate in the repository itself. If one were to maintain an entry tunnel, this clearly becomes the most logical exit pathway for those gases. While the benefits should be weighed against this, there is a likelihood of weighing up a lot of clear problems against potential benefits in the future that are poorly known or understood.

BRUCE MCKIRDY: I consider that once a repository is closed and sealed, it should be passively safe, and not rely on future intervention. A key component and benefit of this waste management solution is that it does not rely on further intervention to remain safe. Once a repository would be built, we would expect the process of filling the repository with waste to last around 50 – 100 years, then there is the possibility to leave it open slightly longer. So for up to 100 years the waste would be expected to be retrievable by the same routes used to put it in. Within the French programme there has been discussion of a period of retrievability post-emplacement and prior to closure. To summarise, we would expect the waste to be accessible only for 50-100 years while emplacing, and potentially for a short time afterwards, during which time in effect the repository would be acting as an underground store.

PROF BRUCE YARDLEY: I agree – once the repository is full, close it up.

TIM FARRON MP: What are the long-term risks to the communities into the fairly distant future of burying the waste in west Cumbria, taking account both the geology of the region, but also the general long-term risks that may result?

PROF BRUCE YARDLEY: You should also evaluate the long and short-term risks of not burying the waste to these communities.

SIR TONY CUNNINGHAM MP: There are clearly risks of doing nothing.

PROF BRUCE YARDLEY: But recognising that, I interpret the question as, once buried, what do risks start to be? The key risk is the return of radioactive material to the surface in some concentrated form: the thresholds people usually talk about in this context are relative to average background radiation levels. I am not a professional repository
designer – and this would clearly be a matter for designers to deal with when designing a repository. Issues include the fact that one or two radionuclides are quite soluble in water and these would be an issue, however these would be short lived, so as long as they can be captured by the engineered barriers this should be okay. Longer term, the question is what happens when water eventually gets at the waste being stored in a repository. In the worst case, oxidised water enters the vault and reacts with alkaline concrete but without being reduced. If surface water reacts with cement in a deep environment, it may result in an issue of uranium solubility. It is important, however, to question the extent to which oxygen would be present. A useful analogy is the school experiment of a nail in a bottle – if nails are placed into two bottles, one of which is sealed, the bottle with oxygen present results in quicker rust. Only when oxygen is present will the nail rust. The extent to which ground water would be oxidised within a repository could be expected to be low. In the case of having huge fluxes in oxygen—for example if vessels had been damaged on the surface—as a result, we would expect the uranium to dissolve in the water. I would expect, however, an arrangement where water moves in and out of a vault becoming alkaline and neutralised, but where radionuclides would precipitate out at the point at which water moves into the rock surrounding the repository and becomes neutralised. In the event of a catastrophic failure with very fast fluid flows, there would clearly be a serious problem but I do not judge this to be very likely. That is more likely to happen in surface storage. These rocks don’t randomly have large amounts of flow.

**PROF STUART HASZELDINE:** The key point to note about the static bottle experiment is that it is static, whereas this question is about fluid and flows. In the school experiment, the bottle with water flowing through it would result in rust being produced most quickly of all. We should be clear that we are making an unnatural concentration of uranium in an area with intense water flow: this is essentially engineering an unnatural scenario against the intentions of nature. I would also contest the issue that the relevant soluble isotopes are limited to hundreds of years in their half lives: Carbon-14 in gaseous form has a half life of thousands of years, and iodine also has a long half life; both are very metabolisable to humans. There are well known retention issues in Sweden with the poor performance of copper canisters and at present the KBS3 engineering proposed by NDA does not work. I consider that there is very solid evidence for oxidising water permeating through the fractures of rocks in this environment – it was measured in boreholes. Where there is evidence of the last minerals to precipitate in many of these faults, there is evidence of oxidising characteristics and glacial water has manifestly

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5 Professor Yardley has clarified that the point he intended to convey was that even if there is a lot of oxidised water and a small nail, the solubility of oxygen in water is so low that it is used up with little effect. Likewise a buried repository would have to be exposed to an enormous quantity of oxidised water to have much effect.
gone through these sites to the great depths in question. I consider that
Professor Yardley proposes a spurious and “children-cartoonish” painting
of the expected water flows within this type of repository. We should
remember that if we seal the site up and found we have made a mistake, it
would be very difficult to go back.

PROF BRUCE YARDLEY: It is clear that we two experts can see the different
assumptions that we are each making and it is not appropriate to argue
about it in this context. I consider that Professor Haszeldine has taken
an extreme case in his work by showing uranium solubility in strongly
alkaline water, which has reacted with cement, but at the same time
considering an oxidation state derived from the atmosphere.

BRUCE MCKIRDY: Let us remember that we are not deciding to build a
repository right now. Before that stage could be reached, the scenarios
that Bruce and Stuart have described would need to be defined in a single
safety case that would be openly published and would most likely need to
be subject to international review. We need to take all the data we have,
as we have discussed in the context of these questions, and to put this
information into the context of a full safety case and ensure that this
case is properly reviewed by those people who have the expertise to deal
with this information.

RORY STEWART MP: If siting a repository in different geologies does not
present an issue or risk, why have French teams gone to such efforts to
site their repository in clay rather than crystalline rocks if the risks
are so low? You seem to be suggesting that the risks are so minimal – why
would the French bother to bury this in clay?

PROF BRUCE YARDLEY: I do think the work Professor Haszeldine has carried
out about uranium solubility takes the worst possible combination of
circumstances, beyond what is reasonable to consider.

RORY STEWART MP: And why have the French made their efforts to site this
in clay?

PROF BRUCE YARDLEY: I am certainly not saying that it is a good thing to
have water flowing over the waste and we clearly want to minimise this.
But at the end of the day, a tiny amount of radiation returning to surface
is not a catastrophe for the entire planet or entire Cumbria. In contrast,
a container being breached at Sellafield at the point in time when a
strong wind is blowing towards Manchester clearly is a problem. I feel we
should not be forced into extremes of saying that this is either a
disaster or completely okay – we must be able to nuance this and find an
area in the middle. I do feel that the risk is overhyped and not
accurately represented.
TIM FARRON MP: It seems that there is a reasonable likelihood that further geological investigations in West Cumbria will not leave us with a good chance of being able to proceed - what happens then?

BRUCE MCKIRDY: The waste is currently stored safely on the surface and we currently package the waste so that it is both safe for storage and suitable to be housed in a repository. There is no issue with continuing to do so. The MRWS process is also still open to other parts of country to volunteer. We hope to receive more information from Treasury about the size and nature of the benefits packages, which we consider will present a clear opportunity for other sites in the UK.

JOHN WOODCOCK MP: Is this an accurate assessment of the evidence that you have given: none of you are saying that West Cumbria is necessarily completely unsuitable, and therefore it becomes an argument about what the best sequencing of events ought to be - whether Cumbria ought to go forward into Stage Four of the process now, or whether there ought to be an examination of other sites. But from what I have heard, there is not a question that Cumbria is de facto unsuitable at this stage?

PROF STUART HASZELDINE: No - I am saying that West Cumbria is de facto unsuitable. We have heard both from Dr Dearlove, geological advisor to the West Cumbrian MRWS Partnership, and in March 2012 from both the Inspector and the technical assessor of the original Nirex inquiry, that in their terms, “the prospects of finding a suitable site in Cumbria are low).

JOHN WOODCOCK MP: Can I check this, as I may have misunderstood. Clearly you have severe doubts and it has been helpful for me that you could spell out those doubts. I thought there was something of a consensus across the panel that the level of work required to test your thesis has not been done. I understood you were arguing that a better use of public money might be to put the money to use in other sites.

PROF STUART HASZELDINE: I would like to nuance that back to you as “we should now spend time and money looking for other sites as a Plan B and Plan C in case Cumbria fails”. However, I am also saying that we do know enough to exclude Cumbria as Plan A, as the detailed geology of the coastal zone, deep water flow, and rock formation is known well enough to know this would place all the onus on engineering a solution.

BRUCE MCKIRDY: I disagree. I consider there is a reasonable prospect of finding a suitable site. I am not arguing that West Cumbria is definitely suitable, but it presents a sufficiently reasonable prospect to look further.

PROF BRUCE YARDLEY: I think the prospects are reasonable in Cumbria, but there could be better prospects elsewhere. However, I would like to see a stack of waste canisters left in the middle of Parliament Square to remind
you that we do already have this stuff – it exists now and we do need to
do something about it!

RORY STEWART MP: Do you agree that as a fundamental part of our ability
and the public’s ability to assess the process there needs to be more
transparency about the criteria against which the region will be assessed?
This is not just IAEA guidelines but details of what kind of complexity of
rock, what speed of water flow, what volume of water, we think would be a
problem. As we have identified in this discussion, we cannot rely entirely
on engineering; we know this will eventually collapse. The only way we can
progress this is with clear criteria against which we can balance and
assess the research conducted.

BRUCE MCKIRDY: I absolutely agree on the need for transparency and an open
process. I think we need to avoid artificially-derived numerical criteria,
although during the process we do need to be very clear and open about
what research is being done, what conclusions have been drawn from this
research, and why those conclusions were reached.

PROF STUART HASZELDINE: I agree that we need criteria. We also need a
critical friend or critical voice\(^6\) within the process: all my work and
that of Professor Smythe to challenge the process has been self funded,
which means there has been no real critical friend or independent voice to
speak against and challenge proposals. There are very clearly better areas
of geology, which could perform better in the UK. I consider that DECC as
representing the UK public has not performed its duty in finding an
adequate number of sites to consider.

PROF BRUCE YARDLEY: Yes: it will be difficult, but I do agree that the
public needs to be told what the criteria are and how the investigations
in West Cumbria are being benchmarked both against other hypothetical
sites, and against the present risk that exists with the current surface
storage of waste.

JAMIE REED MP: I believe that many of my constituents are actually
insulted by the scaremongering that has gone on, which implies a grand
conspiracy to implement the repository project. I consider that Section
Six of Professor Haszeldine’s submission contains a series of false
assertions. You said that you can speak for Professor Smythe, who writes
in his submission that he has direct experience as a BGS scientist of
being forced to publish scientific papers that he didn’t believe in, but
that he was forced to do this by the Department of Energy. Do you actually
believe this kind of thing is still going on? Do you believe that my
constituents, trades unions, NDAs, and myself actually want to site the
repository against our own best wishes in geologies we know to be

\(^6\) Professor Haszeldine has clarified that he considers such organisations which represent the public
outside of the developer’s control, are funded in France (CLIS) and in Sweden (MKG, Swedish
Radiation Safety Authority) with several millions of pounds each year.
unsuitable? Do you believe that a British Government of any colour, the British State, would wish to site the repository in a region where it is fundamentally flawed?

PROF STUART HASZELDINE: I believe we have been able to explore that issue without the emotional terms you are using now. We clearly need a site, but we need to achieve good value for money for the UK as a whole. What we have now is the first two communities to volunteer, but we know that there are better sites in the UK. The UK Government should be actively working to encourage those communities to engage with the process, and in other countries this engagement has lasted for much longer - for many years. We need to make sure we have a good spectrum of choice. At the moment, by analogy, we are not sure which brands of soap powder we are choosing between, or even if we have a choice at all. This is not a satisfactory way of proceeding.

BRUCE MCKIRDY: We do not see these activities as mutually exclusive. We have been clear that we want to examine the West Cumbrian geology in more detail by entering Stage Four of the process, but in parallel DECC wants to look around the rest of the country. And that is the plan for proceeding.

PROF BRUCE YARDLEY: You will see that there is a remarkable amount of agreement here, despite our different positions. This highlights that we need more opportunities for people to sit face-to-face, or shoulder-to-shoulder, and discuss this to better understand our sticking points. Of course Government can be seen to be out to get us, but that is always the case!

SIR TONY CUNNINGHAM MP: Can I ask each panel member to briefly sum up their position please?

PROF STUART HASZELDINE: I would like to formally rebut Jamie Reed’s assertion that Section Six of my submission is incorrect: I do consider this statement to be factual. I would note that the process today has surfaced many issues that the MRWS process did not manage to surface. I consider that the public should be informed and represented by impartial advisers on this issue – and it is not always clear who “the public” are, whether this is communities, councils or other groups. I believe we need to survey the whole of the UK to seek alternative regions in which to engage with the public. Much of this work has already been done in the 1970s and 1980s and would require trivial additional work. The NDA say they are supportive of this work: therefore, why should we rush into spending £40 million when we could instead go to other communities to begin a dialogue on this issue? It is clear that West Cumbria is not a geologically suitable setting. It is clearly a setting that would rely heavily on engineering, and lead to the technical discussions that would arise from that - resulting in questions and issues of “my number or your
number?”. For example, we know that the height of the wall protecting Fukushima from a tsunami was judged to be adequate by engineers, but then this later failed. Relying purely on engineering in a repository puts us in that position again. I consider it would be premature and wrong to go to Stage Four of MRWS process in West Cumbria.

BRUCE MCKIRDY: I believe it is appropriate and entirely reasonable to proceed to the next stage. We know we have the information we need; let’s now look at it further. We should be able to look at Professor Haszeldine’s claims and also look at other claims. At the end of the day, the independent regulators will be the arbiters of this. We should remember that Stage Four is only about finding out more, and communities retain the ability to withdraw at any stage of the process if they so wish.

PROF BRUCE YARDLEY: There is a case that there could be suitable sites in West Cumbria – but there also might not be. Given that uncertainty, there remains a case to continue to look for suitable sites elsewhere. But I consider there is a reasonable chance of finding a suitable site in West Cumbria.

SIR TONY CUNNINGHAM MP: Thank you all. My colleagues will know themselves we meet regularly and it is often the case that when we meet, one or two of the MPs is unable to attend, so for the six MPs here present to all attend a meeting is a sign of our great engagement, and we are very grateful. Thank you for taking the time and trouble to join us.

--Meeting ends--